

ROME 1480

Between Fact and Fiction: Configuration Theory

(Revised Version of *A Model of History*)

Staale Sinding-Larsen

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Per Clarice ed Emilio

da Mormor e Morfar

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Corrected in May 2016.

A special recognition of the helpful and advisory role of Chief Engineer *Knut Rø* at the *The Norwegian University of Science and Technology* (NTNU, formerly NTH, where I worked for thirty years). His continued support has always been of great importance for my work. And our friendship a stimulation.

This being probably my last book, I want to renew my expression of gratitude to my first teacher, Prof. *Ulrich Middeldorf*, director of the German Institute in Florence, then in the Palazzo Guadagni in Piazza Santo Spirito. He tried to teach me to bring my ideas in some manageable order (I hope he succeeded to some extent). Later, *Liv* took over the teaching job.

And when I studied history at the University of Oslo, we had eminent scholars to teach us: *Arne Ordning*, *Sverre Steen*, *Johan Schreiner* and *Jens Arup Seip*, and the unforgettable *Max Brünn* (who left us too early in an accident on a German Autobahn).

There are others to whom I owe a tribute.

Colgo l'occasione, nel pubblicare questo libro, di ringraziare profondamente nostri cari amici a Roma, Paola e Paolo. La Dott.ssa Paola Nunzi e Paolo Celotti, Giudice Emerito di Corte d'Appello, hanno, durante i decenni passati, tutti e due insieme e separatamente, portato a noi, Liv e me stesso, tanta ispirazione ed essenziali contributi alla nostra conoscenza di letteratura, arte e politica in Italia.

In this context, a true resource person has been the late *Richard C. Trexler*, of SUNY at Binghamton, NY. At a congress in Strasbourg in 1985, he accepted and endorsed some ideas of mine (vectorial, "directional" perspectives rather than conclusions) and thus gave me the first push in the

direction in which I have tentatively worked since the early 1980s. He left us too early, but his work remains among the crucial ones and is exceptionally inciting, both for their substance and for their theoretical and methodological acumen. In fact, he wrote, among other things, two works on apparently so different subjects as these: *Public Life in Renaissance Florence*, and *The Christian at Prayer. An Illustrated Prayer Manual*, on a ms in several copies attributed to Peter the Chanter, who died in 1197. If my present work can contribute to calling attention to Trexler's works, then it has been useful.

To our friends *Razi Kalbe Naqvi* and *Najmi Abbas* we owe not only inspiration in a wide range of concerns. Their friendship made us feel at home with our new life in the northern town of Trondheim (site of our *Institute of Technology*).

Liv Erstad (S-L), who left her lecturership at Göttingen University to transfer to Rome, has followed my argumentation with her usual sharp observation and wide perspectives all the time. She regularly contributes with her acute comments and sharp questions. So in many respects my works are co-productions. Thanks, Liv! *Senza di te, niente.*

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REFERENCES

To simplify, I will refer not to pages (somewhat shaky in an Internet publication) but to internal subdivisions determined by the *FrameMaker* distinctions of H1, H2 and H3, such as respectively 1 (for *Part*), 1.3 and 1.3.1.

The numbering of *Figures* (Fig. *n*) go by *Section*, not *Subsection* (1.3, not 1.3.1).

References to authors, *Sections* and *Subsections* are made with asterisks: Herbert *Lindenberger; *1.3, *Living in the City*. Authors cited without the asterisk are listed in SL, *Burden* and/or *Patterns*. In many references to the present book, I shall simply say *local*, *locally*.

Some Anglo-Saxon readers could resent my relatively lavish use of quotes *in German* (though I do translate the more demanding ones). It is their option, really, to stay inside or outside of one of the two or three main European languages in wide and very active use in culture and scholarship (to say nothing about an enormously rich literary tradition in prose, poetry and for the theatre).

The book is a *ballon d'essai*. I am aware of a number of imperfections, and hope that Readers will alert me to more of them, to the advantage of a revised version planned for 2015 (accompanied by the extension on Tacitus' *Annales*, announced in *Section 3.5*).

1PART 1 ROME IN STATUTE AND CHRONICLE

1.1 *Configuration Theory*

The primary object of my visit to Rome is pope Sixtus IV's bulla of 1480, *Etsi de cunctarum*. Next, the first sections of Tacitus' *Annale*.

A definite goal, however limited, requires particular preparation on the part of the visitor. Involved with an urban statute, that is, a law document aimed at handling such complex matters as a large city, and the center of the Catholic world, some theoretical preparation is indispensable, on top of the relatively modern awareness, that we never enter a situation without some predictive ideas (Einstein, Knorr-Cetina and her colleagues, Gollidge and his group: to be cited as we go on).

1.1.1 *Opening the Book*

A Model, in the singular, in the title of the book simply means to say that it would be absurd to pretend to having found or developed a general model

of absolute validity, coverage and application. The book is one model, with a number of subordinated models.

Launching my *Configuration Theory*, pretends to nothing more than suggesting a way out of the *impasse* represented by some standards in the traditional Humanities, and to develop further the idea of interdisciplinarity - or *open_source work* (Webster, 3 *configuration: a geometrical figure usually consisting of points and lines and the points, lines, and planes which may be derived from them*).

The entire book can be regarded as a macro *Cmodel* (*C* for *configural*, my name for the metaphorically, non digitally, operative graphical models in use here), a statement of theory, a basis and test for the applications. Using distributive patterns of graphical models as the basic method, combined with verbal description, offers the advantage, as Richard *Skemp stated, of *showing structure* (*The Psychology of Learning Mathematics*).

Such structures represent tools for handling, controlling and criticizing the proposed observation and argumentation and units that are compatible and comparable, while facilitating communication, making the reader always know where she or he is in the discourse.

Of course any amount of verbal discourse can be appended to the patterns of graphical models, thus with a *structured model anchorage*.

I am not going to labor the issue of verbal approaches, except implicitly in my discussions of the subject of history (*2.1 to 2.3), while concentrating my efforts on graphical models, the building and handling of which represent the frontline concern in the present book.

In this sense, the book is premised on what I have called *bi-track work* (*4.4, *Bridge and Bi-track*), visually distributive charts and models operated in connection with verbal ones. In *Part III*, then, 3.3, *Loading Sixtus into Models*, is accompanied by 3.3.1, *Reading about the Popes*.

Were I to suggest a *conclusion to the book as a whole*, it might go as follows.

History writing as we know it, defies classification, and should be evaluated far beyond the academically accepted traditions (**Part II*). But critical assessments of the area are often not very efficient. Evaluating the field *from the inside*, terminologically speaking, in the normal prose used in the history writings themselves, is not sufficient.

I will appeal to what I am calling the *pseudo-Gödel* paradigm (Kurt Gödel. 1931), *reflecting* the notion of the *impossibility to prove consistency <in a system> without using methods from outside the system* (**The Math Resource*). We have to find at least one tool that lies outside, and *graphical models* are one of them, being definitely external.

There are alternatives for reading the book.

1. It is more adequate for using than for reading. The detailed *Table of Contents*, with all the *Figures* indicated, should facilitate the consultation.
2. *Speedy González* can pick up the essential message and method in 3.1, *MODEL DOMAIN AND ROADMAP THEORY*, and, if tempted, also in 3.3, *LOADING SIXTUS INTO MODELS*.
3. Wanting the book in a nutshell, then visit *Hardcore* and *Softphocles* in their cages, with a nut which is out of their reach (3.6, *TWO RATS AND A NUT*, with the book's single picture, designed with a *CAD* program).

The somewhat unusual character of the book requires a rather extensive *Introduction*.

I am not after "truth", whether this means analytically or historically (in which context the truths can be markedly different, as we know), merely searching for ways to do things in mentally and argumentatively manageable ways, opening up, as I hope, for going further (see also SL, **Operational Determination. Math in buildings and math statements about them*, at this *Internet site*).

My focus is not on substance, volume and hypothetical completeness, but on the theoretical, methodological and experimental processes we can develop and pursue on retrospect matters, sharply distinguished from the cases when historiological approaches are applied to forecasting with a view to planning, even though ideas from the *Social Sciences* do play a supporting role.

Starting from a case, we have no rules to tell us how far out we should go. The available data and info are arbitrarily known; all our history-writing is condemned to being piecemeal. The decision is ours, one as good as the next in terms of completeness. For this very reason, we can hold that work on theory and methodology is the only definite option we have, in case we should feel we need a somewhat reliable platform.

Thus, the crucial idea for the entire present project is that the only reality (above trivial levels) to which we have access, is our own conceptions as we understand them and write them down or, as locally, set them down in models. To the extent that we are encountering what can be taken as objective or factual reality, we have to accept as fundamental a degree of *indeterminacy* (*2.5, *Indeterminacy a Resource*), reflecting this notion as it arises in modern Physics.

The book, at least in the present provisional version, develops by a mixture of systemic procedure and jumps. I do find, however some consolation in the *Introduction to Modern Physics* (p.131) by **Richtmyer et al.:* *Confusion usually reigns while important physical advances are being made; it is only afterward that a clear-cut path can be laid down leading straight to the goal.* But I do not even have a clear goal, only a path.

The core of the present book can be stated in few and simple terms: testing the capacity of graphical models, non-digital ones that I call *Cmodels* or just models, as reflections of digitally runnable models, expressing usefully theory of analysis regarding soft material such as historical events and processes; specifically the bulla *Etsi de cunctarum* of Pope Sixtus IV, of 1480 and the first eight paragraphs of Tacitus' *Annales*.

My program, then, is to *see how far graphical non-digital models (Cmodels) can take us.*

A *model* such as discussed and tentatively applied in this book, cannot be defined for what it might *be*, only for *how* we can work with it. By loading items into a verbal or graphical structure, we can develop, specify, illustrate and explore the structure so that our documentation or ideas can be traced and followed up through some specific pattern which, as with theories for starting off an argumentation (following Einstein: *theory first*), makes one's hunches and ideas manageable and reportable.

Studying a document we recreate it; most documents of some complexity can be read in several fashions and contexts, narrow or wide, as we find natural. *We* possess the scale by which to measure them, it is not *there*.

The new digital culture will slowly change attitudes and procedures, making process, analysis theory and technique, rather than "conclusions", relevant for financing and jobs and for measuring institutional "progress". Trying to implement such a program will involve complexities.

1.1.2 Position at Noon

There are some fundametal principles supporting the present book:

1. Being *process-oriented* rather than result-focused, not pretending to "conclude";
2. awareness of the *contemporaneity* and *momentaneousness* of whatever we perceive or write (even depicting a "story" will make it so in our models);
3. awareness not only of limits but also *limitations*: where do we have to stop? (taking a teaching from Rudi Paret's *Die Grenzen der Koranforschung*);
4. applying the *Open_Source* (or interdisciplinary) procedure (*Fig. 1.1.1);
5. using *Graphical models (Cmodels, from configural)* integrated with *verbal models*, considering the latter as attachments to the graphical ones.

I want to *understand* the documents, for now a simple *statute*, later a *chronicle*, and the contexts out of which they arose. By understanding I mean to be able to *position models both verbal and graphical in some system*.

Pinching the title from Eric Linkater's hilarious fictional family history, *Position at Noon*, simply means that, like the *Observer* on the diagram (Fig. 1.1.1), I shall be testing a program for a unified vision of the *hard* terms as well as the *soft* terms.

The graph gives a crude, provisional picture which should be refined as substantive work proceeds, I am trying to be finding myself at the midpoint where the curve tips over, hoping from this position to get a view of two environments meeting there that are different but which I shall be trying to connect by the trick of elaborating theoretically the history field.

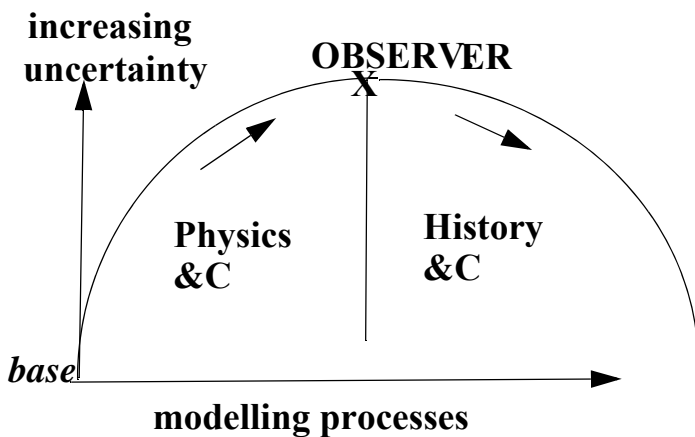


Fig. 1.1.1. *Position at Noon: Diagram of "Interdisciplinarity"*.

Sticking to the simplification of the diagram, one could, at least for a start, note as follows:

Science: historically starting from the solid base (with proofs etc.), the field

has moved steadily in the direction of indeterminateness or Indeterminacy (a subject for this book). *History*: as a field, as I see it, and will try to show in Part I, is traditionally vague in its methods and evaluations. My proposed injection of graphical models next to the verbal ones, is an attempt to provide the field with a firmer base.

A system reproduces a *structure*, making it dynamical as a whole and/or internally (Fig. 1.1.2. *System Embedment*). All values will bring with them verbal components, but only in one interconnection do they dominate the flow between the system and the soft values (in the links *system-verbal-soft*). The difference, never too precise, to tell the truth, between hard and soft, will emerge gradually, since it is a dominant concern in the book (4.3, *Soft Values facing Hard Ones*).

To characterize the position and role of my *Cmodels*, to be distinguished from illustrative *charts*, we can say that they are lodged in memory and not in any hard system. They serve as place-markers or mental maps into which to lodge, in metaphorical or attributed sense, our records and

arguments. This also applies to the bearing system, which consists of the notions developed here.

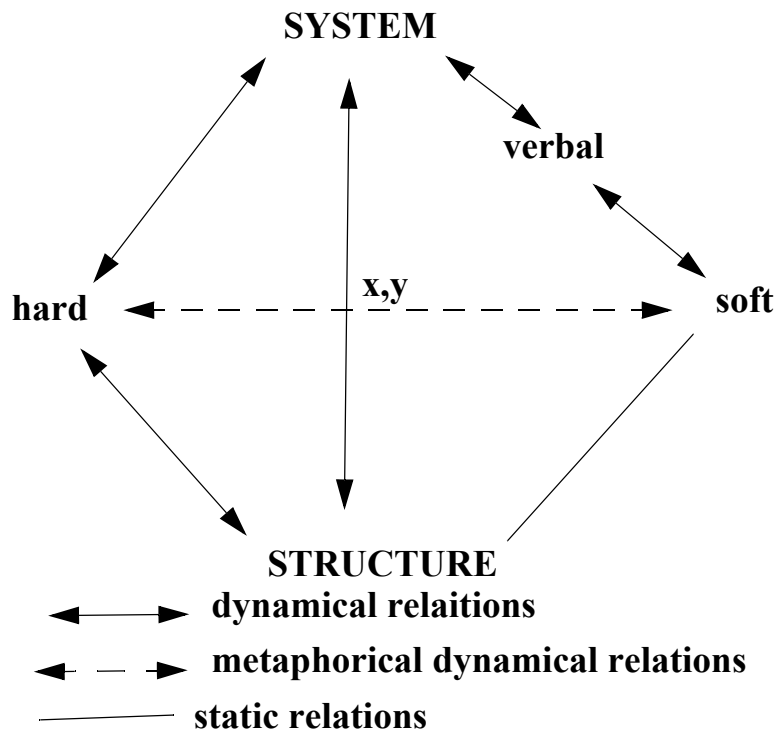


Fig. 1.1.2. *System Embedment*

A continuous prose account usually focuses on subjects of special interest (to keep the publisher content and give the reader something useful and capturing). Graphical models do not represent continuity directly and to show differences in weightages, we have to distinguish between the types of

models, not positions along a flow of argumentation.

The entire book should be regarded as an *encompassing theory*, inside of which other theory levels are developed (Fig. 1.1.3, *Framework Theory*). In 3.2.1, *Four Theory Levels*, I describe the *four levels* of statements and argumentation in the present book in the following terms (here abbreviated). They are: 1. *Incipient Theory*, 2. *Elaborative Theory*, 3. *Encompassing Theory*, *Focus Theory*. The entire structure of the book represents the framework theory, subordinated under which are the specific theories. The book as theory can be illustrated with a chart (Fig. 1.1.3, *Framework Theory*).

The idea for the *chart of the book* derives from Von Weiszäcker's *Das Gefüge der Theorien* in his *Aufbau der Physik*. Connecting two or more models in a group opens our scopes but at the same time discloses limitations and creates problems, some of which can prove productive by provoking us to reconsider some situation or argument (saying things like this gives me an unpleasant feeling of trying to teach my colleagues about elementary truths, but i have to say them to make my argumentation as complete as possible).

Even a small battery of models will therefore usually cover a much larger field than is in direct focus for the researcher or characterizes the document on hand. Undercurrents and peripherals culled from the model

and its context can arise and alert us to further search. Next, the model will tend to place us under obligation to follow up what has been initiated or, indeed, also where a field is left blank while apparently somehow connected with one or more neighbors.

With designed models, we have to make decisions on where to place a specific item, and, having it there, can later alert us to errors or inadequacies and suggest improvements. An even a minimally consistent abstract model can turn out to have field that, at least temporarily, have to remain empty.

The *chart* in Fig. 1.1.3, to specify further, depicts the main items in the book and their interrelations. The drift of the chart is to illustrate schematically the character of the *present book as a whole* as a model or frame that is expressed in the *TOC*, incorporating the entire chart, and containing several lower-level graphical models (such as the *Cmodels*). It is not "complete" (whatever that might mean). The chart could have been developed further, but is being left in an incipient state.

Models, speaking now of graphical ones, put before us a limited but conceptually clear survey of alternatives; while, just because of this advantage, the models set limits and limitations to what we can do: borderlines that are rarely notable in verbal accounts. Such a *Cmodel* operation will often lead us to revert to a preceding model, and we have feedbacks that prose writing only offers through the pen of the critically inclined reviewer. Loading items into some graphical pattern will also help us to see and alert us to the potentialities of the model structure itself.

Graphical models also can illustrate and alert us to processes in time as well as logically, because they mark positions in several interconnected places. With models we can establish *storage* in which to lodge environment data that we feel belong without have a clear idea about *where*.

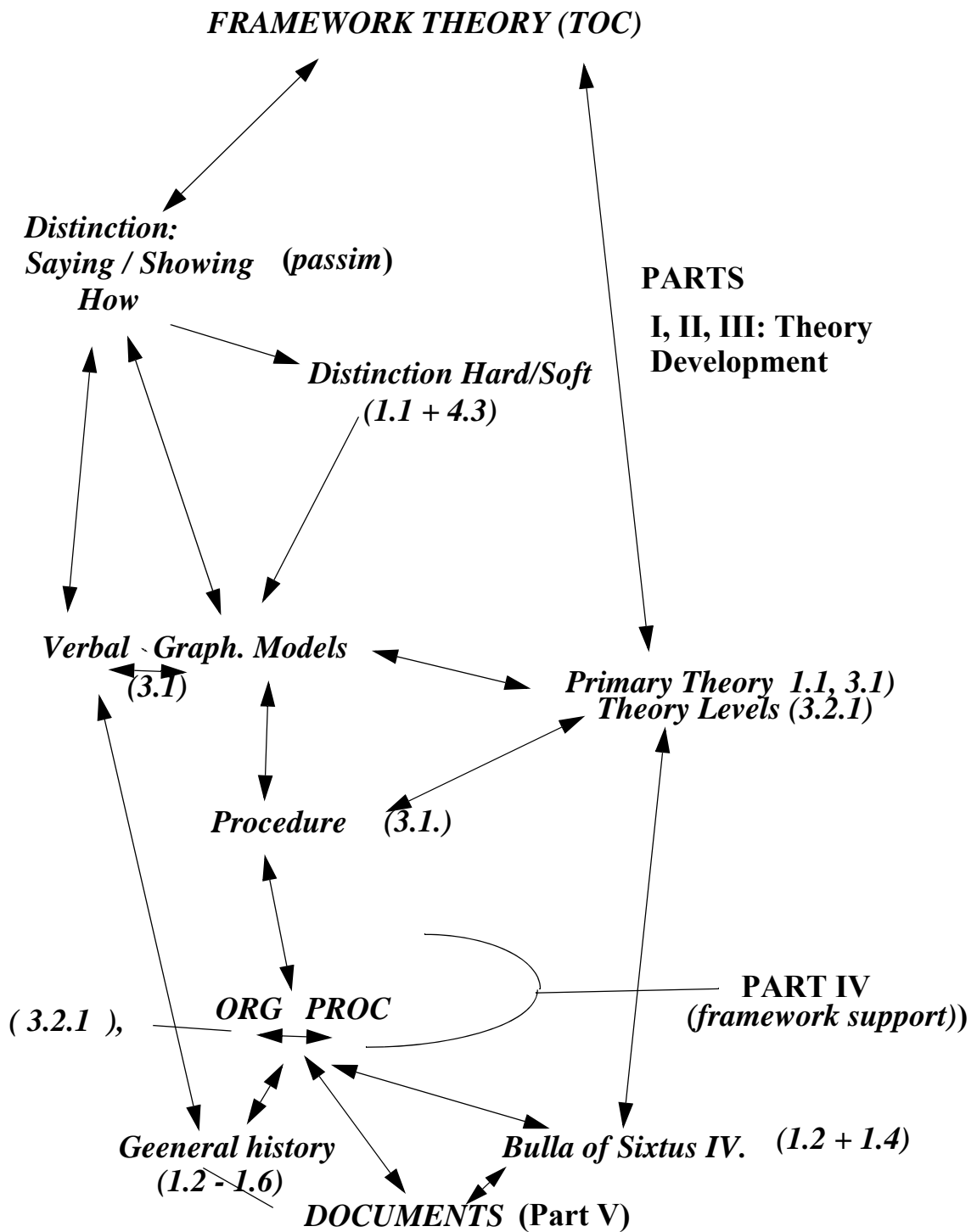


Fig. 1.1.3, Framework Theory (TOC = Table of Contents. The figure is of limited application, aiming at indicating, none too precisely, the range and scope of the book.

Thus my central concern is to explore the tools through which *Soft* and *Hard* argumetation can meet. The classical criteria for models are stated in the following terms by *Eves in the context of *mathematics*:

A model of a postulate set... is obtained if we can assign meaning to the primitive terms of the set that convert the postulate into true statements about some concept. There are two types of models - concrete models and ideal models. A model is said to be concrete if the meanings assigned to the primitive terms are objects and relations from the real world, whereas a model is said to be ideal if the meaning assigned to the primitive terms are objects and relations adapted from some other postulate system (*Eves, p. 155).

When gradually the active models have been elaborated up to a certain point, elements in storage can be activized in turn. Try to send in a written text and tell the publisher that chapter *n* maybe will turn up useful later on.

Having opted for the *bi-track* procedure means combining verbal and graphical models metaphorically, that is as *models (or in terms of images)* interactive, working in parallel (*4.3, *Soft Values facing Hard Ones*). This option is pragmatcal and defensible only in terms of its *strategical structure reflection* from the hard to the soft evidence, program or parameter, avoiding the issue of right or wrong and instead agreeing with Giovanni Papini: preferring *verità provvisorie ma operanti, all'ebrezza delle parole ipersatratte* (De Finetti, p. 13: preferring truths that are provisional but working, rather than the inebriation from hyper-abstract words).

One item that has been bypassed entirely: so-called *mental states* (consult John Searle and others). Were I to try my hand on that, the outcome would have been a clumsy imitation of Don Quijote's battles with his fancies.

My models are not out to show by what kind of mechanism or apparatus humans think, only to *illustrate and handle* the *processual products* of hypothetical thinking, and especially how to relate them to Science models. How else could I try to handle such a vague issue as history writing? I am sure one can idenntify weak points, even dubious foundations, in my argument, but on a pragmatic level I want to see how far it can take us. To repeat: I am at the laboratory bench.

Under these condiitons it is necessary to follow the idea of *maximation* (SL, **Patterns*): elaborating data and information on models, we have to maximize both the capacity of the models *and* the possible and likely categories of material to enter into them, accepting the blank spaces that will show up in them. Fig. 1.1.4, *Interrelated paradigmas*, illustrates likely or possible network connections or implications of the models.

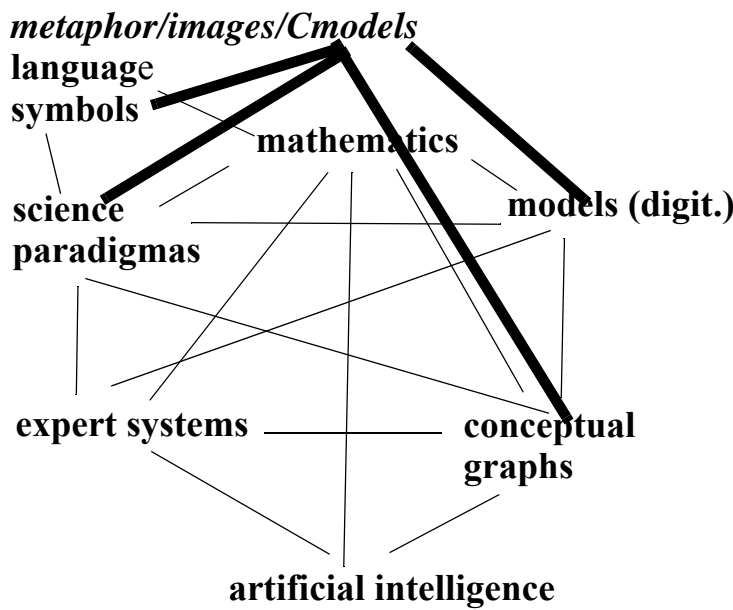


Fig. 1.1.4, *Interrelated paradigmas (on expert systems there is a vast literature, to which the reader is referred),*

I shall apply so-called *Object Orientation* to the issue. The crux of the *Object approach* is to ask, not what a thing is, but for a list of some of its characteristic features or attributes, and then ask for the methods considered

adequate for *handling* them. I do not ask, what is a ritual? (SL, *Burden, *passim*), knowing only too well that attempts at definition here would either be superficial or take us for a ride. We are asking for the system's ingredients *and* characteristic functions and active factors in a ritual process and how to handle them analytically in a way that highlights the apparently important features in their functional interplay. I wouldn't "cover" anything, but I might pick out significant features in the dynamic relevance pattern. Thus, quoting from the publications just listed (details: SL,*Burden, IV, 5.2, with further references and slightly different conceptions), Objects will be embedded in systems and will themselves embed systems. This is the idea of *Object Orientation*, a paradigm more carefully considered in SL, *Patterns (4.3.4.; further on *objects*, *Krakowiak, pp. 73f.).

Another factor in the *integration of models with systems* is the one labelled *emergent properties* (SL, *Patterns, 4.3.4).

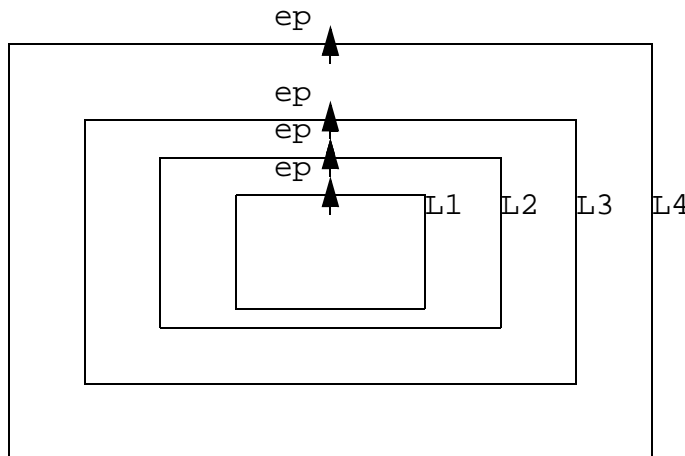


Fig.1.1.5, *System of Emergent Properties (after Hitchens). Four levels, from each of which properties are "emerging".*

If an object, a system items or a process like a

ritual, is highly complex, there are the so-called *emergent properties (EP)* (Fig. 1.1.5). Most systems are conceptually endowed with significance that means more than the sum of the parts. For such occurrences the somewhat disputable term, *emergent properties*, is widely in use (SL, *Burden, V, 2; also regarding the closely related issue of *Object Operation*).

Any complex system, and there are few that aren't, can be described as consisting of a number of sub-systems, like a Chinese box. Herbert Simon can be quoted for an introduction.

*In a weaker interpretation, emergence simply means that the parts of complex system, have mutual relations that do not exist for the parts in isolation. Thus, there can be gravitational attractions among bodies only when two bodies interact with each other. We can learn something about the (relative) acceleration of binary stars, but not of isolated stars (*Simon, 1996, 170ff.).*

The idea is important because it teaches us, including the Humanities, not to take the *systems issue* too lightly.

Concerning agent-oriented and emergent view of intelligence, Luger writes (SL, 'Burden and *Patterns): *Finally, the phenomenon of intelligence in this environment is "emergent". Although individual agents are seen as possessing sets of skills and responsibilities, the overall cooperative result can be viewed as greater than the sum of its individual contributors. Intelligence is seen as a phenomenon resident in and emerging from a society and not just a property of an individual agent (Luger, 18ff.).* Hitchens (104f.) offers the following examples of how a "containing" system is related to the emergent properties of some subsystem; aircraft or ship related to engine; company to division: *For example, an aircraft or ship 'sees' the thrust, weight, fuel consumption, heat dissipation, noise, etc. of its engine - these are engine systems [a subsystem's] emergent properties. A Company or organization 'sees' divisional profitability, operational costs, work-in-progress, enthusiasm, resilience, etc. - these are divisional emergent properties.* Steve Weinberg (29ff.) gives another similarly construed definition of the buzzword 'emergence'. *As we look at nature at levels of greater and greater complexity, we see phenomena emerging that have no counterpart at the simpler levels, least of all at the level of the elementary particles [in physics]. For instance, there is nothing like the intelligence on the level of individual living cells, nothing like life on the level of atoms and molecules... The emergence of new phenomena at high levels of complexity is most obvious in biology and the behavioral sciences... <but> it also happens within physics itself ...*

Focusing on how we do things rather than how (and what) we are ourselves whenever doing them, I have relied more on engineering than on cognition and the rest in the vaguely interconnected paradigms. *Chalm-

ers notes (p. 4): *Trying to define "conscious experience" in terms of more primitive notions is fruitless. One might as well try to define "matter" or "space" in terms of something more fundamental.* So be it as long as we are staying outside of Physics.

We build or rebuild graphical models and graphs (for digitalization or just mental use and elaboration, as my *Cmodels*), and we load our items and thought programs into them. To develop this program we do not need the inward-looking cognition or the philosophical literature. We are better off with the literature on *systems, information and technological design and planning* (in addition to the publications cited *passim* here, see *Cor-mac).

Hence, besides systems (*4.6, *Systems and Networks*) and information publications, I have been influenced by, and used in earlier publications, such construction-oriented publications as those by *Gregory, *Dieter and *Jakobsen (with seventeen contributions).

Staying with *Jakobsen*, let me note a few relevant points - not directly transferable (of course) to my material and tasks, but as pointing out directions, to the extent that we can compare *model building to industrial design* and gain something from the exercise.

So-called *Abstracts* are often most useful, and Jakobsen starts his (p. 41 in the cited publication) with this formulation (with my numbers inserted), of the points he has elaborated on pp. 42- 44):

The requirement specifications are the basis for design of mechanical products. Their articulation and structure could therefore be of utmost importance for the success of the design. The author suggests that the requirement specifications are structured so that the [1] functional requirements, [2] evaluation criteria, and [3] boundary conditions are clearly separated... (after which he goes over to recursive processes that need not be considered here).

Regarding the [1] *functional requirements*, he specifies that these are *a list of the functions which are transformed into the attributes the solution should possess.* In the local (mine) context this can be reapplied in the following terms.

- (1) The configurations, when there are more than one of them, must be directly relateable to each other, either as a series or by being integrated (*3.1, *Model Domain and Roadmap Theory*).
- (2) The local *Part IV*, with a few additions from other places in the present book, provides such a list.
- (3) The *Cmodel* configurations represent, *simplifying and approximately*, such attributes.

Regarding the [2] *evaluation criteria*, Jakobsen notes that often *there exist more than one possible solution which satisfies the functional requirements*: therefore attention to the evaluation criteria.

The linking up or integration between two or more models can, in the local cases, be evaluated only by approximate or experimental criteria, not definite ones. In case of such complexity which can make understanding or survey too cumbersome, the given model must be available for dismembering or splitting up in sections.

Several point and models in the contribution by W. Beitz, pp. 9ff. in the *same publication*, can be seen as extensions, elaborations and marginal modifications of those in Jakobsen's paper. As with the latter, the function that Beitz calls the *working interrelationship*, of course is fundamental. In our local cases there cannot be any such correlation *except in terms of metaphor* or literary paradigms *compared for significance, not mechanism*, with the "real ones" (*4.3, *Soft Values facing Hard Ones*).

This observation can lead to another one, namely that there is "something" working between the soft and the hard approaches, and I would *tentatively* consider that as a factor of *virtuality*.

In the *Microsoft Computer Dictionary*, 5th. ed., 2002, we have the following entries (among 40 entries on *virtual!*) that can be of local use: *virtual*, *virtual device*, *virtual memory*. Let me limit the present view to the basic entry: *Virtual. Of or pertaining to a device, service, or sensory input that is perceived to be what it is not in actuality, usually as more "real" or concrete than it actually is.*

Technical information and explanation is to be found in *Sowa, pp. 305, 312 and, especially, 380; and in *Krakowiak, pp. 214f., 329 - 31, and 409. Webster offers two definitions, and I am going to stick to them: 1. *being functionally or effectively but not formally of its kind*; 2, *of, relating to, or being a hypothetical particle whose existence is inferred from indirect evidence.*

From these observations one may try the following argumentation (here, I am entering unsafe ground, asking the reader for assistance).

When I am reflecting on some event or thing, my brain (for what it may be) first retrieves such an *object*; next (usually immediately, but still there are two phases here), I form a mental or verbal or combined *dynamical picture* (an unstable one) of the object. In this passage I seem to have mustered, more or less comprehensively, mechanisms in my mental setup.

Let me suggest that these mechanisms correspond to a *virtual operator*. Not pretending to be, myself, particular in any way, nevertheless I am no less complex in my mental setup than other ordinary people. Therefore I will experiment and "install" the *prologation model* illustrated here (so

named after PROLOG, for which, *see SL, *Burden*) in Fig. 1.1.6) as representing the virtual machinery for my handling of the link between the *soft* and the *hard* programs or objects. Thus I assume that the path is as follows: *soft-prologation-hard*.

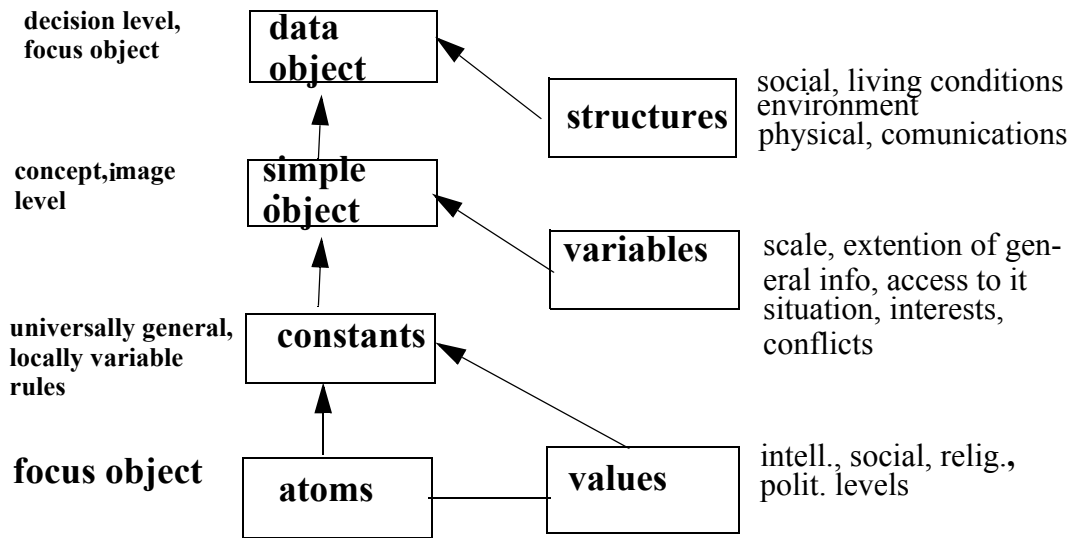


Fig. 1.1.6, above: *The "prologation" model or Virtual Operator, a crude model, starting with observation of selected object, and elaborating the experience in the ascending course.*

Starting out with a general *focus object*, the model will represent general characteristics according to the individual specifications regarding object observation, a *virtual operator*.

The model presented and disussed here is loaded with a seemingly limitless content. With all models of this type, the *maximation principle* (SL, **Burden*) must be observed in order to achieve a satisfactory scope, coverage and efficiency. Of course, in most real cases there will be reduction to a few basic items, with several even bypassed.

The idea here goes as follows. Our linking up the ORG model with the PROC model (or v.v.) (*3.2, *Elaboraing the Tools*), takes place on the *operational level*, the level of acting upon the models, in that each is designed for storing contents, and these contents are then considered as being linked up with one another, one with one or one with several, as on Fig. 1.1.7.

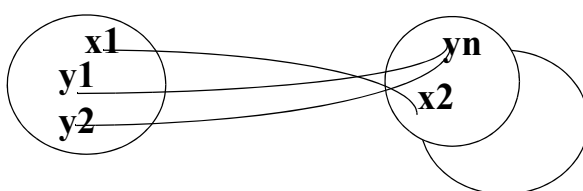


Fig. 1.1.7, *Linked sets.*

This linking up of the models pre-supposes but does not show a mechanism that works in the

background, a *mechanism establishing the links*, and that can be partly recordable or just to be inferred, such as the process illustrated in a maximized version in Fig. 1.1.6.

This experimental passage will now be left behind, and only the operational relation *soft-hard* be considered and applied. This relation can attain significance and be made ready for constructive argumentation provided it is embedded or otherwise related to *theory*, which will be developed on four levels (Fig. 1.1.8, *Theory Levels*).

We are guided by all sorts of ideas, from hunch to elaborated and focused theory. My focus being more on theory than substance, I have to realize that for the present assignment of analysing the papal document, I will have to apply *four levels of theory*. They come as in the list presented here and on the model in Fig. 1.1.8.

The Meta level is included in Fig. 1.1.8, for completeness while not normally relevant here. But it is always possible that the level may be relevant, whenever we claim some prime basic for the entire procedure (Personally, I am not going to sound such depths). The theory now in focus is intended to capture *soft* values and items and the embedment into Meta theory strictly speaking does not apply. It is included for two motivations. Some more or less definite or vague idea of a metatheory will often hover in the background. Next, it cannot be excluded that, under certain circumstances, a meta theory will be developed *post factum*, especially when the model and its connotations are being linked up with *hard* values. Theories here work both ways, forwardly ("advancing") and recursively ("returning"). The following syntax is not out to sound depths, but merely to illustrate a procedure.

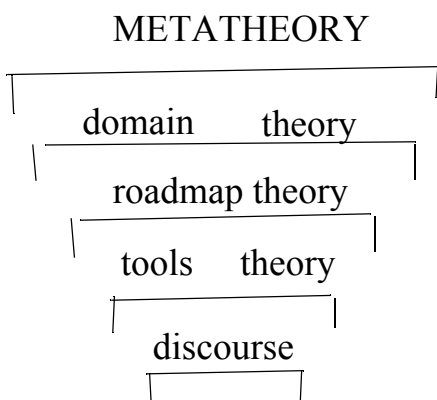


Fig.1.1.8 *Theory Levels*

Here are the parameters in the model, Fig. 1.1.8.

1. *Domain Theory*. By hunch, more or less vague ideas about my assignment and some knowledge about the subject and its historical environment, and some familiarity with model usage in various disciplines, I have developed *in gnereal versions* the PROC and

the ORG *Cmodels*. I let them, with their categorizations, advise me about my *roadmap*. We let our procedure be determined by the PROC and ORG models, a primary *operation* categorization directly, and initially, expres-

sive of *incipient theory*: the group of ideas, purposes, interests, aims, capacities and shortcomings that nillywilly operate in me and tell me, as Wittgenstein might say, *what I have to do*, and also what I am enabled to do. Behavioral patterns in humans, especially intellectual and mental ones, are highly complex, and the cited field of study correspondingly challenging. An articulate demonstration of this is offered by A. L. George and A. Bennett's *Case Studies and Theory Development in the Social Sciences*, Cambridge (MA), 2005.

Next, we have

2. *Roadmap or Program Theory*. Connected with the cited models, a program for analysing the bulla is being developed, and we are in the midst of it now. The subject is the elaborated and commented text of the bulla of Sixtus IV (1.4, *Dissecting Sixtus*). Then we have the

3. *Tools or Operative Theory*

In the book, this theory level is summed up with much of the list under the TOC (the *FrameMaker* table of contents); as well as the contents as scanned and separated out from the bulla: *content categories*; these categories can be culled from the *numbered version* of the *Category Provider* (3.2, §1). Together, these entries and mini-programs make up the operative context or environment for the program theory.

4. *Discourse or Focus Theory*. The parameters here are derived from the theories just listed, serving to explore some specific subject, and I have chosen a limited theme group in the bulla ({6} in 1.4, *Dissecting Sixtus*), the famous row houses (*case in serie*). To accommodate this on the PROC model, a box No. 8 has been added to Fig. 1.1.9.

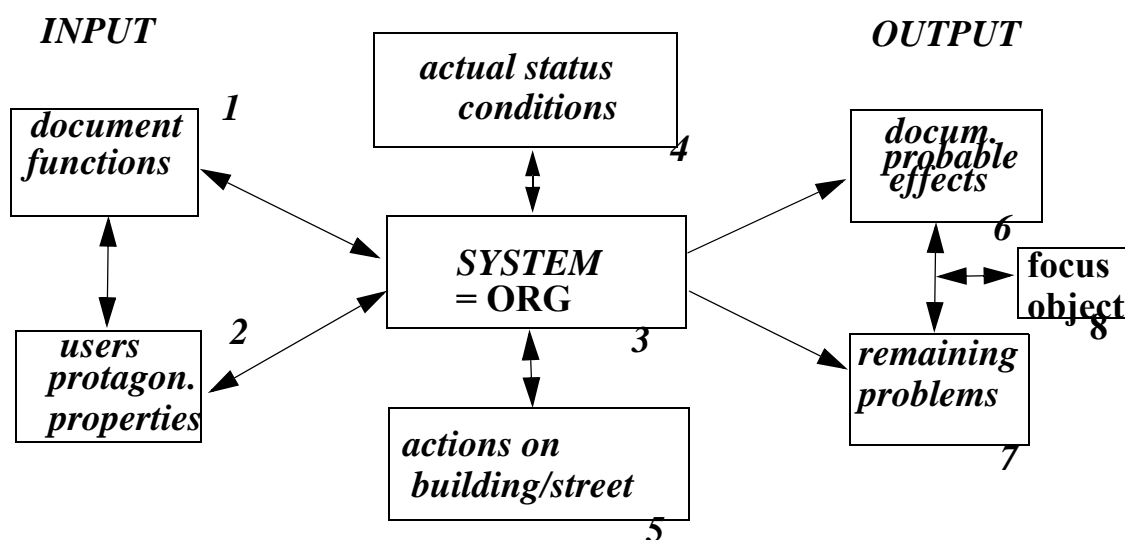


Fig.1.1.9, the PROC-with-ORG model with a box (8) - focus object - added.

The model and the list specifying the nodes in it need specifying some points made earlier.

It is true that the present discourse aims at supplying *soft* argumentation with support or reference bases from the *hard* ones; the *connection* being the paradigm. It is nevertheless also true that the predominant perspective is on the soft values. These two points should mean that I cannot directly adopt and use arguments from the Sciences.

To get out of the *impasse* I have to use *graphical, space-cum-subject distributive models* (here: *Cmodels*), rather than verbal means, as tools for recording and argumentation, with words in a subsidiary role.

Here we are concerned with operative, ready-for-use models in terms of contents to be loaded into them (*shapes*), not with the raw elements, defined by their basic *forms*, that go into such applicable models. They are designed for recording and discussing history issues, not for exploring my mind working with them.

An undercurrent in the present book is the notion that *soft* disciplines would gain on reflecting somehow the norms basic to the *harder* ones. But this should not deflect attention from the fact that even *Physics* is dominated by the ideas of *approximation* and *indeterminacy*,

My *soft/hard* terminology (* Fig. 1.1.2) is intended exclusively for the use, scope and coverage of the *Cmodels*, single or in group, not for contexts or historical or other substantive processes. Let me repeat that my debate concerns *models* directly and documents only indirectly, for I do not entertain the illusion that one can appreciate and evaluate a document directly, without any intermediate tool. Perhaps some intermediate factors reside unnoticed inside us, and models offer a means to bring out some of them.

Now we should be ready for facing the issue of decisions regarding the use of our models and the guiding they can offer. They are my motor factor. Clearly, any initiative, action or step is taken by decision rather than by deduction. Are there reliable and generally accepted rules for making them in such an environment as we are facing in this book? I am not so sure about that, and I do not pretend to advance original views about it. So we need some support from the literature for our grasp on this crucial and, in our cases, evasive paradigm.

Without trying to come up with new ideas especially relevant for the present task, I will refer to *Dieter.

Dieter, in his book on *Engineering Design* (pp. 141ff.), offers a synthesis of the program, which I now report somewhat abridged:

A decision-making model contains the following six basic elements.

1. Alternative courses of action ... a, b, c etc.

2. States of nature (environment of the decision model: normally out of the control of the decision maker).
3. Outcome, the result of an action and a state of nature.
4. Objective is the statement of what the decision maker wants to achieve.
5. Utility is the measure of satisfaction or value which the decision maker associates with each outcome.
6. States of knowledge is the degree of certainty that can be associated with the states of nature. This is expressed in terms of probabilities.

On this basis one sets up a table of parameters. Some math enters into game, e.g. regarding probabilities (detailed and articulated relation in *Davis-Olson, passim).

Having stated the salient points in my *approach theory*, let me face the more salient substantive matters.

On the Internet, one can do things that a publisher of printed material couldn't have accepted. Internet publication can freely use space, and I have shamelessly repeated, even closely, my arguments and figures wherever I found them useful, relieving the Reader of the trouble to wonder every now and then where the chap said that.

Publishing on the net, we seem to be in good company, for the *Vatican Library*, according to *La Repubblica*, 21 March 2014, employing a Japanese firm, starts digitalizing their enormous collection of manuscripts: 82.000 documents with 40.000.000 pages, 43 million billions bytes, at the stipulated cost of 18.000.000 €. I take this opportunity to extend my sincere thanks to the memory of the late director of that library, the unforgettable, highly competent and always helpful *Prefetto* Leonard E. Boyle, O.P, now buried in the crypt of San Clemente, Rome.

A necessary component in this process is, as hinted already, an operative conjunction between *Science* and the *Soft* disciplines, the latter reflecting some principles from the former. Obviously, this "reflection" is a critical issue. My subjects and themes are "critical" in a double sense: crucial for the entire enterprise; and developed for being integrated in an experimental research process intended to draw fire.

Not only will my *aims* be more or less deeply modified underways, but so will my *procedure and theory*, as a consequence, but sometimes modifications in them take over as the basic incentive. Nothing is "conclusive" here, and in support I will cite the subtitle of *Chalmer's admirable book, *The Conscious Mind*, namely: *In Search of a Fundamental Theory*. We are on the road, but which one?

My plan is to work my way through the "substantive" *Parts I, II and III*, and end up, in *Part IV, Framework for our Realities*, with their embedment in the larger framework.

More remains to be said about the production line of the book, which is twofold, *one* to create a sort of *laboratory condition* for my exploration; *two* that the road leading up to what provisional conclusions I might come up with, is *part of the same conclusion*. The first point involves *limitation* within set boundaries and exclusion of subjects beyond them, however interesting they might seem.

This condition essentially amounts to selecting one group of documents or evidence, in the present case especially Pope Sixtus IV's bulla *Etsi de cunctarum* of 1480, excluding from the purview the larger historical context, in order to validate coverage and efficiency of one's chosen method and approach, the focus being in theory and methodology rather than substance. This approach perhaps is a modern one, but Miguel de Cervantes applied it in his *Novelas ejemplares*, excluding from his compass everything but some essentials. Cervantes asked to be praised not for what he included but for what he omitted (*alabanzas, no por lo que escribe, sino por lo que ha dejado de escribir*), a typical aspect of modern model conception. The excellent literature historians, Alonso Castro in particular, who have written about this collection, were not familiar with the post-Herbert-Simon tradition and did not, as we well may, translate *ejemplar* with our term of a verbal *model*.

Speaking of *Pope Sixtus IV*, there is a vast material about his politics, both in general terms and in the economical one which I consciously do *not* use in my present analysis of his *bullae on Rome* of 1480. Liv Erstad S.-L. called my attention to a book in her collection, Lauro Martines (a professor at the University of California), *La congiura dei Pazzi, a translation of April Blood. Florence and the Plot against the Medici*, Oxford Univ. Press 2003, an exceptional study whose "moral" can be generalized, with politics in the centre. Here, Sixtus IV appears almost everywhere as the head of State he not only was but also considered himself.

Graphical models are especially comprehensive (can be made to be so) and effective. They must be designed and since they are made up not of lines of arguments but surfaces to be, tentatively, made significant, we will fill them up with what we think *should be there*, realizing Einstein's claim that theory must precede observation and decision.

In addition, a graphical model must be "*completed*", meaning by this that all we can think of as relevant (Wodehouse: *always think of everything!*). This means that fields remaining empty will expose our shortcomings or failing information. For example, we know almost nothing (as far as I am aware) about how and by what kind of people the papal bullas were construed, developed and edited; a circumstance easily submerged in a

written account but prominent in any sufficiently capacious graphical model of such a document.

While Sociologists scan people's reactions to their surroundings, students of history cannot do that.

Perhaps because of Descartes' insistence on the mind/body split and Antonio *Damasio's reputedly conclusive effort to integrate the two traditionally sharply separated entities (in his *Descartes'Error*), I have stayed away from *mind and cognition issues* (not only because of my low level of adequate competence). For I have gained the impression that the problem is relevant on a much deeper level than the operative one on which I prefer to work.

Some recent publications, however, take up certain *operative aspects of cognition*, and I cannot simply ignore them.

A few references can be made in the present connection. In addition to books by Bechtel/Abrahamson, Boden, Dennett, Fodor, Penrose, Winstanley and others listed in SL, **Burden* and **Patterns*, there are the following ones:

John G. Benjafield, *Cognition*, Englewood Cliffs (NJ) 1992; David J. Chalmers, *The Conscious Mind. In Search of a Fundamental Theory*, New York/Oxford 1996 (with numerous references to the role of *information*); Hörmann on the Philosophy of Language (*Meaning and Context*); Loewer and Rey on Fodor's ideas, in their *Meaning in Mind*; Katz on *Cogitations*; MacCormac, on *Cognitive Theory*; Minsky and Papert on *Perceptrons*; and John F. Sowa, *Conceptual Structures: Information Processing in Mind and Machine*, New York 1984, to cite the most important ones (as I have been able to evaluate).

Synthesizing *Meaning in Mind* (*Loewer et al), I am impressed by the rich gallery of important insights and ideas offered by various authors in this collection, but is the query properly framed? In some of the 14 contributions, the issue seems to be to search for evidence of "meaning" in something called the "mind"- widely discussed under endlessly different inputs. I doubt this, for I do not believe such queries can be answered without appending a great number of further queries. I would rather (and will) ask about the *How*, with the point of departure that the only access we can *describe* and to some extent *control what we are doing*.

But the volume is worth considering, for clearly some dynamics enter the game in several contributions, especially the editors' long Introduction.

Progress in a scientific or scholarly work in theory consists in the *problems* formulated and how they are can be handled. Conclusions, results or outcome are mostly vague and indefinite, most having been chosen among many alternatives, and not available for precise description and often

ininsufficiently informative. The best we can hope to gain from them is that they lead us on to other problems and further enquiries.

Consequently, the *graphical models* here presented and put to use are not to be considered as *definite* nor *definitive*. They are features in a process and should be modified, extended or rejected if, as I hope, the present experiment is being further developed and carried on by others than myself, perhaps in other directions.

The *basic program*, now to return to that, is to proceed on the principle of Operational Determination (SL,* *Operational Determination. Math in buildings and math statements about them*, on the present site), which means avoiding to be sunk in the quagmire of object identification, asking What? and opting for how we handle our objects and programs, asking How? Asking What is history or What Kind of history leads us into a never-ending rambling. An excellent work like Arthur C. *Danto's *Analytical Philosophy of history* (Cambridge, Engl., 1965) adheres to the "objective" tradition and fails to provide a workable methodology, at least by the criteria basic to the present venture.

But history writing is not one simple category, as we know. Some specific historical subjects offer more to go on, such as State constitutions, laws, political theories; generally, it seems, cases where written formulations provide a spinal chord while inciting us to look around for more.

Another relevant publication is Robert D. *Baird's *Category Formation and the history of Religions* (Mouton 1971). Of course, religion is one region accessible in terms of recordable texts and formalized rituals, making categorization a more promising prospect. But still, it would be an inadequate limitation to stop at that point. For there, too, the account branches out without definite limitations. To this comes our perhaps unfortunate tendency to see things in context, also by contrast. Hisham al Kalb's *Kitab al-asnâm (Book on Idols)*; ed. Wahib Atallah, Paris 1969), is out to debunk idolatry by explaining the confidence in idols in pre-Islamic society, but nevertheless is not understandable without taking into account the orthodox Islamic rejection of "anthropological" imagery. You cannot say *Yes* without implying *No*.

Conditioning the book as a *model*, a multi-faceted *shell*, expressed by the *Table of Contents*, encasing the *operative models* and their supporting programs, my intention, let me repeat, has been to work my way through the "substantive" *Parts I, II and III*, and end up, in *Part IV* with supporting programs. *Part V* contains the documents and the *Bibliography*.

1.2 *Planning for Society: Martin V and Sixtus IV*

This *Section* gives an overview of the documents-in-focus, the policies of the two popes, as an introduction to general considerations of perspectives and methodology. The bulla of Sixtus IV will be subjected to an initial text analysis in the present *Part* and explored in model terms in *Part III*.

There is some motivation for evaluating the two papal documents in one go. The Bulla published by Sixtus IV in 1480, *Etsi de cunctarum* (S.IV), obviously refers back to the one published by the first post-Schismatic pontiff, Martin V's *Etsi in cunctarum*, of 1425, a fact on display in the choice of incipit - *etsi in/de cunctarum*. The two documents give a remarkably clear view of administrative and urban issues; while, of course, not delivering everythings that modern scholarship would require. Both bear witness, by the directions they give, of the conditions and development potentials of the city of Rome at the beginning of the modern era.

The *Sixtine* bulla being much more elaborate and, since by 1480 the city had developed the most elementary features of a well-functioning urban structure, and because by that time real change in the professional world was taking place, this bulla will be our main concern.

As an introduction to the documents, I want briefly to illustrate the most important stages in the urban renewal of Rome shortly before and after the *re-establishment of the papacy in the city in September 1423*. For more information, please consult SL, *A Tale of Two Cities (T2C)* and the literature cited there. Pietro Tomei and Torgil Magnusson give numerous references to urban statutes regarding Rome even before the fifteenth century, but their focus is on architecture rather than urban scenaria and amination generally speaking (*the additional bibliography in 5.3 and 5.4). *The book*, even after all these years, is still Ludwig von Pastor's *Die Stadt Rom zu Ende der Renaissance*, Freiburg i. Br., 1916. That the greatest expert on the papal archives and documents also was exceptionally alert to the physical-architectural image of Rome, tells something about the cultural standards before the era of specialization.

The reader will soon note that the material presented in this methodological experiment, does not amount to a substantial study of urban issues. I have omitted reference to important studies, such as those by Re, Tomei, Magnusson, Urban, Frommel, all referred to in SL, *T2C*.

There is a recent volume exceptionally concentrating on economic, social and political issues in Rome: André Vauchez (ed.: there are 13 authors), *Roma medievale*, Rome-Bari 2006, new ed. 2010.

As a background to the two bullas of 1425 and 1480 to be republished here (5.1 and 5.2), *excerpts and comments* will now be conveyed regarding the statutes for Rome of March 1363 (which were revised shortly after that

date, but in the same year), according to Camillo Re, *Statuti della città di Rome*, Rome 1880; also the statutes of 1453 and 1471 are briefly surveyed.. The selections are insufficient for further study but should give an impression of the general drift of the papal bullas together with SL, T2C, a contribution focusing mainly on the external aspects of houses and palaces in the two cities. Further on the present subject, * 3.3.1, *Reading about the Popes*.

1.3, *Living in the City*

So far I have bypassed an issue that is important not only for the present argumentation but also, and primarily for the general question of theory and methodology: the *sociological dimension*.

With this we enter a subject that the models presented and discussed in the present work can only partially capture. To compensate, we should probably have to develop submodels on several levels. In the present work, I shall bypass that program. Awareness of limitations remains an obligatory condition in any research work. A colleague once blamed me for exposing some uncertainties in my own work: I should leave that to others! But wouldn't I be best equipped to do so?

Some general issues and some specific theories were discussed in SL, *Burden*, 4,6, *Handling and Coping: She and He - or They*, pp. 187 - 190 (see below for a quotation). In addition, some references are due to R.E. Pahl's *Whose City?*, 1975, and to Wright *Mills' exceptionally wide-ranging and articulate contribution, *The Sociological Imagination*, of 1959. He has a very cogent chapter on *Uses of history*, in which he explores the relations, to him and many others considered fundamental, the *intimate relations* between *history* and *Sociology* (pp. 54ff. and, especially pp. 162ff.). He insists on the *indeterminacy* (not his term) of historical studies.

After discussing various alternatives in understanding *social order*, he concludes: *But such "correspondence" is only one type, only one answer to the "problem of order" (p. 55)*. Modern literature on cities, starting (approximately) with Louis Mumford's *The Culture of Cities*, is so richly provided both with analytical perspectives and documentaion that any attempt to use it on Papal Rome of the fifteenth century will end up with an *embarras-de-richesse*.

Of course the attention, degree of understanding and interest or priorities among the people are crucial factors here, with many combining reactions on two levels, what is politically and ideologicall acvceptable, often dependent on class loyalties, and what attitudes issue from individual

stand, situation and environment. Robert Merton's *middle range* sociology comes forcefully into this game.

At different stages in the process outlined in the present book, differently inclined and equipped people are silently present. To produce a picture that captures at least their *potential or likely position in the city* would require far more data than are available. Sociological exploration is a matter of approximate contemporaneity and corresponding access to data and cannot build on reconstruction. So let me limit the scope to probable and general basic principles and record them in a crude graph (Fig. 1.3.1). This is an adaptation from a model in Ivan Bratko's *PROLOG*, which I used also in *SL, Burden, Model 5*, p. 222. The social variables here are not class, economy or cultural connection, but *cognitive setup with regard to education, understanding of the world and society and inclinations in these directions*.

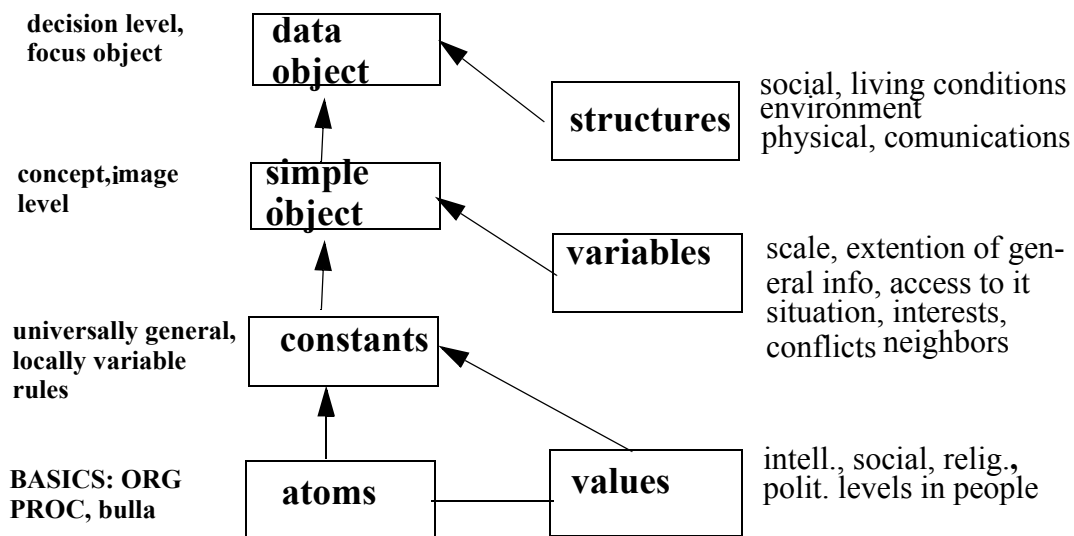


Fig. 1.3.1, *Social Cognition Variables (a crude and provsional model after Ivan Bratko's PROLOG, with local specifications)*. The "atom" node is connected to items 4 and 5 in Fig. 1.2.1, the PROC model.

For instance, we cannot say anything generally about neighbor conflicts, though one important but theoretically limited type of quarrel emerges from the bulla regarding housing and living quarters. So I have to include a term like *neighbors* on the graph without further specifications. The consequence is that we have to rely on graphical views.

The operative trick of the graph is that we let the case in focus "ascend" up the model, which "reacts" with a *no*, a *yes* or a *specified and nuanced acceptance* of the step being passed on the way. By this procedure, supported by the specific info that I am bypassing here, we would come out

with an introductory but vicarious classification of people's reactions to the city and its functions.

Let me continue this *Section* with an edited quotation from SL, *Burden*, 4.6, pp. 187ff., regarding sociological programs, among which there are several. But I shall elect one which I consider the most constructive.

The specific position that I introduced in my book of 1984 (*SL, *Iconography and ritual*, pp. 171f.) is represented by various authors such as Knorr-Cetina, Cicourel and Collins (Knorr-Cetina and Cicourel, *Advances in social theory*, pp. 139ff., 150 - 56, also with the quotation of Collins below): ... *there appears to be no theoretical justification for taking the individual for granted as a simple, elementary unit of social action ... ; rather we have to deal with a multiplicity of selves constituted in communicative interaction ... Today we are confronted with the notion of multiple identities which appear to be insulated rather than to be functionally integrated into just one person, or one individuality.* Thus the macro-micro problem - how to make the multitude and the individual work on the same analytical level? - is solved: Macro- phenomena are made up from aggregations and repetitions of many micro-episodes (Collins). According to Ritzer (Ibid., p. 493.), Knorr-Cetina (1981) accepts interactional domain, grants greater role to consciousness and macro-level phenomena, like Collins *makes the case for a radical reconstruction of macro theory on a micro-sociological base, she is also willing to consider the much less radical course of simply integrating micro-sociological results into macro-sociological theory ... I... believe in the seeming paradox that it is through micro-social approaches that we will learn most about the macro order...* (K.-C.).

Smelser also comments on the macro/micro problem (Smelser, *Handbook of sociology*, pp. 87 - 93, 106ff., 119ff.). *Theorists have been led by this focus on transformation [linkage between macro and micro]: an analytic one sustained by invisible processes in the larger system. This analytical linkage is achieved by the application of 'transformation rules', like voting procedures, to individual action] to consider individual action not as objects for analysis in their own right but as initial conditions for the operation of structural mechanisms. In this way, structural explanations - about the rules of constitutions, ... the dynamics of organizations and intergroup relations ..., the system of prestige allocation ... - have begun to replace utility arguments within the rationalistic micro tradition* (Smelser).

Still, we may want the group to exist by itself, too. In that case, with the fourth perspective, we are helped out by Hogg and Abrams; the *self-*

individual is transformed into a group-individual: Social identification with groups is as psychologically real, and measurable, as interpersonal attraction, reactance, frustration, performance anxiety or any other psychological phenomenon. In focusing on this transformation - from individual to group member - the approach opens the way for a more integrated and complete analysis of the social psychological functioning of individuals in society. By avoiding reduction of groups to individuals, it allows us to conceptualize the relationship between individual and society, and to place theoretically the group within the individual (Hogg and Abram; Social identifications, pp. 217f.).

Whenever required, the group characteristics get absorbed by the individuals who will then act accordingly. At least this outlook leaves group characteristics as something that can be treated as such, oblivious if necessary of individuals, whether "basic" à la Elster or burdened à la Knorr-Cetina and her colleagues. It is not necessary, as I see it, to take a definite stand with respect to these alternatives. But if we accept some or all of them, we certainly are obliged to try to be clear about when and under what circumstances this or that version is actualized.

Again, to adopt the object-oriented approach, I would say that there is no question about what is the basic element, individual, group or a mixture of them, but rather how any specific analytical assignment requires us to treat them.

So now the issue turns on what our actors really do and how what they are doing relates to whatever situation or organization in which they are involved.

Anthony Giddens introduces the term *structuration* (Ritzer, *Sociological theory*, p. 487) relating action to structure... *there is no sense in which structure 'determines' action or vice versa.* The rigid macro / micro distinction is not useful. The theory of structuration runs somewhat on these lines: the basic domain of the social sciences is not the experiences of individual actor nor societal totality but *social practices ordered across space and time.* The ontological (basic-foundation) starting-point here is not consciousness nor social structure *but rather the dialectic between activities and conditions occurring in time and space* (Ritzer).

Whichever way we look at our manner of handling social entities in an analytical venture, we cannot forgo considerations of how people involved in the actual situation were identifying themselves. Did some specific group consider themselves primarily as that very group, secondly as Catholics and thirdly as Venetian citizens, and so on?

In the context of so-called social identifications, there are two aspects

of relevance to the present discussion, the first one leading up to the second: *stereotyping* and *attribution* theories. Stereotypes here are somewhat similar to Putnam's. I am following Hogg and Abrams here (Hogg and Abrams, *Social identifications*, Chapter 4).

Stereotypes are generalizations about people based on category membership. They are beliefs that all members of a particular group have the same qualities, which circumscribe the group and differentiate it from other groups. A specific group member is assumed to be, or is treated as, essentially identical to other members of the group, and the group as a whole is thus perceived and treated as being homogeneous... An important feature of stereotypes is that they are shared; that is, large sections of society will agree on what the stereotypes of particular groups are... Stereotyping is a fundamental and probably universal bias in perception which has important and far-reaching consequences for behavior...It is a central component of prejudice and intergroup relations... Furthermore: The analysis of social functions of stereotypes can perhaps be taken further if it is related to work on causal attribution and is located in the context of concepts such as social representation, ideology, and orthodoxy...

The attribution approach goes a step further in maintaining that there is a more fundamental underlying need to render the world predictable in order to be able to behave adaptively. Such predictability is cognitively represented by individuals as intuitive or naive theories of the world which are arrived at by spontaneous and largely automatic cause-effect analyses of events. People are intuitive scientists engaged in the business of employing science-like but informal causal analyses in order to satisfy a fundamental need to understand the causal relationships between event, and thus render experiences, actions, and so forth, predictable and ultimately controllable.

Connected with this is the perspective of social representations that are distinct for different groups in a society and *originate in everyday social interaction and furnish individuals with a commonsense understanding of their experiences in the world. They are [citing Moscovici] 'a set of concepts, statements and explanations originating in daily life in the course of inter-individual communications...'...Social representations appear to possess many properties in common with social stereotypes - both are shared, socially acquired, rigidly impervious to disconfirmation, employed to prejudge, and so on... But at the same time the theory of social representations is extremely vague and imprecise.*

Social sciences, like parts of psychology, feel a certain responsibility

for deciding on categories because they are so much involved in contemporary society and the public management of it. An analytical venture has a freer hand to experimentation without having to take other consequences of it than intellectual miscarriage.

Quote (edited) ended. Before developing further the model types and applications, we have to scan the document they are meant to handle.

1.4 *Dissecting Sixtus*

The following -edited version of the bulla of Sixtus IV should bear me out on my chose of items in the two models just presented. Having acquainted us with the bulla, we should be ready to try the two models, supported by a few more models, on the document.

Here is the *bulla of Sixtus IV* with numbered summaries and comments ("clean" version in 5.2).

{ 1 } **ETSI DE CUNCTARUM civitatum temporali dominio Romanae Ecclesiae subiectarum decore et venustate cogitare nos deceat: ad nostrum tamen almam urbem apostolorum Petri et Pauli glorioso martyrii cruore Domini nostri Iesu Christi consecratam, civitatem sacerdotalem et regiam, eiusque decorem et venustatem, tanto accuratius aciem nostrae considerationis extendere nos convenit, quanto illa caput est orbis, et Altissimus in ea sacerdotii principatum et christianae religionis caput instituit, et sui vicarii Sedem, ad quam, de universis mundi partibus christifideles confluent in numero copioso, voluit collocari..**

TENTATIVE TRANSLATION

Even though it is Our obligation to consider the dignity and aspect of all cities under the temporal government of the Roman Church, <nevertheless> it behoves us as carefully <as possible> to care in particular for our city which is dedicated to the passion of our Lord Jesus Christ and the glorious martyrdom of the Apostles Peter and Paul, in that <the Church> is the Head of the World, <and also because in the Church> God [Altissimus] constituted the leadership of priesthood and the Head of Christian religion, and the Seat of His vicar, to which Christians from the entire world assemble in great numbers.

COMMENT

Besides a general statement of the status and prerogatives of the Pope, characteristically the chapter emphasizes the pilgrim issue, which was a concern in M.V but now takes on a primary role. Great works on the churches, especially St. Peter's, had been initiated by earlier popes, especially Nicho-

las V, and more hotels and boardinghouses built, and pharmacies instituted, so now the city was more ready for receiving the pilgrim masses. Under Sixtus IV, the Ospedale di Santo Spirito, close to the Vatican, was built (active until the 1970s). The increasing pilgrim traffic also boosted market development.

{ 2 } §1. Cum itaque viae et stratae publicae eiusdem urbis, in plerisque locis, causantibus porticibus, prosellis et aliis variis aedificis domorum sitarum iuxta illas, adeo arctae [artae]existant, ut per eas commode deambulari, et necessaria ad victum multitudinis civium Romanorum et curialium ac aliorum in ipsa urbe habitantium et confluentium ad eandem, praesertim temporibus indulgentiarum anni Iubilaei et aliorum concessarum per nos et praedecessores nostros Romanos Pontifices, visitantium apostolorum praefatorum [Sts. Peter and Paul] basilicas et alias eiusdem urbis ecclesias; deferri commode nequeant:

SUBJECT

Portici - groundfloor colonnaded passages, (stone and wood) benches on house fronts and other structures attached to the houses, create traffic problems, especially in the periods of great affluence to the churches. Furthermore, claiming there were only portici on the street, and no doors, could be used to try to escape taxation. Taxes were paid pro door, each one being, then as today, numbered separately. Of course the authorities would win any such contest, but then, as later, only after such a long time that the case had lost its actuality, witnesses no longer being available, etc.

COMMENT

*The problems are discussed in SL, T2C and here, *1.2.*

{ 3 } et in quibusdam locis vix singulariter singuli equestres se obviantes, in eis transire possint per easdem; idque cedat in non modicam eiusdem urbis deformitatem, ac civium, curialium et confluentium praedictorum incommoditatem: et propterea nos, habita super iis deliberatione matura, decrevimus vias ipsas, praesertim quae magis frequentantur et principaliores existunt, ampliari;

SUBJECT

Furthermore, such hindrances, besides impairing free movement, also damage the visual aspect of the city, and by papal decree the main thoroughfares will be widened.

COMMENT

*See SL, T2C, and here, *5.3.*

{ 4 } ac porticus et impedimenta praedicta, quibus sic arctantur, amoveri et lateribus opportune pavimentari, iamque opus ipsum coeptum sit in diversis locis et in illius prosecutione non cessetur;

SUBJECT

The cited portici and other hindrances shall be removed and the streets be covered with cobblestones or sampietrini; such works, already started in some places, must continue.

COMMENT

*See SL, T2C, and here, *5.3.*

{ 5 } ac (sicut accepimus) propter demolitionem huiusmodi, nonnullae ex domibus ipsis, quarum porticus et prosella ac alia aedificia dirui oportuit, exinde, utpote necessariis mansionibus solitis et officinis carentes, ad inhabitandum minus commodae et fere inutiles factae sint, et ea propter illarum domini eorum parietes decenter, ut expediret ad decorem viarum earumdem, reparare, et expensas opportunas propterea subire non curent, sublata spe habitandi in eis, aut alias utilitates recipiendi ex eisdem;

SUBJECT

Legislational and usage problems connected with such demolitions, and relevant obligations.

COMMENT

The cultured aspect of the streets also considered.

{ 6 } expediatque, ad obviandum huiusmodi incommoditatibus, ex duabus aut pluribus contiguis domibus unam commodam construere, aut partem unius ex eisdem domibus alteri convicinae domui incorporare, sicque indemnitati dominorum earumdem obviare et decori huiusmodi consulere;

SUBJECT

If two or more proprietors are involved in such works, they should combine their efforts to create one single common building.

COMMENT

*Here the basis for the row-houses (details and examples in SLT2C, and here, *4.5.). Some paragraphs in the bulla specify rules regarding properties owned by more than one proprietor or over which several have rights; that is the following paragraphs.*

{ 7 } et vicinarum domorum domini ut plurimum super iis non convenient, et recusent sibi invicem complacere, etiam pro iusto et rationabili pretio: contingat quoque interdum nonnullos, tam Romanos cives quam curiales et alios forenses, in eadem urbe domos de novo aedificare vel antiquas reformare et ampliare velle, et pro illarum decenti constructione indigere convicinis domibus, interdum ruinosos et depressis, domui depressae vel ruinosae, vel domorum dirutarum sediminibus [sedimen, sedimonium, varia notione; hic pro loco quovis vacuo ad aedificandum vel plantandum idoneo, *noted by the editors, but in a later paragraph*], plateolis et solo, seu alio loco vicinis, et huiusmodi domorum et sediminum, seu

platearum et soli aut loci dominos requisitos ut de illis eisdem aedificare et reformare volentibus, venditionis titulo complaceant, de dominibus, sediminibus, solo seu loco, oblato etiam persaepe plusquam iusto pretio, id facere nullatenus velle, aut longe plus iusto pretio, etiam nonnunquam duplum illius transcendendo, petere pro eisdem;

SUBJECT

Conflicts between neighbors, unwillingness to build new houses or repair and enlarge old ones; conflicts over houses, courtyards and empty areas adequate for building; economic aspects. Sanctions - also in the following entries.

COMMENT

Again, the visual aspect is considered.

{ 8 } quo fit ut, praesertim curiales et forenses, qui ad id iuvare et allici deberent, maxime a Romanis civibus, ab huiusmodi eorum laudabili aedificandi aut ampliandi proposito retrahantur;

SUBJECT

Especially if locals and shopowners, particularly Roman citizens, who ought to collaborate on the issue, should fail to do so,

{ 9 } et si aliquando dilecti filii Franciscus de Porcariis et Bapt. Staglia, moderni et qui pro tempore fuerint magistri aedificiorum et stratarum eiusdem urbis, pro construendis novis plateis in locis convenientibus, aut antiquis ampliandis et reformandis, volunt domus aliquas dirui facere in totum vel in partem, illarum domini, similiter oblato eis etiam iusto et rationabili pretio, ne id fiat, pertinaciter se opponere;

SUBJECT

Corrective interventions by the city authorities (Mastri di Strada, etc.).

COMMENT

*see S,LT2C, and here, *5.3.*

{ 10 } et huiusmodi novarum platearum ordinationem et antiquarum dilatationem, ampliationem, omni conatu possibili impedire non verentur, quae omnia publico bono et decori ac pulchritudini eiusdem urbis, nostraeque circa id intentioni obviare manifeste cernuntur.

SUBJECT

Whenever people do not respect the requirements for such improvements.

COMMENT

Public welfare and urban order.

{ 11 } §2.- Nos igitur, aequum arbitantes publicam utilitatem in iis praeferrere privatae commoditati quorumlibet, et illorum, qui tam salubri publico bono in directe modo praemisso se opponunt, duritiam, superioris

auctoritate et aequa ordinatione comprimi; ac volentes propterea super iis omnibus opportunum adhibere rimedium;

SUBJECT

The Pope claims authority focused on public utility and weal and to interfere in cases of disorder, threatening sanctions against those who might oppose the stated measures.

COMMENT

Emphasis on the publica utilitas

{ 12 } motu proprio, non ad alicuius nobis super hoc oblatae petitionis instantiam, sed de nostra mera deliberatione, et ex certa nostra scientia et de plenitudine potestatis apostolicae, hac in perpetuum valitura constitutione, statuimus et ordinamus quod venerabilis frater Guillelmus episcopus Ostiensis, camerarius noster, praefati Franciscus et Baptista, ac ipsorum episcopi, Francisci et Baptistae in camerariatus nostri et pro tempore existentis Roman. Pontif. ac magistratus aedificiorum Urbis officiis respective successores, qui pro tempore erunt perpetuis futuris temporibus,

SUBJECT

Pope asserting full power over the city

COMMENT

*The illusive but formally declared authority of the city council (SPQR = Senatus populusque romanus) ended with Pius II (see SLT2C, and here, *5.3.)*

{ 13 } ad requisitionem damnorum [legimus dominorum loco damnorum <editor's comment>)] domorum, quarum porticus, prosella seu alia aedificia, pro viis seu plateis et aliis locis publicis eiusdem urbis, hactenus diruta fuerint dirui contingeret in futurum quandocumque de mandato magistrorum eorumdem, si domini praedicti [see editor's comment, above] in domibus ipsis inhabitare soliti erant ante demolitionem eandem, et tempore demolitionis huiusmodi factae et quam fieri contingeret in futurum, absque dolo et fraude, inhabitabant et in posterum inhabitabunt, et propter huiusmodi demolitionem iam factam et quae fient, domus ipsae effectae sint vel efficeruntur in posterum, pro eorumdem damnorum [Hic ut supra] ipsarum commoda receptione et inhabitatiome incapaces;

SUBJECT

Demolition of and rights regarding minor structures, such as portici, benches, attached to houses.

COMMENT

*Keeping the city under control and in fuctional order, neighbor relations crucial. - And see T2C, and here, *5.3.: a comment valid for numerous clauses following.*

{ 14 } sintque iuxta eas aliquae domus per earum dominos minime inhabitari solitae, sed pro earum annua responsione vel alias locari consuetae, ex quarum coniunctione cum domo huiusmodi sic incommodae effectae, domino domus sic incommodae effectae, adversus incommoditatem huiusmodi, subveniri valeat, teneantur et deberant compellere illos, ad quos domus ipsas sic vicinia legitime eis pertinere constabit, etiam si ad Ecclesias et monasteria, tam virorum quam mulierum, Ordinum quorumcumque, etiam exemptorum, necnon beneficia ecclesiastica, hospitalia et loca pia pertinerent, ad vendendum easdem domos vicinas, quas inhabitare soliti non sunt, dominis domorum contiguarum, quas sic incommodas effectas cognoverint; pro pretio, per duos probos et expertos viros per utramque partem eligendos, determinando et declarando.

SUBJECT

Houses not in permanent habitation

COMMENT

{ 15 } Si vero ii duo concordēs in eodem assignando pretio non essent, eo causa ispi camerarius et magistri aedificiorum praefatae urbis, habito ipsorum duorum iudicio, pretia eadem imponere et assignare habeant.

SUBJECT

Disagreement between neighbors; role of authorities.

COMMENT

Paragraphs from here specify juristic rules regarding ownership and use of houses.

{ 16 } §3. Et si forsā contingeret ex demolitione huiusmodi, duas domos sic per earum dominos inhabitatas, incommodas modo praedicto effici, et inter eas esse aliam domum per illius dominum locari solitam, quam quilibet vicinarum domorum praedictarum incommoditate subiacentium et ad receptionem ipsorum non sufficientium, sibi vendi et suae domui incorporari postularet, debeant camerarius et magistri praefati illi ex eis sic petentibus venditionem huiusmodi fieri mandare, quam magis indigere modo *vendenda cognoverint*.

SUBJECT

Specifications of the subject in { 16 }

{ 17 } Et si forsā uterque aequaliter indigeret, partem uni et partem alteri (si commode vendi poterit) vendi faciant, aut aliter desuper provideant, prout eis videbitur expedire.

SUBJECT

Continuation: solving issues by sale of properties

{ 18 } §4. Et si in neutra domo vicinarum, quae sic inutiles iam effectae forent ex demolitione praedicta vel efficerentur in futurum, earum

domini habitarent, sed eas locare soliti essent, liceat etiam tunc camerario et magistratis praefatis (si id petatur per alterum dominorum earumdem) domum, quam maiora incomoda [sic] passam esse cognoverint, domino alterius domus magis laesae, si emere voluerit, vendi facere modo praedicto;

SUBJECT

Forced demolition or sale of properties

{ 19 } et illum, instante domino domus magis laesae, ad id compellere: et similiter dominum domus e contra minus laesae ad emendam domum magis laesam, aut suam domino domus minus laesae vendendum compellere, seu alias, prout eis videbitur, providere ut ambae domus ipsae, inutiles et inhabitabiles non remaneant, et similiter, prout eis videbitur, providere teneantur quoties domus ipsae sic vicinae et locari solitae aequaliter laesae et incommodae effectae forent.

SUBJECT

judging in conflicts between owners

COMMENT

In a city with underdeveloped institutions and traditions, and in dramatic growth, conflicts will occur continuously.

{ 20 } §5. Et ne, ob proterviam et duritiem dominorum domorum, siue quarum demolitione plateae in eadem urbe necessariae et utiles ad illius decorem de novo ordinari vel iam ordinatae ampliari commode nequeant, platearum earumdem ordinatio et ampliatio, ac palatiorum et domorum de novo constructio seu reformatio retardetur, eisdem motu et scientia ac auctoritate et potestate statuimus quod camerarius et magistri praefati possint et debeant dominos domorum quarumlibet locari (non autem per ipsomet inhabitari) solitarum, ecclesiasticos et saeculares, quacumque dignitate fungentes, compellere ad vendendum Conservatoribus seu syndico eiusdem urbi domus, quas camerarius et magistri praefati, necessarias et utiles esse cognoverint pro huiusmodi plateis de novo ordinandis, et antiquis reformandis et ampliandis, pro iusto et rationabili pretio, ut praemittitur, imponendo.

SUBJECT

cases of conflicts; intervention by the authorities.

COMMENT

A major purpose of the bulla is to assert the established authority; the population were used to being under pressure from the old nobility and their neighbors.

{ 21 } Et similiter ad vendendum domos huiusmodi per eos inhabitari minime solitas, sed locari, quas utiles et necessarias esse putaverint, pro palatiis, domibus seu aliis aedificiis, tam prophanis quam ecclesiasticis, in eadem urbe de novo construendis, seu iam constructis ampliandis, per-

sonis habentibus iuxta illas domum seu solum aut locum alium, et volentibus inibi de novo domos vel palatia construere, seu iam constructa ampliare, pro iusto et rationabili pretio, ut praefertur, taxando.

SUBJECT

In cases of non-permanent habitation, building new houses or enlarging existing ones

COMMENT

The growing city; avoiding instability and consequent unctrollability.

{ 22 } §5. Et inter duos seu plures sic aedificare seu ampliare volentes, et pro huiusmodi venditione eis fienda, ad effectum praemissum instantes, illamque eis fieri petentes, ille praefertur, cui domus, platea seu locus, de cuius venditione ageretur, magis adiaceret, seu qui illo magis indigeret, et ex cuius aedificio plus decorari eiusdem urbis consuli speraretur.

SUBJECT

Continued

{ 23 } Et si in omnibus praefatis venditionem huiusmodi pro parte uni et pro parte alteri fieri mandare, aut eorum alteri, prout videbitur.

SUBJECT

Sale of houses under predicament

COMMENT

The growing city; avoiding instability and consequent unctrollability.

{ 24 } §6. Et in singulis casis praedictis, in quibus volumus quod camerarius et magistri praefati compellere possint aliquos ad vendendum, si illi, ad quos pertineret, moniti et requisiti, per camerarium et magistros praefatos, bis cum termino convenienti, eorum arbitrio moderando, vendere recursaverint, aut malitiose distulerint, praefati camerarius et magistri debeant, vice et nomine illorum sic requisitorum et recusantium vel differentium,

SUBJECT

Specifications of relevant authority intervention

COMMENT

{ 25 } venditionem huiusmodi facere, cum promissionibus, obligationibus, poenis, renunciationibus, iuramento, pactis et clausulis consuetis, et pretium inde proveniens recipere et penes aedem sacram, aut fide et facultatibus idoneam personam deponere, dominus domus seu alterius loci sic per eos pro tempore venditi (si venditionem ipsam ratam habere et fideiussores de evictione praestare voluerint et non alias) consignandum habeantque venditiones ipsae, quas sic per camerarium et magistros fieri contingeret, et traditiones locorum et domorum sic venditorum plenam roboris [sic] firmitatem, ac si per illos, ad quos domus ipsae tunc pertinebant,

fierent; et eosdem penitus et omnino operentur effectus, quos operarentur, si fierent ab eisdem.

SUBJECT

Furter clauses on forced or unavoidable sale of houses

COMMENT

The growing city; avoiding instability and consequent uncontrollability.

{ 26 } §8. - Provideant autem camerarius et magistri praefati, in casibus praedictis, in quibus statuimus aliquos compelli debere ad vendendum proponentibus nova aedificia construere, seu iam constructa ampliare velle, ut tales sic proponentes ante omnia se obligent ad inchoandum et perficiendum huiusmodi nova aedificia modis et formis, ac infra tempus et sub poenis, de quibus ipsis camerario et magistris (personarum et aedificiorum qualitate inspecta) videbitur, et ab illis, qui sic se obligaverint, poenas exigant memoratas;

SUBJECT

Obligations of the authorities in such cases

COMMENT

The specific cases but also an occasion to assert authority in a city with chaotic traditions.

{ 27 } et nihilominus eos compellant ad observandum praemissa per eos, vel quas prius habebant et etiam propterea eis venditas domos aliis aedificare volentibus vendendum pro iusto et rationabili pretio, ut praefertur, moderando.

SUBJECT

Economic parameters in such cases

{ 28 } §9 - Et quia interdum contigit quod habentes domos, sive domorum sedimina, claustra seu loca in eadem urbe et illa vendere volentes, variis plerumque modis et occasionibus illa vendere recusant habentibus domos, sedimina, claustra et loca vicina, illisque vendere nolunt; nonnumquam illa vendunt aemulis eorundem vicinorum, seu personis eis parum gratis;

SUBJECT

Clauses regarding additional structures and grounds.

COMMENT

Rome was still a semi-rural place, and invited urbanization planning; also because of the sharp increase in population; then as now, people from the districts sought a new basis in the great city.

{ 29 } quo fit ut ipsi domorum, claustrorum et sediminum seu aliorum locorum vicinorum domini, illa emere volentes et habere nequeunt, retrahuntur persaepe ab aedificando de novo in eorum sediminibus et locis vi-

cinis, ac ampliando domos, quas inibi habent, sicque decori eiusdem urbis, aut saltem ipsorum vicinorum commoditati non parum detrahitur.

SUBJECT

So that those who want to buy houses etc. but are not in the position of keeping them, abstain from building new <structure> in their grounds and those nearby, while enlarging houses they already have, so that the dignity of the city and the convenience of the neighbors are not impaired.

COMMENT

Keeping the city under control and in fuctional order, neighbor relations crucial.

{ 30 } Volentes super hoc aequae ordinatione providere; notu, scientia et auctoritate praedictis, etiam statuimus et ordinamus quod praefati sic vendere volentes, teneantur et debeant domos, sedimina, claustra et loca alia illis contigua, pro iusto et rationabili pretio, per alios evidenter et non fecte forsitan oblato.

SUBJECT

Control of economics in cases of sale (ref. to { 30 })

COMMENT

Keeping the city under control and in fuctional order, taxation issues important in a city with no good traditions in terms of taxation.

{ 31 } Et si illa aliis quam vicinis preafatis venderent, venditiones ipsas (quoad illos qui emerent et illorum commodum) nullius sint roboris vel momenti, et habeantur pro infectis;

SUBJECT

Control of economics in cases of sale - continued

COMMENT

Keeping the city under control and in fuctional order, neighbor relations crucial.

{ 32 } et proinde ac si per illum ex vicinis, cuius venditio ipsa, praesentis constitutionis vigore, fieri debebat, facta foret, debeant camerarius et magistri praefati, e mentem a possessione domus, sediminis, claustris, plateolae, seu alterius loci sic empti, absque ulla tela iudicii, vicino instante et pretium rationabile offerente, et dicto emptori (si illud recipere, et emptioni per eum factae renunciare et ipsum vicinum, iuxta camerarii et magistrorum praedictorum ordinationem, cautum facere noluerit) persolvendum deponente, amovere, et ipsum vicinum in illius possessionem inducere;

SUBJECT

Consequently, if a sale is decided, respecting the present constitutions, the authorities - on certain conditions - shall veto the sale, and let the neighbor take over the property.

{33 } et si forsán duo essent vicini, quibus domus, claustrum, sedimen, plateola seu alius locus, de cuius venditione ageretur, utilitatem et commoditatem affere posset, ille ex eis praeferri debeat in praemissis, quem camerarius et magistri praefati, consideratis circumstantiis universis, venali domo, sedimine, claustrum, solo, plateola, seu loco alio, magis indigere declaraverint.

SUBJECT

Authorities desiding in case of conflicts or doubts regarding the rights and needs among neighbor owners.

COMMENT

Specific problematics but also authority assertions. The red thread.

{ 34 } Et si aequaliter indigerent, et pro parte uni et pro parte alteri possit exinde commoditas provenire, utrique proportionabiliter concedatur. Si vero, facta illius divisione, portiones utriusque fere inutiles essent, non dividatur, sed camerarius et magistri, alterum eorumdem vicinorum, quem voluerint, praeferri faciant in praemissis.

SUBJECT

Continuation

COMMENT

Specific problematics but also authority assertions. The red thread.

{ 35 } §10. Et ut ea, quae supra statuta sunt, votivum sortiantur effectum in praemissis omnibus et singulis, camerario in ecclesiasticas, et ei ac magistris praefatis in alias personas facultatem et potestatem concedimus: ita quod idem camerarius, per censuram ecclesiasticam; et ipse ac magistri praefati, per poenarum et mulctarum exactionem ac personalem distractionem et alia iuris remedia, contradictores quoslibet et rebelles compellere valeant ad praemissa.

SUBJECT

Continuation, especially regarding properties of ecclesiastics (and Church?)

COMMENT

The status, role and rights of the churches and monasteries are not amply treated in the present bulla. One could gain the impression that this was not implemented until the Vatican Treaty between Italy and the Church in 1929.

{36 } §11.- Non obstantibus constitutionibus et ordinationibus apostolicis, ac municipalibus statutis [!] Urbis, confirmatione apostolica vel quavis firmitate alia vallentis; exemptionibus ac indultis, privilegiis et literis apostolicis; necnon interdictis personis ecclesiasticos bonorum im-

mobiliū alienationibus et praestitis per eas desuper iuramentis, a quibus eas absolvimus, contrariis quibuscumque; seu si aliquibus, communiter vel divisim, a Sede praefata indultum existat quod interdici, suspendi vel excommunicari non possint per literas apostolicas non facientes plenam et expressam ac de verbo ad verbum de indulto huiusmodi mentionem.

SUBJECT

Further specifications re properties of ecclesiastics (and Church?)

COMMENT

Specific problematics but also authority assertions. The red thread.-

{ 37 } Volumus autem, quod pretia domorum et aliorum bonorum immobilium ad Ecclesias, monasteria et alia pia loca huiusmodi pertinentium, quae vendi contingeret in posterum vigore praesentium, penes eadem sacram, aut fide et facultate idoneam personam, cum recognitionibus, obligationibus et cautelis etiam in talibus adhiberi solitis, deponantur, et in emptionem aliorum bonorum immobilium pro eisdem ecclesiis, monasteriis et piis locis omnino convertantur.

SUBJECT

Church properties and Convents, Monasteria

COMMENT

The status, role and rights of the churches and monasteries are not amply treated in the present bulla. One could gain the impression that this was not implemented until the Vatican Treaty between Italy and the Church in 1929.

{ 38 } §12 Quodque dilecti filii Camerae eiusdem urbis conservatores praesentes nostras literas in registro privilegiorum et aliarum scripturarum eiusdem urbis in eorumdem archivio conservari, solito registrari, et illorum tenores in locis publicis et consuetis eiusdem urbis, sono tubae praemisso, vulgare sermone publicare; ac praesentes valvis Capitolii triduo, iuris horis, et alibi, prout camerario et magistris praefatis visum fuerit, affigi faciant, ut omnibus omni tempore facilius innotescant.

SUBJECT

Registration and publication of decrees and ordinances (also with trumpet blowing).

COMMENT

This was the custom in most Medieval cities.

1.5 Challenged by Tacitus

Publius Cornelius Tacitus (died ca. 120AD) might tell me (but he cannot, having left us some time ago): you are doing Sixtus' bulla, a formal and static law document, admittedly with complex subjects, but with no em-

bedded process or time dimension. How about my *Annales*, a chronicle with more or less parallel strands of events and a completely different structure, substance and intended audience?

This *Section* is limited to suggesting perspectives. *Section 3.8* will be reserved for exploring the Tacitus-Cicero material in a later work. This is because of the increasing volume of this forage into Classical discourse and chronicle.

There are, obviously, a number of perspectives and scopes in analysing a chronicle like the one by Tacitus. Discussing a project related to work already brought to a certain level, can be useful, partly by putting the work done into a larger context, and partly to note some methodological differences deriving from the nature of the document in focus in the new project.

I shall consequently lay out a prospect for such a work, without implementing it, the idea being that it can be of interest and use to note the different problems such a project would involve as compared with that of the relatively simple papal bulla. So I am claiming no "copyright" for this idea. Whoever might want to take up this project, would have an excellent opportunity to criticize my entire experiment.

I am going to try *two approaches* to the selected pages in the *Annales*.

1. Status in admin./polit./eccles. leadership and subordinated organs, before and after, using the line ORG-PROC-ORG(Using Category Provider, ORG and PROC; appealing to Common Sense);
2. Following one individual: Tiberius; same sequence.

As a sequel to my discussions regarding the bulla of Sixtus IV, I had planned to subject Chapters I,i to I,viii of Tacitus' *Annales* to a related analysis (the first eight chapters). Having worked on this project for a while, I had to realize that this would have to become another book.

The assignment could be to try the method just developed for the analysis of an urban statute, on a traditional *historical* text, namely the first eight chapters of the *Annales* by *Publius Cornelius Tacitus*. The character of the *Annales* vindicates the option. I need an apparently rational, matter-of-fact and economical text (relatively free of literary stylishness) which reports on events or *res gestae* with as few comments as possible, offering asides only as associated or appended informations of the same character. Perhaps it is superfluous to mention that my selection of and handling of it would not be imed at history writing but at an exercise in theory. I shall select paragraphs I, i to I, viii, in Tacitus *Annales*, because here the events and perspectives are sufficiently dramatic and varied to serve for putting my ideas at a test.

For this task, we should need an extended version of the PROC and the ORG (I put this in the subjunctive since this task will be planned but

not implemented). Let me work out the latter alternative, noting some of the strategic points of difference between an *urban statute* like the one of Sixtus IV and an *historical chronicle*.

An *urban statute* or any other document imposing certain rules and procedures, while stipulating measures for implementing the program, will obviously be formulated on the more or less commonly known contemporary background of context and environment *and* needs and provisions, *but* it has to take as given in the recorded or implied situation. Normally, it will be addressed to people in authority at several levels, intending them to pass on the message. The statutes, too, do involve a factor of processing with time dimension, for example when warnings and hence predicting for the future is lined up with some definite statement or requirement and must be categorized under this.

A *historical narrative*, or *chronicle*, on the other hand, if articulate and well-informed, can assemble in a literary flow some processes that are mostly not linear but intertwined and include several parallel strands of conditions, situations and events. Such documents elaborate the time dimension and event sequences, which make the building and use of models more demanding, and requires elaboration in linear but also transversal dimensions, a process with more or less parallel strands. The inborn imprecision of natural language makes this possible. Instead of issuing orders and directives, it has to be devised such that the readers can grasp at least the main points in the complex pattern. The narrative also will be intended to remain accessible and understandable for some time ahead; and usually also to be standing as a fine memorial to the author or the authorities who produced it.

The two verbal models just outlined will often overlap, so it would be risky to stipulate sharp boundaries between them. It is all a question of *tendencies* - of *dynamis*, as Heisenberg might say.

Working with a chronicle, we have to construe *hypothesis* or *hypotheses* over it, ask for the tacit rules and evaluations that went into the formulation of them (Fig. 1.4.1). In the statutes, we chiefly form hypotheses on how the injunctions might work, less about what they say; while of course the chosen vocabulary has to be studied in the given context and tradition.

One solution open to us if we want to keep the unity in model application to an historical chronicle, is to re-use the PROC and ORG ones, while extending the former so as to include a minimal list of general parameters that can, when we develop the *Working* version, be translated into historical realities.

The chart now coming up exemplify some entries (Fig. 1.5.1).

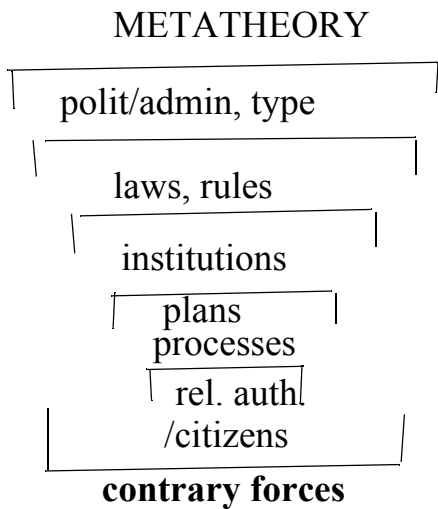


Fig. 1.5.1, A chart of hypothetical categories in the Input Register in the PROC-2 model for Tacitus, labelled REGISTER on the model, Fig. 1.5.2, to follow.

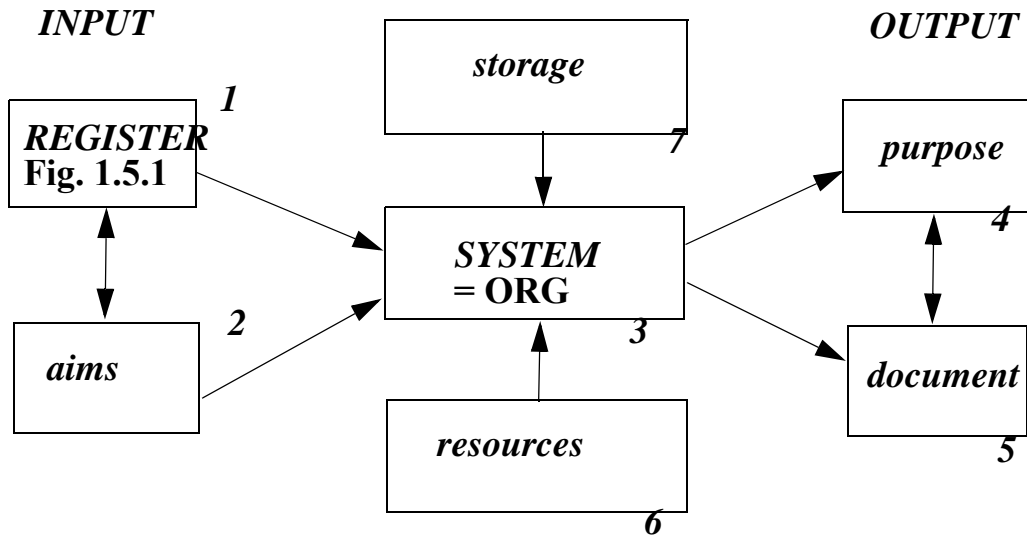


Fig. 1.5.2, The PROC-2 model, with REGISTER node.

A particular problem is how to handle the *vocabulary*, which should be given in Latin/English. The denominations of the top levels in the Roman State vary with time and require a certain amount of study before they can be put to use in such a context as the one in question here.

With the politically and administratively relevant words in Tacitus' *Annales* regarding the *Republic* (before Augustus) and the *Principate* (with Augustus and Tiberius) as top-level items, subordinated terms culled from Cicero and Cowell's book on him, can be set up as a basis for model development. The political, administrative, social and military vocabulary in use related to and dated from the years following Caesar's usurpation of power, through the republican ideals described by Cicero and Tacitus, to the reigns of Augustus and Tiberius, is vast and complex. A good help is to be found in *Cowell's book, *Cicero and the Roman Republic*.

Since Cicero offers texts on State and legislation matters, his work is a useful aid for scanning Tacitus, who constantly refers to such matters, even though often cursorily. Also H. J. Rose's *A Handbook of Latin Literature*, New York 1960, will be useful.

Cicero was utterly sceptical regarding the publically claimed virtues and ideals: *nostris enim vitiis, non casu aliquo, rem publicam verbo retinemus, re ipsa vero iam pridem amisimus...* (*De re publica*, V, i, transl. C. W. Keyes: *For it is our own fault, not by any accident, that we retain only the form of the commonwealth, but have long since lost its substance*).

It might be preferable to scan Tacitus himself (ca. 54 AD - ?), in the *Annales*, with support from Cicero (106 BC - 43 AD ; *De legibus, De re publica*), for *key terms, vocabula* rather than statements, combining them into groups to form categories on the models (even though, to cite Mazzolani, linguistically he should be classified along with Sallust and Cato).

The *Annales* could be scanned in two phases, as the result of our choice of focus: the *System* node.

1. *The old system as valid up to Augustus' time.*

2. *System changes under Augustus and Tiberius.*

This would mean to link the actual model to the previous ones used on the papal document.

To prepare the text selections for critical scanning, I would quote in short paragraphs followed by my English summaries. Such summaries obviously and unavoidably will be colored by personal codes and purposes. "Objective approaches" do not exist.

I have been greatly helped by consulting a parallel edition in Italian: *Tacito. Annali*, vol. 1, Rom e 1995, translation with an introduction and highly illuminating notes and comments by Dr. *Lidia Storoni Mazzolani*. For refreshing my Latin, Dr. *Alessandra Zoffoli's Verbi latini. Manuale pratico per l'uso*, Bologna 2012 (318 pages), has been a godsend.

Here are some of the most relevant passages in English summaries or translations (not neatly distinguished here) from the original Italian text by Mazzolani (pp. 7 - 13).

Tacitus' fundamental subject, let us say his deep problematics, is power, the behavior of whoever conducts it and whoever is subordinated to it; in both cases the degradation this power causes in the human mind.

The fundamental problem in Tacitus is one of political ethics. In his reflections on the exercise and limitations of power, he does not take up constitutional issues, nor argues against the monarchy [we would perhaps have said: dictatorship], while he does not envisage a restoration of the republic, knowing that it cannot be reinstated. [I would submit that he can look as indecisive as Seneca in his writings]. The principatus is no longer being dis-

cussed unless it be to hope for a mild one. It is an historical necessity, following from the imperative: the government with the romanization of the world that is an obligation for the Romans.

They cannot rescind this obligation, but the mismanagement of the administrators, the high-handedness of the military units provoke disruptions that compromise the stability and the duration of the dominion that Tiberius, like any Roman, want to be infinite lasting. ("life in the capital was bleak tetra", Tacitus says about the reign of Tiberius, "the Leader did nothing to extend the dominions"). Part and parcel of Tacitus' moralistic intentions was the engagement regarding the conquered peoples (also with a touch of influence from the rhetorical tradition).

The menace from the Germani is a constant worry in the writings of Tacitus... and his descriptions of their customs contain some degree of admiration...

He describes Tiberius as being reluctant to accept the power and as wanting respect for the Senate, and alien to the beginning deification of the princes: a prince corresponding to the ideals of Tacitus himself. But as an historian, Tacitus cannot pass over the fact that Tiberius inherited the family tradition and the idea of the principatus that was to become a permanent institutions. He ended up isolated and disillusioned by the attitudes and behavior of the Senators, who strived for privileges rather than the responsibility expected in those in power. He became convinced that there was no hope of change in State affairs, resigned by the succession after Tiberius by Caligula, Nero and Domitian.

Thus far Mazzolani (a curtailed and simplified summary, not rendering justice to her articulate contribution).

A historical document like the *Annales* contains, analytically speaking, not one but several versions, not all of them transportable to a model. Experimenting till we happen upon one that does, is no solution. We have to decide on the basis of theory (and decision always rests on theory, however fuzzy), which kind of version or versions we need to penetrate and then see what happens. Whenever an attempt does not work, we have gained some new insight. Especially so if we are working on processes rather than on confirming results. Such a negative upshot contributes to our understanding, and its being displayed is one of the advantages of using models that verbal models usually just bypass in silence.

Regarding methodologies for scanning a text, there is a vast literature, but generally the focus is on what is considered an artistic text, belonging, that is, to the vaguely defined field of *literature*. A field resembling that of history by being just as steplessly categorized over a vast scale from the most plain to the most sophisticated works (S. Haugom Olsen's *The Struc-*

ture of Literary Understanding, Cambridge [Eng.], 1978, offers a good introduction; also works by the late Göttingen professor, Wolfgang Kayser).

Translation does not warrant anything, nor does so-called "objectivity", because any translation is an interpretation, incapable of escaping some amount of theory, even whenever not actively theory-driven. Instead we have to study and develop *articulatedness* and *systemic relations*.

We can work - *experiment* - on three interconnected or interrelated levels. The chronicle involves partly different scopes and problemsthan does the statute, so I have to do some rethinking, which I postpone to a seperate Internet publication.

1.6 Looking Ahead

The evidence so far presented could have substantive value, but that is not my point. I have prepared the history material for my more general assignment, that of *building and trying out graphical models*, mostly those that I label *Cmodels*.

Following upon *Part II*, where some fundamental and productive uncertainties are dicussed, the model issue is faced in - as I hope - its widest scope in *Part III*.

That excercise should prepare us for attacking a more complex document, not a formalized statute like that of Sixtus IV, but a historical *chronicle*, the first chapters of Tacitus *Annales* connected with some reading of Cicero's *De re publica*.

Part IV is dedicated to theory embedment for the material in *Parts I, II* and *III*, listing items contributive to the theoretical and analytical venture that is te primery interest in the book.

END PART I

2 PART II FACING INDETERMINACY

2.1 The Subjects and Range of History

In Alessandra Zoffoli's excellent *Verbi latini*, there is an example that fascinates me: *mihi arduum videtur res gestas scribere* - *it seems a difficult task to write about historical events*. Because (in *my* application of the formulation), writing about historical events and processes, our brain starts a complex game, so we never really know where we are, cognitively speaking. Mental mechanisms start playing, pendling, even shilly-shallying, between documented understanding of the topic and ideas of our own making, associated with clusters of notions, "inborn" and acquired ones,

some of them hovering in the background, but somehow active. It is humanly understandable that scholarship generally has simplified the picture of the amorphous mass called *history* in the *res gestae* tradition, concentrating on "facts", more or less extended; how else can one teach it in the universities?

Traditionally, history is distributed over two parameters, - let me return to this - *categories* and *periods*. For categorization I am relying on Rosch's criteria (SL, *Burden*, 5.4.1-2, on the present Internet site).

The *period* issue is a complex one, the factor *t* for time entering the game. We can think of an undefined length of *t* in which one or several *conditions* hold and *events* arise. But this *t* must be limited to the chosen and describable factors, and not based on construals of time duration and length, since then we should be caught up in a web of continuously occurring, on several levels, alterations and changes. Thus, the operative units are conditions (the plague of 1630) or events (the war 1939 - 45), *not* time length or stretch (for ideas on time and space, *see* Barrow).

Periodization is tricky because there are no absolute criteria, only decisions we may take. These in their turn depend on *what* we will show and *how* will do it, so it is part of a creative act - which is often exported under the label of objectivity. Canavaggio (pp. 1ff.) conveys illuminating comments on what he calls *una época de contradicciones* - while in reality showing that most "epochs" are contradictory and complex (*see* also his next *Section, Tradición y innovación* (pp. 2ff.) and the acute but to my view inconclusive notes on the so-called Baroque (pp. 4f.): but how can anyone be "conclusive", even "clear" about such a chaotic concept. There are about as many "Baroques" as there are authors.

We should probably distinguish between historical writings that focus on *period* and those that take their point of departure in some *case* (or time-limited situation or process, which amounts to the same in the present context).

Then there is the question of historical "distance": can we have one?

I would hold that *all history as told or written is contemporary with whomever writes or narrates a piece of it and with whoever reads it*. This claim applies even to documented facts. Any one of the stories will emerge from a context, and the historical protagonists will have had different views on this; the choice among the options is ours; and modern scholars may each one of them have different interests, inclinations and preferences. Compare exact records in drawings from the Egypt that Napoleon's artists knew and the modern ones, and there is, even when the drawing are precise and correct, a surprising difference between them. In addition, in most cases we will need to work heuristically.

One useful feature of historical research is that it brings out problems of limitations and limits; only that the authors mostly remain silent on that point. Starting as it were *in medias res*, how far out shall we move? Where do rational linkages end and pure (perhaps inspired) creativity begin? I suspect that this question cannot be answered in general terms, only specifically, however unsatisfactory this may turn out.

Considering *history in models terms*, we find *imposed structures*, created by the protagonists (but still having to pass our mental processes): economic institutions and regulations, political systems, and a large body we can call *rituals*, meaning purposely designed complexes of actions, physical as well as mental, and rules for them(**Burden*, with Bibliography).

The former alternative, as we have noted regarding the cited *history of Spain*, creates a limit or boundary within which everything happens, the latter starts out from the case and works centrifugally out in various directions without having to postulate some outer boundary. The modalities can be illustrated with a *circle* and a bunch of arrows starting from a common point with different directions and lengths, *vectors*.

Carrying the idea of a distinction further, I end up with the following system, always speaking of history *writing*, rather than the study of it; thus to return to an issue already brought up.

Later I shall return to the question of capturing the data and their environment. But there is another question to face also. Is there a workable distinction between *history* and *Stories*? I am asking this because Niccolò *Macchiavelli doesn't write a history of Florence but *Istorie fiorentine*, the noun in the plural. The point seems to be that the concept of *history* is very flexible.

In Oslo in the early 1950s, we had a history professor who wrote an excellent book entitled *Middelalderen*, plainly *The Middle Ages*. I seem to recall that at that time we were not alone in taking it for granted that what we were reading about was *The Middle Ages*. And of course we thought he was objective (which undoubtedly he tried to be). Much later we understood that we had read about *His Middle Ages*. We had learnt at school that we should strive to be *objective* according to a rule that said: *First description, then analysis*. Only later we saw that there is no description that does not interpret.

History is no operable category, anymore than *Science* or *Literature*. We can work *inside* such an academically accepted and budgetarily convenient field, but we can work only *on* specific paradigmas within it. Thus *history* as a term does not show sharp outlines or boundaries. The field acquires meaning exclusively in terms of the operational categories it contains; when I apply *action* to paradigmas or programs in it (mentally,

when thinking about it, or concretely, as with writing or teaching): we can transfer Marcus Tullius Cicero's definition here (*De re publica*, I,1, 2): *the existence of virtue depends entirely upon its use (virtus in usu sui tota posita est)*. We cannot speak of a *philosophy* of history, only of categorization connected with the term. Sociological and political theory are out to systemize events and processes in our so-called real world. By adhering to this general program, the disciplines carry with them unsurveyable and unpredictable features and data. Limiting this approach to what can be captured by some *graphical models*, whether digital or just reflective, some of these features will have to be left behind or out. By fetching them back again as *imponderabilia*, we have to accept a literary-institutional, even fictional, approach as a valid supplementation to our modelled universe. Accepting this distinction can be deemed a *realist* attitude. We have to accept that in our complex and emotionally perceived world there are few things that are available to our control, if by *control* we mean to assess its functions and possible paths, in other words, the procedures, forgetting about the "real" nature of things.

There is thus no *The history*, only *written history*, written by someone with certain aims and under given conditions; and *studied*, that is somehow digested, *read* history under always specific conditions. And there cannot be any *Philosophy* of history, only categorization within a fuzzy or nebulous area. On the other hand, one can probably build a philosophy for the *understanding* and *writing* of history, but here the principal subject is not what happened but how we are and act when understanding or writing on the subject: ideas about ourselves as actors in the sociological terms.

The act of *writing* is at least one step removed from *knowing* history (or believing one does so) (*Cercas has some interesting, but somewhat complicated, comments on this). For this agenda, I believe, ideas and experiences also from literary studies should be called in for support.

So what subjects are to be considered historical? We can start with setting up a scale, starting with what has always been considered relevant, chronicle writing in the usage of Marcus Tullius Cicero.

Let us consider a few extremely *abstracting* cases of "pure" fiction with historical references (rather than true content).

Wouldn't it seem awkward to claim that Alessandro Manzoni's long poem, *Coro di Adelchi*, has historical value? Professionally yes, but not by significant standards. History is what we perceive as historical, with specific references, and standards can only be individual and cultural. Literary stories about past conditions and events at least remain generally free from time-line straightjackets and classroom idiosyncracies.

It would be hard to claim that studies of human behavior, literary as well as "professional" ones, are irrelevant for the field of history.

The *Thomas Theorem* is classical: *If men define situations as real, they are real in their consequences.* So-called *Personal Construct Theory* postulates (to cite some of its key formulations) as follows: *A person's processes are psychologically channelized by the ways in which he anticipates events - A person anticipates events by construing their replication ... Each person characteristically evolves, for his convenience in anticipating events, a construction system embracing ordinal relationships between construct* (SL, *Iconography and ritual*, p. 157, with ref. to Downs, *Personal constructions* esp. p. 77. The entire volume is dedicated to this perspective; so are in part contributions in Downs and Stea, *Image and environment*; and Canter, *The psychology of place*). The bottom line here is that we never go unprepared to facing some object, issue or idea, but with some amount of more or less relevant and developed preparation. We approach for some reason or motivation, and thus with expectations, with anything between vague hunch to precise preview.

These perspectives coincide on essential points with idea development in Physics since the 1920s, particularly so with Albert Einstein's insistence on theory having to take precedence over observation (*4.5 *Programming for Theory*) and Werner Heisenberg's paradigm on *indeterminacy* or *Indeterminacy*(*2.5, *Indeterminacy a Resource*, and 2.5.1, *A Short Quantum Reader*).

So if Lessing's *Nathan der Weise* makes me reflect over the use and misuse of power and the unity of the human world (east and west), forgetting about G. E. Lessing or the splendid *Deutsches Theater* in Berlin (Liv took me there), then the play becomes a piece of history in the sense of offering a verbal model depicting essential functions in what we are used to label *history*.

Mario Vargas Llosa's comments on *novela* writing are, as I see it, valid also for "professional" history writing: *una realidad ficticia ... la materializará mediante la escritura* (*Cartas a un joven novelista*, pp. 14f.; cf. p. 27: *disidencia con la vida real...*). Academic history writing looks more "objective" and "realistic" because university traditions, economics and career programs set narrow boundaries to the projects and fixates the aims outside of any conception of the subject itself.

It is not awkward to claim that some "correctly documented", academically accepted, historical chronicles create distortions worse than declared fiction. They tend to leave out essential features involved in or surrounding their subjects. In SL, *Teresa, where are you?*, I have already cited an example of this, the *History of Spain* by *Edwards and Lynch, a

splendid work when evaluated by traditional standards, for the facts recorded; adopting the good old models from Cicero and later. But vastly failing when it comes to notions that would seem to be relevant only slightly beyond the given date limits. The authors cite some pieces in Spanish literature, especially the theatre, that were *published* within the given time span for the book, that is after 1600AD, but do not hint at the new literature emerging just after the year 1600. Could such a literature spring out of nothing at such a precise date. Or should one take a peep at the years when these tendencies were under preparation? Could theatre performed Anno 1601 be sprung upon a public that was totally unprepared? Or must the theatre to some extent reflect tendencies and conceptual capacities in the audience?

Products like this are as distorted as the literary concoctions their authors tacitly or openly reject, because their "responsible" narratives have been missing out experiences and ideas, many documented and many with good probability behind them, sacrificing the imagination and drive that might put the reader into a state of mind receptive also to the bare facts, because thus they would be evaluated in their context. Our universities have cemented the structures, replicating themselves.

A historical scenario depends (while not exclusively) on factors that can be partitioned into three interlocking parameters, *sense*, *motivation* and *significance*. Domingo Ynduráin in his edition (23 reprints) of Quevedo's *El Buscón* (p. 45) alerted me to this idea with his considerations of *sentido* and *significación* (but the model is mine, with references to the present topic).

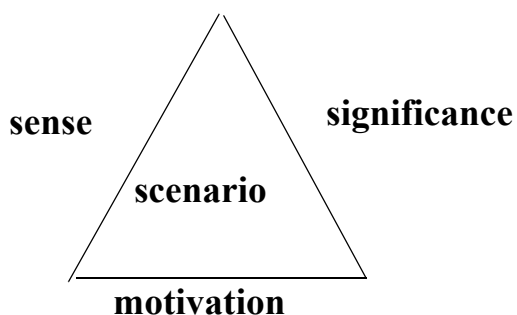


Fig.2.1.1, *Scenario Graph*

Let me illustrate the principle with a graph, Fig. 2.1.1. The *scenario* could be this:

Pope Sixtus IV orders: *Remove that dead cat from the street in Our city of*

Rome!

The *motivation*: Thus to avoid health damage *and* scaring away the pilgrims who bring money to the city.

The *sense*: Clean streets for better health and comfort.

The *significance*: An ordered society, the Pope being the lord and by the statute confirmed as such, and reforming Rome.

Of course the *significance* should have to be extended to comprising political, dynastic and ecclesiastical notions, but we let that be.

As we know, an historical *subject* is not such an evident things, depending as it will usually be on several factors. An event or process involves three factors (at least): what is *documented* (often, simply what we have to be content with), what one can understand about the *protagonists* in the event or process, and the biased and more or less informed view of the *writer* her/himself (Fig. 2.1.2).

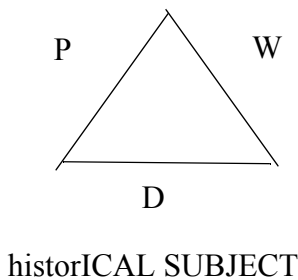


Fig. 2.1.2, *D = documented P = situation protagonists - W = writer her/himself.*

The conception of general history in research and writing is as a shell inside of which my handling of the documents must be assessed and evaluated; also in the cases of Cicero's *De re publica* or Tacitus' *Annales*, in which my analysis can be carried only to a certain point, with no other "conclusion" than the analysis process itself.

The big issue is to see what the term *history* may comprise and contain. My hunch here is that the field is a very vaguely defined one, seamlessly varying between the extreme fact documentation to *quasi-fairy tales* with some "real" material inside them. The field of history is not clearly defined or bounded except when considering the field as firmly subdivided in specialized branches. *The Economic history of France under Colbert* surely can stand on its own feet, but hardly so the *history of France* or of *The Middle Ages*. Trying to analyse them, we have to start from some smaller "internal" units or themes or subjects and let the view fan out in some of the likely directions, never being sure (or we *ought not to*) about the external boundaries.

Another question of course is how the bulky included material can show us how historical issues, subjects and themes are being managed by scholarship. A scanning here seems to reveal that research methodology and interdisciplinary perspectives do not attract much attention in the scholarly world of the historians, traditional, in fact, medieval-type, academic subdivisions in our universities counteracting such openings. The new digital culture will probably allow us to say, with the great historian, Robert Graves, *Goodbye to All That*.

2.2 *History, Stories and Fiction*

We can read about the abundantly documented development of Barcelona between 1888 and 1929 in Eduardo Mendoza's *La ciudad de los prodigios* (2006, with an Introduction by José R. Valles). The real facts are intertwined with the life of a poor man profiting from the disorder in the building process and becoming a gangster and very rich. This example of a classical type of novel, probably is especially engaging because it mirrors a strong tendency in us. We are unable to read about the simplest fact without wrapping it up in some reconstructive notions.

Whatever we propose or claim beyond pure quantification, we cannot pretend to arrive at anything more than a continuation with or substitution by an alternative view amongst several equally eligible descriptions. This is being considered a "modern" outlook, but what does this mean when the idea can be found in works by Miguel de Cervantes y Saavedra, who died in 1616?

We can consult Américo *Castro on this, in his *El pensamiento de Cervantes* (1925), a work focusing primarily on the latter's *Quijote*, parts I and 2; and also Julio Rodríguez-Puértolas' updated comments in a recent republication of this book, to some extent based on notes delivered to him by Castro shortly before the latter's death (2002).

Castro's summing-up of his interpretation of Cervantes is worth quoting: *la realidad es siempre un aspecto de la experiencia de quien la está viviendo* (p. 22; reality is always an aspect of the experience of whomever makes it), recalling Pirandello, as when the latter uses the title *Così è (se vi pare)* - it is like that (if you think so). Castro offers a short study of *Lazarillo de Tormes* (1554, published anonymously in four cities; pp. 441 ff. in the cited publication), focusing on the piecemeal character of Lazarillo's fictitious story about himself, a series of episodes with no interpretation and no conclusion; and no sufficiently obvious case for the Inquisition to take action.

Typically, Castro also wrote a piece on *Cervantes y Pirandello* (1924, pp. 691). He is worth listening to also because he did not consider his own book "definitive" but a stage in a process, working on improving it till his death. The editor of the new edition, Rodríguez-Puértolas, gives a penetrating analysis that should be relevant far beyond our specific subject (but too extensive to be reported here; pp. 9 - 25).

But such ambiguities and complexities also penetrate the "exact" Sciences, in the *Quantum* world as well as in the work of the probability mathematician *Bruno de Finetti*, another "relativist". I am going to spend some lines on his work and its entourage, since it puts us right into the core of the present book.

In 1934, Bruno de *Finetti (1906 - 85) wrote a book with the powerful title: *L'invenzione della verità*, published posthumously with comments in October 2006. The posthumous publication of the book (**Bibliography*) contains an extremely interesting *Introduzione: Scienza senza illusioni*, by Giordano Bruno (not the original one!) and Giulio Giorello, which must be treated as an autonomous and important contribution: their *Introduzione* (pp. 9 - 55), amounts to an autonomous contribution which brings De Finetti's work up-to-date; but it is too richly endowed with ideas and references to find a place here. On *probabilità*, recalling the role of De Finetti as a specialist in statistical mathematics, there are two entries on pp. 171 - 173, set down by B/G, with historical notes, axioms and formulations in predicate logic - and a special version developed by De Finetti himself. De Finetti was an internationally acclaimed mathematician specialized in probability calculus, statistical and stochastic math, economics and decision theory. He combined his work as a mathematical statistician with a Pirandellian gnoseology regarding reality, which he stated with blunt clarity in the title of the book, *The Invention of Truth* and elaborated in the text.

De Finetti, in his discussion of *probability*, has chosen Henri Poincaré's writings as his platform, supplying also arguments from Giovanni Papini and others, and offering a somewhat modified version of the idea of the subject.

The important point in the present context is not to give the technical details (which are beyond my competence), but to note that the idea of what might *probably occur or have occurred*, is the groundwork building-block of the epistemological perspective.

De Finetti also avails himself of Giovanni Papini's view of *pragmatism*, as it attracts *all who think in order to act, and thus prefer provisional truths rather than the inebriation from hyperabstract words (...tutti quelli che pensano per agire, cioè che preferiscono verità provvisorie ma operanti, all'ebbrezza delle parole iperastrate)* (De Finetti, p. 13).

Bruno De Finetti, too, adopted the Italian dramatist and prose writer Luigi Pirandello's version of relativism, at the briefest expressed in the title *Così è (se vi pare): this is how it is - if that is what you think*). Characteristically, De Finetti quotes from Pirandello's novel *One, nobody, hundred thousand (Uno nessuno centomila)*, the passus stating that each of us have a proper probability and from *Six characters in search of an author, 1922 (Sei personaggi in cerca d'autore): We have to invent the world in order to find place for our awareness (Dobbiamo inventare il mondo per inquadrarvi le nostre sensazioni ...)*.

Prediction is crucial in any study of historical processes because a stage *A* will necessarily include and involve predictions about stage *B* and hence assume corresponding attitudes, be "colored" by this prediction.

Two key terms in De Finetti's book are, as we have seen, *probabilità* and *previsione*.

The latter term needs a certain discussion before being used in English translation. Here are some notes. Collins/Sansoni has *previsione: forecast, prevision, foretelling*. Closely on the Italian significance in Zingarelli: *atto, effetto del prevedere (predizione: atto, effetto del predire)*. I would add *anticipation*, on which Webster, No. 5, has *intuition, foreknowledge, or prescience*. So much for the lexical values.

Taking the *functional* line, we can consider *prediction* as connected with *prevision* and the translations of the Italian *previsione*. Herbert Simon notes: *My predictions will face backward, for backward predictions are really the only ones we can wholly trust in this realm. After all, forward predictions may be influenced by the very theories we are trying to test* (*Simon, *Models of my life*, pp. 368f.). I understand this as meaning that we can predict about the future by evaluating the potentialities in the past. But can we escape letting our theories influence the procedures whichever way we carry on?

Wright *Mills, in his important book *The Sociological Imagination*, offers some constructive comments on the idea of *prediction and control* (pp. 127ff.). Having noted Simon's claim that prediction works backwards, we can let Mills suggest the implications.

Having started out with some critical comments on the *rationalistic and empty optimism* guiding studies on human affairs, Mills discusses various aspects of a couple of terms, *control and prediction*, ending up with John Stuart Mill: *if we can understand the structural transformations of our epoch, we might have 'basis for prediction'*. Needless (almost) to say, our "understanding" will normally be influenced by our predictions: how will all this end up?

Let me supply a summary of a report from Manfred *Geier, *Kant's Welt*, p. 173, who offers an excellent synopsis of some of the elements just noted that have become a modern commonplace: *an object in our focus adapts itself to our mode of perception; our experience being employed to understanding the objects, depending on our terms of thinking. Our understanding does not adapt itself to the object, for this must adapt itself to our understanding.*

Als Objekt der Sinne richtet sich der Gegenstand nach der Beschaffenheit unseres Anschauungsvermögen; die Erfahrung, durch die die Gegenstände erkannt werden, hängt von den Begriffen ab, durch die wir sie

vosrstellungsmäßig bestimmen; die Erkenntnis richtet sich nicht nach den Gegenständen, sondern die Gegenstände müssen sich nach unserer Erkenntnis richten.

Awareness of the fluctuating relations between factual observation and human cognition has a long story which can be highlighted with a couple of examples; and by consulting works like Ronald Giere's *Explaining Science* (how can one *explain Science*, which is a conglomerate of activities and of which one definition is as good as the next?) .

From Leibniz' life we learn that the invention of the *Calculus* influenced human thinking and philosophy (*Antognazza, 241ff., regarding Leibniz' ruminations on the relations between objects and concepts of them). A next wave of impact from the hard sciences came with *Quantum theories*.

The picture of fluids and fluctuating conditions in *Chaos*, a natural phenomenon (and also the title of an illuminating book by James Gleick), in its turn had an impact on the hard sciences. Under such conditions the understanding and application of *models from the sciences* become critical (*Gleick, pp. 278f. and 60ff.).

Important features from the story of fluctuation between the hard and the soft are recorded in Charles S. Parker's and George E. Dieter's books, the first on *management info systems*, the second on *engineering and design* (read: implementation).

A severe problem with history understanding and writing is that of *limitations* sideways, backwards and forwards.

To concretize, let me deliver a short and true story in order to discuss the delimitations of an actual event related to its larger context of events and developments; this with an eye to the criteria for delimitation of a subject treatment. Here is the story.

My wife Liv and I inherited from her parents, having lived in Western Uptown Oslo, a heavy, large, circular coffee table in birch, set on four low but crafty legs. Intending to give it a clean-up, we discovered that a thin, isolated and very long electric wire had been wound around the very uppermost part of the legs; you had to creep under the table top to see this antenna which, we understood, had been used to pick up instructions from London to the Norwegian Resistance during the Occupation (for Oslo city, 09 April 1940 to 08 May 1945; our war went on for a long time).

During the Occupation, Liv lived alone in the apartment in which she had grown up, her officer father being in a concentration camp in Germany and her mother and two younger sisters having fled to the West Coast where the family of farmers and fishers gave them food (in Oslo we had very little).

Unexpectedly, one day she was contacted by a family friend who asked if she could lend a room to a married couple whose names had to remain undisclosed, an indispensable provision. She accepted and the couple moved in, selecting the room with the coffee table. She hardly ever saw them, for they stayed inside at daytime and he went out at night. She understood their role, and she realized the danger: torture and execution if discovered. A traitor lived in the apartment below, so the risk was a real one. On the other hand, that may have been the motivation for the Resistance having chosen just the apartment of my wife's family: the Gestapo would hardly guess that something "illegal" would take place so closely to a potential informer. And we did have informers. Just across the street, the Resistance tried to liquidate one, but failed, and two schoolboys were taken away and shot. But let me not be unfair. We, presumably "Aryans", had no Marzabotto or Casaglia or Fosse Ardeatine in our country.

The couple in Liv's home disappeared after some time and she stayed on, her deed remaining unknown till this moment. Her behavior was heroic, but I do not think it was absolutely exceptional; "our" women being tough, fearless and to-the-point.

This short story is understandable provided we insert it into the large context of WWII and the Occupation of our country. But how to describe, to say nothing of delimiting, this "large context" which expands back- and forwards?

We might start from inside - from the story just told (bypassing now the question of *how* it has been told) and the local conditions, working our way centrifugally. *How far out?* The only answer that I can find to this kind of query, is that there is no answer to it except the one we make up ourselves. The answer in the cited case is of course the dominance of the personal factor. Having noted this rather obvious circumstance, we have at the same time admitted that *beginnings* and *conclusions*, principally speaking, are arbitrary. This problem becomes even more *evidently* intractable in methodological terms when fact and fictions are combined, whereas we can believe we are better off when the fictional elements are less evident.

We have a typical example of the *fashion of historical and fictional* elements in Lope de Vega's *Peribáñez y el Comendador de Ocaña*, which, especially as noted in Marín's edition, reveals features in contemporary society that illuminate characteristics of the class-defined society in a way that mostly do not arise in standard history texts. For in the theatre, people speak to one another, illuminating patterns of behavior left out in scholarly works (for the theatre reflecting social patterns and conditions, see Marín, pp. 31 - 38. I have not listed the relevant Spanish publications in the *Bibliography; they are easily found, having most of them been repub-

lished numerous editions). Another example is Lope's *Fuente Obejuna*, for which see below.

Colin Smith, pp. 18f., insists on the fusion in his edition of the *Poema de Mio Cid* (ca. 1140? - see also Castro, pp. 357 - 368). Its realistic or veristic character has led some to question its value as literary art, while the precise reference to persons and places, and its display of details, have led others to regard it really as a rhymed chronicle (... *su carácter eminentemente realista o verista ha hecho que algunos se pregunten si posee suficiente dimensión épica; su aire histórico - de hecho, en parte pseudohistórico -, la exacta alusión que hace a personas y lugares, y su cuidado por el detalle, han llevado a otros a considerarlo, equivocadamente, como una crónica rimada*).

Relations between history and fiction (*poesía*) is a central issue in Cervantes' *Don Quijote* (ed. Blecua, p. XLIII), reputedly with backing from Aristotle (who cannot defend himself), so the subject now on the agenda is not a new one. *There is no definite boundary between the one and the other.*

It would not be easy to claim that certain novels and stories, even when they do not cite sources, are without basis in documented historical information and relevant evaluations. There are many other comparable works. I am harping on this issue because I think we should demolish the inbred academic illusion of being *right* about anything.

The anonymous Spanish story, *Lazarillo de Tormes*, works by Tolstoi, Balzac (*Illusions perdues*, one among many), Edith Wharton's New York novels and tales, Manzoni's *I Promessi Sposi* (also on the plague of 1630, but including, to have "novel protagonists", the bloodless Renzo and his boring fiancée) are all historical accounts in literary garb.

Many literary texts have historical value without referring to specifically documented material. Ignazio Silone's novels about ordinary people and their life and conditions in the Italian countryside, for instance, his *Fontamara*, a concentrate distilled from lived realities, may be counted in here along with many others.

2.2.1 On Secure Ground?

Some history literature must be reliable? Let me start with the *res gestae* tradition.

In his *De re publica* (and partly his *De legibus*), Marcus Tullius Cicero adopts the *res gestae* tradition: he tells us what happened, with his protagonists and center-pieces always being individuals in various positions in politics, the military and the government. This is the tradition fol-

lowed by Macchiavelli, but with the modification that his writing had to reflect the complexities of modern politics applied to a city under dramatic development. In the same general tradition, we have the *History of Spain* by *Edwards and Lynch. This is a splendid work when evaluated by traditional standards, for the facts recorded; adopting the good old models from Cicero and later.

If we stipulate a scale from "*real facts*" (*Tatsachen*) <-----> to *fiction*, then historical accounts and data and concepts as well as pictures in prose fiction will find their place at some point of the scale; but we must not hope to find sharp distinctions on that scale.

Let me spend a little time over the fact-focused tradition of tentatively realistic recording known from Titus Livius up to Macchiavelli's *Istorie fiorentine*.

Ver iam adpetebat, the former tells us, spring was on and the troops could move again. Very straightforwardly, but we need a distinction between, on one hand, more or less indisputable records of facts, and, on the other, notions, opinions or situations that are embedded in interpreted contexts or systems.

Let the former be *data* and the latter *concepts*; this term justified by the notion that we ourselves, on top of the documents, come up with them and elaborate them. Thus Titus Livius, starts his *Ab urbe condita libri CX-LII* (in H. J. Rose's translation, with the original appended; Rose, *A Handbook*, p. 295), with proclaiming the healthy effects on society of conversance with past history (I wish he were right): *to have before ones' eyes conspicuous and authentic examples of every type of conduct (in cognitione rerum salubre et frugiferum, omnis te exempli documenta in inlustri posita monumento intueri; inde tibi tuaeque rei publicae quod imitare capias ...)*. Livius' great work was classified alternatively as *Annales* and *Historia* (Rose, p. 298), the latter probably as more interpretative than the former, which brings more purely *res gestae*.

History writing recording *res gestae*; was considered *purposeful* with regard to contemporary and future society, by delivering models for an optimal private and public life and warnings against failures to face up to such ideals. Cicero insists on that.

The "moral", it may be assumed, would tend to color an account in black and white, the good and the bad examples. Apparently only relatively recent story-telling actively calls forth cases and perspectives that connect both these extremes. Perhaps so because since the nineteenth century we have lived in a world in which *indeterminacy* has been a manifest if not dominant factor.

In his *De re publica*, II, 5, Cicero describes the foundation of Rome,

telling his readers that the town was founded by *Romulus*. Is this *history*? We do not know whether Cicero took it literally or used the legendary name symbolically. But he does stress Romulus' quasi-divine wisdom in choosing *where* to build the town, and in a kind of pre-Montesquieu argument for the influence of the environment on man and his life, to say nothing about the military aspect, he gives us details about the topography and greater geographical setting. *Qui potuit igitur divinius et utilitates complecti maritimas Romulus et vitia vitare, quam quo urbis...*etc. Regardless of the use made of the name of Romulus, the focus is not on the foundation itself but on the chosen setting, and the story functions historically because it answers the query, *where* was it preferable to build the future capital of the world, and what could one learn from the case? So Cicero wisely passes lightly over the foundation act, insisting - paedagogically - instead on the choice of site, which of course was - and is - well known.

2.2.2 Widening the View

Limiting the category of historical studies to accepted academic and faculty norms, would exclude accounts that may be classified as fiction but which reveal more understanding than most of the professional writings. Anatole France's *Les dieux ont soif* is probably the most realistic - and frightening - account of the French Revolution, with constant focus on the human side. Other fictional but essentially historical stories are Thomas Mann's *Buddenbrooks. Verfall einer Familie*, and Falcones' *La catedral del mar* (2006), to cite just some of them. Gore Vidal writes, without citing documentation (which can however be easily traced), to the point about crucial events and phases in American history, the very subject that Somerset Maugham blamed Henry James for failing to consider, accusing him of writing instead about the *tittle-tattle in English country houses*; not an especially just criticism, since James in *The Bostonians* and elsewhere really *is* concerned with human lives in a way that undoubtedly is historically relevant and illuminating. Robert Graves' two books on Roman history, *I, Claudius* and *Claudius the God*, as well as his *Goodbye to All That*, about the Great War, are valuable as fiction, we know that, but we can hardly reject the books as being historically irrelevant; nor can we regarding Erich Maria Remarque's *Im Westen nichts Neues*, about the same war.

My focus will be especially on *Spanish literature*, with two motivations. One is simply that on this subject I am a little better informed than on other branches. The second and basic argument is that Spanish society was, in particularly manifest forms, subdivided in definite socio-economic

classes and in religious denominations, at least, traditions or more or less consistently upheld customs. Attention to such structures are prominent in Spanish theatre and prose, and hence also in scholarly writings on them.

Spanish intellectual and professional traditions were nourished from three sources: *Hispano-Latin*, *Arabic* and *Jewish*, this last cited one being of particular importance. History-focused Spanish literature therefore is convenient for studying the relations subsisting between fiction and writings on history. And a very high percentage of Spanish scholars and writers were so-called *conversos* - converted Jews - themselves or by family tradition, having at some point, at least formally, and under threat from the aggressive Dominican judges at Toledo, gone over from Judaism to Christianity; this also applied to Miguel de Cervantes and many important writers.

This is the tale of the difficulties involved in having different cultures, indeed religions, living together. Isabella had taken the definitive step by driving all Jews who refused to convert, out of the country.

2.2.3 *In Direct Focus*

Some accounts focus on limited sections of historical events, such as Alessandro Manzoni's description, based on solid sources, of the plague in Milan (*I promessi sposi*). Or a recent well-documented book on the *Battle of Lepanto* (1571).

We have another example of historically based and focused fiction which centers around a specific type of case with its descriptive limitations but wide but unrecorded references: Émile Zola's *Au bonheur des dames*, 1883. As a young man from Aix-en-Provence, here a friend (later self-made enemy) of Paul Cézanne, Zola arrives in Paris, writes the frightening novel *Thérèse Raquin*, but also the paradigmatic organization-focused story just cited, fictionally but drastically reconstructing the violent installation in an old city area in Paris of a large department store and its beginning activity. The editor of my copy, Paris 1984, publisher Fasquelle [but who can find precise dates in French publications?], Armand Lanoux, in his *Préface*, is very explicit about the analytical qualities of the novel (pp. 8f.). The story is a fiction, but the case is "emblematic" for the development of the European city after the Industrial Revolution (with parallels in Italian cities in the fourteenth-fifteenth centuries).

An excellent account of a true historical event lasting only a few hours but involving a whole nation, is the aborted attempt at a take-over of Spain by the military on 23 February 1981, is Javier Cercas' *Anatomía de un in-*

stante, Barcelona 2009 (paperback 2010). Here, the potentials of relativizing history are amply demonstrated and exploited. The book is a "modern" one in that a definite event, the *instante* just referred to, is translated into a many-level process, not all of the "moments" strictly compatible while rather alternative (*see* for example his Chapter 1). This would not have been a novelty in literary fiction, but Cercas' report is a sober historical analysis in a political context. He returns constantly to the event all through the book, looking at it from a number of vantage points. No "professional" history thesis thus programmed would have been accepted by our universities. Because here, you must not be *uncertain*, you must be sure about the matter and deliver it to the world or the faculty, even if it is accepted that you name it all a hypothesis (a question of academic politeness).

2.3 A Philosophy of History?

Something more has to be said about the philosophical basis for these *Sections* on history. I am taking the term *philosophy* in a narrow sense of the word, *rational arguing about*, excluding the operators of *believing* or *conviction*.

Argumentation will touch philosophical problems and ideas, but I am not going to get myself lost in the wilderness that has been around since the earliest times and summarized by Erasmus of Rotterdam. Poking fun at the schools, Erasmus of Rotterdam, in his *Praise of Folly* (*Moriae encomium*, 1511, *Chap. 53*), reduces Philosophy to its real self: *Iam has subtilissimas subtilitates subtiliores etiam reddunt tot scholasticorum vitae...*; and he lists paradigms from which it is more hopeless to extricate oneself than from the famous Labyrinth: the *Realists*, the *Nominalists*, the *Tomists*, the *Albertists*, the *Occamists*, the *Scotists*; and these are not all of them, he notes, only the most famous ones. We are not much better off today.

*Seiffert and Radnitzky's *Handlexikon zur Wissenschaftstheorie*, München 1992, presents a much longer list.

Marcus Tullius Cicero bet on argumentation formed in active statecraft and politics, ironically placing philosophy as a weak follower of that tradition and emphasized the *handling* as the true manifestation of thinking (*De re publica*, I, 1,2: *virtus in usu sui tota posita est*, etc.). De Finetti, to cite a modern scholar, refers to the field of traditional philosophy as *una sterile arena di acrobazie verbali e di ludi dialettici* (translation hardly required, p. 69) and specifies the criticism (*see* also *Bruno and Giorello, summary (p. 10). A related discussion in Lucretius' *De rerum natura* (VII, ed. cit., 94) is about *astrology*, with a precise catalog of all the configura-

tions (which still today, even after Galilei-Newton rendered the idea impossible, populate the colored weeklies).

In his *Models of Thought*, of 1979, Herbert *Simon introduced what he called *two strategic principles* (pp. xf.), now to be quoted almost *in extenso* (his book started me off to what I have been trying to do ever since); remembering, however, that he talks about *digitally* running models. But some of the perspectives here can be useful also for my *Cmodels*.

1. *Thinking Man is capable of expressing his cognitive skills in a wide range of task domains [applying the math model with domain and range]: learning and remembering, problem solving, inducing rules and attaining concepts, perceiving and recognizing stimuli, understanding natural language, and others. An information processing model of Thinking Man must contain components capable of humanly intelligent behavior in each of these domains; and, as these models are created, they must gradually be merged into a coherent whole.*

2. *There exists a basic repertory of mechanisms and processes that Thinking Man uses in all these domains in which he exhibits intelligent behavior. The models we build initially for the several domains must all be assembled from this same basic repertory, and common principles of architecture must be followed throughout...*

It is *theory* that determines our approach to, our understanding and handling of themes, subjects and ideas, as Einstein pointed out in Heisenberg's talks with him: *Erst die Theorie entscheidet darüber, was man beobachten kann* (*Heisenberg, 1979, p. 31, and 2006, p. 37).

We cannot apply *law* or *logic* to historical material, William Dray's *Laws and Explanation in History* is clear about this (Oxford 1957; I have the Italian version, Milan, 1974). A comparison between history and Science cannot be made on the definitory level, only on the operative one, attempting to make *soft* arguments to some extent mirror or reflect the *hard* ones.

The question in the heading, *A Philosophy of history?* - is actualized because of the shakiness of developing theory on such a slippery and vaguely bounded field as history understood or written. Almost at every corner we are rounding, we run into *imponderabilia*.

In the following some aspects of this question will be discussed, but in the nature of things, with no reliable systemic anchorage. In many or most cases, the closest we can come to systemization is a tentative ordering by categories, not even they of high precision. The systemization issue will be taken up in a wider view in the sequel to the present work, as indicated in 2.10, *An Upcoming Sequel on Tacitus*.

The *Sciences* have much to offer for such an approach.

The essential teaching to be culled from them is to work process-oriented rather than subject-oriented, and, as a corollary, that there are no definite conclusions or results. . . *physics, like most sciences, is a dynamic subject where nothing is taken for granted or is a dogma* (Alonso and Finn, *Physics*, 1992). My central reference for these ideas is the story of the so-called *Quantum Mechanics and Theory* (2.5, *Indeterminacy a Resource*, and further on).

I can hear university colleagues complain that I make things too abstract. One reply is that theories are more real than the facts they are out to explain, cover or embrace, and require more space. Another one is delivered by Sasha *Krakowiak (and others in the same sense):

*The level of abstraction of the means of expression provided in this way tends to increase with technical advances, i. e., the objects and operations considered elementary on the abstract machine are implemented by more and more complex sets of objects and operations on the physical machine... The more we are enabled to emulate machines, the more complex things become (*Gregory, *Mind in Science*, in the *Bibliography in SL, Burden*); and challenging us even more.*

Originally, I planned to discuss at closer quarters some publications on history that could have articulated, perhaps supported or censured, my notions. One is Arthur C. Danto's much-acclaimed *Analytical Philosophy of History*, London 1965 (I have the Italian version, *Filosofia analitica della storia*, Bologna 1971). That work is excellent for what it says, less so for how it is said. But one cannot blame him for that. Danto appears to have been facing the same difficulty as I have been of handling a liquid without too much of stratification in it. Reading about history we work through some text about texts, three times removed from what happened. And "what happened" depends on whom among the contemporaries you ask and which historians you read and the perspectives you have inside you.

The present work is out to investigate such complex issues with the purpose of making them somehow manageable and available to analysis, which is exactly what a *Cmodel* is all about, and at the same time open up for profitable relations to the sciences.

The most problematic issue we have to face up to is the *apparent discrepancy* between, on one hand, simplicity in construal and smallness in dimension, versus complexity and high levels of numerical or conceptual bulk.

We have to *decide* if and how we will simplify our issue by rendering it manageable with models, accepting the loss in nuances and *imponderabilia*, and what we will include and how much of it. And for this determination there is no scale or measure or criterion except, again, what we

think we are up to. What is my purpose for doing this study, in what direction lies my aim?

Nobel Prize laureate in economics and administrative science, Herbert A. Simon, with his *science of the artificial* proposing the *satisficing* criterion, and his *bounded rationality*, and Eleanor Rosch with her relativizing categorization in a *perceived world* (*SL, *Burden*, 5.4.1-2) have somethings to say about such conundrums. So also the sociologist Tom Burns, cited by *Silverman, *The Theory of Organisations*, takes a comparable view: *The objects for classification are not organisations or parts or attributes of organisations but analytical concepts and frames of reference within which methodological procedures can be designed and comparative studies usefully made.* We, of course, have to decide about procedures and usefulness (see also the notes on *Causality* in Franco *Selleri's *Die Debatte um die Quantentheorie*).

Herbert Simon stated that we should work with simplified descriptions that leave out *the cluttering details* of reality: *Research in problem solving has shown that the efficiency of problem-solving efforts can often be greatly increased by carrying out the search for a solution, not in the original problem space with all of its cluttering detail, but in an abstracted space, from which much of the detail has been removed, leaving the essential skeleton of the problem more clearly visible; and further: 'Simple' theories are generally thought preferable to 'complex' theories. A number of reasons have been put forward for preferring simplicity, but the most convincing is that a simple theory is not as easily bent, twisted, or molded into fitting data as is a complex theory* (*Simon, *Models of thought*, I, pp. 63 and 324f, respectively).

The *present work* (SL's) is out to investigate the use of *simplification* to make complex issues manageable and available to analysis, which is exactly what a *Cmodel* is all about. The same applies to certain operative key notions, such as that of *causality* and *causation*. Let us have a word on this in the very context, *Quantum Mechanics*, in which the traditional idea of causality emerges as unreliable.

Regarding *simplicity* versus *complexity*, Murray Gell-Mann, Nobel Prize in Physics and "inventor" of the subatomic particle *quark*, is out to make a readable book, inviting us to enrichment of very sober arguments with pictures from complex Nature. The book, in fact, bears the title *The Quark and the Jaguar. Adventures in the simple and the complex*.

It is typical for his book that it conflates wide perspectives from our chaotic Nature and rigorous argumentation founded in Math and Physics, bringing together the simplicity of nature's basic elements, at the subatomic level, and the complexity of adaptive natural systems (*the quark and the*

jaguar), utilizing his vast knowledge of Math, defined as the fundamental *Science* (pp. 108f.), and Physics. It is a colossal and tightly woven achievement, and it would be almost senseless to try, in the present frame, to summarize features from it.

One can extract some of the essence by quoting from Gell-Mann's p. 369: *Complex adaptive systems function best in a régime intermediate between order and disorder*. The moral of this is not so easy to draw when it comes to the systems discussed in the present book, since they are *artificial and no more adaptive than we/I make them*. Nevertheless, since I try to be consistent in matching soft and hard programs, Gell-Mann's observations provide a platform. He develops the idea of the interrelations between the simple and the complex.

Let me briefly comment on a few recent publications, one of the characteristics of them being the complexity of subjects and perspectives that make them challenging for any attempt to sort out with some precision the levels of sense and significance in them (of course, this can also be said about several of the writings cited in the preceding *Sections*).

First Mario Vargas Llosa's *Sables y utopías. Visiones de América Latina*, a collection of fifty-two shorter and longer pieces delivered on many different occasions and in 2009 published in one volume. Latin America is supremely adequate for studying political history and theory, having been - and still seems to be - a shifty mosaic of liberalism, harsh capitalism and drug traffic, extreme poverty, raw dictatorships, guerrilla disturbances, semi-democratic experiments, isolated bouts of idealism, a splendid but apparently not very influential literature (fiction and poetry); the whole exposed to US attempts at indirect but also direct meddling; the entire conglomerate sharply described, analysed and evaluated by Vargas Llosa in this collection on 460 pages: a model of history writing, from which I "should have" selected thoughts for my sections on history.

Another book one should exploit much further than is possible in the present context, especially because it can stand as a model for a whole category, including some already mentioned, is the following one.

The experiences of a single individual can, if written with with what I call a *pseudo-vectorial* perspective, of extended historical accounts. One excellent example is Saul K. Padover's book, *Experiment in Germany. The Story of an American Intelligence Officer*, of 1946, which I have in the Italian version, called, wildly misleading, *L'anno zero. 1944-1945: un soldato ebreo alla scoperta della catastrofe tedesca*, Turin/Torino 2003. Padover, whose Jewishness plays no role in the book (except that, as an exponent of this culture, he was extraordinarily sensitive and analytically intelligent),

was no soldier and was regarded as an alien element among those who were soldiers.

He interviews a number of persons in Germany right after the Americans had entered the respective territories, and it is only the lack of emphasized sociological methodology that makes the book look less "academic". The book amounts to a study of *attitudes* and cultural traditions in a country under Nazi control, with the manifest ideology and national characteristics and all the embodied contradictions. The reported evidences "cover" the years from the late 1920s up to 1945 (hardly an *Anno Zero!*).

Another publication is Herbert Lindenberger's book about the sufferings of his own family in Germany, *One Family's Shoah*, Stanford 2013. He writes *shoah* instead of the usual, but completely mistaken *Holocaust*. I have always pointed out the absurdity of using the Biblical term *holocaust* for the murder of several millions of Jews and Slavs. In the Bible, Jephthah is ordered to kill as an *offering to God* the next person he will meet on the road, and this turns out to be his daughter. She exclaims: *Offer me in holocaustum!* Herbert's book more than justifies advice from myself and probably other friends to write the book when he, understandably enough, was reluctant to publish about his own family.

Herbert's book is another excellent example of how wide historical perspectives can be called up by a factually limited, even subjectively conceived case. In this connection Gad Lerner's *Scintille. Una storia di anime vagabonde*, Milan 2009, may be cited (thanks to *Tiziana Gessani* in Rome, who gave me the book).

2.4 Assigning Connections

Categorization, at least pragmatically, is crucial in any discussion of theory and modelling regarding soft subjects. In addition to sociological paradigmas, some new perspectives enter the game.

Any field or area has to be assessed by some criteria, at least, that are found outside of it, and the *Sciences* have much to offer for such an approach. The essential teaching to be culled from them is to work *process-oriented rather than subject-oriented*, and, as a corollary, that there are no definite conclusions or results. . . *physics, like most sciences, is a dynamic subject where nothing is taken for granted or is a dogma* (Alonso and Finn, *Physics*, 1992). This "moral" of a dynamical Science, with flexible boundaries coming into the bargain, is applicable to the Sciences, so that interdisciplinarity cannot be ruled out on any level or in any connection. My central reference for these ideas is the story of the so-called *Quantum Mechanics and Theory* (*2.5, *Indeterminacy a Resource*, and further on).

If we want to get some grasp on historical subjects, events or processes, I would say that the cited authors do not fail us, but that *academic tradition does so* by being unable to provide a model that could include perspectives from other fields in a meaningful pattern ready to be communicated to students and readers.

Because of our university subdivisions, in their traditions and curricula, *interdisciplinary* ideas are more or less ruled out (but fashionable at academic cocktails, according to Gell-Mann), and *pictures* do not belong to the field of *history*, even when they express someone's or some group's conception of specific events or processes across time. Is the following not a historical record?

At the original level, now crypt, of San Clemente in Rome (partly destroyed in 1080 and rebuilt a few years later on top of the old building), there is mural telling the following story. A composite saint, St. Clement (a mixup of someone drowned in the black sea and the first Pope Clemens, AD 88 to 97), is shown in the sea surrounded by swimming fish, where angels build him a sanctuary (details with liturgical texts in SL, **Patterns* and **Working* - on the present Internet site).

Someone will tell me that this is not *history*, it is *legend*. I would ask how to define the difference in a case that was - for a long time, if not today - regarded as a true historical event, one that affected people's historical ideas and conditioned their world outlook. Or would I be told by professionals that *history* gets truer and truer with time?

A historical subject much in view is of course the *female element*. In the traditional Christian society, the female element was always taken into account, nevertheless in a sharply subordinated role, often considered just an empty box into which to store the nascent baby. The female human being was accepted as a subordinated and secondary member of the family whose significance and role depended exclusively from the male.

Dacia Maraini, in her *Chiara di Assisi. Elogio della disobbedienza*, Milan 2013, gives, as Liv has shown me, translations of a vast range of theological-social writings from the Pauline letters in the Bible across the early Fathers (John Chrysostomos, Hieronymus, Tertullian, Augustine etc.) to many from the so-called Middle Ages (Thomas Aquinas and others) - and they all adhere to this view of women; or rather, *the woman*.

How to decide about what is history and what is not be included in a purview? The Romans, thinking in terms of *res gestae*, would not include subjects - at least not explicitly - like those we know from Sociology or Psychology. We, however, including them and a lot more, can use the idea and set the divide: what *has* happened versus what *is* happening and may be happening.

This is the place in which to refer to a set of paradigms that could seem related to the present program, so-called *social networks*. The connection would be based on the nature of digital models in use when handling this kind of networks, such as we find in *Borgatti, Everett and Johnson's *Analyzing Social Networks: much of our culture and nature seems to be structured as networks... Furthermore, a generic hypothesis of network theory is that an actor's position in a network determines in part the constraints and opportunities that he or she will encounter, and therefore identifying that position is important for predicting actor outcomes such as performance, behavior or beliefs* (p.1).

Urban and countryside life in the post-Classical Roman world, usually supported by the liturgy of the churches, experienced regular events of festive celebrations. The undercurrent of *daily* and *weekly* celebrations and people's participation in them (SL, **Iconography and Ritual*) is more than an extension from the great celebrations. It is basic to it both in religious and socio-political terms. With this summary I believe to have referred to an essential aspect of the work of the *Krems Institute*, to which I now turn.

Most useful and interesting it has been to have contact with the *Institut für Realienkunde* at Krems a/d Donau and one of the leading scholars there, Prof. Gerhard Jaritz, not to forget Prof. Elisabeth Vavra, the Director.

In 1989, Jaritz published a book that he modestly calls *an introduction to everyday history in the Middle Ages (Zwischen Augenblick und Ewigkeit. Einführung in die Alltagsgeschichte des Mittelalters)*. The work is much more than an "introduction"; and I have profited from it also in SL, **Working*, where I quoted some of the most crucial statements in the book. His chapter *Alltag - seine Komponenten und ihre Überlieferung* (the everyday and its contributions to tradition; pp. 13ff.) opens with a statement that I want to quote *in extenso* and which is accompanied by a graphical figure interconnecting four nodes: *Mensch - Objekt - Situation - Qualität*.

Alltag... spiegelt eine gewisse Anzahl oder 'Summe' von Gegebenheiten wieder. Diese sind bestimmte Bedingungen unterworfen, aus gewissen Absichten entstanden und beziehen sich auf konkrete Situationen. Jede entsprechende Quellennachricht läßt sich so als eine aus bestimmten Gründen entstandene Verbindung bzw. Verknüpfung der Kategorien Mensch (geschlechts-, gruppen-, altersspezifisch etc.), Objekt, Situation (in der die Mensch-Objekt-Beziehung auftritt oder durch welche sie ausgelöst wird) sowie Qualität (im weitesten Sinn, etwa als Form, Farbe, Material, Größe, Wert, Funktion oder Zahl) erkennen und interpretieren (with ref. an earlier publication by GJ). *Alltag läßt sich allein in der Auseinandersetzung mit*

solchen Verknüpfungen bzw. Verbindungen analysieren, die sich im Rahmen von Kommunikation ergeben...

Let me epitomize this important statement, using, somewhat unidiomatically, *everyday* as a translation of *Alltag* (also with reference to the important contribution by Helmut *Hundsbichler, *Alltagsforschung und Interdisziplinarität*). The *everyday or Alltag* mirrors some events which are determined by certain conditions, purposes and aims and are related to specific situations/events. Any entry in the sources (documentary evidence or information) can be recognized and understood in terms of the model connecting four categories: man-object-situation/event-quality/property. The Everyday can be analysed only in such correspondences/interconnections as arise in the framework of information/communication.

The *Alltag* perspective should be fundamental to the entire project of the present publication. For if we cannot account - tentatively - for normal conditions and situations among normal, average people, then we have missed the train, being left standing at the station quite alone (perhaps in the company of some other academics). In spite of honest attempts at breaking up the image, in academic history writing the leading and conditioning image is usually that of the bosses or *caporali* (to allude to the emblematic Totò movie, *Siamo uomini o caporali* - we are privates or officers) .

Since we have been preoccupied with "human" issues, the sociological ideas of *relativism* come into view. Relativism has long been a keyword but has been "resisted" by, among others, Margaret S. Archer (*Allbrow). Her comments are interesting in the present context because, if I read her correctly, she insists on using one basic model rather than changing over to another one as the wind blows. She writes (p. 20; the article; pp. 19 -33):

Speaking of a repertoire of responses to the various claims of relativism, she continues: Essentially these hinge on reasserting the unicity of 'human nature' as a basic axiom of the social sciences. Without endorsing the universal principle of humanity... no mode of life can be intelligible at all. In contradistinction, the price of agreeing that actors do inhabit truly 'different worlds' whose principles are matters of local linguistic conventions would be the abandonment of any comparative work whatsoever...

Historically oriented fiction, we know, can often be of more *sociological interest* than academically qualified history writings; works by Balzac and Tolstoy providing instructive examples.

Barred as we are from direct approach, the rather unsurveyable research volume in academic Sociology can be relevant only on the level of *methodology and theory construction*. In SL, **Burden*, there is a *Section* on two or three distinct approaches in the relevant literature (**Burden*: IV, 6: *Handling and Coping: She and He - or They?*). The drift of that discussion

was to identify perspectives of indirect utility for historical research. The context was a substantive study of ritual practices as laid down in a ceremony master's instructions for a church (San Marco, Venice). That ceremony book described existing practices and suggested rules for improvement on them and to some extent also introduced novelties. Thus there is some affinity between that book and the present one.

But my focus now is more on theory and methodology for handling them, while using the document as a test case for this assignment.

For such a program, I shall look to *challenges* from *modern Sociology*. A particularly penetrating analysis is briefly and systematically presented in an article by Margaret S. *Archer, *Resisting the Revival of Relativism*, and in *Albrow and King, *Globalization, Knowledge and Society. Readings from International Sociology*, pp. 19 - 33.

Archer starts with a short historical survey of "relativism" and summarizes (p. 19): *The common thread running through the career of relativism is an imperialist 'socio-centricity'. It is a careering movement which greedily loots percepts, concepts, truths, reason or logic, tearing them from their rooting in common humanity which abides in the same universe and making a gift of them to 'different worlds' to make what they will of them... [a note on certain 'strong' programs]... Radical relativism thus undertakes the demagification of science: it is an attempt to storm the twentieth-century bastion of universalism, a sort of dissolution of the laboratories in theoretical terms.*

The attack is efficient enough, but still sticks to the *what-there-is* syndrome and is tied up in a *knowledge* argumentation, basically evaluating the identity of things, rather than what we can do with them.

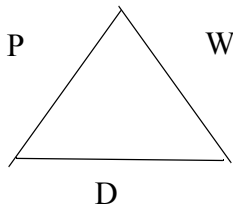
Sociological theory is out to capture and systemize events and processes in terms of human, social, economic, political and religious groups and categories in the human-experienced real world. To make programs fit this general assignment, the discipline is eternally caught up in the conundrum to choose between partial investigations and hypothesing over *states and situations* where, generally, the part-investigations have to handle human factors that defy usable verbal formulation and must search for assistance in abstract models. But a model to be made productive, must feature action not state, the *How -to-do* rather than *What-there-is*, - unless we want to rely on *charts*, such as those that illustrate how our business or industry or administration is built up; but then we have limited and static pictures of states, not potential dynamics.

With our point of departure in the observations just submitted, we must conclude that *concern over history is not a well-defined assignment*. Now we can be more definite about that.

One, we have certain documented data and information regarding time T_1 ; *two* the historical protagonists will have conceived of them *as well* as a number of other factors and features of their time, time T_1 ; *three*, the present observer and interpreter, at time T_2 , will handle and understand those two groups of perspectives, as well as certain paradigms and observations she/he will include in an overarching conceptualization. Of course, there are many "present writers".

So far we can picture the subject for these three integrated aspects in the shape of a *triangle* (pretty obvious), *D* standing for documented data and information, *P* for evaluations on the part of protagonist(s) in the historical situation, *W* for the writer's view (Fig. 2.4.1). Of course the *D* is being interpreted, usually sequentially, by *P* and *W*. By repeating the model operation, processes emerge (they will allways have to be defined as series of steps).

Fig. 2.4.1, *historical subject, i. e., event which is, probably, terminated.*



HISTORICAL SUBJECT

The DPW model of course is drastically simplifying. But we can introduce into the *P* factor structural conditions, tendencies (in Heisenberg's sense) and and constraints. Here we would find material and factors *available for description*. To specify now the parameters that could "accompany"

the *P*(rotagonist) on the model, we can appeal to specialized studies in social networks, such as *Borgatti, Everett and Johnson, *Analyzing Social Networks* and *George and Bennett, *Case Studies and Theory Development in the Social Sciences*.

The *P input* into the model can be described as being *in parallel* specific features as well as some structure of social networks. This double input can then be described in accordance with the proposals regarding *sociological theory* as stipulated by Knorr-Cetina and others (S I, *Burden, 6. *Handling and coping: she and he - or they?*), noting underways that Wright *Mills writes some pages (pp. 1622ff.) to promote the position that *there are several reasons for this intimate relation of history and sociology*.

Let me quote the relevant passage from Knorr-Cetina. "The third position", which I discussed in my book of 1984 (SL, **Iconography and ritual*, pp. 171f.) is represented by various authors such as KC, Cicourel and Collins (Knorr-Cetina and Cicourel, *Advances in social theory*, pp. 139ff., 150 - 56, also with the quotation of Collins below): ... *there appears to be no theoretical justification for taking the individual for granted as a simple, ele-*

mentary unit of social action ... ; rather we have to deal with a multiplicity of selves constituted in communicative interaction ... Today we are confronted with the notion of multiple identities which appear to be insulated rather than to be functionally integrated into just one person, or one individuality. Thus the macro-micro problem - how to make the multitude and the individual work on the same analytical level? - is solved: Macro- phenomena are made up from aggregations and repetitions of many micro-episodes (Collins). According to Ritzer (Ibid., p. 493.), Knorr-Cetina (1981) accepts interactional domain, grants greater role to consciousness and macro-level phenomena, like Collins makes the case for a radical reconstruction of macro theory on a micro-sociological base, she is also willing to consider the much less radical course of simply integrating micro-sociological results into macro-sociological theory ... I... believe in the seeming paradox that it is through micro-social approaches that we will learn most about the macro order... (K.-C.).

Ideas of relative realities were abroad at a much earlier date in Physics.

2.5 Indeterminacy a Resource

For a guide to theory, argumentation and the study of rational behavior, I am appealing to the debates that arose during the development of *Quantum Theory*. This body of theory, hypothesis and experimentation will therefore be an accompanying subject.

Our unorthodox friend, the late *Paul *Feyerabend* represented the view that had been developed in the reputedly *scientific* field of Physics: *there is no absolute difference between Science and literary myths* (chapter 19 in his *Wider den Methodenzwang*): *Es gibt also keinen klar formulierbaren Unterschied zwischen Mythen und wissenschaftlichen Theorien....*

From my early youth I have been sceptical of *scientific proofs* and I can thank my mother for that. Daughter of an internationally known scientist, she believed and insisted that this or that was *scientifically proved*. Adhering to the political opposition (mild differences in small and problemfree Norway), I must have felt that I belonged to the opposition here too. Now of course, I see that I was right and in good company.

We have support from the *Quantum* world for our asking for the *How* rather than for the *What*. Following this lead, we can do without the shaky support from traditional Philosophy.

Having perhaps succeeded in illustrating some of the irregularities and uncertainties in history understanding and writing, I want to show that we are in good company, namely that of *modern Science*.

First, it is to be noted, with Professor Razi Kalbe Naqvi of NTNU (biophysics), Norway, in a talk in June 2014, that *progress in Science* is not the absolute domain of "geniuses". They did not create the new knowledge alone, they arose with some ideas from the greater network of toplevel but normal Science:

To those who want to emulate Newton or Maxwell or Rutherford or Einstein or Dirac or Gibbs, I have naught to say. To those who are content to have Lord Rayleigh (J.W. Strutt, 3rd Baron Rayleigh) as their exemplar, I say: You too can have a carrier like mine.

The persons in the first two lines of Box 1b [shown to the audience] belong to the category of truly creative scientists, and most of us have not been blessed with an excess of creativity. If there are any Einsteins or Maxwells in the world of science today, I have not met them. We need to identify a different role model, and one candidate for placement on the pedestal is that whose name is highlighted.... Lord Rayleigh, who died in 1919. The word notoriety had obviously a different meaning in those days! His scientific work never blazed into a single flare .. ; and though useful, it never reached a great commercial success. He was not a great inventor, but he increased the range of fog-horns. His work is characterized by finish, skill, competency, even elegance, style, in fact. Much of it was critical in essence, and consisted in the filling in of gaps or the removing of obstacles in other men's investigations, the labor of the file, the final process of polish to theories roughed out by others. He has been truly said to be rather a critic than a creator, and a man with a lesser share of scientific imagination than the two great Victorians, Kelvin and Maxwell.

So far Razi Naqvi.

When I agree that normal Science counts for much more than is often acknowledged, this of course is in my own interest. But let me visit the bigwigs who did promote the new Physics of the twentieth century and with this the idea of a fundamental *indeterminacy* (also dubbed *uncertainty*, as in *Cassidy's book on Heisenberg). In mathematical Physics similar statements have been made, e. g. by Michel *Blay (in my Engl. translation of his *Les raisons de l'infini*, p. 163):

*Galileo's project was ... no longer that of mathematical physics, not at least as this was practiced on a daily basis. Just the same it continued and continues today, to furnish the means by which mathematical physics can always be questioned, revised, and renewed, the means by which mathematical physics will always hold out, in its deeper and most vital structure, the possibility of completing our knowledge of the world; and the reason why mathematical physics will always be, in a word, reason (recommended reading for *Horgan, with his *The End of Science*).*

In the present book, two interlocked ideas are taken as given. That the fundamental principle in Physics *permits* or *justifies* the acceptance and

adoption of the rule of *indeterminacy* (for which, see below) in historical studies; and that by the same token we are *obliged* to adopt it because the fundamental nature of the real universe cannot be eluded. Humans live in a world and have created cultures that combine incompatibles. Pirandello was aware of that. Our mentalities sit on an edge between two opposites and we have poor control over which way we will veer. How otherwise could one explain the dramatic change in attitudes in Germany across 1945 (forgetting about normal human hypocrisy such as described by Saul Padover)?

The notion of *indeterminacy* in Physics is a resource primarily because it opens up for a freer approach (but there are other aspects, too). And the concept helps us out of the straightjacket of academic lore. The constraints, however, are there, only less conspicuous.

I have sought support in the Quantum experience, focusing on the notion of *indeterminacy*. And I have called in this program and a few related ones for backing up my view - shared by many - of the importance of asking *How* rather than *What* and accepting general inconclusiveness.

The issue is relevant because the entire present work is dedicated to sounding the reflection in the soft studies from the hard ones.

Now let me present some of the *literature on the subject*.

An especially detailed (but generally accessible for non-professionals like me), description of the *Quantum* revolution from Planck to Heisenberg is to be found in Richtmeyer, Kennard and Cooper's *Introduction to Modern Physics*, 6th. ed., New Dehli 1976 (numerous editions).

There are two caveats to consider, and let me give them.

1. *The central laws of Physics cannot be applied to human behavior and cognition. Time is biological and no entropy can be attributed to our culture.*

2. *The only manner in which the comparison with Quantum theory can have any value is in terms of negative statements. We should hardly expect - even if it cannot be excluded - to find an order in human affairs when we find basic disorder in the laws of Physics, the parameter of indeterminacy.*

It is true that, working on human and historical affairs, we will strive to achieve some kind of *order*. But this is not to be found *there*; we have to *create* it.

And the alternatives are to some degree period-given. It is no logic but human affairs that have substituted a certain disorder and unpredictability for the certainties voiced in our parents' generation, when one's elders could insist that this or that was *scientifically proved*.

The *Quantum experience* is not directly relevant here, but the themes of *uncertainty, indeterminacy and inbred conflicts* have permeated certain sections of society and, after the grotesque Fascist and Nazi experiences and

two great wars, have contributed to making the themes a prominent perspective in our culture. In this sense and only this, can we claim that *indeterminacy* in Physics can be a resource for soft studies.

Society may have been prepared for accepting the idea. The contributions of "culture" to the growth of scientific idea has been a subject in scholarly literature in the recent decades (*works by Born, Cartwright, Casti, De Finetti, Feyerabend, Gardner, Holton, Miller, Simon - for some of these, also *SL, *Burden*).

On the other hand, the *Quantum* experience can to some extent *justify* the attitude built upon the indeterminacy idea, making some of us thinking: *If things are like that in our physical world, would it not be consistent to look upon our conditions and processes in similar terms?*

Let me put on record some critical features in the *Quantum Revolution*. For an outsider like me to give a sufficient *and* readable account of the *Quantum revolution* is no small assignment. On the other hand, if one is unable to do that with moderate success, then one cannot use the theme for argumentation. So-called *interdisciplinarity* requires some efforts from the reader as well as the writer; and people at one end have to be tolerant about the faults of those at the other. Approximation will often have to suffice.

Modern Physics, generally speaking, have much to tell us to make us doubt about the inherited certainties in earlier generations, such the *Twin Paradox* (described by Feynman in his *Six Not-So Easy Pieces*, pp. 77ff.). Another one is the reliance on *probability statistics* instead of definite quantities (Feynman). Feynman claimed that he thought nobody understood quantum mechanics, and he notes (p. 29): *The symmetries of the physical laws [on p. 1: a thing is symmetrical if one can subject it to a certain operation and it appears exactly the same after the operation] are very interesting at this level, but they turn out, in the end, to be even more interesting and exciting when we come to quantum mechanics. For reasons which we cannot make clear at the level of the present discussion - a fact that most phycists still find somewhat staggering, a most prfound and beautiful thing , is that, in quantum mechanics, for each of the rules of symmetry there is a corresponding conservation law; there is a definite connection between the laws of conser- vation and the symmetries of physical laws. We can only state this at present, without any attempts at explanation.*

Developments in Science has shown that *indeterminacy* is a *resource*, the latter term adequately defined by Anthony Giddens, admittedly in another context, as ... *capabilities of making things happen* (Giddens, *Agency, institution*, p. 170); happening, as I take it, qualified as conceptually and intellectually. Indeed, *resource*, even when understood in the everyday sense,

can mean supplying something capable of starting a process, often along a line of rationality. But rationality is *bounded*, as Herbert Simon has argued.

A new outlook followed upon the discovery of the role of *probability*. *Mit der Wahrscheinlichkeitswelle wurde ein völlig neuer Begriff in die theoretische Physik eingeführt* (Heisenberg., *Quantentheorie und Philosophie*, p. 17). The transition from one static condition to another (in *QT* terms): not a sudden change, because *das eine Bild wird allmählich schwächer, das andere taucht langsam auf und wird stärker, so daß eine Zeitlang beide Bilder durch-einander gehen und man nicht weiß, was eigentlich gemeint ist. Vielleicht gibt es also einen Zwischenzustand, in dem man nicht weiß, ob das Atom im oberen oder unneren Zustand ist* (a reference to the "double existence" at atomic level).

Einstein dramatically retorted: You are now moving in a very dangerous direction. For you are speaking at the same time about what we know about nature and not about how nature really is. *In der Naturwissenschaft kann es sich aber nur darum handeln, herauszubringen, was die Natur wirklich tut... Also, wenn Ihre Theorie richtig sein soll, so werden Sie mir eines Tages sagen müssen, was das Atom tut, wenn es von einem stationären Zustand durch Lichtaussendung zum anderen übergeht* (id., pp. 38f.).

As a conclusion to the refernces just made, I shall quote a passage from *Gell-Mann, p. 6, of 1994 , which also could have been used as a general introduction to the subject:

Quantum mechanics is not itself a theory; rather it is the framework into which all contemporary physical theory must fit. That framework, as is well known, requires the abandonment of the determinism that characterized the earlier "classical" physics, since quantum mechanics permits, even in principle, only the calculation of probabilities. Since its discovery in 1924, the predictions of quantum mechanics have always worked perfectly, up to the accuracy of the particular experiment and the particular theory concerned. But, in spite of this uniform success, we do not yet fully understand, at the deepest level, what quantum mechanics really means, especially for the universe as a whole.

We should by now have sufficient background for me to introduce the basic *vocabulary* for the *quantum complex*, using *Fischer's *Glossar* (pp. 282 - 284) and *Polkinghorne's *Glossary* (pp. 92 - 96; also with a summary of the essential mathematical equations on pp. 83 - 91); but mainly following Fischer. Traditionally, *Quantum Theory* (*Quantentheorie*; here abbreviated as *QT*) refers to the early phase of the new Physics (*Frühe Version einer Theorie der Atome, die eine Mischung aus klassischen Annahmen und Quantenbedingungen darstellt*).

Quantum Mechanics (QM) (Quantenmechanik) refers to the subsequent stage, with *Heisenberg's and Schrödinger's laws of motion in the atomic context, and which consists of essentially imaginary units (*Zuerst von Heisenberg und Schrödinger formulierte Bewegungsgesetze für den atomaren Bereich, die wesentlich imaginäre Elemente einschließen*).

However, I am going to *simplify the scheme* somewhat, considering *QT* as the general theory panorama, covering the initial stage *and* the *QM* stage associated with Heisenberg and Schrödinger.

Quantum - what is meant is a quantity in Nature that cannot be further divided into lower units in terms of *effect* (energy and time); demonstrable in the configuration of quantum jumps, variable changes [the *quantum* referring to Planck's constant h , the value quantifying the notion that motion on the atomic level goes by jumps, not continuously] (*eine nicht weiter teilbare (und nicht begründbare) Größe der Natur, die als Wirkung (Energie und Zeit) angegeben wird; praktisch durch Quantensprünge (unstetige Änderungen der Energie) nachweisbar*).

The problem of choosing between properties that were incompatible but nevertheless coexisted *in every experiment*, goes under the names of *Uncertainty* (the title of an excellent monograph by *Cassidy) and *Indeterminacy*. I shall use the latter, which, so to speak, has been made canonical by Gell-Mann, and which corresponds to Heisenberg's *Unschärferelationen*.

The fundamental teaching from Modern Physics (*Quantum Theory, Quantum Mechanics*) is that we do not work with Nature but with our concepts about these issues or subjects. This also, modestly claimed, is the general thesis in the present book. The models I am using serve as *intermediate operators between the notional real system and our statements about it*: - *real system -> models -> our statements*; the models introducing complex spaces into the game; whereas traditionally the path would be linear: *real system -> our statements about it = model*. This idea is related to Ronald *Giere's way of arguing (2.6, *Determination and Understanding*, and *passim*).

The kernel of the *Quantum idea* can be summarized as follows. The 1920s saw several interconnected fundamental discoveries: Niels Bohr's *Complementarity*, and Werner *Heisenberg's *indeterminacy (Unschärferelationen)*. The former turns on Bohr's assertion that *both wave and particle notions appear simultaneously in any given experiment* (*Cassidy, *Uncertainty*). The latter took up the paradox that one cannot measure both position and momentum of particle at one and the same moment with perfect precision. In the same direction of "*oscillating*" and *observation-dependent reality* works Max Born's *statistical* [distribution in average values] interpretation of Schrödinger's wave function, and also Wolfgang Pauli's *Exclusion*, showing that *no two electrons in an atom can exist in the same*

quantum state. Born's contribution was an interpretation that gave *probability a primary role in Physics and with this confirmed the acausal theory, the identification of the nature of an object depends upon the observation of it; to believe in its independence from this is an abstraction which has turned out to be untenable*. The idea of *causality* as traditionally interpreted goes by the board.

A *divide* goes between these conditions and those in which quantifiable experimentation, math and logic take over. But mechanical ideas unsupported by math also play a role here. We have a "proto-example" in Simon Stevin's graphical model (1586) combining a right-angle triangle and a chain of rolling balls, used in a thought-experiment on gravitation (Clericuzio, pp. 176f. and his *Figura 23*). Stevin published in the vernacular, insisting on giving non-specialist people access to his discoveries.

The interrelated positions of the principal programs in Modern Physics are splendidly explained in Von *Weizsäcker's *Aufbau der Physik* (Fig. 2.5.1, here).

The highly complex interconnected programs evolving during the period from the end of the nineteenth century up to the late 1920s, brought about *radical changes in the views of reality and causality*. This is the kernel issue of the whole business. In fact, the very term *QM* indicates this discovery, which was Heisenberg's personal achievement.

At issue was really how to frame the "right question" and this turned out to be the following question he recalls in a book of his, *Der Teil und das Ganze*. Here he is asking: Calculating with approximate values, can one make the margin of approximation so small as not to compromise experimental results and, presupposing this, predict place and velocity for an electron? A short control after my return to the Institute [after a recovery period at Helgoland] showed that mathematically the operation was possible - and the approximate value thus confirmed was later known as the *Indeterminacy in Quantum Mechanics*.-

*Kann man in der Quantenmechanik eine Situation darstellen, in der sich ein Elektron ungefähr - das heißt mit einer gewissen Ungenauigkeit - an einem gegebenen Ort befindet und dabei ungefähr - das heißt wieder mit einer gewissen Ungenauigkeit - eine vorgegebene Geschwindigkeit besitzt, und kann man diese Ungenauigkeiten so gering machen, daß man nicht in Schwierigkeiten mit dem Experiment gerät? Eine kurze Rechnung nach der Rückkehr ins Institut [Heisenberg's return] bestätigte, daß man solche Situationen mathematisch darstellen kann und daß für die Ungenauigkeiten jene Beziehungen gelten, die später als Unbestimmtheitsrelationen der Quantenmechanik bezeichnet worden sind (*Heisenberg, *Der Teil und das Ganze*, p. 97).*

Von *Weizsäcker (Fig. 2.5.1) epitomizes the break with classical views in the following terms (p. 490f.), under the heading *Das Deutungsproblem der Quantentheorie* (the interpretation issue concerning the *QT*). He declares himself convinced that the story is one of fundamental philosophical advance, progress. *It was not the QT [itself] that had to answer before the law courts of traditional philosophies, but rather these philosophies had, within their own system, to answer for this, with the QT as a witness [an adequate way of looking at Philosophy].*

... daß es sich um einen fundamentalen philosophischen Fortschritt handelt. Nicht die Quantentheorie hat sich ... vor dem Gerichtshof überlieferter Philosophien zu verantworten, sondern diese Philosophien haben sich in einem selbst philosophischen Prozeß zu verantworten, in dem die Quantentheorie als Zeuge auftritt. Einstein, too, of course, had ideas relevant to the problem (see *Induction and deduction in physics*, *Isaacson, pp.116ff.).

The notion of *fundamental indeterminacy* in scientific procedures, processes and products can be dated back, at least, to *Immanuel Kant*. Here is Manfred Geier on Kant's view that *our grasp of <real-world> objects is not framed by the nature of the objects, for it is the objects that come into view on account of our conceptual abilities.* Kant's "revolution" began

mit einer einfachen physiologischen Feststellung... Als Objekt der Sinne richtet sich der Gegenstand nach der Beschaffenheit unseres Anschauungsvermögens; die Erfahrung, durch die die Gegenstände erkannt werden, hängt von den Begriffen ab, durch die wir sie vorstellungsmässig bestimmen; die Erkenntnis richtet sich nicht nach den Gegenständen, sondern die Gegenstände müssen sich nach unserer Erkenntnis richten; die Ordnung und Regelmäßigkeit also an den Erscheinungen, die with Natur nennen, bringen wir selbst hinein...(Geier, p. 173).

In the *Quantum universe*, comparable ideas arose, this time supported by observations in Physics. Heisenberg claimed that Niels Bohr believed more in his models than in the reality they were designed to represent (see below). This stance can be linked up with the appeal to visualization, to imagery or pictures in order to approach reality, as considered by many scholars from Bellarmino to Arthur *Miller.

Heisenberg himself has a chapter, *Quantenmechanik und Kantsche Philosophie* (Heisenberg, 2006, pp. 62 - 75). Let me highlight a few points in this essential relation.

Quantum Mechanics (QM) exploits the Kantian notion of *causality*; for Kant not being based upon empirical data but quite the opposite, the very presupposition for all experience. It belongs to the category of reasoning that Kant labelled *a priori* (*es ist umgekehrte die Voraussetzung für alle Er-*

*fahrung, es gehört zu jenen Denkkategorien di Kant "a priori" nennt; for a closer review of Kant's use of this term, *Bennett, pp. 62ff. and his index).*

Traditionally, Natural Science presupposes direct causality (*eindeutige Verknüpfung von Ursache und Wirkung*).

How, then, is it possible that *QM* will dismember the law of causality and yet remain a Natural Science: *daß die Quantenmechanik dieses Kausalgesetz auflockern will und doch gleichzeitig Naturwissenschaft bleiben möchte?* (We might perhaps answer that NS is not a clear category but a cluster embodying different laws; but let that be).

In response to these queries, Heisenberg goes on to explain what kind of teachings the *statistical* interpretation of *QM* has brought forth. After ten more pages of argument, which I shall bypass here, Heisenberg offers a historical view on the problem: the structure of human thinking undergoes changes, and the advance of Science is realized not only by the discovery and explanation of new data (*Tatsachen*), but also because we learn anew what *understanding* may mean: *daß wir immer neu lernen, was das Wort "Verstehen" bedeuten kann*. For a layman like myself, it seems acceptable to say that witnessing statistics bringing out results we do not understand in the customary sense of this verb, is a *recording* that represents another way of understanding.

For a closer view of the substance, we should note that Heisenberg focuses on the following key terms: *Observation, Probability, Complementarity* and *Possibilities, Tendencies* (respectively *Beobachtung, Wahrscheinlichkeit, Komplementarität* and *Möglichkeiten/Tendenzen*).

Observation, of course, depends on the conditions for and aims of the operation, and here *Complementarity* is crucial, since this is the notion according to which Classical and Quantum Physics can be combined (see Polking-horne's explanation of Complementarity: *The requirement that the results of classical physics must be recoverable from quantum theory as a good approximation for the behaviour of systems whose action is large compared with Planck's constant [h]*. Action: *An important dynamical quantity, related to the 'business' of a system, which can be measured in units of Planck's constant*).

Quantum Theory-speaking, the theoretical interpretation of an experiment requires *three steps*, the first a *probabilistic* evaluation of starting conditions, then certain *calculations*, and thirdly, a new *computation of the system* (Heisenberg, *Quantentheorie und Philosophie*, 2006 (orig. 1979), pp. 45ff.). Only the second assignment cannot be realized in Classical terms, because at issue here is what to do with the electron's *notional orbiting* around the atomical nucleus, a notion that cannot be established

because of incommensurable dimensions. Intuitively it seems clear that *end results* will turn out as *tendencies* rather than hard facts. These are the critical points in the Chapter, *Die Kopenhagener Deutung der Quantentheorie*, pp. 43 - 61, in the cited publication by *Heisenberg.

Quantum mechanics and related theory, fundamental in our physical existence, offer sufficient justification for us not to try to rely on *certainty* when considering complex issues and problems.

Of special interest for the present work is the fact that there were *three propositions* (not the ones just noted) that together form a genuine *verbal model*; in that they introduce for consideration as positive values certain interrelated entities in such a way as leading one to explore the consequences and the sequel. Some protagonists, we shall see, disavowed it. The model is useful by setting boundaries - *yes* or *no* - in the understanding of fundamental Physics in the 1920s.

Following *Selleri regarding the "modern" protagonists with their negative attitudes to the triple verbal model, I shall bring a short survey, hoping to support the *epistemological platform for my own work*. This can sound rather cocky, but then I do not pretend to contribute anything to the theories. I find some ideas in the Physics debate just cited, constructive for developing a policy of an adequate *logistics*.

The *three propositions* (Selleri says *Fragen, questions*), as formulated by Selleri in a succinct but eminently pertinent statement, were up for debate. He sets up a divide between assent or dissent among the protagonists, as we shall see a little later on. The questions precisely recapitulate the fundamental notion in Physics, specifically regarding atomic structures and behavior, but also in general philosophical terms, as the author notes (epistemological, one might say).

I shall give the German original in brackets; better than my translation (Selleri, pp. 3f). Here are the three questions:

- #1. Do the basic objects in the physics of the atom - electrons, photons and the atom itself - *exist* independently from humans and their observations?
- #2. If the answer is *Yes*, will it then be possible, regarding the structure and the development of objects and processes at the atomic level, to understand these things in terms of models of thought that correspond to reality?
- #3. Should we formulate/work out the Laws of Physics in such a way that every observed effect/result can be referred back to at least *one* origin/cause?

Here are the originals.

- #1. *Existieren die grundlegenden Objekte der Atomphysik - Elektronen, Photonen und die Atome selbst - unabhängig von den Menschen und ihren Beobachtungen?*

#2. Wenn ja, ist es dann möglich, die Struktur und Entwicklung atomarer Objekte und Vorgänge durch die Formung gedanklicher Bilder zu verstehen, die der Realität entsprechen?

#3. Sollte man die Gesetze der Physik so formulieren, daß jeder beobachtete Effekt auf zumindest eine Ursache zurückgeführt wird?

While those who looked at the new *quantum mechanics* with scepticism (more or less consistently, or even plainly negatively, like Einstein, for a while), all answered positively to the three questions.

They were *denied* by Sommerfeld, Bohr, Born, Pauli, Heisenberg, Jordan and Dirac.

The above questions, Selleri announces, will be recognized as the *reality status of intelligibility and causality (Probleme der Realität der Verständlichkeit und der Kausalität)*. From this, he develops his story of the critical phases in the debates through three generations of direct protagonists (pp. 4 - 41).

In the forming years, *QT* was debated as a philosophical and epistemological issue. Later, it became a tool and not so much a subject for metatheoretical concern.

We have an example of severe disagreement over the *QT* regarding Planck's constant h . *The equation for the energy in each individual spring [Bolles' image] became $e = hv$. Planck did not think of hv as a real thing the way Einstein did, but he had shown that by speaking in terms of units of action, what he called quanta, he could understand why his earlier radiation equation worked* (*Bolles, p. 44).

Good summaries of the *QT* are due to *Alonso and Finn, their superb textbook on *Physics*; to *Beiser, *Cassidy and *Leinaas. Reference is also due to Von *Weizsäcker's *Aufbau der Physik*, with an extensive and highly articulated treatment of the subject. Von W. also refers to a publication that I have not seen; a *hervorragendes Buch*: Max Jammer, *The Philosophy of Quantum Mechanics*, 1974.

For a close study of Einstein's reactions to and against the *QT*, there is, beside numerous other publications, E. Blair *Bolles, *Einstein Defiant. Genius versus Genius in the Quantum Revolution* (an informative but somewhat rambling account full of distracting historical references; and statements like the following one: *As passionately as Monet believed in color, Einstein believed...*, etc.).

In some scientific texts we are told that Classical, Pre-Quantum Physics is an attachment on the Quantum one. Whatever the way one looks at the connection between the two programs (and I am not equipped to take a stand on that), the links have to be kept in mind. At least the Quantum view seems to need them.

Hoping to come to grips with this question, at least by way of suggestions in an experimental context, I would rely on Von Weizsäcker's *Aufbau der Physik*, a work that goes to an impressive depth and amplitude of scope; written by one of the second-generation *Quantum* protagonists.

The cited scholar gives a graph, among several ones, of the historical development of the relevant *theories and their interrelations* (*Diagr. 3: Das Gefüge der Theorien*) and specifically with *quantum theory* (*Diagr. 4: Rekonstruktion der Quantentheorie*). Here he has to do with *stated* subjects; and *our descriptive models come in as elaborating agents between our explicative statements and our understanding of reality* (Fig. 2.5.1).

We can also consult Richard *Feynman's book, *The Character of Physical Law*, written with his usual lucidity and appeal, and certainly not predicting any *End of Science* (*Horgan's book). He tells us, and he was exceptionally able to epitomize and at the same time have the readers or audience follow his discourse:

You may think that I have told you everything already [about modern Physics],... But the principles must be principles about something; the principle of the conservation of energy relates to the energy of something, and the quantum mechanical laws are quantum mechanical laws about something - and all these principles added together still do not tell us what the content is of the nature that we are talking about (p. 149 in the cited edition).

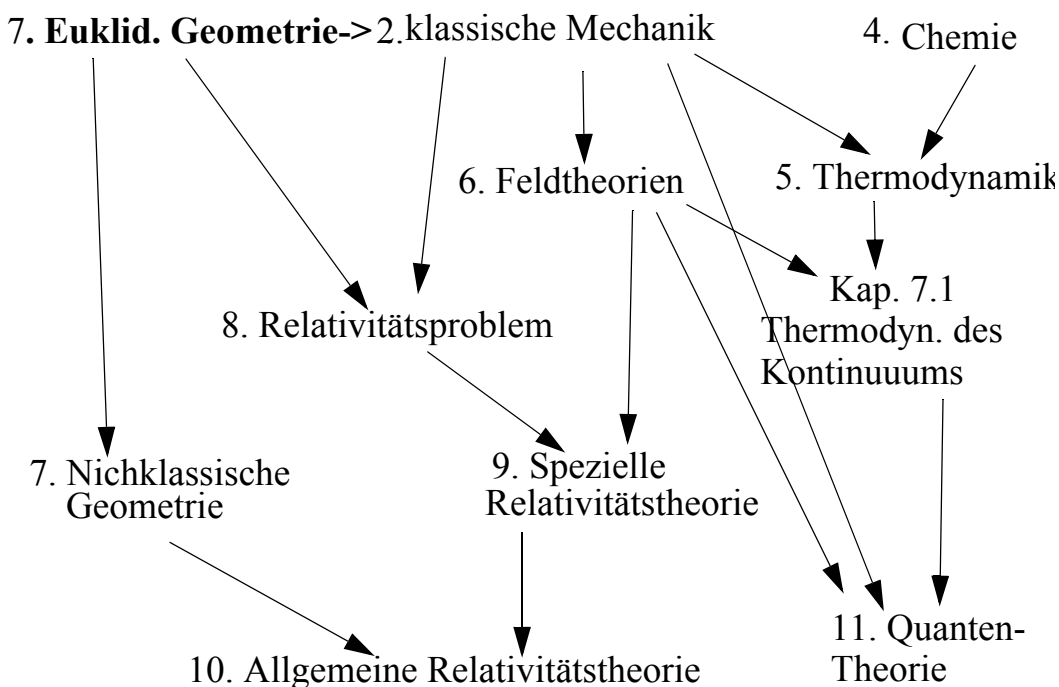


Fig. 2.5.1, *Das Gefüge der Theorien*, the historical generation of the theories, redesigned after Von Weizsäcker, *Diagramm 3*, p. 221. *Gefüge*: Construction,

Structure, System, Frame, Articulation (Cassell's German Dict.). The other terms should not need translation.

In order to extend somewhat the picture conveyed above but also to substantiate the subject, I shall bring some *quotations* from Selleri and others regarding the essential features of th *QT*, in English with the German originals appended (in *Italics*); a little *Reader*. The order in which I cite the items is not very strict; specialists may resent my intrusion into their garden, but academic boundaries have less importance than earlier; and the scientific message in the quotations should be relevant for the Humanities and the Social Sciences also.

2.5.1 A Short Quantum Reader

There have been published a vast amount of books on the substance of *Quantum ideas* that are more or less accessible to a layman like myself (*Polkinghorne, 1984 and later ed.s, and Camejo *Arroyo, 2006; the latter an incredibly fascinating work by a person who was extremely young when she published the book); for a focus on the *debates* among the protagonists themselves, rather than on their results, there is Franco *Selleri's *Die Debatte um die Quantentheorie*, 1990, which I have in the German edition (especially valuable since it was revised specifically). Here we go.

Bohr's definition of *Physics*: It would have been false to claim that the job of Physics is to find out how Nature is constituted. Physics is concerned with the statements that we can make regarding the reality of Nature. ... The word Reality is also [just] a word, a word we have to learn how to apply.

Es ist falsch zu glauben, daß es die Aufgabe der Physik ist, herauszufinden , wie die Natur ist. Physik beschäftigt sich mit den Aussagen, die wir über die Natur machen können...; and: Das Wort Wirklichkeit ist auch ein Wort, ein Wort, das man richtig zu benutzen lernen muß .

Bohr again:

The radical nature of our [present] attitude to how we describe Nature during the development of atomic Physics, is probably brought out most clearly in the fact that even the principle of causality ... has been shown to be too narrowly framed to enable us to describe the regularities that

appear in the individual atomic processes.

Wie radikal der Wechsel unserer Haltung bezüglich der Beschreibung der Natur während der Entwicklung der Atomphysik ist, wird vielleicht am klarsten erkennbar aus der Tatsache, daß sogar das Kausalitätsprinzip... sich als zu enger Rahmen erwiesen hat, um darin die Regularitäten zu beschreiben, die bei individuellen atomären Prozessen auftreten.

Pauli:

Material or normal physical objects whose constitution should be independent of the way in which we describe them, such things are metaphysical appendages. We have seen that modern Physics has been forced by factual experience to realize that such abstractions have to go.

Materielle oder allgemein physikalische Objekte, deren Beschaffenheit unabhängig sein soll von der Art, in welcher sie beobachtet werden, sind metaphysische Extrapolationen. Wir haben gesehen, daß die moderne Physik, durch Tatsachen gezwungen, diese Abstraktion als zu eng aufgeben mußte.

Pauli again:

Facing some specific system (object), can the outcome of prospective observations exclusively consist in statistical previsions (primary probability), while the result of single [specific] observations are not determined by rules/laws, and cannot be linked up with a cause?

Bei gegebenen Zustand eines Systems (Objektes) lassen sich über die Resultate künftiger Beobachtungen im allgemeinen nur statistische Vorausagen machen (primäre Wahrscheinlichkeit), während das Resultat der Einzelbeobachtung nicht durch Gesetze bestimmt, also letzte Tatsache ohne Ursache ist?

Heisenberg, too, speaks of statistical handling (ed. 2006, pp. 14ff.).

Heisenberg on causality (here repeated):

The chain between cause and effect could be explored quantitatively only by appealing to the entire Universe - then, however, Physics would disappear and only a mathematical pattern remain.

Die Kette von Ursache und Wirkung könnte man nur dann quantitativ verfolgen, wenn man das ganze Universum in das System einbezüge - dann ist aber die Physik verschwunden und nur ein mathematisches Schema geblieben.

For summaries of the essentials in the *Quantum* program, the reader is referred to the splendid textbook by *Richtmyer & al., pp.

129ff. (Planck), 233ff. (Bohr), 196ff. (Heisenberg).

2.6 *Determination and Understanding*

Comforting prospects for academics: your university discipline tells you what to decide when facing a text, a picture, an attitude, a behavior. When two or three differently schooled people look at one and the same object, such as pictures of pious men (or women or both) that are shown kneeling before a crucifix or a saint, each "school" tends to see more or less exclusively what is its speciality; while a "school" defies precise definition.

In a recent contribution on Late-Medieval religious *drama/theatre* (Pamela King, in the cited Krems volume; *Jaritz), we are told, with abundant bibliographical support, how portraiture reflects reality: "*Again, let us begin with the relatively simple image, the static representation of a donor kneeling at the feet of a saint*". The way the portrayed individual *directs his gaze* with a distinct focus or otherwise when kneeling before a crucifix or saint, discloses, according to the writer, the cognitive status of the portrayed person, as if portraiture *mirrored* events or actions in the real world.

But no!, will other say, for the individuals were not portrayed for what they *did* but for what they *were or pretended to be*. The important thing in portraiture is that the facial likeness, correct or idealized, with the adequate dress and trappings, was presented to the contemporary audience and to posterity; an interpretation that strikes me as obvious. At any rate, one has to look beneath the appearances and realize that depicted prayer (which the "donors" are doing) and theatrical performance, even the sacred one, are two functionally different processes in different contexts.

Thirdly, the *sociologically* oriented onlooker would overlap that claim and say that the dress, colors and jewellery which denoted certain social, perhaps also political, standing was the dominant interest.

Training according to academic subdivisions does not ensure or even support analytical competence beyond given limits that are often too narrow.

The kernel of my argument here is *determination*, whether tentative, experimental or hypothetical. Such an estimate will normally arise from some kind of *understanding*. I am discussing this tricky issue without references to the enormous philosophical literature focused on it. In an experimental, approximative and operating world, we can and must simplify our verbal models.

Placing an item into a system, we understand the item, provided we are able to locate the system itself into some meta-system, for which again... But we do not here need infinite regress. We "understand" why Newtons (unauthorized) apple fell to the ground, and we can express this grasp on the event mathematically, and will *understand* it even better. *Causation* and *explanation* are notions, if applied the traditional way, that leave us with chains with infinite regress. In numerous cases, we go full circle, as we do when saying that the water in the tank froze *because* the Celcius temperature sank below zero: quite correct, since we defined zero Celcius temperature by the freezing level of water.

But usually, especially when facing complex items, these home truths can be forgotten and another one be substituted as a tool for determination. The theory which is being developed across this book will, I believe, bear me out on this theoretical and strategic decision, for which I shall certainly not claim originality. There can be no absolutes here, for we will, and usually have to, select reality criteria according to the models by which we can handle them; this sound like circularity: and it is of a kind we have to live with.

A neat, but debatable, distinction between rationality and more or less emotionally and individually framed patterns arose early in Antiquity. Terentius has it in his *Andria*, where the line is drawn between what is natural and what is driven by thought (*industria*, diligence, activity; in the excellent Italian edition by Laura Pepe: *secondo un piano*): *Paulum interesse censes ex animo omnia ut fert natura facias an de industria*. Today, such a distinction looks spurious; but not to our grandparents, perhaps.

The traditional notion of explanation and causation attribution as some kind of linear sequence: *A because of B*, simply doesn't work. Both notions have to be understood in a spacial frame.

Such as:

Loading or positioning an item into some presupposed *system* and exploring the constituents of the item in that frame,

or

developing a *system* around the item.

In other words, explanation is a productive process, and no one can claim any explanation to be definite or final. .

Here too, Richard *Feynman delivers useful comments. In his *Six Easy Pieces* (p. 24), he notes:

What do we mean by "understanding" something? We can imagine that this complicated array of moving things which constitutes "the world" is something like a great chess game being played by the gods, and we are observers of the game. We do not know what the rules of the game are, all we

are allowed to do is to watch the playing. Of course, if we watch long enough, we may eventually catch on to a few of the rules. The rules of the game are what we mean by fundamental physics. Even if we knew every rule, however, we might not be able to understand why a particular move is made in the game, merely because it is too complicated and our minds are limited... We must... limit ourselves to the more basic question of the rules of the game. If we know the rules, we consider we "understand" the world. And Feynman supplies three criteria for telling whether the rules which we "guess" are really right... - etcetera.

Intending to quantify a *causality* relation, Werner Heisenberg noted, would take us to the end of the Universe (*Selleri, p. 31). The causality-effect chain could be monitored quantitatively only by counting in the entire universe, but then Physics disappears and we would sit back with a purely mathematical scheme (*see above: Die Kette von Ursache und Wirkung...*).

There are fundamental ideas of causality in the *Quantum* debates, in which the statement of Heisenberg arose (*2.5, *Indeterminacy a Resource*). The paradigms teach caution when using them metaphorically on soft material.

Let us say we agree that if *history* is description and causality attribution and evaluation of events and processes in time dimension, then there is no available semantical logic that rescue it from being, to a greater or lesser extent, the creation of the writer or story-teller; and colored by observational limitations and prejudices and subjective, career-focus or fuzzy motivations. The over-all image of this activity is a seamless scale that compromises attempts at categorizing history accounts by any criteria but the very same ones that we applied when writing. I can say I am trying objectively to do historical research, but this is an information about myself, not about what I am doing. To render this circular process available, experimentally, at least, for handling with some degree of precision and readiness for communication, to pin down some sufficiently simplified elements, we can use *Cmodels* and verbal models in combination, working in parallel, using the *bi-track* approach.

Causality is always a tricky idea in the Sciences and outside of them. Historical causality-arguments of the type of linear sequence leave us sinking ever deeper into the quagmire of infinite regress where one station is as good as the next (*linear causality*). It would be easy for me, applying *infinite regress* and, referring to international financial and economic developments and interdependence, to show that Auntie Julle (borrowed from Ibsen) broke her leg on the ice in Oslo because of the real-estate crisis in the US. The crisis or indeed the United States of America - the options are numerous - would then be the *explanans* of Auntie's mishap.

Connecting the notions of *instant* and *causality*, we have Calculus to help us, providing a graspable and imitable picture of instantaneity as the product of certain operative moves.

Here is a traditional model of the *instant* in the Calculus that I designed for SL, **Patterns* (Fig. 2.6.1, here).

The y -value (range) depends on the value in the domain, x . We can say that a specific x -value is the *cause* of a specific y -value. This is one of the many possible expositions of the basically vague notion of causality.

The relation $x \rightarrow y$ is a determining one, to one x there follows one and just one y . If we repeat the operation n times and notionally with a minimal distance on the number line between the x -values, then we have a *quasi-continuous* line - but only *quasi*. To make the line *continuous*, we have to let our imagination play and imagine that the distances dwindle down to *zero* (which, mathematically, they never do). The notes on *time dilation* in Alonso and Finn's *Physics* (pp. 493f.) can get us closer to the nub. *The time interval between two events occurring at points at rest relative to an observer is called the proper time interval* [and they refer to the equation they have calculated out]. In model terms, then, we cannot skirt such time intervals, which forces us to relinquish the notion of continuity.

The highly complex interconnected programs evolving during the period from the end of the nineteenth century up to the late 1920s, brought about radical changes in the views of *reality* and *causality*. If we want to explore the perspective of scholarly unification, then the Quantum experience can arise as a challenge. Apparently, the *Quantum* experience especially has contributed to shaking up traditional views on "realities" as well as the sciences that are out to handle them.

With these observations behind us, let us hear Von Weizsäcker on *Kausalität* or causality (Von W., pp. 120, 301, 522, 632, and relativity, 465). *Bohr sagt, nur in der klassischen Physik seien Raum-Zeit und Kausalität vereinbar*. And he required machine precision and determinate results (pp. 522f.).

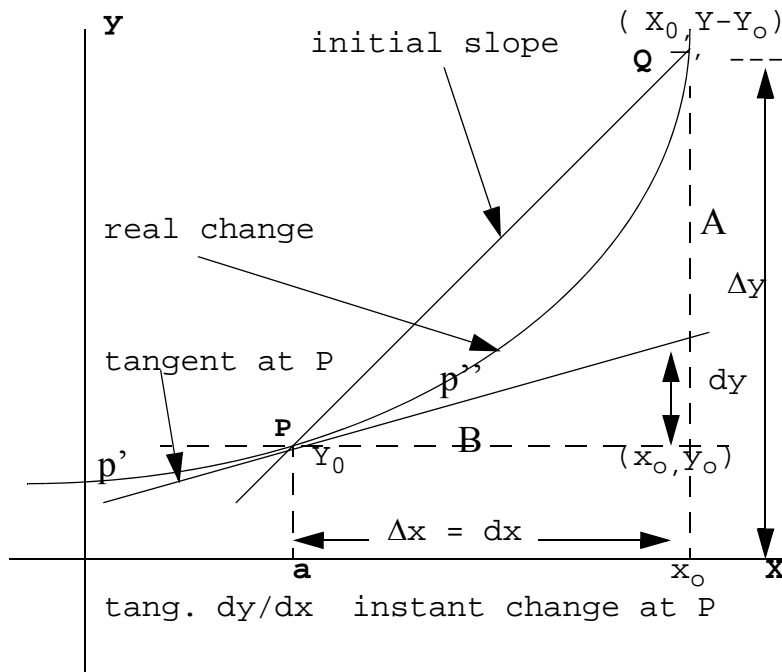


Fig. 2.6.1, Slope initially determined by the increment, $Q - P$ gradually approaching P as the increment dwindles toward (not to) zero; then the resulting slope, degree of inclination, is the derivative.

A time interval, on Fig. 2.6.1, may be defined as the time elapsed between two events, as measured by an observer. An

event is a specific occurrence that happens at a particular place and time. Thus, in terms of these definitions, when the bob of a pendulum reaches its lowest point during a swing, this occurrence is an event. After a certain period of time it will return to the same position; this is a second event. The elapsed time between these two events is then the time interval. Thus the time interval is the time it takes to do something: for a pendulum to oscillate, for an electron to move around a nucleus, for a heart to beat etc.

The only imaginable substitute for *linear causality* notions in describing causality relations, is that the *explanans* contains or encloses the *explanandum*, as in the appended Figure 2.6.2. Explanation is an issue of *classification*. But this is a *description* of existing relations, one circle does not engender others, being no operative factor. But the graph can be used to denote such causality relations.

***Models*, especially *Cmodels* with space allocations and distinctions, are an adequate tool for this kind of manipulating figuratively with items already recorded; the models can be creative only in terms of our figurative manipulation of them.**

When shifting our discourse one or two levels up to where verbalization reigns, then many things seem possible, but we do not know why, because the level-shift cannot be explained. To explain movement between two levels, *both* have to be taken in identical or at least congruous terms.

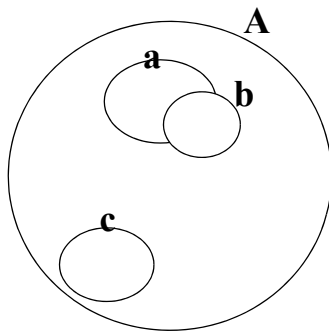


Fig. 2.6.2: *A explanans for a and b and the intersection of a and b, and for c.*

So I think we must conclude that, beyond the measurable and quantifiable entities in Math and Physics, *no one understands causality* (nor need to). Niels Bohr noted that *the radical nature of our <present> attitude to how we describe Nature during the development of atomic Physics, is probably*

*brought out most clearly in the fact that even the principle of causality has been shown to be too narrowly framed to enable us to describe the regularities that appear in the individual atomic processes (Wie radikal der Wechsel unserer Haltung bezüglich der Beschreibung der Natur während der Entwicklung der Atomphysik ist, wird vielleicht am klarsten aus der Tatsache, daß sogar das Kausalitätsprinzip... sich als zu enger Rahmen erwiesen hat, um darin die Regularitäten zu beschreiben, die bei individuellen atomären Prozessen auftreten) (*Selleri, p. 31).*

Without referring here to the discussions regarding the nature, application and processing with graphical models, let me note that in the level model introduced in *Part I* (Fig.1.1.8), I have indicated space for an all-encompassing *meta theory*. This is the level at which the present argumentation is grounded.

In the *following paragraphs* I am going to review some central terms and issues (without aiming at a high degree of systemical order).

Justus *Buchler wrote a good introduction to *The Concept of Method* (New York 1961), to which I now refer (especially his pp. 124 - 134). The subject is highly complex and multifaceted.

For a *guide to theory*, argumentation and rational approach, I am appealing to the concepts listed in 1.3, *Living in the City*, citing Simon, Giddens and others, as well as modern Physics, more specifically to the debates that arose during the development of *Quantum Theory* (from now *QT*) (*2.5, *Indeterminacy a Resource*).

This body of knowledge, hypothesis and experimentation should therefore be an accompanying subject to any attempt at "explanation" .. John *Horgan, in his provocative book, *The end of science*, predicts the débacle of one university branch of science after the other. This is an excellent example of how a road taken can be highly instructive and thought-provoking, while the conclusion is less so. How can one predict a definite end for a vast set of programs in various interconnected levels that are dominated by indeterminacy and approximation? For that is exactly what they are.

For me the outcome is that we *do not work in and study Science*, but *specific programs and paradigms* classified inside the cluster. Excellent studies as *Holton's *Science and Antiscience* and *Giere's *Explaining Science. A cognitive Approach*, take up specific problems in theory and experimental practice. In premodern times, new challenges appeared, some of them menacing (SL, *Patterns), while the addiction to rationality remained.

I want to extend the perspective, most particularly on *knowledge in a field traditionally regarded as definite and logical: mathematics*; and referring particularly to Philip *Kitcher's book, *The Nature of Mathematical Knowledge*. My motivation for this is his reaction against the *belief in a priori knowledge and his advice to take actively in consideration also the historical development of knowledge acquisition*. Ronald *Giere, too, takes the historical and human aspects into account (*see below*). Kitcher's argumentation is grounded in a more pragmatic view of human understanding and intellectual discourse. He notes in his *Introduction* (pp. 4f.):

The theory of mathematical knowledge which I shall propose breaks with tradition not only by rejecting mathematical apriorism. I shall also abandon a tacit assumption which pervades much thinking about knowledge in general and mathematical knowledge in particular. We are inclined to forget that knowers form a community, painting a picture of a person as having built up by herself the entire body of her knowledge of (for example) mathematics. Yet it is a commonplace that we learn, and that we learn mathematics, from others. Traditional view of mathematical knowledge would probably not deny the commonplace, but would question its epistemological relevance. I shall give it a central place in my account of mathematical knowledge.

A third break with the usual approaches to mathematical knowledge consists in my emphasis on the historical development of mathematics. I suggest that the knowledge of one generation of mathematicians is obtained by extending the knowledge of the previous generation. To understand the epistemological order of mathematics one must understand the historical order... and Kitcher refers to Lakatos as having taken a similar view of the epistemological relevance of history. Kitcher also quotes Quine (from the latter's *Two Dogmas of Empiricism*) in support of his views (pp. 80f.). As noted in one of the many positive reviews, Kitcher does *some useful debunking*.

The decision rests with us.

We have, to *produce knowledge* (which is not *there* by its own), to decide where to lodge or where to move subjects or objects in a system that we have determined or adopted and learned to recognize; thereby stating where it shall belong, thus giving its basic meaning or significance; supplying further details to the subject and the system; having discovered or pre-

dicted links to other systems. I take this to mean, *moving models within some system*, which, like all systems on which we can operate, is embedded in larger ones.

Ronald *Giere's pioneering book, *Explaining Science. A Cognitive Approach*, integrates science issues with cognitive models, noting that *as yet no standard cognitive views describe, for example, how data and scientific theory are related. This is a drawback, but it is also a blessing. The shortcomings of both the philosophy and the sociology of science stem from the fact that, in being true to their disciplinary backgrounds, both philosophers and sociologists of science have failed their subject matter - science* (Giere. p. 5).

It can sound somewhat awkward now to turn to the idea of the *obvious*, and the mechanism of *definition*, but we can hardly bypass it.

If I write the equation, just to take a simple example, $A = f(x^2)$, people would read it adequately. If I write $A = A$, they would rightly tell me that the equation says nothing. But why? Because the meaning of the sign = is obvious. Is it really? Have we left out all of number theory? (When you ask a modern mathematician about his subject, he will probably tell you: *number theory*).

The so-called obvious can arise as very tricky and usually worth exploring. Stating the obvious also implies another advantage. Doing so, I expose myself to full view and open for criticism. The so-called basics are usually much more complex and unpredictable than is often assumed, and chance is that I should come out as not being able to dig into the term and its linkages.

My model applications are being *gradually developed*; it would be useless to try to give a comprehensive definition right at the outset. As Banesh *Hoffman notes regarding vectors, *it is the nature of definitions not to be completely satisfactory ...*; and he spends a whole little book on vectors, developing the subject. Functional definitions must be processual not lexical, which means that they are descriptive, not definitory.

But our processes can rarely be programmed on all levels right at the inception. Our *approach* or *opening theory* is a process, not an event.

It should follow from my notes so far that certain research lines are *not* included in my purview, while they will hover in the background, awaiting to be explored.

One such subject is scholarly framed substantive *social studies*, such as the more recent ones dealing with case studies, and investigating existing social networks in specific or typical societies; eminently described, discussed and exemplified in the important work by Alexander L. *George and Andrew, *Case Studies and Theory Development in the Social Sciences*, of 2005. Here, the parameters in actual socio-political management and in-

tervention are running as a kind of undercurrent. Much the same general notion can be applied to another recent work, *Analyzing Social Networks*, of 2013, by *Borgatti, Everett, and Johnson.

I have stayed away also from a closely related field with which I am not operatively familiar: *Philosophy of Language*. Nevertheless, a hunch tells me that perhaps the distinction, qualified as important by Hintikka (pp. 69f., 75-79), between modal expressions and descriptive ones (Hintikka, pp. 15ff., referring to Wittgenstein), could be applied directly to our graphical models. But I shall leave this as a suggestion, certainly not an original one (*see* also Emmon *Bach).

Both *studying* history and *writing* it are creative acts that can bring into the picture notions and ideas that are not sure to be recognized when someone else explores the actual subject. There is no *the history* of anything and no scale is given. Also the focused *range* or *dimension* to which the awareness is adapted, is worth considering.

2.7 Reality and Approximation

Intending to start working on various kinds of evidence and sources with tools as abstract as graphically designed configurations, my *Cmodels*, the question of "reality" (however vague it may be) necessarily arises at this point, even though the models as such are being discussed more closely in *Part III*.

"Reality", let me remind ourselves, must be gauged by some dedicated and chosen systems parameters, and it would be easy to develop a system in terms of which the "reality" can be directly approachable. But it will still remain one system among other systems of comparable nature, for there is no rule for deciding which is preferable. "Realism" then means nothing more than sticking to norms that seem optional.

It doesn't take much knowledge about modern theories of science to become aware of the relativity of what is often called "the reality". It is an adequate subject with which to start a work, especially because whatever realities we face, they tend to be approximative..

Ronald *Giere's model, his Fig. 3.8 (much in use in the present work; here, Fig. 2.7.1) places real system in a contributing role related to the model nucleus. But should not the "reality" be understood as being integrated in the model nucleus itself? Is there some "real reality" out there? Bypassing the problem (if it is a problem), I treat the whole little Giere model as a heuristic one, hoping for the best.

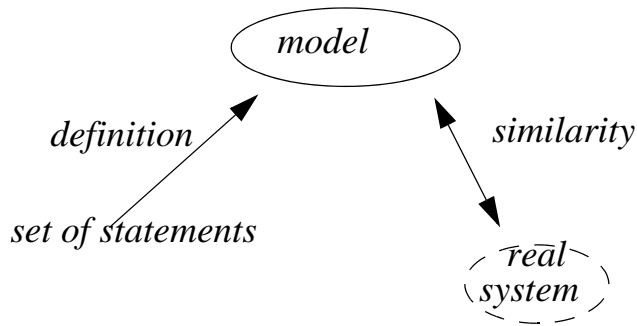


Fig. 2.7.1, Giere's model, his Fig. 3.8.

By integrating the models in theories for systems, the question arises: do the models or the document take the priority or assume the basic

role? Which means to decide between theory and substantive hypothesis. Then of course one can ask: will not theory-based analysis normally elaborate the substance sufficiently to produce a feedback to the theory? And so not only at the end of some process, but at several stages in its, so that we must envisage an *ongoing circulation* between the input, output and processing zones. It may be that our cognitive operations somehow replicate this circulation. At any rate, we can see here that "reality" vanishes behind artifice.

Some attention, then, is due to *feedback theory*. An adequate field in which to look for it is *information management* since here processes and the "cybernetic" or directional factor cooperate. An exceptionally rich, articulate and instructive publication is Gordon B. *Davis and Margrethe H. Olson, *Management Information Systems*. The authors discuss feedback in several connections. Assuming it a duty to having cited this aspect here, I shall nevertheless bypass it and go on.

Each single model type can, as I have noted in SL, **Burden* (and *locally*), be used as more than just an illustration of scenaria intended primarily as *information*, whether described verbally or not (as a tree showing the pattern of an organization). We can make it serve as a *tool*, certainly on a metaphorical level, not available for being *run*, by displaying the features just noted, experimentally altering the pattern, changing contents in some places, supplying elements where we identify blanks, and create a platform for going further.

The chosen model should be "loaded", starting from the end terms or predicted categories in the material to be studied (theory first!). That is, for example:

1. urban statutes, 2. consequences of them.

Whereupn one registers several phases of input: reading backwards, from 3. local political and admin. conditions; 4. central local political, economic and admin. conditions; 5. external political and economic conditions.

This same science moral seems to lie behind Von Weizsäcker's extremely instructive and inciting *Aufbau der Physik*. A study of his use of

graphical charts confirms this impression. Let me repeat the caveat that they are metaphorical, not digitally runnable. Von Weizsäcker does *not* display a *model of Physics*, only how the subject is *structured in his book*; obviously reflecting the reality as he sees them. I take this as supporting the view of realism just mentioned; that reality is what we are grasping or committing to paper or computer or doing.

We have to *decide* on our systems considering the needs and utility where models are to be involved. In most cases in focus in the present publication, and in many listed in the literature on sociology, management, engineering and history, the systems idea is fundamental (*Beam, *Davis-Olson, *Dieter and *Parker, pp. 86ff., in the **Bibliography*).

The present discussion is focused on *working*, the operational aspect. This denotes the focus of the assignment, which is that things we observe or imagine are construed by our working on and with them, not (except when quantification is sufficient) by any statement about what they supposedly *are*. It is our *doing* that has definitory relevance and usefulness. Thus, the emphasis shifts from case to work and we end up with big theory for small cases. You have to take it or leave it (I have a feeling of having said this already. The quandary of the present book is that most of what I am saying should have been said at the beginning!).

Bertrand Russell had the British sense of sharply focused paradox, and he summed up much of what he stood for in the following sentence, stated with almost-Biblical didacticism.

All exact science is dominated by the idea of approximation.

The idea is fundamental for observation *and* the operative principle in the most ground-breaking paradigm in the mathematics starting with Leibniz and Newton: in the *Calculus*, developed by both of them almost in parallel, even though *Antognazza gives the priority to the former.

Now, to return to our models.

There are, at least, two alternatives for the *reality-relation of Cmodels*.

On *one hand*, one works with models intending to stay on a special, theoretically defensible, *model level*, whatever the "Truth" or "Reality" might turn out to be, and comparing one of them with others, all the time regarding this chain as one's operating platform (Max Planck, Niels Bohr).

On the *other hand*, taking models to illustrate, almost as in a photo, nature's reality (Einstein).

A photo, however, does not show what we see directly (Einstein, of course, knew that). The former attitude (Planck, Bohr) is the more realistic one because it avows that there is no reality other than what we construe in our mind and fix with our terms of recording, understanding and conviction.

There is more to say about the *specific model designs* in the reality context.

For the rituals and processes in the Roman Church, I developed a *graphical model*, that can serve as one example (Fig. 1.1.7, *The Interface Model*, in SL, *Works, on the present site, and in Jaritz, G., ed., *Ritual, Images and Daily Life*, pp. 7 - 4, Berlin 2012); a conference ["workshop"] contribution with eleven articles and a remarkable introduction by Jaritz himself). This ritual model was intended to show how I myself see the rites, their traditional background, context, conditions, purposes and effects; *and* how I see the Roman Catholic views as attested by the documents and by the actions in which they are involved or which they establish. There is nothing absolute about my picture of this complex, only a roadmap. This limitation applies to all models that cannot be physically or mathematically tested.

It is not obvious that the graspable or fathomable realities we may hope to have recorded by our models have more substance than the models themselves.

Werner Heisenberg has a relevant comment, which I repeat here, on Niels Bohr's famous model of the atom with its planetary orbits (*Beiser, pp. 124ff.). Bohr *believed in his pictures of the atom, less in his own hypothesis about the atomic reality behind them (Es ist also gar nicht so sicher, daß Bohr selbst an die Elektronenbahnen im Atom glaubt. Aber er ist von der Richtigkeit seiner Bilder überzeugt. Daß er für diese Bilder einstweilen noch keinen angemessenen sprachlichen oder mathematischen Ausdruck gibt, ist doch gar kein Unglück. Es ist im Gegenteil eine außerordentlich verlockende Aufgabe* (*Fischer, 55, and *Heisenberg, 1996, 49). Nevertheless Bohr's theory started a new field of research.

The story behind this picture as told by Heisenberg (*Heisenberg, 2006, p. 9) brings into the open a fundamental *reality function* of models, even in cases when they fail to deliver as much as expected. Here we are (in my summary): *Bohr's model disrupted the interior consistency of Newton's mechanics [preparing the road for innovation]. Yet there were problems [in the modern context], for the new theory expressed by Bohr's model was full of contradictions. Nevertheless, it contained an essential part of reality. With this, Bohr's theory opened a new field of scientific research (Bohr's Theorie hatte ... ein neues Forschungsgebiet eröffnet - *Heisenberg, 1979, ed. 2006, p. 9; *Fischer, pp. 54f.).*

Arthur *Beiser, formerly of New York University, makes a similar point in his *Perspectives of Modern Physics*:

Bohr applied quantum ideas to atomic structure to obtain a model which, despite its serious inadequacies and subsequent replacement by a

quantum-mechanical description of greater accuracy and usefulness, nevertheless persists as the mental picture many scientists have of the atom. While it is not the general policy of this book to go deeply into hypotheses that have had to be discarded, we shall discuss Bohr's theory of the hydrogen atom because it provides a valuable transition to the more abstract quantum theory of the atom (*Beiser, p. 124); but I shall bypass his further discussion.

Compounding data, insights and concepts into a designed model, especially, but in any model, also verbal ones, amounts to *freezing the issues artificially*. But then it is just this artificiality that triggers new research and, occasionally, novel findings, by its capacity of postulating possible features and relations between them, without tying us to responsibility toward encroaching reality around us.

We try to build reconstructive models of processes and situations and people's scenarios in them. My argumentation so far shows, I believe, that such models cannot be tied up in formal paradigms based more or less directly on the rules of logic, mathematics or computer science. Even though this is certainly possible for limited chunks of the empirical world, these models would fail to cover some highly relevant features in the overall pattern. Not all people argue; some *arguefy* (in Empson's formulation), and everybody occasionally just "feels" intuitively or connect concepts by sheer habit. The American physicist Richard Feynman warned against using physics theories to "prove" everyday conditions; on the other hand, we may share some of the unpredictability of physics (so far SL, *Burden, 3.1).

Models are realistic, analytically speaking. Werner Heisenberg, we have seen, maintained that Niels Bohr seemed to believe more in his models of the atom than in the reality they were intended to illustrate. A realistic view of science will consider *theory*, as expressed in the models, as the activating agent. Wittgenstein, we know, distinguished between *Sinn des Satzes* and *Sinn des Bildes*. His science "moral" is attractive for his focusing on *doing* things. The distinction between *saying* and *showing* has a venerable history, being fundamental for Descartes and also for Kant (Hintikka has a section on this subject, 6. *Analogia fra geometria e algebra*, pp. 233 - 237). The functions of *verbal media* is the central subject in Quine's famous *Word and Object*, a book that can be approached with much profit from Hintikka's discussion of it (Chapter IV, pp. 98 - 113).

We have noted that, in systems such as we are to do with in this book, there cannot be any "the" reality ("truth" only in logics and math sense). Therefore, the model can only record and show what *I myself* or *I myself* multiplied by *n* are handling (in Science and in most business and industri

contexts, the plural is normal, the Humanities are mostly done by lone wolfs).

Nevertheless, the principle of *subjectivity* remains unchallenged. This is, or ought to be, an *operative* subjectivity in the sense that the *I times n* can absorb the model and do something interesting and/or useful with it.

Even so, a model should be taken to represent a phase, step or stage in a cognitive process and to be subjected at any moment to being replaced, modified or rejected. Routine business and industri charts and info models tend to stay permanent, especially at elementary levels, conditions regarded as static and with lower pretentions to be creative.

The *relations between a model* (math, digitally or non-digitally graphical or verbal) and the *reality it is designed to handle* do not always go unidirectionally from the one to the other. Bi-directional relations can be an option. In 1926, Werner Heisenberg had to face this issue. Instead of asking, as he writes (*H. ed. 2006, pp. 19f.), how can the now known math schema describe a specific experimental status/condition? We can ask, turning the query around, is it really so, that in Nature only such experimental states/conditions are to be found (experimentally), that *also* are available to expression in *QT*? (*Statt zu fragen: Wie kann man in dem in-zwischen bekannten mathematischen Schema eine gegebene experimentelle Situation beschreiben? stellte man die andere Frage: Ist es vielleicht so, daβ nur solche experimentelle Situationen überhaupt in der Natur vorkommen, die in dem mathematischen Formalismus der Quantentheorie auch ausgedrückt werden können?*). The argument is carried on (pp. 20f.) and leads to Heisenberg's famous *Indeterminacy principle* (*Unschärferelationen*). Richard Feynman has a chapter on the subject in his little book, *The Character of Physical Law*, pp. 127ff.: *Probability and indeterminacy - the Quantum Mechanical view of Nature*.

So far we can conclude to note that *approximation* will be a central and indispensable modality. The idea does not come out clearly in verbal expression. In math terms we get a manifest view of it.

The *radius of a circle* (see Fig. 2.7.2) can be expressed completely and definitely with simple math; there are, of course, an infinite number of them. The *normal to a general curve* is specific as it is designed, while representing a general rule for all such configurations: being at right angles to the tangent of the curve at any given point on any curve. While the circle radius is exact, any meeting point of a radius line or a tangent with the curve is only *approximate*. Trying to establish exactly the point on the curve will always leave us with some indefinite latitude, so that our demonstration remains inconclusive in absolutist terms. This passage from the specific to the general was a first step in Leibniz' invention of the *Calculus*.

(*Antognazza, pp. 155ff., and her Figs 3.1 and 3.2, from which the present figure (2.7.2) is derived and simplified).

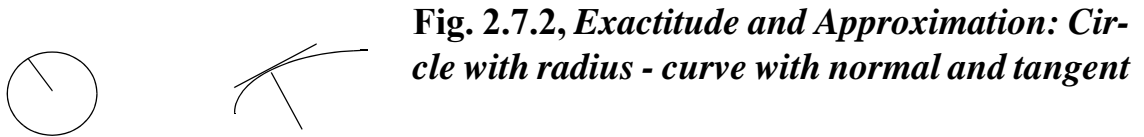


Fig. 2.7.2, *Exactitude and Approximation: Circle with radius - curve with normal and tangent*

The idea of approximation is valid also for some *graphical models*, which come in two types when their *outlines* are considered.

Those with straight lines, corners and angles (like most of them in this work) denote simple *frames* established merely to isolate the model contents from the text body. *Circular model* outlines, which I would call *boundaries*, do *not* indicate sharp outlines but on the contrary fuzzy ones, in which cases the relations between the model contents and the surroundings or environment are approximate, even uncertain. Fig.2.7.3 appended here, illustrates the rule; and Fig.4.8.1, *One main and four collateral vectors*, the practice.

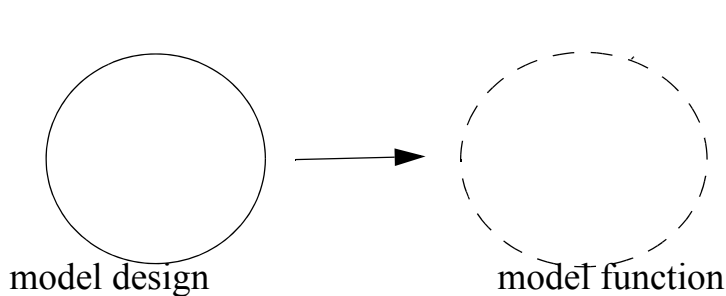


Fig.2.7.3, *Distinction between graph. boundary (left) and functional boundary (right).*

2.8 Artifice and Artificial Reality

Under the program devised for the present experiment, the grand distinction between *artificial* and *natural* evaporates because - apart from hard facts (but not always even here) - the only reality we have in *complex scenarios* is what we construe ourselves. This, as I have noted, also applies to *history being handled as an object*.

We can stick to the illusion that our *words* cover or point to reality, but *reflected models* (*Cmodels*) seem at least once removed from that functionality. Here, I shall briefly refer to Herbert Simon's book, *The Sciences of the Artificial*. On p. 5, he claims that *We have now identified four indicia that distinguish the artificial from the natural; hence we can set boundaries for sciences of the artificial*, etc. But I do not get the point about "boundaries", since the four criteria he sets forth are qualified with *usually*, *may imitate*, *can be*, *are often discussed*. On p. 113, Simon discusses *the kernel of*

the problem with "artificial science", referring to organizational design, applying his very useful distinction between inner and outer environments. Further on, I shall discuss Simon's idea and my own regarding the use of artifice.

The term *artificial/artificium* I take to arise in three different but interconnected contexts, as follows; focusing, however, on *processes* and not on Simon's "Things".

1. *Simulation* of Real-World functions, mechanisms, production processes (such as Artificial Intelligence, or in/by our conceptions of them);
2. *created and elaborated image(s)* of the cited Real World subjects;
3. *created model(s)* of any kind of idea, etc., with the purpose of testing and applying the image(s) (2.) in an argument.

Starting out from a platform of recordable realities, I am working out a processing of them adjusted for a *program* for analysis and argument development. We cannot take the subjects raw.

A document such as a papal bulla involves several interconnected levels of factual considerations: *a*, the need for it, *b*, the plan for it, *c*, the formulation of it, *d*, the choice of language, *e*, the verbal content, *f*, the desired effect, *g*, feedbacks during the work on it, and, *h*, predictable feedbacks after the publication. Not a simple picture but a highly complex one, with numerous features that will remain our construals. Several also require decisions on the part of the protagonists, not all of them "rational", some *artificial*.

For a detailed exposé of *artificiality*, we have Herbert *Simon's work, already cited, on the *Sciences of the Artificial* (see *Bibliography*) and for the related idea of *operational determination*, just hinted at, see SL, with the same title, on the present site.

On p. 5, Simon sums up his notions about *artificiality* (speaking of *things* where we might say *processes*):

1. *Artificial things are synthesized though not always or usually with full forethought by human beings.*
2. *Artificial things may imitate appearances in natural things.*
3. *Artificial things can be characterized in terms of functions, goals, adaptations.*
4. *Artificial things are often discussed, particularly when they are being designed, in terms of imperatives as well as descriptives.*

My view is somewhat different, focusing on intellectual or mental *action* rather than the definition of some "thing". My approach will be *operational* rather than *lexical*.

Artificial according to Webster, 1: *contrived through human art or effort and not by natural causes detached from human agency : relating to hu-*

man direction or effect in contrast to nature - with accent upon the *operational factor*. Let me pursue this line.

In fact, *handling* a document in terms of the *factual considerations* reflected in it, or indeed such facts directly, will always involve some *aim or purpose*, thus calling in some abstract qualities or parameters that can be named *artificial factors* in the game - so much, usually, that there is nothing to be gained by starting out from the idea that things are definite or coming down to hard facts. Since our intellectual - and emotional - handling of an object to a predominant extent creates it, I do not search for the *What* but for the *How*, seeing that a manageable subject is an expression of our teleological argumentational process, our methodology grounded in some leading or guiding theory.

Artificial intelligence, according to Webster, is related to this *operational* way of thinking:

1 : *the capability of a machine to imitate intelligent human behavior (as reasoning, learning, or the understanding of speech)*

2 : *a branch of computer science dealing with the simulation of intelligent behavior in computers.*

On the elementary model level, let me propose a distinction between two procedures.

The *first* is describing historical material by accentuating hard facts, thus creating a *periphery* delimited against the exterior and the interior: a *pure circle*, for example. We know that the external and internal themes are there, but the model does not display them. The substance here is generally documented and, apart from the interpretations attached to it, of a *definite* modality (Fig. 2.8.1).

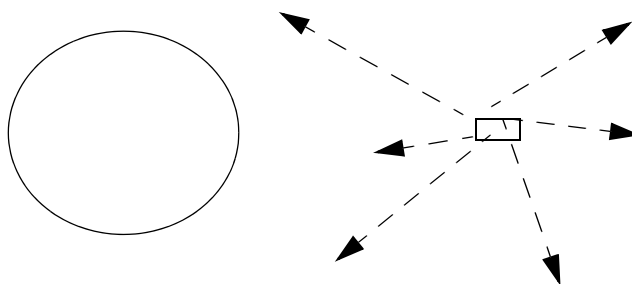


Fig. 2.8.1 *History Writing. Peripheral-definite and Pseudo-Vectorial-indefinite.*

Next, we start out from some particular case regarding an event or an individual's experiences,

and work our way out, in various directions, *pseudo-vectorially* (since a math vector has definite length), and the paths that are followed will usually be indefinite and of variable reach, but with characteristic focus, something comparable to Heisenberg's *dunamis* ; let us say they are intentional,

adopting Webster's definition No. 3. *intentions, a purpose or attitude toward the effect of one's actions or conduct.*

There can be no conception or written account of history that is not subjective in the widest sense of the term. The *historical reality* are our own concoction, or we extract parts of it from somewhere applying our own criteria. Our models partake in our conceptual and epistemological processes and our *understanding and writing of history accounts take place on levels of artificial reality.*

Some people reject this idea, among them, in an excellent work, Gerald *Vision in his *Modern Ant-Realism and Manufactured Truth*, London 1988. His argumentation such as he presents it seems faultless, but he simplifies the issue, thus *manufacturing* his own truth, shared by many, to be honest. For he wants his dinner but no kitchen, counts the *actus* but forgets about the *agens*. His bibliography suffers from serious omissions. Arguing against the paradigm of artificiality, why does he bypass the most important writings on the idea - such as those by Herbert A. Simon?

No chunk of reality is definite but has to be handled in terms of models, verbal, math or graphical, that set down a simplified and manageable picture.

Javier *Cercas, in his *Anatomía de un instante*, p. 275, on the aborted State overturn in Madrid on 23 February 1981, gives a an articulate description of the quandary regarding the boundaries, vertically and horizontally, of an historical event, and I shall translate it even though it is a lengthy piece. *When did it all begin? Where did it all begin? Who started it all? There are no participants, witnesses or investigators of the aborted overturn who do not have answers to these questions, but there are hardly two explanations that are identical. Even when they are contradictory, much in them is valid or could be so: to subdivide history is a arbitrary operation; it is strictly speaking impossible to determine the exact starting-point of an historical event as it is also impossible to determine exactly when it ended; any happening has its origin in a preceding happening and this one in a previous one; and so on to infinity. For history is like (physical) matter, it never is created or destroyed, it only changes.*

The idea of *artificial reality*, is a modern fad but also, indeed, a most useful notion and technique (or techniques); *not, however*, totally distinguishable from other, more homely, kinds of artificiality.

Philosophical depth is out of my reach; whatever it may mean. I just want to mention that many outside that discipline have contributed to the understanding of *creativity* and its close companion, *productivity*. Margaret

Boden (with a whole book on creativity) or Herbert *Simon (with *The Sciences of the Artificial*, and a lot more in his *Models of Thought*), or, finally, Arthur I. *Miller (*Imagery in Scientific Thought*, with creativity as a principal subject) - to cite three among many. *Clericuzio, *La macchina del mondo*, pp. 18f., has illuminating notes on the sociology of science in the Early Modern period (references in SL, **Burden* and **Patterns*).

We sit back with a system or a template for it, which we can develop, modify or keep, such that inside it we can elaborate our subject in a *creative procedure*; provided we accept, at least not contradicting, Wittgenstein, Herbert Simon, Richard Gregory or Margaret Boden (references in SL, **Burden* and **Patterns*), to the effect that *creativity* can be described as elaborating an existing system and/or features inside it. If I understand him right, what Llosa seems to mean, is that the *narrador* enters into such a game (related comments in his *Las ficciones de Borges*, 1987). But so we do, all of us, when handling something pre-established. When I used to prun our (Liv's and mine) olives at Collina, I entered into an established system of values, priorities and rules. A creative act might consist in my introducing a modified fashion of selecting branches to cut; but equally well it could be a show of incompetence in a demanding job.

Artificial Reality and *Operativity* (applying *How*-views rather than *What*-views) also are essential rulings in the theory-building effort in the present book. It is meant to have approximately the same value as *indirect imitation* or *as reflecting somewhat obliquely the original*. The vast literature more or less explicitly dedicated to the study of metaphor and meaning can best be summarized, I think, by saying that confusion often replaces depth and plainness replaces articulation, while the distinction between the defintory *What* and the operative *How* often is not exploited nor indeed recognized.

Here one might cite a vast literature, like the excellent book by E. R. Mac Cormac, *A Cognitive Theory of Metaphor*, Cambridge (MA) 1988. These contributions offer wide and utterly complex accounts of the *cognitive* workings of metaphorical or imitational or interpreting paradigms. Presently, however, I am working on operational issues rather than psychological ones.

I am going to spend some time on the distinction between, on one hand, *the nature of "things"* (to apply Simon's name for them) in the Simon perspective of *inner and outer environments*, and on the other, the nature of our *handling* them.

Simon's main model is tripartite, with *interface* sandwiched between *inner* and *outer environments* (the inner being, for example, the function-

ing of a machine, the outer the field of its intervention or external action: the knife and the bread).

To make is usable and useful, the term *artificiality* has to be applied not to *things* but to our *handling* them (mentally, intellectually, mathematically or logically). Since all handling is selective and abstracting, in fact *creating*, insisting on the artificial can only mean accentuating this creative process and disclaiming the idea of objectivity of handling.

To my view, Simon's four-part verbal model of the *Artificial thing*, makes sense only provided it is wrapped up in an *operational* model.

I too want to make four points.

1. Simon seems to classify objects for their build-up and their intended and implemented *functioning*. Of course, he is dealing with *digital models*. Locally, the alternative is to classify the build-up of *our way of working out* this or that idea or picture.
2. In the local context, the distinction between *natural* and *artificial* vanishes, leaving behind only our focusing on the *created* aspect in terms of our mentally and intellectually *handling* whatever we have before us. Ronald Giere's model (3.11, *Ronald Giere's Model*) can display the structure here.
3. Under the local operational perspective, one cannot classify objects directly, only our handling of them (the former alternative would have taken us for a ride or involved us in indefinite circularity).
4. This confirms the notion that there is no sharp distinction between the *natural* and the *artificial*, only a case of partly overlapping or dovetailing between them.

There is no escape from the tie-up in artificiality. For whatever we do, our *operational* procedure will determine the outcome (SL, * *Operational*, on the present site). This idea is related to the complex notion of invented reality and truth developed by writers like Pirandello and De Finetti and discussed in several connections in the present book.

Something more has to be proposed regarding the constructive processes elaborated by our exploration.

The idea of *artificiality*, we have noted, is fundamental also for the building and use of *models*.

Models are fashioned in accordance with some *rules to which we think they should conform*. Let there be no illusion that the operation devised to ensure this is "objective" and independent of personal and cultural inclinations. Henri Poincaré's view on mathematical creativity and special aesthetic sensibility is particularly well-known (*Miller, *Imagery*, pp. 31, 234).

Models of the type used in the present book pretend to *show images of processes* but they cannot show processes directly. The image will be a plat-

form for us to elaborate ideas of processes (also illustrating processes with other models) - and *feedbacks*. In the cases explored here, the feedbacks can only be imagined in general terms, their historical complexities are not scannable with the means within our reach.

So this is still where we are, linked up with *artificial realities* - this is the *occhio del ciclone* of the entire enterprise - *and* should be a strong stimulus to go further, collecting the evidence that would be needed to approach the feedback issue. This is a question of highly complexity often non-phased or fuzzily related anti-processes, some among them causing a productive process to be modified during its course (of course, Herbert Simon's *The Sciences of the Artificial* hovers in the background, despite the fact that he focuses on "things" rather than processes).

Not only the models themselves but also, indeed, the things we try to handle with them, are the products of specific *productive moves*. Two scenarios that can look exactly identical can have been produced with different methods and require different modes of handling. One example.

In his biography of Immanuel Kant, Manfred Geier offers a thorough analysis of Kant's *verbal* model of the *World System* (*Weltsystem*) in which there is *mass* and *forces* that attract and repel (*Anziehung, Abstößung*: Geier, pp. 73-76). Kant of course builds on Newton's cosmology, in which the corresponding entities in the English version are collected under the denomination of *force* and *momentum* (*Alonso and Finn, *Physics*, Chapter 6, pp. 93ff.).

According to Geier, there is no difference to be noted between Kant's world image and the real one (*Zwischen Kants Weltmodell und dem realen ist kein Unterschied zu entdecken. Das Simulakrum ist perfekt, die Modellkonstruktion ist vom Modellierten nicht mehr zu unterscheiden*).

This is so, we can agree, on the level of present *picture*, but not on the level of the *production* of the picture. Newton stuck to a system of mechanistic rules and could calculate force and momentum, thus to produce his picture. Kant looks over the imaginary scenario and enthusiastically (as Geier tells us) finds he can integrate Newton's rules in it.

The product of Kant's conceptualization cannot, as things are being formulated in Manfred Geier's book (I have not read Kant's original on this subject), be repeated in comparable versions; elements in them cannot be differently related to each other. To develop other alternatives or modifications to the system, we should be able to work out the distinction between *form and shape* (I am adopting Lord and Wilson's terminology, for which see SL, *Patterns*), in doing so, manipulating the former while keeping the latter. Kant's world image does not give us any handle for such a process (*form and shape*: *Lord and Wilson: *We have chosen the word*

shape to indicate those aspects of geometrical form which have to do with the external aspect that an object presents to the world. The word form has been reserved to indicate that some aspects of internal structure is also under consideration).

Kant, as far as we read him in Geier's words, gives us the comment without the subject, the shape without the form. But for the reference to Newton, Kant's picture *in terms of its creation* does not seem different in from the one offered by Ovid in the very first verses of his *Metamorphoses*, I,1:*Ante mare et terras et quod tegit omnia caelum/ unus erat toto naturae vultus in orbe,/ quem dixere Chaos: rudis indigestaque moles,/ nec quicquam nisi pondus iners congestaque eodem / non bene iunctarum discordia semina rerum*, etc. Geier refers to the cosmological ideas in works by Leukippos, Democritos and Epicuros (p. 82).

The upshot of these considerations? To repeat: that both the models and the objects they are intended to handle for their identity and for making them ready for analysis, depend on and involve complex scenarios, partly of our own concoction; which should mean that we have to translate the scenario into systems that we consider as being embedded in still larger systems and include or involve systems.

These entities will normally be worked in *processes*; at least we should be prepared for this and explore the dynamics. For my argumentation I shall have to think in terms of *directed forces* rather than midpoints, centres and exact numerical or logical places, so that the mathematical notion of *vectors* can be used consistently, while modified into non-math idiom by the removal of the length dimension.

A framework for analysis, then, is not invariable; it is - or should be - a tool to be gradually sharpened or reshaped in response to our findings. In fact, one of the primary aims of analytical argumentation is to develop intuitions concerning scenarios we are facing into an analytically viable tool by gradually sharpening it. For this reason no definite nor comprehensive definition can be stipulated at present. The same applies to other "operative" terms in the book.

Analytical reality has to take, step by step in the process of analysis, some bounded and fixed form, be it in a list, a flowchart or in some kind of graphical model. It is necessary to be aware of the problems attending the use of non-digital models (*Cmodels*) such are being used in this work. Their consistency can only be assessed by the way they can be made to integrate with one another in a manner that seems to produce reasonable, accessible and manageable pictures of the cases at hand.

At the same time the models unavoidably fix positions and interrelations rigidly, at least for each step, and this is strictly speaking incompatible

both with the idea that there may be several levels for the functioning of any specific factor or relation, *and* with the processlike character of any situation. But we have to live with thi; or else work with sequences if models for each case.

2.9 *Imponderabilia*

The term *imponderabilia* comes from who knows where, but since no dictionary lists it, I take it as an unauthorized but useful, negative derivate from *ponderabilis* - *with weight*. I have used it several times with no one protesting, so here it is. SL, *Working*, has it on a graph: what is left at the end when all attempts at more or less rational description, analysis and, eventually, explanation, don't work any longer. In the *pictorial arts*, iconographical content is normally amenable to rational discourse and research, while the manner in which it is being visualized usually isn't.

For someone outsider to the academic games (like me), the difference between various soft-evidence contributions often is not evident, simply because, apart from professional slang, the verbal formulations are not clear, despite their possible literary merits.

What about the *emotional contents and awareness* of often non-classifiable sensations linked up with perceptions, things, concepts and processes? We cannot catch such emotional connotations or *imponderabilia* with any systems or models. They will be presented in fluctuating vocabularies and strongly individualized idioms with regard to the connections between object and feeling and the conditions and background for these links, and hence elude any categorization that is sufficiently sharp to be of any use in *general* analysis. In several works, I have relegated such items to the vast and vaguely outlined class of *imponderabilia* (in SL, **Burden*, **Patterns*).

We cannot put Beaudelaire's *Les fleurs du mal* or Pushkin's *Bezuy* through a model test, so let us be content about that. On the other hand, let us not fake science by pretending to be able to apply rational research criteria to the poems (one reason why science looks so much more prestigious, is that it costs much more and that you can pick up petrol from the North Sea with it). Grasping the soft messages and their style remains within the *imponderabilia*, and here they can freely display their excellence, often in major cultural contributions (to state the obvious).

Architects often claim to work in interdisciplinary modes. But they don't, floating as they are between *art*, which constructional requirements keep at some distance, and *technology*, which the close neighbors, the engineers, practice while the architects, to preserve their identity, only visit. Floating between extremes is not connecting them.

It is here that literature in prose, poetry and art take over, enriching our world. But the essential features here cannot be illustrated nor indeed run or configurationally loaded on models. Which is the criterion for classifying them as *imponderabilia*.

Honoré de Balzac, always alert and sharp, gives an illuminating example of the chaos over art in his *Le chef-d'œuvre inconnu*. A painter represents a female saint masterly, but there is no life in the figure. He combines two styles imitated from great masters, betraying that he has focused more on the design than on the expression. Speaking of Raphael, Balzac's old painter facing the younger one with his female saint, comments: ... *sa grande supériorité vient du sens intime qui, chez lui, semble vouloir briser la forme. La forme est, dans ses figures, ce qu'elle est chez nous, un truchement pour se communiquer des idées, des sensations, un e vaste poésie, Toute figure est un monde, un portrait dont le modèle est apparu dans une vision sublime, teint de lumière, désigné par une voix intérieure, dépouillé par un doigt céleste qui a montré, dans le passé de toute une vie, les sources de l'expression*. This is a verbal model of *one* writer's views on *imponderabilia* in *one* situation, which we can share or just enjoy; bypassing attempts at analyzing with higher semantic accuracy and precision cases that elude or defy such undertakings.

Effects of such emotional connotations and awareness play a role in the constitution of the *iconic interface* in the process of getting inside of an ideological or religious system (*Graph 1*, in SL, **Working*). This is one of the factors in merging history and fiction (*see Part II*).

To note that *imponderabilia* are fluctuating does not amount to claiming that *system-driven* material is the exact opposite. Von **Weizsäcker* has a section 4. *Metaphysik*, pp. 634 - 640, in which he notes that *Quantum* theory does not preclude "spiritual" realities, ... *daß nichts im Wege steht, die Quantentheorie auch auf entscheidbare Alternativen über seelische oder geistige Vorgänge anzuwenden*. I wouldn't endorse this idea because I am not sure what he wants to say.

Balzac, probably unintentionally, reminds us that the term *system* can be used also on imagery that hovers between formal design and *imponderabilia*. In his cited story, the old man criticizing the painter's work, notes that, *Il ne suffit pas pour être un grand poète de savoir à fond la syntaxe et de ne pas faire des fautes de langue! ...Tu as flotté indécis entre les deux systèmes, entre le dessin et la couleur...* But Balzac's *systems* are one not endowed with definite *structure*.

To conceptualize and develop a theory, we have to work within some-kind of *system* and using some sort of *structure*, at least some configuration that looks likely to be amenable to being available for a transformation

into a structure, one with definite categories and elements being distributed over a 2D or 3D space. How can we develop theory without a describable *and* described, perhaps even depicted, structure?

The picture of an *imponderabilium* can perhaps be tentatively *illustrated* (surely not defined or explained, which the very notion evades) by the following word image, or *verbal model*.

Let me set up *imaginary webs*, one for each category we want to consider (a representative of a philosophical "school", for instance), and each with its proper geometry of crossing and intersecting lines (never mind the details here).

In one of them, the test case, someone will send an impulse across the pattern and this will affect and mark off particular sections of the pattern and thus deliver a picture of some significance to someone else. A second impulse would engender a different pattern in the web.

A *verbal model*: let two webs communicate in the sense that No. 1 is sending an impulse from its pattern over to web No.2 for this to receive it. Now comes the question.

Are both webs so precisely constituted that the communicated impulse will reproduce exactly the same image? If not - and this alternative can be common to such webs, the *received image* will reflect the original one only imperfectly, partly because it is not entirely "virginal". Such a crisis in a projection can arise because there are no definite rules defining the picture itself, only the logistics of passage from one node to another. But fundamentally so, because there are no rules governing the *What* for defining any such web. Usually, they will be constructed by intuitions à la Brouwer. Two sets of intuitions in two individuals are (usually) initiated on a vast, unsurveyable and unpredictable mass of traditions, inheritance and experiences.

Many terms in frequent use are *imponderables*: culture, art, *even science*.

Reading about *Culture Theory* forced me to ponder over the issue, and here are my remarks which, as I see it, can relieve me of the obligation to worry more about the matter.

Where do we find system and structure in the commonly recognized field of *culture*? R. A. Shweder and R. A. Levine, in the book edited by them on *Cultural Theory. Essays on Mind, Self, and Emotions* (Cambridge, Eng., 1984), whose title might lead us to expect a book on cognitive theory, present many views on the matter and obviously also discussions of them. and they offer solutions; most correctly, in a modest tone, to tell the truth: an interesting and honestly framed critical series of contributions on the issues (there are many that I cannot deal with here as I really should have

to). Much of the matter in the book comes under the category of *imponderabilia*.

Another vast but loosely conceptualized category is *Science*. How can one predict the collapse of a loose cluster (as *Horgan tried) ? I am not here discussing history, Sociology, Architecture, Physics (apart from introducing paradigms in some such fields), but theory-bearing models - certainly not *Science*; not the big snowball but its ingredient crystalline particles, usually not all identical as in the snow.

The general characteristic, to some perhaps a flaw, of Horgan's book, *The End of Science*, is that it takes as its central concern a vast, multifaceted, loosely defined and continually changing cluster of activities, roughly labelled *Science*, rather than picking out one or two analytical models - to be found both in and out of "Science", and evaluating them in some general perspective of theory and methodology. A reviewer quoted on the dustcover proclaims the book as a *biography of science*, and I read that as a restrictive comment. That it also is *hugely entertaining*, as another reviewer notes, is true, and I would submit that it is highly inciting and thought-provoking: a great book, but with the limited basic idea that science need to stay in the forms we are used to.

With clusters like *Culture* an even more tricky notion, that of our *Mind*, enters the game.

Among recent studies in computer-modelled *psychology*, Margaret Boden's *Computer Models of Mind*, 1988, stands out for its elucidation of central and, reputedly deep, issues. She dismembers works in cognitive science by such highly articulate and, to many of us, like me until her intervention, convincing authors as Pylyshyn and Johnson-Laird (Johnson-Laird, *The Computer and the Mind*). The former published, in 1985, a 290 pages book on *Computation and Cognition. Toward a Foundation for Cognitive Science*. Consulting these publications, one notes disagreements on fundamentals on so many critical levels that whatever overall view might surface, one can get disoriented, being forced to shilly-shallying endlessly between competing views without much hope of finding there some definite analytical platform.

It is important to try to realize one's limitations. So-called interdisciplinarity, if practiced and not only proclaimed, is an excellent paradigm to achieve that. Focusing on processes rather than results or solutions, we can keep the game going. But we have to count in many aspects in what we usually call *knowledge acquisition and storage, as well as non-formalized information..* Human components of course have to be taken into consideration.

I have no competence to be coming up with a *Study of Man*. This is the topic of a book of 1984 by John F. Sowa, of IBM Systems Research Institute: *Conceptual Structures: Information Processing in Mind and Machine*, in which the *algorithms of work on subjects*, is linked up with our mind's build-up and how it is enabled to handle whatever might be relevant. The reader will have noted already, that the distinction is not absolute, for in studies of the psychological perspective, the problem of technical abilities as they are manifest in real actions, will surely emerge. But this is not in my focus here. Sowa's technical approach is relevant for my project.

He introduces his Chapter 3, *Conceptual Graphs*, with this caption: *Conceptual graphs form a knowledge representation language based on linguistics, psychology, and philosophy, In the graphs, concept nodes represent entities, attributes, and events, and relation nodes show how the concepts are interconnected.* He offers important ideas and insights on models and model theory (see his *Index*).

Again, in spite of the differences from the preceding examples, we are to do, not directly with states of mind and the functions that are involved, but the accompanying and resulting operations, now in a more dynamic frame.

It is certainly no new discovery to realize that matters look different depending on viewpoints; but it is another thing to try to articulate the issue.

Quoting Dunbar: Our approach will have to be developed within some kind of a more general *framework*. The literature provides us with *programmative theory and framework theory*. *A programmative theory provides scientists with a reason for doing a particular experiment or with a particular way of looking at the world: it behaves like a Kuhnian paradigm. Within this programme, scientists generate subsidiary hypotheses that specify how the framework theory works in practice: it is in these that scientists test in detail and accept or reject in a Popperian fashion. Darwin's theory of evolution provides a framework theory for biologists: it encourages them to interpret their observations in a certain kind of way and suggests particular hypotheses to test. The subsidiary hypotheses may or may not be right, but their disproof is not itself evidence that the framework theory is wrong. It merely tells us that the framework theory does not produce its effects in quite the way we supposed* (Dunbar, *The trouble with science*, pp. 22ff.).

In the second half of the seventeenth century, numerous scholars, including Leibniz, developed projects for a universal *artificial language in which a clear and unambiguous correspondence between signs and concepts was established* (*Antognazza, *Leibniz*, pp. 92ff.), efforts foreshadowed, in

Europe, by works by the Catalan philosopher Ramón Lull. The Science "Revolution" had made formalism the kernel of a universal challenge. Our so-called Cognitive "Revolution" coupled with the digital breakthrough has generated a repetition that has, over the last twenty or so years, stimulated an almost unsurveyably extensive literature.

Time has come to start facing the documents; here is one of them.

2.10 *An Upcoming Sequel on Tacitus*

A chronicle tells us a story, or better, a series of interconnected stories. It shares with most history writings selectiveness without too clear criteria and reduction to what at the time and in the writer's mind was taken to be most important. Analyzing it, we can try to sort out important events and recorded attitudes and integrate them in contexts, some of which unavoidably of our own concoction. Of course I shall not risk any literary evaluation, leaving that to the experts.

Having behind us the present program for exploring features in history understanding and writing, we can abstract our findings. I have committed considerable space to the subject of history. The gist of my handling of this material is the integrating relationship between fact and fiction under certain conditions. Focusing on *statements* (the Sixtine bulla) rather than *chronicle* (Tacitus' *Annales*) for the model elaboration, the multilevel and time-dimensioned chronicle still awaits a corresponding handling which will have to include a further development of the *system issue*.

As I have noted, to embark on such a program, will require so much space as to have the present version of the book burst at the seams. The ensuing macro-insertion in the present work, *Taking Tacitus to Task*, will, I hope, appear in 2015. Some preparatory *Sections* are already included here (*especially, 1.5, *Challenged by Tacitus*, 3.5, *Reading Tacitus with Cicero in Mind*, and 5.5, *Tacitus, Annales, I, i to viii*).

END PART II

3P A R T III PLANNING FOR ROME 1480

*The arguments now coming up can seem detailed and elaborate. But since the building and non-traditional use of graphical models for historical material is my main subject, I have decided to opt for such a handling of the issues, which are really complex ones. Readers who want to go more directly to brass tacks, can skip directly over to 3.2, *Elaborating the Tools*.*

The purpose of this and the next Sections is to introduce my tools, four models, and determine their capacities, coverage, and mutual relations, so as to

form a Group. The exercise then will be applied to the bulla of Pope Sixtus IV of 1480.

In this Part, some charts and models will be repeatedly discussed and applied. This is to keep the stream of argumentation moderately flowing. Assembling all relevant info under each single chart or model at a time, would make it harder to follow the discourse.

3.1 Model Domain and Roadmap Theory

Let me recall that I am speaking of *Configurational models* (not digitally runnable) or *Cmodels*, whenever specification is called for. Whenever I am speaking of digitally run models, I shall make that clear. Of course, these as well as Turing Machines can be subjected to similar manipulations.

This idea of models is in need of refinement, for the distinctions are not consistently sharp. We shall need a distinction between a static *Chart* and a *Model* with real, potential or metaphorical *dynamics*.

As a more articulate meta-model, I will use the plan of a big-city Metro (= Subway = Underground).

The *Metro plan for Madrid - Plano esquemático de la red* - can serve the stated purpose. One can make the following metaphorical operations on it, or in terms of images.

#1. Chart - static. The City authorities want to see if there are urban areas insufficiently served by the metro network. For that purpose they use the plan (in a professional version), which is then a static chart.

#2 Model - mentally operated and dynamical. Now I want to plan a trip from *Las Musas* to *Elíptica*, a long distance, and I study the alternative routes for that. Then I use the plan as a graphical model of the non-runnable type, for selecting the route I plan to take, and mentally I go on the trip.

#3 Model - digitally operated. Having made a decision, I go down into the *Las Musas* station and travel across town to *Elíptica*. The plan is implemented and the process depicts a digitally running model.

Version #2 is the one constantly being used in this book, labelling the type a *Cmodel*.

A *chart*, then, is just a display, perhaps of the same picture, without the dynamics being intended or metaphorized: a model blocked halfway.

Thus the distinction does not go between definitions but between use modalities. There will arise cases where the allocation is arbitrary.

There can be *no conclusion except a provisional and alternative one*. Using one model or paradigm can never guide us into security: there will always be *n* others equally valid, often on different levels. The idea of *soft models replicating hard ones and "bi-tracking" them with verbal models*, is

central in this book and will have to be *developed gradually* as the works is evolving.

Normally we have to use both tools, *graphic models* and *verbal* ones; the *bi-track approach* (SL, *Burden, 1.4.5). We have to work in two parallel courses, with prose and with graphic models capable of showing structure. |We have to work in two parallel courses, with prose and with graphic models capable of showing structure.

Let me repeat the crucial idea (for me), that Cmodels can serve in categorizing issues that in the next move are handled in prose.

Let us imagine our research process in the more formalized terms of a succession of stages of data acquisition, while still depending on *verbal* recording. Such a *linear process* with some of its specific stages can be represented as follows from beginning to conclusion:

1(documentary data)...n-10(interpreting documents) -> n-9(adding information)...->n-5(first overall hypothesis)... ->n-3(interpreting new documents identified on the basis of the overall hypothesis) ->n(tentative conclusion).

Let us say that at present I am at stage n-10. I may know where I am and what is happening there, but to see how this is related to other stages, say, to n-6 and n-2, or, indeed, to all of them, from 1 to n, I would have to make my way through them, one after the other.

Relying on words alone, we are tied up in linear argumentation, without "lateral" expansion at certain points, and no feedbacks. One cannot achieve rigorous exposition and argumentation. Statements expressed in frameworks with visual positions, extension, distribution and mutual relations and drive, that is, graphical models, at the basic level or in the initiation phase of a process, can allow us to approach such as an ideal, at least in the meaning of Herbert Simon's *satisficing* criterion; at the cost, of course, of richness in concepts and articulation.

This means that I will use verbal and graphical models in parallel, the first are declarative, the second are demonstrative, being relatable to Wittgenstein's distinction between *Sagen* and *Zeigen*.

The models proposed in the present work are graphical in the sense of being designed figures, mainly consisting of *arrows, rectangles and circles that are interconnected with lines or arrows*. They represent, as *Parker says, real-world elements and the relationships among them, but - there is an *however* here: they do not pretend to represent reality directly, since this can be done with any *n* number of models for each piece of "reality" that we might want to handle. They work twice removed from this, representing our image of it that we find interesting, workable and productive.

Working with the structure of interrelated or interconnected graphical model, here *Cmodels* and *Cgroups*, is a *productive* assignment, for it

forces me to balance against each other various options both for building them and using them in documentation and argumentation. Verbal models are not so helpful, since they do not, as Richard *Skemp said, *show structure*.

Node-distributing models are useful on two accounts.

We can keep our record of the subject and our argumentation about it under better control, reading off coverage, results and validity;

and we can communicate this to the reader for further evaluation and development, granting her or him an opportunity to reshuffle according to some different understanding.

Let me specify the idea further, in a repetition from *Part II*.

1. The models I am using serve as *intermediate operators* between the real system and our systemically framed statements about it, *real system -> model -> analysis system -> our statements*.

2. Traditionally the path would be linear: *real system -> our statements about it -> model*.

My choice has been developed from Ronald *Giere's Model (Fig. 3.1.1), but extends it somewhat by attributing systemic qualities and paradigmas to the model, turning it into a further developed minisystem.

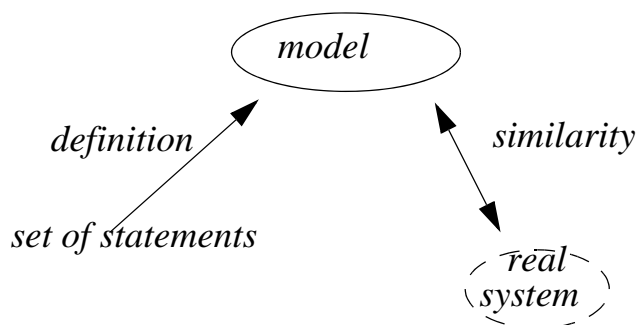


Fig. 3.1.1, *Giere's model redesigned but essentially reproducing his Fig. 3.8, p. 83.*

There are limitations, even shortcomings, however, to the use of graphical non-digital models such as my *Cmodels*.

They do fixate the case to *a moment or instant*, *not showing process or timeline* such as verbal models can, on account of their vagueness or inaccuracy. This is not such a flaw in a context defined as momentaneous and timeless at the act of reflection or formulation. For I have insisted that our view and descriptions can take only one at a time. Info-type models will have an input and an output, but this does not mean to imply a more or less continuous process, merely a before and an after, only cause and outcome or product. The models do represent theory, a theory in itself being a static field.

Herbert *Simon was among the first to study and write about model theories (not *Model Theory*, another thing), and some of his observations in his *Models of Thought* (*Bibliography) can prove relevant for the present

ruminations, even though we must remember that he presupposed digitally running models.

We have been dealing with *Cmodels* in *Parts I and II*, and I shall now be looking closer at their domain and range. They are intended to handle *objects*.

A graphical model sets out spatially aspects of one or several objects, and the kernel of our argumentation regarding it, with an input and an output, all together a production line with lateral interconnections (e. g. to storage). The crux of the matter appears to be the *nature of an object*.

The purport of the cited perspectives (also *1.1, *Position at Noon*) appears to be, of special relevance locally, that a *Cmodel can set out and distribute items according to some theory regarding some object, with the crucial proviso that the object itself is a process rather than a "thing"; and furthermore, that an object consists of more than just physically, numerically or semantically recordable ingredients*.

The gist of the perspective is to ask, *not what an object is, but for a list of some of its characteristic features or attributes, and then ask for the method adequate for handling them*. This, in a nutshell, is the program of *Object Orientation (SL,*Patterns)*. *Our handling of an object is part of the object*.

I do not ask what is a ritual?, knowing only too well that attempts at definition would either be superficial or infinite. I am asking for characteristic functions and active factors in a ritual process and how to handle them analytically in way that highlights the apparently important features in their functional interplay. I wouldn't "cover" anything but I might pick out essential features in the dynamism. Thus (quoting from SL, **Burden*):

An object consists of a set of attributes and methods. Methods are groups of instructions with reference to the attributes (Blair, Gallagher, and Shepherd, *Object-oriented languages*). A corresponding distinction goes between a data base (accumulation of facts) and a knowledge base: data base plus rules for how to handle them: Coyne, Rosemann, Radford, Balachandrian and Gero, *Knowledge-based design systems*).

*Furthermore, the question is, what is an object at the conceptual level (the user view) and how is an object realised in practical systems (the implementor's view). At the conceptual level, an object is any perceived entity in the system being developed ... In more detail, an object is defined as follows: - An object is an encapsulation [joined together in a packet or module] of a set of operations or methods which can be invoked externally and of a state which remembers the effect of the methods ... The methods are the set of operations which we are allowed to perform within the context of the object (*Blair, et al., Object-oriented languages, p. 26).*

So an object can best be regarded as a scenario for processes and actions. Let us stick to that, and go on.

I need a variety of models suited to my assignment. Leaving aside for the moment verbal models, concentrating on designed ones, I would say that for my use there is a 2D or 3D design showing some system of interconnected or interrelated general categories of items, terms, concepts, notions or observations reflecting cases or subjects considered, heuristically, as representing "reality", such that with lodging into them specific contents, we can *depict* a real process and stages in it, between different states or situations. In the non-digital *Cmodels* in use here, the dynamics can be represented only in terms of new versions of the same basic picture. A non-digital model, unfortunately, *ne se bouge pas*.

The force of graphical models is that they can be so constructed as to combine categorization with space structure, proposing interrelations and connections in a way that verbal media cannot normally do, making recording and relevant argumentation simpler, more definite, but also, in most cases, less articulate than verbal models.

A *model*, furthermore, is intended to represent one stage or step in an argument or documentation process, and to be developed, modified or rejected as new data are collected or the model is being tried out, In this sense, too, the model is "abstractly dynamical".

The crucial feature of a graphical model is, to cite Richard *Skemp, their capability of *showing structure*. With *structure* one will mean the order in some pattern of selected items, by *system*, a structure really or metaphorically (by our mental operations on it) dynamical inside and, in some types (info models) from the exterior and out to an exterior (see Fig. 1.1.2, *System Embedment*).

Systems, the "home" of most models, are often classified as *open* or *closed*, the former in exchange with the environment, the latter without contact with it (which of course is an artificial condition). In the present context, with the limitation imposed by designed model, we have to work *as if* it were under the open perspective.

The application of the models works in the elementary sense that the graphs, to repeat an important point, must be contentless in the design and involve such positional parameters as *equality, distribution, inclusion, exclusion, tangentiality, superpositioning, partial covering or overlapping, chainage, and scale and dimension*. And they must be *congruent*, consisting of one and the same type of elements, numbers, geometries, logics formulas, or literary statements, which cannot be mixed (while numbers and words can indicate the significance and role of a model).

One published design case can serve to display the failure of respecting this rule. The cover of *Shweder's (& al.) book *Culture Theory* shows in colors a cubic box open at one side. On the two external surfaces there are two human faces in profile, and folded across the two visible internal surfaces there is a third profile, all of them placed on the square-designed surfaces. The box itself is precisely marked with square grids such as we are used to seeing them on formalized models, normally grid cubes, in which the meaning is that the grids penetrate the cube entirely, dividing it up in n tiny cubes. What has a human profile to do here?

Does this configuration denote a human factor in a formal context model?

One can come up with two opposite interpretations, equally valid (as I see it). The picture can be understood as representing either that *soft* science reflects *hard* science (and it could be used to illustrate rather loosely the idea of the present book), or else that the soft distinguishes itself from the hard, as the latter is traditionally understood. Since the cited cover image combines two distinctly and formally different categories of design or configuration, it comes out as obviously ambiguous. We have to avoid such ambiguities as seen in the Shweder design. A graphical model must consist of analog elements, such as 2D or 3D geometrical ones, not including more or less naturalist pictures from our environment.

We can decide that in a reflective relationship between *soft* arguments vis-à-vis *hard* ones, the former unavoidably have to apply, by mirroring or picturing metaphorically, the same kind of modules as the hard one.

Now is the time to implement this idea. I shall start with *Ronald Giere's* important contribution.

Giere's model (his p. 83), Fig. 3.1.1), with *model* in the ellipse, will be used in modified versions, labelled *Giere-M<odified>*.

Fig. 3.1.2 shows the Giere-M model, used as an external shell containing, the PROC<ess> model (Fig. 3.2.8) integrated, which in turn can contain the ORG model (Fig. 3.3.2). This model integration can be illustrated by three circles (Fig. 3.1.2).

This group of three models constitutes the central model idea in the present book.

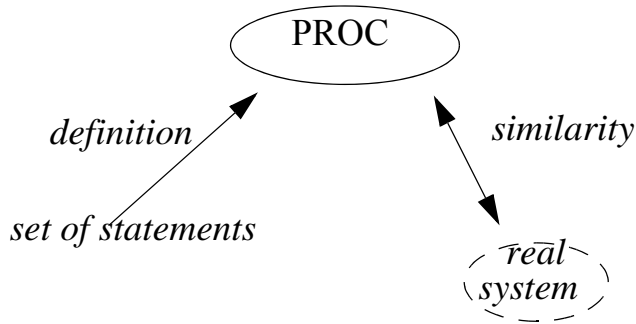


Fig. 3.1.2 *Giere-modif (Giere-M).*

It will usually be advisable, even necessary, to combine two or more *Cmodels* in a group, a *Cgroup*. They will arise as small systems and have to be treated as such (Fig.

3.2.3, *Cgroup: the three models for S .IV interrelated).*

The integration can be less simple than may have been expected. The *Giere-m<odified> model* (Fig. 3.1.2) brings in a "real system". The following comments should not be taken to mean that something has escaped Giere; but occasionally known ideas have to be repeated specifically for a specific context.

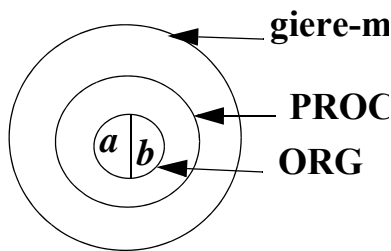


Fig. 3.1.3, *The three models integrated. a represents housing, b areas, urban structure*

The *triple model* (Fig. 3.1.3) can stand as an exemplification of a normal cognitive process. On levels of some importance or complexity, the three layers will be cognitively unified in various alternative modes, all at once, step by step

or centrifugally or centripetally. "Reality" will never arise in isolation, while the weightages of each of the three shells will vary individually, culturally and according to condition and situation. Nor will such alternatives be always stable or predictable. We have to do here with situations that can involve *imponderabilia* and must accept the predicament. Graphical models can help us discovering distinctions not always evident with verbal tools, and sort out the imponds from the manageable items.

Now I will develop further these ideas, supporting the process with other graphs and models.

Some readers may rightly ask: must we make it that complicated?

Yes, in the present discussion I have to, because I am proposing a general methodology for using graphical models, and then I have to apply the maximation principle, developing the model abstractions across all probably relevant levels, without regard for practical applicability in the present experimental assignment in theory rather than substance.

In the prospective follow-up, announced in 3.5, Reading Tacitus with Cicero in Mind, and planned to be published in 2015, in which the discus-

sion regards a chronicle and not merely a statute, the question of substance will be explored. The present editorial structure will probably be justified by that sequel.

Let me recall that the present book is dedicated to the theory and application of *verbal and graphical non-running models (Cmodels)* taking the *bi-track approach* (4.4). We need to choose *one or an interrelated set of basic models*, so as to ensure logical and semantic coherence and maintaining control of the process of analysis and argumentation. Alternatively, to skip over to a new model whenever one has problems with using the former one, obviously is an escape not a solution.

The central *Cmodels* are the *PROC<ess> model* (Fig. 3.2.8, = Fig. 3.2.2) and the *ORG<organization> Model* (Fig. 3.2.7).

Facing some specific task or subject to analyze, accompanied by general programmatic basis, outlook and priorities, and having tentatively determined a theory to be applied, we should survey the tools at our disposal; which I now venture *in abstracto* (three points to be made):

#1 a survey chart, like the *Category Provider* (Fig. 3.2.4), or another relevant one;

#2 a general view of some theory and analysis system and process, like the *Theory Levels* here illustrated (Fig. 3.1.4), showing each theory level integrated into the above one, ultimately into the *Meta* level.

The *meta theory* in this book is the entire framework expressed, mainly, in 1.1, *Position at Noon*, the entire *Part IV*, plus 2.9, *Imponderabilia*.

Next, we have the *domain or incipient* level which, as noted already, plays approximately the same role as does the independent domain with *x* values in a *Cartesian system*, where the range with *y* values is dependent on the *x* values. Embedded here, we have the *roadmap or program theory*; next, the *tool or operative theory*.

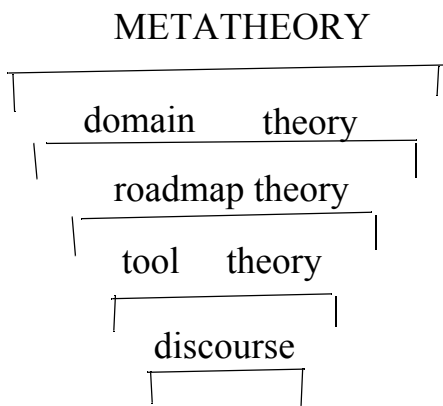


Fig. 3.1.4, *Theory levels*

#3 *First theory, then action.*; this is the "moral" of Fig. 3.1.4. The *theory* levels encase the *discourse* level. Under *discourse* in this model, we have our programs, interconnected and these will again be viewed as shells, the most comprehensive one being the *metaprogram*, containing other shells, as in the figure here repeated (Fig. 3.1.5, *Program Interconnections*).

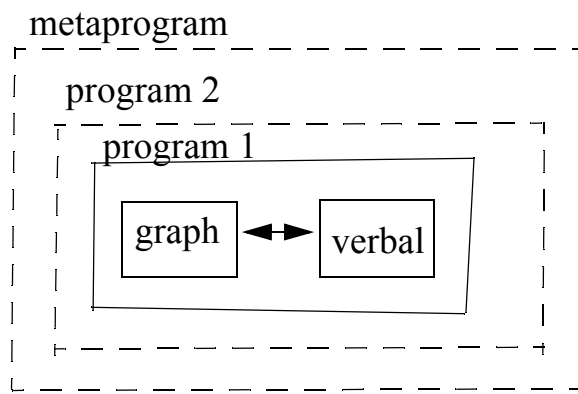


Fig.3.1.5, Program Interconnections

The double level of programs on the figure simply indicates that our work, even when not stated explicitly, will (usually) be subdivided in program levels. This means that the *three programs* in Fig. 3.1.5, with verbal and graphical models, including

the group in Fig. 3.1.3, *The three models integrated*, are integrated in the discourse level of Fig. 3.1.4.

Program 1 can be the operative process, while in *program 2*, we locate our methodological ideas and decisions, mainly how to *interconnect* what to explain and how to explain it: Fig. 3.1.5.

Here, I feel the need to admit that, even if (as I hope) the procedure is clear, it is complex. We will rarely, if at all, work in terms of such patterns, but it is meant to represent a maximum of systemic order, and as such can serve as a reference basis or checklist for work that goes on much more chaotically.

Opting for the operational approach (SL, **Operational Determination. Math in buildings and math statements about them*, on the present site), I want to connect it with the closely related idea of procedural perspectives. **Sowa (p. 23) has a note on the procedural-declarative controversy, referring to Herbert A.*Simon.*

The *procedural* or *operational* approach assumes that a person's knowledge of the world is embodied in procedures that actively interpret the environment and operate on it. Sowa quotes Simon's example of both views, two definitions of a circle, the first *declarative*, the second *operational*:

- *A circle is the locus of all points equidistant from a given point.*
- *To construct a circle, rotate a compass with one arm fixed until the other arm has returned to its starting point.*

Integrated in the roadmap now under discussion and evaluation, we have the *tools*, in the present case graphical and verbal models connected in the bi-track approach (4.4, *Bridge and Bi-track*). The outcome of the process is of course the discourse as developed and presented in the book itself, which represents a *roadmap* - pretending merely to suggest a methodological approach.

Now I will hazard to ask if such a system as described (summarily) here can be carried further over into *machine terms*; and not merely men-

tally and metaphorically, as ventured in the present book. In other words, be transposed over to what has been aptly called *machine vision*, that is, recording and managing our (my) system on engines working in the tech universe described by no less than 28 authors in the collection, *La visione delle macchine*, edited by Virginio *Cantoni and Stefano Leviaidi. The idea could be developed further, but I am not going to experiment thus far in the present book (and my competence would not be sufficient for that).

One path in what could be called the opposite direction, leads us to *Philosophy*. Unfortunately, this would land us in the usual quagmire of endless progress and regress. This is more or less what *Erasmus of Rotterdam* has in mind, when (on pp. 70/71 in the cited edition of his *Praise of Folly*) he rejects Plato's idea of philosophy guiding the State, and instead notes that history has plenty of examples of philosophy and philosophizing being detrimental to the affairs of State and Government (*Imo si consules historicos, reperies nimirum nullos reipublicae pestilentiores fuisse principes quam si quando in philosophastrum aliquem aut in literis addictum inciderit imperium*).

I want a firmer ground, even at the cost of severe limitations. When Richard Feynman claimed that nobody seems to understand *Quantum Mechanics*, nevertheless this same technological procedure functions excellently in scientific research and in industrial production.

Visually distributing and channelling *Cmodels* not only display the actual structure in 2D or 3D, but will also be giving us a constructive warning, the Capitoline geeze! if we try to do something with empty or insufficiently covered areas, because separate phases and stages in the model are organized to display subjects needing to be attended to. No literary text will give us warning with such clarity and argumentative control as we can extract from *Cmodels*.

But there is a prize for this. We do our work based on models, as I have mentioned, at the cost of renouncing the verbally promoted illusion of representing continuity. But, as we know, even mathematical continuity has to be taken by steps.

Graphical models exploit the visual modality of perception and understanding.

Images express dimensions, at least 2D, by design or mental processing even 3D. This factor puts at our disposal a space, more or less complex, in which we mentally (speaking now of non-digital models) can interrelate positions of items and thus conjure up a dynamical picture, that is, one or several processes; which verbal means cannot do since they state or define without showing. Behind this summary there is a vast literature, such as

publications by Von *Bertalanffy, *Boden, *Churchman, *Miller, *Pylyshyn, *Sowa and many more.

In order to develop a more solid platform for my use of graphical models with, , let me emphasize, some hopefully adequate repetitions, the perspective in which they are situated.

I have been claiming, in several publications, that documentation and argumentation regarding *soft* (non-quantifiable) material cannot apply directly math- and logic-based procedures (no novelty indeed), but that, whatever we do here, *our moves must in their patterns reflect, at least not violate, the rules and that determine hard approaches, such as in Math and Physics, and in the models in use in organizations and industrial activities.*

The systems idea is crucial here, and the application of *feedbacks* an essential part.

Working with an object, it will often become evident that at some junctions, there must be a *feedback* in the system. Models in 2D can take care of the need, while verbal representation would have to perform acrobatics to meet the need.

The mechanism can be illustrated by referring to a model shown by *Davis and Olson (pp. 315ff., and their Figs. 10-6 and 10-7), illustrating systems intended to be run digitally; but the principle is valid for our context, too. Their figure labelled *Feedback control for a system*, is redesigned (keeping the essentials) in Figure 3.1.6, showing the passage from sensors back via the control device to the system.

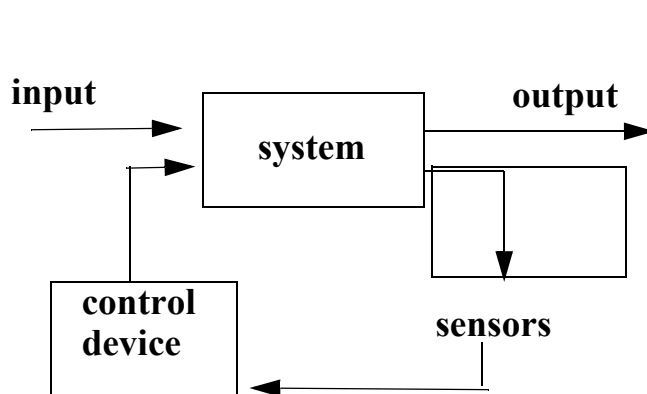


Fig. 3.1.6, after Davis-Olson:
Feedback system

In the model, we have two levels of elements: first, the rectangle as basic *form* (including squares); then the *shape*, which means their dimensions and the relations among the sides, plus their interrelations

(I am adopting *Lord and Wilson's terminology, for which see SL, *Patterns*, and below).

D&O (just cited) write that *Control consists of procedures to determine deviations from plans and indicate corrective action... The basic model of a system ... <is> inputs, process, and outputs.* They use this sequence also as essential in information systems (their Fig. 7-1, p. 200).

To their description of the control function in such a feedback model (cf. the local Fig. 3.1.6), I want to submit explicitly (what they seem to take for granted) that the feedback control can affect the constitution of or details in the system itself, or in the corresponding processing unit. In their Fig. 10-7, *Negative feedback control elements*, the correcting path goes straight to the input.

When in my *INF<ormation> model* (Fig. 3.2.6) the modifying stream becomes a circulation affecting both the processing info and the storage, the model still is comparable to the one illustrated here. The difference, of course, is that we have to imagine or mentally reconstruct the controlling and modifying action. This image of a soft system is under objective control to the extent that it can be compared to the digital model. This notion of the soft reflecting the hard is a central tenet in the present book. It is the optimum we can achieve, if we are willing to accept the unavoidable limitations.

We can evaluate the advantages of working with non-digital graphical models (*Cmodels*) as compared with verbal ones, with theory as the constant reference subject.

Elaborating, for example, the input, we will put some work into installing there as many possibly relevant items as possible. One might say that, yes, but this is not different from searching verbally for causes, motivations or explanations. But there are important distinctions between the two kinds of approach.

Verbally, we would search for some primary causes, provided that we find the specific input issue important; and we will usually bypass items or sites that do not look attractive or essential. And the modality for comparison between two statements of some complexity will usually be vague.

Graphically, we have to fill in any input and the other nodes in the model, without evaluating their importance, and insert as many as likely without at this stage evaluating their mutual relationships and degree of relevance. The graphical model "stares at you", demanding to be taken seriously. Sticking to a limited battery of graphical models make observations and arguments comparable.

Next, the input is part of a whole course across the model and it will be our obligation to treat all parts of it with the same approximate consistency.

In prose, one tends to stay with whatever seems important and plausible. there is no configuration that requires to be handled in every part of it. This is what happens with graphical models, they require completeness and objectivity (within limits, of course).

Regarding our models, we must now consider their applicability: what kind of analytical status and coverage capacity should we demand from them? A more formal *program for productivity* is required here.

A *Cmodel* should be considered analytically productive (through our operations with it), provided that

- a) it brings surveyable order among elements, while evidencing problem relations holding between them;
- b) it can absorb new data and insights,
- c) it can be modified, enlarged, or adapted upon intake of such resources, and
- d) if, by such intake parts of it are disrupted, it still lends itself to repair and restoring of its consistency, and

if the system under the circumstances just mentioned (a, b, c, d) is capable of generating new theories that demand and can elaborate new empirical material (expanded formulation from SL, *Iconography and ritual*, pp. 160f.).

The prospect is the doubly creative process of building a graphical model and then testing it for application on substantive material. We start with building a graphical design (the *shape*), and begin anew with creating awareness in ourselves regarding the scopes, functions and limitations of such models, in general terms (defining the *form*).

Statements expressed in frameworks with visual positions, extension, distribution and mutual relations and drive, that is, graphical models, at the basic level or in the initiation phase of a process, can allow us to approach such as an ideal, situation, at least in the meaning of Herbert Simon's *satisficing* criterion; at the cost, of course, of richness in concepts and articulation.

Starting, yes, but at no point pretending to come to an end or a conclusion or outcome, and never taking the ideas as definite or final: we are working in an ongoing process of *Hows* rather than *Whats*. *Let me begin with the design*.

#A. Designing a model or modifying an existent one, some theoretical principles will lead our work. We want the model to be simple and surveyable and not geometrically complex, which could have disturbing or even misleading effect. It is also important that the design be compatible with already existing models, of which there is a large collection in the literature, even across a step or two.

If the model is intended to handle processes, we normally will make it tripartite, having an input, an processing or operating zone, and an output or product. The crucial feature of a graphical model is, to cite Richard *Skemp, their capability of *showing structure*.

In order to load our items into it, we set up a chart, like the present *Category Provider* (Fig. 3.2.4) of those items that we want to handle and we provide for space (boxes, for example) for those items and decide on their interrelations. And we construct our model.

#B. Awareness.

This phase comes when the secondary (by number not importance) creative effects set in, making us aware of scopes, limitations and shortcomings in the model, and the blanks into which we should have loaded something and will probably have to. The experimental job of completing such a model will easily leave some blank spaces, and this can prove a productive challenge to our analysis.

Gradually, we can discover places into which new or overlooked items should be installed; or, vice versa, items that arise as follow-ups. Developing our model and referring constantly to our subject, we will usually be forced to see that something is inadequate or incomplete even by the limited standards valid for such an operation.

Finally, such operations as are sketched out here, can reveal that the chosen subject should be removed and a more adequate one lodged in or, at least, that the original one should be modified.

Of course readers, too, facing the models used in the present book, will discover such problem spots and, as I hope, act upon them. In this manner, building and actively using the models becomes tool for interaction and possibly also for connecting different paradigms. *In this specific sense, working with models-with-words, as I am trying to do, happens in open space, inviting the intervention and participation of the readers.*

3.1.1 Advise from the Literature

For a general overview of the subject, I have consulted the following publications: J. and A. *FitzGerald's *Fundamentals of Systems Analysis*, 1987 (merely referring to pp. 20, 55, 57 and 100; the book less general than might be expected, focused on business implementation), and Ch. S. *Parker, *Management Information Systems*, 1989. Special graphs are the subjects of S. Lipschutz, *Discrete Mathematics*, 1976 (*I have only the Italian version*) and R. Jeffrey, *Formal Logic*, 1981 (all *Bibliography). Parker's list of models, pp. 89 - 91) can be summarized as follow:

Graphical models are generally using such symbols as icons, boxes, and lines to represent real-world elements and the relationships among them. An example is structure charts (*Parker, Fig. 3.2: an inverted tree with named rectangular boxes - much alike organization and business administration charts) which are commonly used to show how computer pro-

grams are organized. Each of the rectangles shown in the chart represent a well-defined processing task. The modules are then arranged hieratically, to show their level relationship to one another.

The literature is packed with models of different types, and it would not be hard always to find one that fits the actual case or operation. Free application of such a gallery of specific choices would, however, lead our attention away from the creative factor in our work. We need to start out with our theories, not with a gallery of readymade models. Consequently, my models here presented are intended as suggestions, not standards. And they have limited reach by being developed for a specific object.

Straight reading of a document, such as *Sixtus IV' statute* in this book, can be interesting but hardly productive. We have to start out from a consciously structured and manifestly developed theory. Here, verbal means are not sufficient, because they do not show structure. This is what schemas (our models) do (Skemp, pp. 83ff.). Richard R. Skemp speaks of Helping to *show structure* (pp. 83f.) in a book that should be widely known for its exceptional integration of math with basic human intellectual functions (he calls it *psychology*).

The graphical models are our motor factor. Clearly, any initiative, action or step is taken by decision. Are there reliable and generally accepted rules for making them in such an environment as we are facing in this book? I am not so sure about that, but I do not pretend to advance original views about it. So we need some support from the literature for our grasp on this crucial and, in our cases, evasive paradigm.

Without trying to come up with new ideas especially relevant for the preent task, I shall take cues from *Dieter and *Davies-Olson.

Dieter, in his book on Engineering Design (pp. 141ff.), offers a synthesis of the program, which I now report somewhat abridged:

A decision-making model contains the following six basic elements.

1. Alternative courses of action ... a, b, c etc.
2. States of nature (environment of the decision model: normally out of the control of the decision maker.
3. Outcome, the result of an action and a state of nature.
4. Objective is the statement of what the decision maker wants to achieve.
5. Utility is the measure of satisfaction or value which the decision maker associates with each outcome.
6. States of knowledge is the degree of certainty that can be associated with the states of nature. This is expressed in terms of probabilities.

On this basis one sets up a table of parameters. Som math enters into game, e.g. regarding probabilities. (detailed and articulated relation in *Davis-Olson, passim).

In the present context we can only - and need only - distil the rudimentary ideas from the technical procedures outlined in the two cited contributions..

We shall test the ideas on an applied model for the bulla of Sixtus IV. There are at least the following queries to be probed:

- a. the bulla against the urban scene;
- b. particular entries here;
- c. the present author's use of the model(s) on the document (the bulla).

The last alternative will be chosen, out of historical interest but also because this may draw criticism, also from readers, on the present work, specifically on its central concern, the choice and use of models

A mathematical model is used to express quantifiable phenomena, or the relationships among several such phenomena.

Narrative Models describe a system without formalizing it as do graphical and mathematical models. Some examples are the spoken voice describing an object or event, a written text description of a procedure, and a photograph or videotape of an object.

Physical Models are generally 3D representations "that one can hold or touch"(: let me supply an example: the doll-house of our daughter).

Systems, the "home" of most models, are often classified as open or closed, the former not in exchange with the environment, the latter in contact with it.

So far Parker, who from this point goes on to specific business management, developing the idea just noted. Models and various kind of graphs, mostly for either strict logical calculation, or digital application, are discussed in the cited works by *Lipschutz and *Jeffrey. These contributions need not detain us.

The arguments considered in 2.8, *Artifice and Artificial Reality*, mean that we have to articulate both the main constitutional characteristics and the grammar we will apply to our models, involving categorization. Let me start out with the essence.

#1. The models store and show relations between nodes with contents of two kinds, concepts - for which I adopt Putnam's view (SL, *Burden, Patterns*), which means categories (Rosch's view; both in SL, *Burden*, 5.4.1); the idea being that these terms refer to operations and processes rather than definitions - comparable to Banesh Hofman's notion of *vectors*, for which there are precise definitions, but which are changing along with the procedures intended to be using them (*SL, *Burden*, 5.4.1).

#2. The nodes in model networks, so long as they appear in the abstract modality as position markers, can be subjected to digital handling as symbols (cf. Bratko on trees, SL, *Burden*, 9.3), or, failing to serve digitally,

by mental handling. The nodes or model areas containing the categories are spatially distributed. The advantages of this structure was discussed earlier in the present Section.

#3 The subject of categorization , as I have noted, enters into this game. In order to tackle an issue in a meaningful (or not meaningless) manner, we have to develop a different conception of categorization itself. For this purpose some recent views on the subject are presented in SL, *Burden*, Part 5, Chapter 4 and will now be reported in some detail.

We have an example of a *verbal model* in Miguel de Cervantes' *Don Quijote de la Mancha*. The author carefully builds up an image of the madness or *locura* of the chief protagonist. This gives him leeway to say whatever he will (and the book is full of acute observations and ideas). If called before the Inquisition, he could answer the aggressive Dominicans at Toledo that, yes, this is the picture of what a madman can think and say; and those judges respected arguments, they were, after all, followers of Thomas Aquinas.

Graphical models have no substance in themselves, being tools for getting hold of certain subjects and analysing them. Thus the models, as instruments we have constructed and with which to go on towards some goal, can be more reliable than our appreciation of the reality we at any moment are considering. This must have been what Werner Heisenberg had in mind when he thought that Niels Bohr believed more in his model of the atom, than in the reality it was built to represent (2.5, *Indeterminacy a Resource*).

At the same time, since graphical models are developed or built under some theory umbrella, and thus are statements of theory and have to be chosen experimentally, at least, right from the outset, once we have identified to some extent the theory stance we are going to adopt, respecting Einstein's ruling that theory must precede observation. Theory will always precede our grasp of a subject, even though our "theory" may just be a set of preconceived notions or conventions or misinformed perception. Our job in serious analysis is to convert such ideas or intuitions into theories.

The idea of limitation is fundamental. Without referring to it more carefully, I will cite a book by Lázló *Meró with a title I would translate as *The Limits of Rationality*, of course reflecting Herbert Simon's ideas on precisely this subject; the book is translated into German from Hungarian - which unfortunately is out of my reach and from German into Italian, my copy (*I limiti della razionalità. Intuizione, logica e trance-logica*, Bari 2005; German edition: *Die Grenzen der Vernunft. Kognition, Intuition und komplexes Denken*).

Attention to our limitations has always seemed important to me; let me hope not exclusively because of my inborn ones. I started a work with citing Rudi Paret's *Die Grenzen der Koranforschung*, and could repeat it here. Academic career-building of course counteracts such bursts of realism; but who cares when one is not out to making one? Freedom comes when one is pensioned off; this lays a duty and a burden on us who are lucky enough to keep going a little more.

3.2 *Elaborating the Tools*

Having discussed general principles regarding models, the functional aspects relevant for the local task, should now come out as more meaningful.

To the predictable reproach, that in this and the following *Sections*, I am making things unnecessarily complicated, my answer would be that they are really much more complex.

Readers could probably find or invent simpler methods for setting up the models-cum-lists in the next couple of *Sections*, even without graphical models, for example numbered lists with category headings. The point in the present exercise is not to "understand" the bulls of Sixtus IV, but to gauge the coverage capacities of model configurations, trying them out on the relatively simple papal statute.

In her thought-provoking paper, *Physicalist Thinking and Conceptions of Behaviour*, Jennifer *Hornsby starts out with showing and discussing two graphical models. Her models have real contents, such as *brain*, *person*. Ideally, I too would have liked to start like her, but my models carry another kind of contents, with *general categories* such as document functions. So my models have to be differently construed.

There is no generally adoptable metric for the internal structure of a model of the kind in use in the present book; just an average of non-math probabilities; which in some cases can be boiled down to real-life specifics.

We are thus going to use *models* and *charts* and have to distinguish more clearly between these two types of documentation and analysis display.

We have, let me repeat, the following types of basic constituent elements: *straight lines, one- or two-headed arrows for indicating directions among or connections between three kinds of bounded 2D fields, here labeled boxes: simple rectangles or ellipses as well as larger boxes containing other operative (metaphorically speaking) tools: tool-boxes; finally, labelled points.*

These ingredients form the following classes of model structures, usually with line or arrow interconnections and disposed over two or more levels (note: "boxes" can be 2D geometrical designed as rectangles or circles or just verbally indicated).

1. two boxes linked with a line; or a curve connecting points.
2. two or several boxes making up a hierarchical network, spreading out from the top or narrowing downward;
3. two or more boxes making up a network of variously interrelated boxes;
 - 3.1. undirected
 - 3.2. directed (flow diagram)
4. a directed system of lines focused on labelled points, usually with feedbacks (also linear or arrows): a flowchart, not in use here.
5. "Chinese box" system: a set of integrated boxes.
6. Cubes showing interrelated three sides.
7. a network of lines and/or arrows with labelled points making up a system.

Cmodels illustrate and *represent* something, while you can perform operations on them *as-if* they were true machines with wheels, cranks and pinions; or, indeed, computers with running programs. But they are not theoretically pure, but will usually, inside or in terms on our mental actions on them, carry with them noise of various unpredictable qualities.

So we are never *there*, only, if we are lucky, approximately so. The awareness is not a new one. Lucretius knew it, and in his pre-AD *De rerum natura*, regarding natural objects like sea shells, and the diversity they muster, concludes: *Quare etiam atque etiam simili ratione necessessest, natura quoniam constant, neque facta manu sunt unus ad certam formam primordia rerum, dissimili inter se quaedam volitare figura* (V, vv. 377 - 380).

A prose account usually with focus on subjects of special interest and relevance is, in other words, *dedicated*. An abstract verbal model would have to display general categories, whereas a graphical one brings us one important step further, that of evoking priorities and spatial interrelations between them, distinguishing between subjects and operations on them in one view.

Undercurrents and peripherals can arise to make the model alert us to a more extensive and richer historical picture (but not so in literary prose, of course). And one model can be developed from an original one (as we see: INF -> PROC, Fig. 3.2.6) such that the structural and systemic character of both can be directly compared. Next, the model places on us the obligation to follow up what has been initiated, and to this phase we now move on. What can happen is perhaps best illustrated by speaking about feedbacks (below here).

With the documents to be analyzed, I mean the two *Papal bullas*, especially the one of Sixtus IV; and Tacitus' *Annales*, for later consideration. When I pick out some aspects from the relevant documents, this is with the intention of experimenting abstractly with document analysis in model

terms; it is not to work out an arguable understanding of the substance of the document. But the papal bullas and Tacitus' chronicle require different handling. Some provisional informations on the chronicle are collected in 1.5 and 3.5. But this document will be studied more intensively in a *sequence* to the present book, to be published in 2015.

In the statutes, the processual info model PROC with the organizational model, ORG, integrated in it: PR-ORG-OC (Fig. 3.2.8, *the PROC-with-ORG model*).

The bulla is a formal law document. I am not going to try any text criticism on it, nor a juridical evaluation, for which I would not been competent. My focus will be on the descriptions and the requirements regarding Rome and what the bulla thus seem to tell us about conditions and administration in the city, in other words, a rather summary approach in the direction of social and social-anthrological arguments.

The limited perspectives as they emerge directly from Sixtus' bulla can warrant only an initial probing. To this comes my failing competence in juridical language and notions.

These limitations can turn out as an advantage. For they force me to stay at rock bottom, making approaches on elementary, let us say, basic and experimental levels, only suggesting theory and methodology. Among the issues here, there is the one regarding so-called reality (**Table of Contents*).

The program is devised as follows here.

Logistically, the coordinating process will go as on the graph shown here (Fig. 3.2.1 *Relations models - document*). The arrow labelled nodes refer to the partitioning of the *Cmodels*, coming up later, into single boxes or nodes for further development.

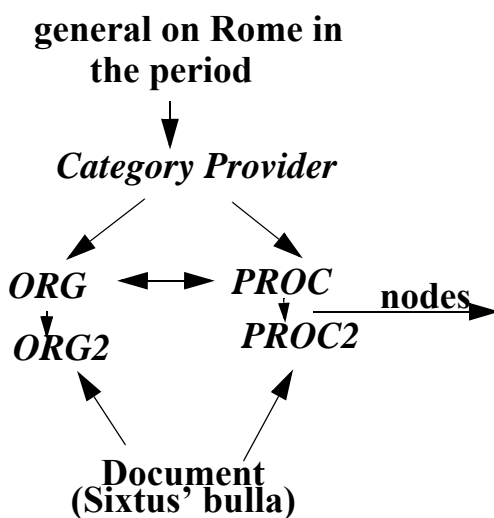


Fig. 3.2.1 *Relations models - document. General version. The arrow to nodes indicate the specific contents of the model nodes or boxes.*

At this point, in anticipation of the substantial presentation, the difference between the two main *Cmodels*, the ORG and the PROC should be more closely specified.

The ORG is considered a semi-static picture in that there is no input or output and that the categories are stable while

there will be subordinated variants. It represents the kernel of a machinery, with a pseudo-cybernetic significance, the central governing organ.

The PROC depicts a process with input and output, containing - in the present experiment (later changed) - the governing kernel, the ORG.

The syntax now is to accept the *Category Provider* (CP) as a relevant choice and pattern (there are n alternatives, naturally) of important and relevant items for our analysing the bulla of Sixtus IV. The items in it will be loaded into the ORG and the PROC.

Next, using the categories there, numbered items from the bulla will be loaded into the *Cmodel* boxes or nodes separately, supplying lists of the items directly referring to each node. Thereupon, the abstract *Cmodels* with empty categories will be refurnished with specific contents, collecting the items in the nodes, and we will have dedicated versions of the model, ORG2 and PROC2. The procedure is illustrated in Fig. 3.2.1, *Relations Model*.

Finally, this combined configuration will be integrated into a more comprehensive system.

Implementing this program, limited to the Sixtine bulla, I shall display the configurations and their attachments.

But some theory work must be faced up with first.

3.2.1 Four Theory Levels

We are guided by all sorts of ideas, from hunch to elaborated and focused theory. My focus being more on theory than substance, I have to realize that for the present assignment of analysing the papal document, I will have to apply *four levels of theory*. They come as in Fig. 3.2.1 presented here (already shown, but now elaborated).

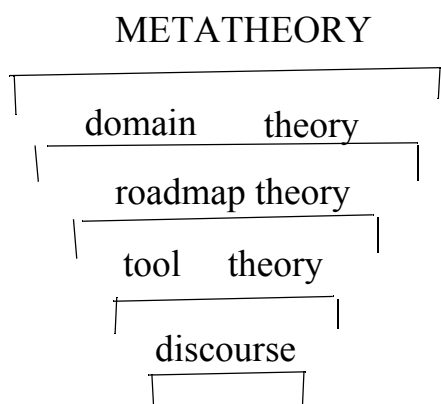


Fig. 3.2.1bis *Theory Levels*

1. *Incipient or Domain Theory*. By hunch, more or less vague ideas about my assignment and some knowledge about the subject and its historical environment, and some familiarity with model usage in various disciplines, I have developed the PROC and the ORG *Cmodels*. I let them, with their categorizations, advice me about my roadmap. We let our procedure be determined by the

PROC and ORG models, a primary *operation* categorization directly, and initially, expressive of *incipient theory*: the group of ideas, purposes, inter-

ests, aims, capacities and shortcomings that nillywilly operate in me and tell me, as Wittgenstein might say, *what I have to do*, and also what I am enabled to do. Next, we have

2. Program or Roadmap Theory. Connected with the cited models, a program for analysing the bulla is being developed, and we are in the midst of it now. The subject is the elaborated and commented text of the bulla of Sixtus IV (1.4, *Dissecting Sixtus*). Then we have the

3. Operative or Tool Theory

In the book, this theory level is summed up with much of the list under the TOC (*FrameMaker* table of contents); as well as the contents as scanned and separated out from the bulla: *content categories*; these categories can be culled from the *numbered version* of the *Category Provider* (Fig. 3.2.4 *The Category Provider with numbers*). Together, these entries and mini-programs make up the *operative* context or environment for the program theory.

4. Focus or Discourse Theory. The parameters here are derived from the theories just listed, and serve to exploring some *specific subject*, and I have chosen a limited theme group in the bulla { 6 } (1.4, *Dissecting Sixtus*), the famous row houses (*case in serie*). To accommodate this on the PROC model, a box No. 8 has been added to Fig. 3.2.2.

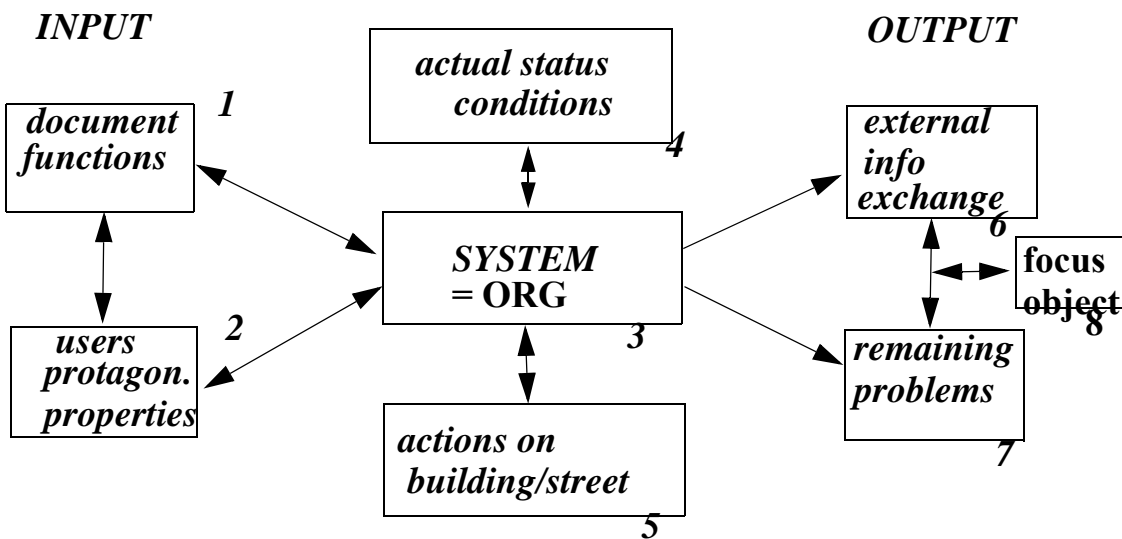


Fig. 3.2.2, the PROC model with a box (8) added.

What is needed for constructive work is the possibility of configuring dynamics as well as complex organizational structure. For this scope I have borrowed some published models and modified them - in fact, extended their scope.

The ORG and the PROC models will be applied for loading in the findings. Here, the course from input to output will illustrate a change of positions and not a goal-driven process. The move leads to a selection of alternative affirmations, much like the bundle of arrows in Fig. 4.8.1. This because it does not do to select one conclusion to the exclusion of alternatives (no criterion exists for exclusions; we must leave that to the religions). We pragmatically select the one that seems to be the most rewarding one in terms of coverage, articulation and consistence. This rule is not only a question of principle for analysis; it also fits the character of the bulla itself, in which aims are only exceptionally stated, having to be partially reconstructed.

The sequence of *Cmodels* plus the *Cgroup* Model that coordinates them, represent one among innumerable notional syntactic theories of general conceptions of a historical document, a statute or a chronicle. On a general level, this is a completely realistic theory and it can be relied on in the present experiment.

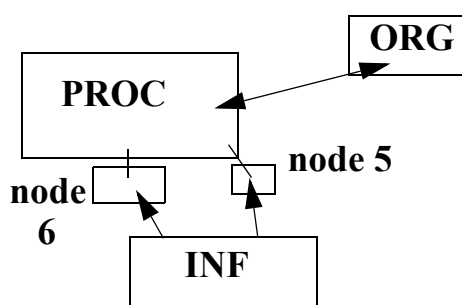


Fig. 3.2.3, *Cgroup*: the three models for *S.IV* interrelated, an interface model.

Informations from the "exterior" flowing in are lodged into nodes 5 and 6 on the PROC model. In the PROC model, in Fig. 3.2.3, node 5. denotes the document = *S.IV*' bulla, indicating its possible influx of items not coming with the general input to nodes 1. and 2, with. further political and administrative basis, the urban rules and initiatives. Node 6. takes up external info, the latter term then in Giddens's sense of "making something happen or occur".

The chart and the models will now be presented for closer inspection, in the following order.

The *Category Provider (CP)* will be presented first (§1). It will appear already loaded with contents, some of them numbered, being a chart containing head-on relevant issues. Then follows the development from INFO<rmation> models (§2) to the PROC<essual> model (§3) ;and, finally, the ORG<anizatio> model (§4).

After that, groups of interconnected models (§5).

3.2.2(§1) *The Category Provider*

The *Category Provider (CP)* (Fig. 3.2.4) is the platform on which the processes are now to be worked out. Here it is with some comments. It be evaluated in connection with a sequence of *Cmodels*.

To make the models useful, we need a list of the parameters intended for our processing of data, info and themes. Such a list will normally not be a general one, rather one that is dedicated to prospective programs; in the present case, the bulla of Sixtus IV.

We shall note how the assignment to build a graphical model and make it useful forces the researcher to try to find items which so to speak await being lodged into the model, to fill the empty spaces or nodes; verbal models rarely offer this challenging advantage.

Not to make the reference algorithm too unwieldy, detailed references will be limited to the ORG model, with summaries and surveys accompanying the PROC one, with paragraph references { n } where relevant. Some entries accompanying the PROC have to be culled from other sources and from general knowledge of Rome in the period.

The *Category Provider* (Fig.3.2.4, now with numbers) is a static chart, not imitating a digital one. It illustrates the working together of three non-too-precise categories (adequate in experimental context), which have been selected among numerous real ones and with the focus on theory rather than substance: *people, works, and economy*.

Needless to say, the selection as well as the internal arrangement is arbitrary, could have been organized in numerous alternative ways. Simplification has proved unavoidable in the present experimental connection. Obviously, some individuals and groups can act both as people and business people at the same time, but they have been kept apart on the chart.

The *CP* consists of items directly culled from *SL, T2C* and the material from the papal bullas in 5.1 and 5.2, recording essential thematics - a theme - from these sources; the theme indicated in it and elaborated in the PROC model (Fig. 3.2.8). The items on this version, to which the ORG and PROC models are intended to be related, are numbered for references.

The *CP* in use here is designed for the Roman documents. For alternative applications, such as to Tacitus' *Annales*, the specific contents will have to be adjusted.

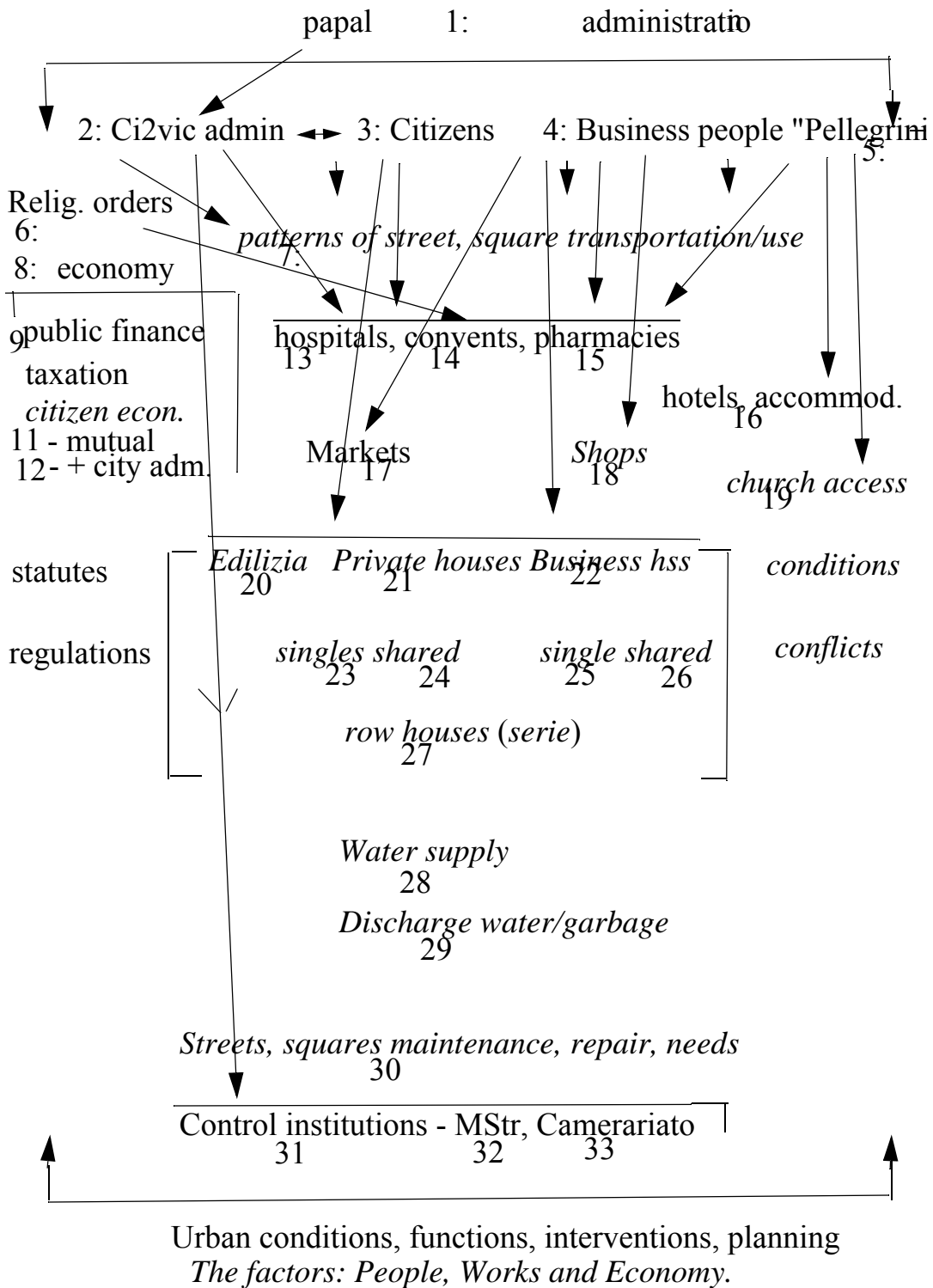


Fig. 3.2.4 The Category Provider. The CP-numbers are set into each unit, while some of them will not be put to use, since they include one or more items numbered already.

3.2.3(§2) *The INF <ormation> Models .*

With the *CP* chart behind us, we shall now consider a rather traditional information model, here labelled the INF. Communication of course is an extensional factor here.

With this we can develop the information issue.

We cannot speak of a relatively complex planning and implementation process focused on display in a public place or in a ritual as a means of displaying and exchanging messages, without looking at it as an information system. The simplest information system consists of three "boxes": inputs (of data and instructions) - processing (of data according to the instructions) - output (results, information).

These inputs are external inputs. But here as elsewhere, the information processing function frequently needs data collected and stored previously, and data and acquired information, too, may be stored here, as we just noted. When data storage is added, the information processing function includes not only the *transformation of data into information* but also the storing of data for subsequent use (*Davis and Olson, 288f.). Thus I have added a fourth "box" to the system, one for "storage". Here data and data processed into information, are stored.

The info paradigm is crucial, since one of my operative models, the PROC<ess> one, is developed from a standard info model.

The inputs to the INFormation model are (at least) the following ones:

1. The documents (Sixtus IV's bulla, Tacitus' *Annales*);
2. the four theory principles cited above (Fig. 3.2.1bis , *Theory Levels*);
3. the statements of aim and purpose in the present Part I.

Two models will be shown here, the original one by Davis and Olson (Fig. 3.2.5), plus the version I have elaborated for the present assignment (Fig. 3.2.6).

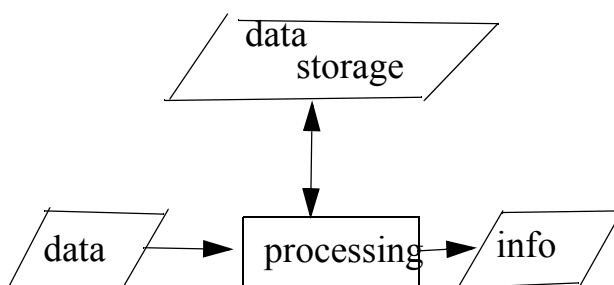


Fig. 3.2.5 *Transformation of data into information in an information system (Davis-Olson, p. 200).*

Both versions are typical info models, flows with input and output. But my elaborated version includes further specifications: a *storage node* and *feedbacks*. The idea with this is that any info operation will to a variable extent rely on stored (familiar, known, compulsory) data, methods and procedures, and partic-

ular informations, including aims, goals, preferences. Let us recall that *information is elaborated data*.

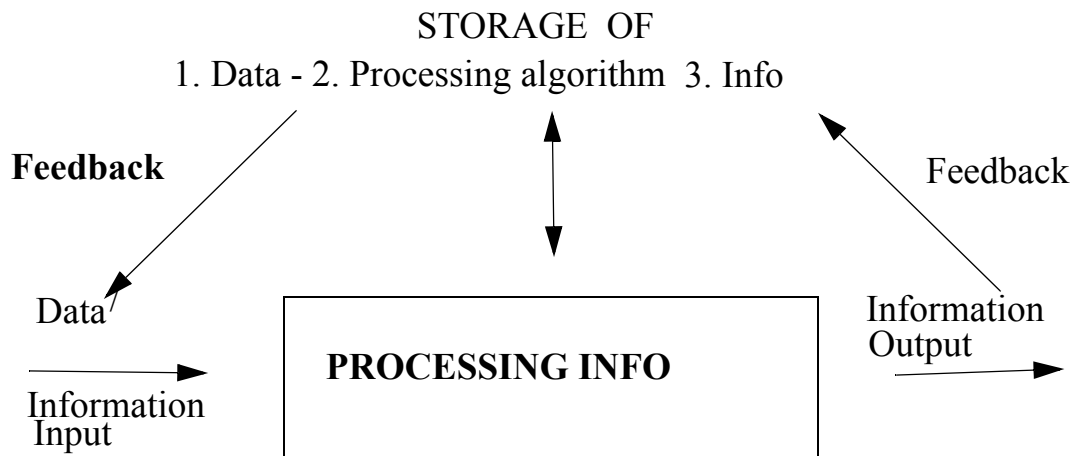


Fig. 3.2.6, *The INF model developed from that of Davis-Olson.*

The application in the theory of *management information systems* of the original Davis-Olson information model, via my revised version, the root of my PROC, is developed in the highly rated book with this title by Gordon B. *Davis and Margrethe H. Olson (2nd. ed., 1984).

3.2.4 (§3) *The ORG<anization> Model*

It seems analytically more workable to set the ORG into the context of the PROC than the other way around. The ORG<anization> model now to come up (Fig. 3.2.7) is modified from one in *Silverman's important book on *social organization*. The items covered in this model can be considered relatively stable, at least for the limited time span considered here, so it does not depict processes, though it cannot totally exclude them.

There are (at least, again) the following entries to put on record in the ORG model.

1. "Pyramidal" structure of the Papal government and administration of Rome;
2. the combined clerical-civic city administration;
3. the Maestri di strada and related urban comptrollers;
4. the classification of citizens in
 - 4.1 social-religious terms,
 - 4.2 economic/financial, and
 - 4.3 professional; and
 - 4.4 more or less residing visitors and pellegrini;

4.5 real pilgrims in the modern meaning.

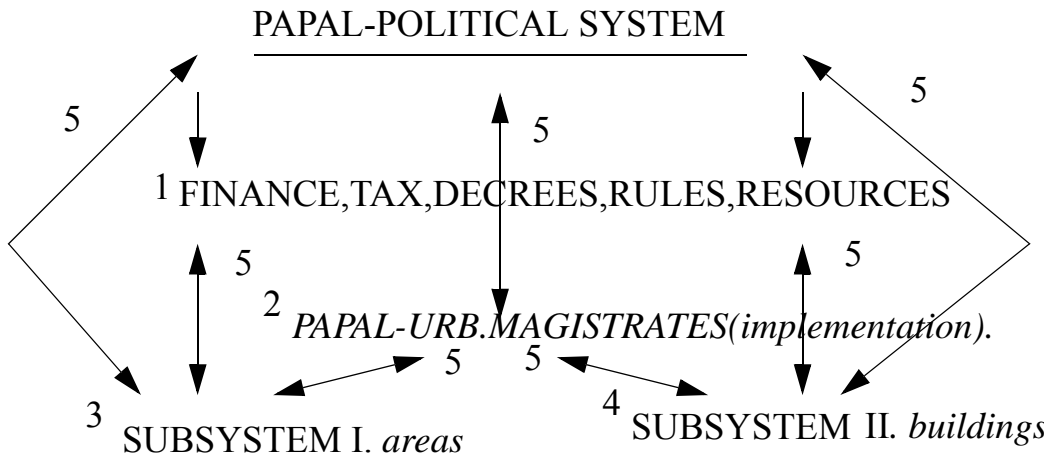


Fig. 3.2.7, ORG<organization> Model, redesigned from Silverman, *The Theory of Organizations*, with new node names and code numbers. Those with numbers 1. and 2. referring to the Category Provider.

Reading off the model, we can note as follows.

The Papal political system is considered here as the source for the entire structure recorded in the model, though even here we must hypothesise some amount of feedbacks. For example, at each selection of new Cardinals or Bishops, there is the risk of disbalance somewhere in the system (a famous relatively recent case: the scandal concerning Bishop Marzinkus, boss of the Papal banking system until the Vatican had to send him back to the States; a case by many regarded as the top of the iceberg).

Financial traditions and institutions have been noted under the PROC model. But there is more, summarily noted: dependence on bankers first from Florence, Siena and Augsburg (the Fuggers), then local banks (see SL, T2C). Taxation: my available documentation does not leave much to say about this subject, which, however, cannot be bypassed in silence. Houses in Rome were taxed after various criteria, one was the number of street doors, the house numbers still today determined by the doors not the building itself.

Since the PROC model includes the ORG model, presupposing it or some other adequate configuration, a few more observations on the ORG as developed in the present context are due.

The ORG model (Fig. 3.2.7) can be used metaphorically without involving us in digital processes. It shows, as does Silverman's original, a typical organizational structure to which all relevant mechanisms and processes can be attributed; which makes the model eminently useful for

studying basic, likely and possible information and decision streams in a real organization.

The *double arrows* marked with 5 are intended to include both directives and feedbacks. No organization model can adequately represent the complexities, even chaos, of an urban-administrative-use system as that of the semi-systemic and somewhat inexperienced practices in Rome of the fifteenth century; so we have to accept drastic simplifications. But the argumentation should be clear enough, also for criticism.

The ORG model as developed with reference to the bulla represents one step which, as we see from the feedbacks (SUB 5, below), leads to a next one. This, however, would need other sources which lie beyond the limited scope of the present book.

Here is a list of *SUB<systems>* connected with the ORG model in Fig. 3.2.7, which could be readapted for installing any relevant information.

The following numbers from 1 to 4 refer to the model subsystems (SUB1, etc.). To unburden the discourse, these items are not emphasized in the edited copy of the bulla itself (*1.4, *Dissecting Sixtus*). The items are listed here as an introduction, the methodologically more rewarding exercise to follow.

1. Finance, tax, decrees, rules, resources
2. Papal-urban magistrates (incl. pope's statement of authority).
3. Subsystem areas.
4. Subsystem buildings.

Specifying:

SUB3 Subsystem I areas

a area identification

b street, square, bridge

c traffic, comunic.

d markets, shops

e waste

f sanitation

g pilergims

h curiales

SUB4 Subsystem II buildings

a housing rules, control

b private single buildings

c private shared buildings

d comb. private/business buildings

e row houses

f portici, meniani, other blocking structures

g conflicts

h sanctions**SUB5 Feedbacks**

The double arrows include feedbacks, which are indispensable for any argumentation regarding social studies. This is an avenue waiting to be explored.

The elaborated Subsystems**SUB6 Subsystem I areas****a area identification****b street, square, bridge****c traffic, comunic.****d markets, shops****e waste****f sanitation****g pilgrims****h curiales****SUB7 Subsystem II buildings****a housing rules, control****b private single buildings****c private shared buildings****d comb. private/business buildings****e row houses****f portici, meniani, other blocking structures****g conflicts****h sanctions**

This list is not determining completeness to be complete; first, because there are no general criteria for that; secondly, because the present book is an experiment, relying on shortcuts.

In the next *Subsections*, I shall elaborate further the "operative" models in preparation for applying them. There will unavoidably occur some repetitions.

3.2.5(§4) *The PROC<ess> Model*

The PROC can be seen as an action program rather than one in time dimension, in the sense that no stretch of time is being considered, only input-action-output, so to speak, in one go. In this sense, action is considered in the ORG, too, but as the range for it rather than the process domain.

Here follows Fig. 3.2.8, PROC-with-ORG integrated. Node captions below, the functions of each node, from 1 to 7, distributed as paragraphs under the resp. code numbers, marked with # *n*<umber>. Specification for the nodes will be limited to generalized items, in which the relevant key

terms and/or expressions are to be found. The categories are mostly derived from the *Category Provider*.

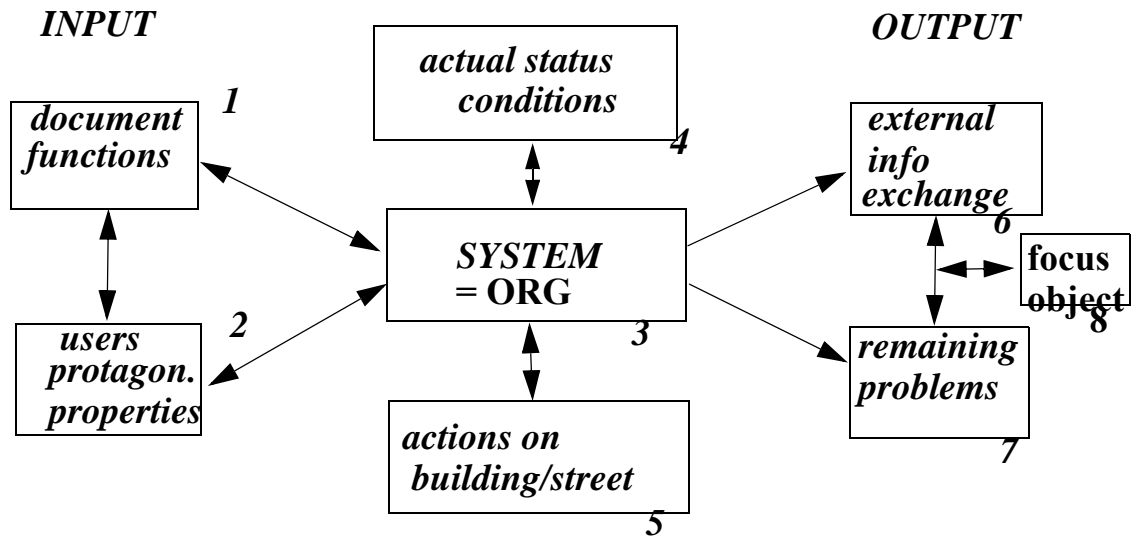


Fig. 3.2.8, the PROC-with-ORG model. Document level and event levels integrated. In addition to the main flow from in to out, there will have been a certain amount of feedbacks. At node 1. will be linked up items regarding people (1.4) and sites (1.5) from the Category Provider.

At this point, let me anticipate our use of the PROC-with-ORG model with a relatively anation of the structure and its subdivisions.

Whenever a bad urban or building condition is localized in the bulla and repair or renewal stipulated, the item will be located at 7 on the model.

The model is *focused on buildings and streets* and on interventions here; the legal relations between people bypassed, except whenever a cooperation or conflict directly touches on structures. This is why an ezxtra box, 8, *Focus Object*, has been added to the model.

Box 6 will be mainly used for more comprehensive goals of renewal.

3. = Papal/Central Admin. System.

1, 2 6, 7, = as indicated.

The double arrows between 6, 7 and 8 indicate that some problems are pending.

The feedback arrows from 3 to 1 and 2 indicate that handling of issues at the organization level (3) can have impact on the long-run functions of the bulla (1), and short-term effects among the population (2) and their response to the mandates.

While the model as a whole represent a general planning-and-implementation process, Box 5, *actions on buildings. streets*, points up specific planning initiatives, in fact, the corrective and improving paragraphs in the bulla.

It is unavoidable that some entries will be listed in more than one place with reference to the model.

The purpose of such a model elaboration as proposed here is not merely to build and convey a more *structured view of the bulla*, but just as much to *construe a theory* tentatively covering or expressing the ideological program behind the Sixtine statutes, capturing also attending and surrounding ideas and attitudes which seem to arise from scanning the emerging pictures in more general theoretical terms which are, in their turn, culled from the theory aspects in *Part IV*. Still, I do want to repeat the point that this entire venture is out to explore the scope and possibilities of using graphical models heuristically in connection with verbal models. Negative conclusions are as important as positive ones.

Here is an example of *one key term referring to seven categories* of functional connections and consequences, partly overlapping, which would end up in different places on the models:

dirty streets -> ineffective urban statutes or laws

dirty streets -> administration responsibility and possible conflicts between top administration and directly involved groups or institutes

dirty streets -> real estate locally devalued

dirty streets -> social-economic decline

dirty streets -> health risk and fewer paying pilgrims in town.

dirty streets -> jobs for disoccupied or poorly placed Romans

dirty streets -> bad image in international diplomacy.

This list illustrates some of the advantages of using the models, since the intricacies illustrated in it would not come out as clearly in verbal prose description.

In the following list referring with #*n*-numbers to the numbered nodes on the PROC model, the following information will be given: after each theme or subject, -numbers will refer to paragraphs thus counted in the bulla of Sixtus IV (*1.4, *Dissecting Sixtus*).

To simplify an experimental work, I have *not* taken the next step, going straight to single key terms; terms easily located within the paragraphs.

1. Planning and regulating City;

1.1.manifesting Pope's authority;

1.2. establishing and instructing the Maestri di Strada and other urban institutes;

1.3. announcement and information to citizens, the Campidoglio reactivated as city civil center.

1.4.citizens, people, categorized after the Category Provider (CP) , with CPn-numbers.

CP3 citizens

CP4 business people

1.5 streets, squares, buildings - categorized after the Category Provider (CP), with CPn-numbers.

2. Categories of administrators and in population and foreigners (pellegrini).

3. see ORG. Connecting 1, 2, 4, 5, 6, 7.

4. Sequel: later statutes and building processes.

some real effect from the bulla:

4.1. improved economic systems

4.2. judicial norms and routines;

4.3. better street order

4.4. market order

4.5. sanitation improvement

4.6. neighbor relations determined

4.7. a few row-houses built

5. Unknown creation and editing process for the bulla.

6. "resources" in Giddens' sense of making things occur, items not recorded on the bulla: making this happen: sharply increasing stabilization of third-state people (bourgeoisie: lawyers, medicine doctors, bank administration, etc. - compar. with Florence; increasing foreign visits (growing international diplomacy, businessmen traffic, pilgrims); comparison and competition with urban order elsewhere (Florence, Lucca, etc.); role of the Cola di Rienzo aborted revolution.

7. Items not recorded on the bulla: Earlier statutes and legal/administrative traditions and rules, and courts (also from other places); "inherited" City administration, law-and-order institutions; local traditions and conflicts (the barons from the great families: Colonna, Orsini, etc.).

While the PROC-cum-ORG model (Fig. 3.2.8) takes care of urban issues, now is the time for setting them into the bigger historical picture of Rome, the Papacy, and Italian perspectives in the late fifteenth century. Such data are always indicative and only approximately "complete", and are taken as listed in the little motivations box in the lower section of the Cgroup model in Fig. 3.2.9, which is lodged into node 5.

The idea is that node 5 now "contains" the production of the bulla itself. This was an important document with a wide range of relevances, locally, nationally and internationally.

While the PROC model describes a situation limited to urban issues directed by the papacy with interchanging (and variable) ingredients, the Interface model in Fig. 3.2.3 indicates the general process through which

the actions of the papacy become effective beyond the limits stipulated in the bulla, or are propaganda issues and may cause reactions locally, nationally and internationally (the *opus ad extra*, to borrow a "canonical" term). Let me repeat it here (Fig. 3.2.9).

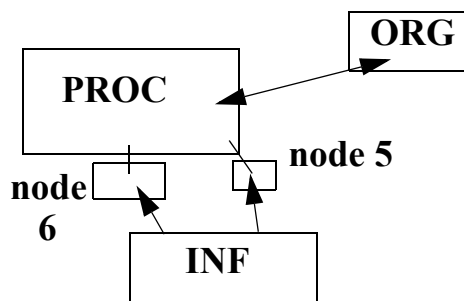


Fig. 3.2.9, *Cgroup: the three models for S.IV interrelated, an interface model.*

This exercise is initiated here, but not developed further, which would require too much space; and, to repeat, this is a work on principles not on substance.

3.3 Loading Sixtus into Models

This is the place for supplying the cited categories with specific contents and load them into the models. Here, I should repeat that in using a visually distributive model, we are forced to set into them the items in spatially coordinated categories or groups. The model forces order and (conditioned) completeness upon the scenario.

Our first assignment is to come to a decision regarding *categorization* that determine the relations between documents, general chart and operative models. There can be no generally valid rule for categorizations here. I shall let the *Provider*, which is also, strictly speaking, an arbitrary option, do the job for us.

The *links* connecting 3,4 with 20-27 on the *Category Provider with numbers* (Fig. 3.3.1), are selected out for the upcoming assignment, that is, the links between citizens/business people and building activities, use and works such as maintenance and restructuring buildings, business regarding them, and regulations, control and interventions on the part of the authorities.

The upcoming lists go by the numbers on the PROC-with- ORG model (Fig. 3.3.2). For the interactions bulla-category provider-proc-with-org-list, see Fig. 3.3.1bis. First, the *Category Provider* with specifications.

The reference system now introduced can look complicated with a view to scan the simple statute; it will emerge as more adequate when we shall be tackling a complex chronicle like Tacitus' Annales. But a method must be applicable to both kinds of documents. An advantage of such a structuring by models, is that it forces us to subdivide the texts into interrelated units.

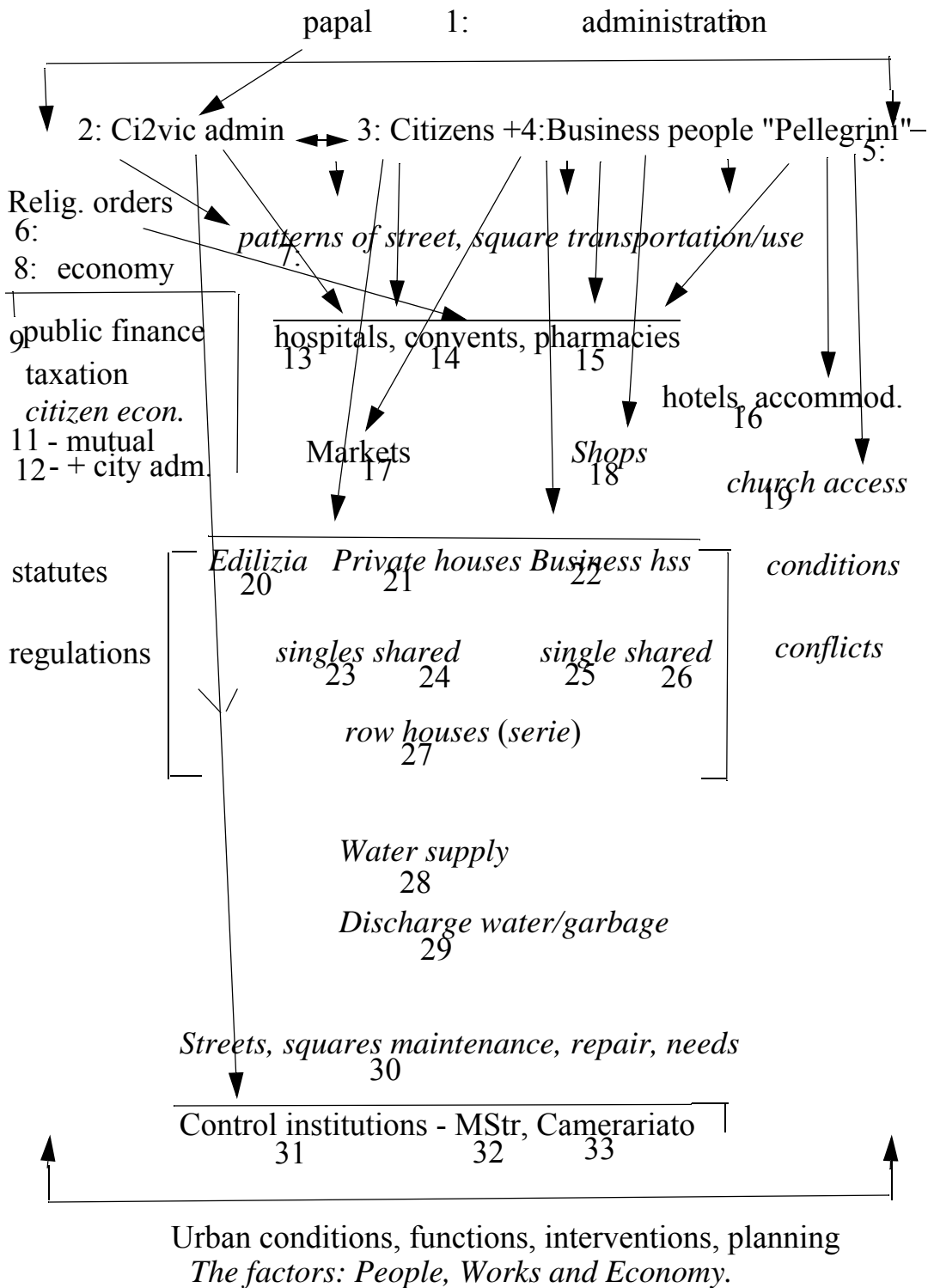


Fig. 3.3.1 The Category Provider with Numbered Items. To note especially the links between 3,4 and 20-27.

My further work will be limited to this program, bypassing the issues of streets, traffic, markets and supply as well as finances, taxes and prices on grounds, buildings etc.

The *next step*, then, is to collect the selected items from the bulla in the SEL<ective> List (*see below*) and load them into the model, while "activizing" also the full version of the bulla (1.4, *Dissecting Sixtus*).

The following conventions have to be kept in mind regarding the references between the entities illustrated on Fig. 3.3.1bis, *Info "circulation"*.

Following the instructions on Fig. 3.3.1bis, the *Info circulation chart*, we transfer items from the *bulla* via the *Category Provider*, selecting the links between 3,4 and 20-27 on the Provider (Fig. 3.3.1).

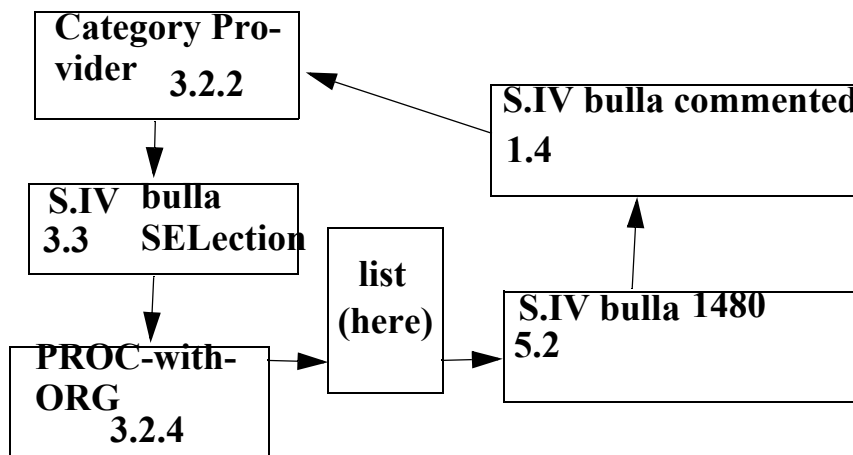


Fig. 3.3.1bis, *Info "circulation" between bulla, chart, models and list. S.IV = the bulla of Sixtus IV. 5.2: entire, un-commented document; 1.4: with comments; 3.3: selections*

adapted for model handling (SEL).

Here follows the *syntax for cross-references* according to Fig. 3.3.1bis.

In the complete, commented version of the bulla (1.4), next to the original § numbers, but irrespective of them, 38 {*n*}-numbers have been inserted (with no significance, just serving as indicators in a rather summarily subdivided text).

The choice of parameters and items is guided by 1.2, *Planning for Society: Martin V and Sixtus IV*. The choice is specified by the experimental status of the present assignment.

On the SEL<ection> List from this, the selection-relevant {*n*}-numbers will be entered, determined by the chosen items indicated on the Category Provider as *the links between 3,4 and 20-27*.

This *List* of units referring to the nodes on the PROC-with-ORG model with the codes *nP* for PROC and *nO* for ORG, will convey the relevant {*n*}-numbers.

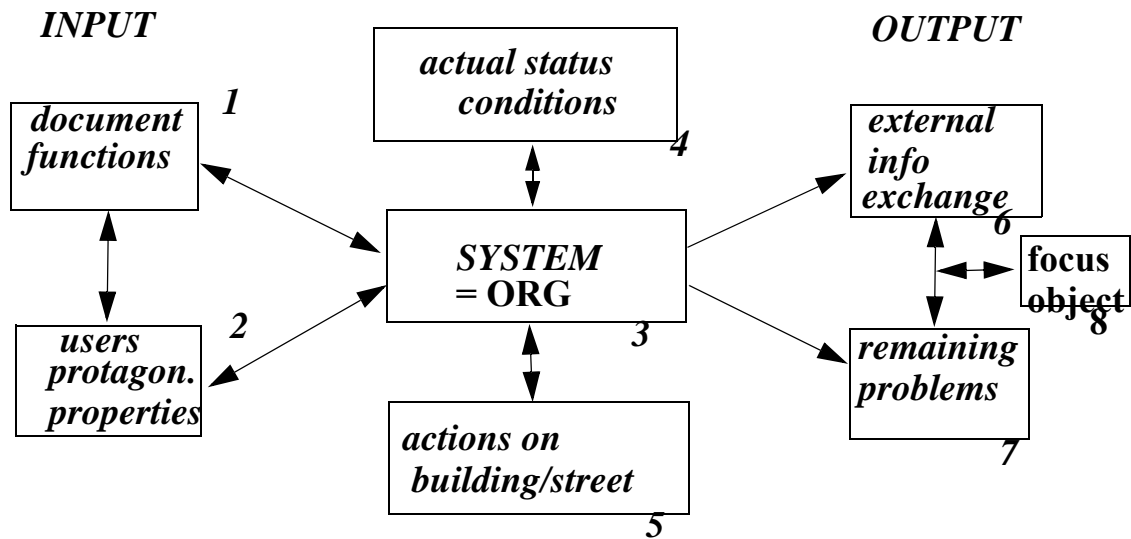


Fig. 3.3.2, *The PROC-with-ORG model and the extension at (8). The model is focused on buildings and streets and on interventions here; the legal relations between people bypassed, except whenever a cooperation or conflict directly touches on structures.*

Here is the *SEL<ective> List* with references via *nP* and *nO* to the PROC and ORG models. Let me repeat that the ensuing operation is not substantive but experimental.

1.P ETSI DE CUNCTARUM civitatum temporali dominio Romanae Ecclesiae subiectarum decore et venustate cogitare nos deceat: *declaration of document authority, aim and purpose*. Making the city in shape to receive masses of pilgrims (who left money behind them, then as now). Full translation supplied. *SUPPL 1.2, Planning for Society: Martin V and Sixtus IV- 4.1, Categorization, 4.2, Data and Information - 4.5, Programming for Theory - 4.9, Operativity - 4.10, Consistency*. More references could be supplied. .

2. P .
 users protagon-ists properties {5} *inhabitandum* (making damaged and repaired building fit for living and using). The subject is almost constantly handled in the bulla: necessity of renewal, conflicts between owners and users, and with the authorities, dignity and visual aspect of the City. {7}. *vicinarum domorum* (Facilitating the building of new structures for Roman citizens, foreigners and Church people (*curiales*). *loci dominos* (not to block access and passage for anyone. *reformare volentibus* (the paragraph gives a vivid impression of neighbor con-

flicts). *venditionis titulo* (obligation to sell property if so required by the authorities; here and elsewhere in the bulla, closer on sanctions and recompensation). {13}. Problems with owners and *absque dolo et fraude*: swindle. Forced demolition if required. continuing, and, *minime inhabitari*, about houses remaining empty or hardly used. {16}. Whenever two or more neighbors cannot reach an agreement regarding properties, then the authorities will step in: *eo causa ipsi camerarius et magistri aedificiorum praefatae urbis*. {17} *Et si forsitan uterque aequaliter indigeret*, partem uni et partem alteri (si commode vendi poterit) vendi faciant. subject continued. The issue with neighbor conflicts over building and demolition fore on in {19}, {20}, {21}, (again intervention by the authorities), also renting houses or sections in them, extension of existing houses: the growing city! {22} *Et inter duos seu plures sic aedificare seu ampliare volentes* (procedures in case of cooperation between builders/owners: an increasing attested occurrence. {24} §6 *quod camerarius et magistri praefati compellere possint aliquos ad vendendum*; {25} *compellere possint* (the public officials can force owners to sell in specific cases, details here). {26} *venditionem huiusmodi* 5 (more on forced sale). {27} *et nihilominus eos compellant ad observandum praemissa per eos, vel quas prius habebant et etiam propterea eis venditas domos aliis aedificare volentibus vendendum pro iusto et rationabili pretio, ut praefertur, moderando*. The authorities forcing sale or other solution to issue, The subject continues in {28}. {29}: *claustrum et sediminum* [late Latin: cultivable ground (see {7})] (rules regarding houses but also open grounds). {30} *locorum vicinorum domorum* (possible conflicts). {31} *statuimus et ordinamus* (authorities summing up rules so far laid down). These subjects occupy the bulla up to {34}, with which assertion of authority is the crucial issue; also the rights and roles of ecclesiastics, up to {36}, {37}. *Non obstantibus constitutionibus* (the rights of ecclesiastics and the Church); {38}, same subject. {39}, publication of the bulla.

3. O

ORG

The Papal administration has been the subject of numerous studies (from Mommsen and on). The bulla refers to administration officials and officers of various degrees of responsibility. {9}. ordering the City Building Magistrates: *dilecti filii (magistri aedificiorum)*; {13}. a list of public officials for the care of the city and also *venerabilis frater Guillelmus episcopus Ostiensis* and other Vatican officials. The authorities are cited frequently.

- 4. P**
actual status
conditions urban deformation, circulation problems (some key-
 words): {3} *deformmitatem*, {3} *transire*, {2} *deambulari*, -
 the general problem of more or less permanent and ob-
 structive structures, attached to the brick-and-stone houses, often in wood
 and risks in cases of fire; blocking passage and use of local streets , many
 of the of the category of a *viculus*, *narrow passway*, required also for the
 functionality of living and workshop/business houses).
- 5. P**
actions on build-
ings/streets .
 {2}, *causanntibus*, {4}, *pavimentnari* (removing ob-
 structions, streets - and use of buildings - repaired)
- 6. P**
external
info
exchange Of course no one expects the bulla to inform about
 this, but it ends with recording an official documenta-
 tion, a ritual announcement of the bulla to the Ro-
 mans: notification on the doors of the *Campidoglio*,
 trumpet-blowing and a compliment to the involved urban officials.
- 7. P**
remaining
problems Later documents - and the extremely small number of row-
 houses in the midst of late medieval buildings, attest to the
 usual meager result of such an operation in Rome (we are
 not in Florence or Lucca).
- 8. P**
focus *Bulla*, {6}: *Row Houses (case in serie)*.
object The story of the row houses, with illustrations of some of the
 remaining ones (Via Benedetta, Via del Governo Vecchio to-
 wards the river, Vicolo Sugarelli); detailed, documented account in in
SL,T2C.
At this point I might summarize the findings. But in the present exper-
imental context, and especisally because the listing above is far frrom com-
plete and carefully systematic, I shall let the rubrics remain without
further comments.

3.3.1 Reading about the Popes

We now will scan sketchily the drift of the documents that are central to the arguments proposed in the present book, the *bulla of 1425 of Pope*

Marin V (M.V) and, particularly, the one of *1480 of Sixtus IV (S.IV)*. After the present introduction, an edited version of the bulla of Sixtus IV will be edited for use, while the scanning and theoretical handling of it will come in 3.3 and 3.4. This splitting up of the matter is motivated by the need for further arguments before facing so to speak the essentials.

Not all projects were implemented. Indeed, Rome never developed according to plans. Scanning Martin V's bulla, and noting that on Sixtus's bulla the *porticoes or colonnades on street level* (today common in Bologna, Padova and other cities in the North) were still considered a problem and to be walled in. In modern literature, this is described as a problem regarding safety, but surely they were closed for taxation motivations, since taxes were paid pr. house entrance; and the portici could be used for protesting, for some time, at least, against the tax collectors: *I have no street door, as you can see* (cases taken to court, then as today, would be long-winded before coming to a conclusion).

Feedbacks can be important, for they can affect the model - reflective of real changes in the situation, so that the model starts anew in a next phase. One kind of feedbacks is that a document or a program is *not* implemented.

Let me offer an overview of the *editorial structure of the bullas*. The one of Sixtus I shall return to it later in this book (*Part III*).

The § numbers are those of the documents.

Bulla of Martin V 1425 (see 5.1, Martin V, The Bulla Etsi in cunctarum).

Preface: statement of the intention to improve urban conditions and restore the city to its former dignity.

§ 1. The Office of the Masters [of the streets etc, *Maestri di Strada = MStr*] having ceased to function, which formerly controlled the structural, technical, proprietary, salutary and functional state of the city and its surroundings, there is now general disorder. People are throwing garbage such as dead animals, rotten fish, etc. everywhere, corrupting the air and prejudicing the health of the inhabitants.

§ 2. The pope, wanting to improve the cited conditions, will reestablish the institution of the *MStr*.

§ 3. Confirmation of the , competences and authority of the *MStr*.

§ 4 - 8. Regulations regarding the implementation of the present document and procedures against lawbreakers.

Readers will note that §§ 3 to 11 in the bulla of Martin V are reported summarily. They implicitly can contain references to economic, financial and political standards, issues and cases, and should consequently be evaluated in such contexts, But that would require further studies of relevant sources.

Bulla of Sixtus IV 1480 (see 5.2, Sixtus IV, The Bulla Etsi de cunctarum).

Preface, in the name of God-given authority, authorizing the Papacy, referring to urban requirements due to the streams of pilgrims to Rome (not only pilgrims but also normal tourists are still today called pellegrini in the Romanesco parlance).

§ 1. In many places *portici* (on street-level, now to be demolished) and other structures added to buildings, make circulation difficult for a great number of citizens and, especially for those who visit the city, and seeking the churches, especially the Basilicas of St. Peter's and St. Paul's, for the *Jubilee* (the first in 1300, stipulated for every 100 years, from 1450, for every fifty years).

The following initiatives are intended to improve this situation and general conditions.

The streets, especially the main thoroughfares, must be freed of such hindrances and be appropriately covered, a work that had been initiated. Further details and specifications are coming up for the cases regarding neighbors in one or in several contiguous houses, also regarding cost and financing [creation of row houses, *case in serie*]. Detailed instructions for new MStr, also for freeing space for new squares in selected places (apparently for new markets).

§ 2. We (the Pope), invested with Apostolic authority, for public welfare, establish and command in a permanently valid constitution, that <named persons>, our *camerarius* and the MStr, a permanently functioning institution, effectuate and monitor the detailed program implementation regarding the use and possible alterations to buildings, or demolition of them, all alternatives depending on the justly evaluated parameters of occupation and use by owners and others. Exemptions for ecclesiastical and monastic buildings and hospitals. Cost and compensation to be determined among the users or, if necessary, by two reliable experts chosen by the owners, or, if this does not work, to be determined by the *camerarius* and the MStr already mentioned..

§ 3. Rules applied in case of dissatisfaction with the demolitions, and if one of the buildings is occupied by tenants in terms of renting contract.

§ 4. Clauses regarding problems arising under §§ 2 and 3.

§ 5. Rules for expropriation in case of conflicts.

§ 6. More rules for such cases, especially considering urban appearance and quality.

§ 7. Judicial clauses regarding the cases cited.

§ 8. Further clauses regarding the cases cited.

§ 9. Further clauses regarding the cases cited, also regarding sale.

§ 10. Papal authorization for the *camerarius* and the *MStr*.

§ 11. Specifications regarding ecclesiastical and monastic buildings.

§ 12. Dispositions for recording and storing the present and other relevant documents, and for public reading in Italian [*vulgare sermone*] of the rules to the citizens, who are to be alerted by trumpet blowers; and for setting up printed informations on the door of the Capitol Palace and elsewhere, *so that always everybody more easily can notice them*.

A few more informations should be supplied in order to emphasize that there were other important works *not included* in the two bullas of 1425 and 1480, especially the churches, only briefly considered in § 11 in Sixtus' bulla. The churches, monasteries and convents are not included since they did not come under the competence of the urban administration under papal control. Under Niccoló V (1447 - 55), apart from great regulations to be considered further on, plans were developed for stabilization of the perilously shaky St. Peter's Basilica with incorporating structures in the form of heavy walls built so far only at groundlevel but set deeply in the ground, a construction so enormous that it was later to influence the new plans for the church, a centralized building as seen on the medal of 1506 (SL, T2C). A big project was delivered by Fra Giocondo, who presented a plan with enormous lateral supporting chapel structures, enclosing the ancient structure, that Jakob Burckhardt dubbed *Elephantenställe*.

There is one particular but important point, already mentioned, to be made regarding a feature *not* explicitly arising in the bulla: the growth of a bourgeoisie of lawyers, administration personnel, medical people, secretaries, banking people etc., the role of which can be inferred as a phenomenon but not quantitatively from the conflicts recorded in the bulla regarding houses of private or business or mixed character.

I have been tempted to *translate the entire bulla*, but claiming no adequate competence in the intricacies of the relevant jurisprudential practice and language, I have taken the low road and instead offer summaries of essential points *regarding physical conditions and use*, while passing over the relationships between the authorities themselves and them and the population. Also, I have not had access to any sociological study of this "population", which was hardly less complex than any other. The issue emerges as even more demanding when we take into account that in Rome the late fifteenth century there was great innovation, with modern banking arising and a new "third class" of doctors, bankers, secretaries etc. (their houses stand tightly packed in some streets on the Campo Marzio) and a geometrically increasing Papal administration; and with the old semi-feudal, bellicose and rackety nobility reduced to more or less obedient citizens

(Colonna, Orsini, Frangipane, Savelli, Anguillara, etc., with their castels in many ancient buildings in the city, even with classical monuments, such as the Arch of Titus, as supporting structures, and the Castel Sant'Angelo as fortress).

Analysing the document means applying a theory to it. Strictly speaking, we should have to distinguish between analyzing the *document as such. a text*, and the *content, that is conditions, objectives, codes and statutes* envisaged in it.

Facing the Roman scene, or any socio-political-economic-cultural scenario, will occur partly under more or less conscious guidance of ideology, s and methodologies, partly by hunch and preferences we are vaguely aware of. Methodological and theory-driven analysis can make this total image clearer and construe a platform on which to continue our investigation - and hope that others may step in.

By 1425 the porticoes had been listed as problematic: §1. *Cum itaque viae et stratae publicae eiusdem urbis, in plerisque locis, causantibus porticibus, prosellis et aliis variis aedificis domorum sitarum iuxta illas, adeo arctae [artae] existant, ut per eas commode deambulari*, etc. But not much can have happened to the porticoes until Sixtus' time; the eternal difficulty in Rome (only Rome?), that decisions are not implemented.

Rowhouses present a different picture. They were ideologically and urbanistically important at least to the authorities (*SL, T2C), who, however, did not, and probably could not, foresee the dramatic professional and demographical and hence urban expansion.

To stick to the rule that we have to experiment with one focus object, I have opted for *housing conditions, use and close environment*. This subject seems preferable because it involves most of the political, economic and social issues without claiming attention to general urbanistics regarding the street and square patterns, general traffic, position and role of crafts and markets, relating the city to thw environments, as well as the position of the churches and the burdens connected with the pilgrim masses visiting them; and, connected with this, the greatly increasing difficulties regarding traffic, sufficient services from *alberghi* ("hotels" would be saying too much), hospitals, and so on. I am using the same categories as above, in the *Category Provider* (Fig. 3.2.4), namely *People, Works* and *Economy*, the last category in a highly simplified summary.

My reading and comments on the documents have limited substantial value, while being justified by my experimental and theoretical program. I do hope I shall not be cited for having studied Rome, intending merely to study the tools that can be used to this assignment.

I have noted important institutions and decisions regarding urban conditions, development and planning, but the documents should be examined by an expert in legal practice and language in use in the fifteenth century, based on the traditions from Roman Law, a subject entirely beyond my reach. Republishing the documents might give, I hope, the reader an opportunity to develop some further and more constructive interpretations than are suggested here. There is no reason whatever to distinguish *in terms of system* between the Vatican State and the other States, no more than it would have been to distinguish between the political and the religious aspects of Calvin's Geneva.

Modern socio-organizational studies have developed new perspectives that could provide new and better understanding.

A document in its sections or paragraphs, an event with its phases and a series of events evolving over time - all have to be integrated in a system in order for us to evaluate them in an historical and functional context, allowing us to handle them cognitively, conceptually and theoretically with a view to implementing, through such a process, our general stand on theory, methodology and purpose.

Taken together, the bullas of 1425 and 1480 mainly lay down rules regarding the following issues: cleaning up (but not saying where the garbage should go), making streets and squares trafficable, and detailed regulations regarding real estate and conflicts over the, use and structuring of houses for living and for business and crafts, all with an implicit, occasionally explicit, reference to economics. These were burning issues, seeing that, in the wake of the urban development under the restored Papal administration, a new class of citizens were requiring increased attention: banking people, employees in the city administrations, secretaries, medical personnel. And preparing for increasing pilgrim arrival was crucial for the economy. Thus the prioritized restoration of the churches, especially St. Peter's and San Giovanni in Laterano, the cathedral, also was financially important. At the same time decisions had to be made regarding the old nobility residing inside the walls and accustomed to behave more or less as they do in Stendhals story. Among the disruptive factors came the role of the cardinals in their new palaces, from which they tended or tried to dominate each their local city area.

While the bulla of Martin V records the subject of garbage and water, without, however, suggesting solutions, the bulla of Sixtus is silent on such problems. They can hardly have been solved, for they remained problems for a very long time, right until the nineteenth century.

Of course there are a lot of issues that the statutes do not mention.

The *People tout court*, in their quality of congregation unified in the *Ecclesia* and actively participating in the liturgy, this complex and fundamental entity will have been taken for granted by readers and users of these urban-political and social documents edited by popes who were simultaneously Church heads and temporal lords, the unity of both qualifications and roles being taken as given.

In *introductory terms*, some issues will now be related to a first presentation of one of the two most important *Cmodels*, the PROC<ess> (Fig. 3.3.1bis).

In the bulla there are some paragraphs that *name certain persons* representing the authorities. How to interpret such specifications in an urban statute with stated general address and no given date limit? There are at least the following alternatives (some of them overlapping each other):

1. Assertion of competence and authority on the specific level;
2. Noise in the system because this was a phase of urban renewal and hence specifics had to be considered;
3. Authorities appealing to the named and their family and entourage; the general assignment could need this support;
4. Camaraderie or corruption; this was - and still is in most countries - a common occurrence;
5. Leading people to associate themselves with persons of high renown;
6. Threatening recalcitrant citizens with individuals in authority known for their power and determination.

Let me set up a *generalized input list* for the PROC model (Fig.1.2.1) related to conflicts (*box 1. Conditions* on the model).

- 1.1. Traditions and room for lawless behavior in Rome;
- 1.2. Clan-formations in city areas.
- 1.3. Protection of selected groups, families by baronial area patrons (highly attractive conditions, while creating loyalty networks at cross purposes with the city administration and policies).
- 1.4. Uncontrollable finances among owners (taxation problem; motivations for conflicts).
- 1.5. In a society in rapid quantitative growth and social diversification, conflicts were hard to predict, to control and even, in some cases, to recognize.
- 1.6. Authorities not sufficiently enabled and equipped, in terms of power, surveying capacities, and laws, for controlling conflicts.
- 1.7. Some of these items hindrance for economic growth and capacity, e.g., facing the pilgrim streams; which represent a source of private and public income.
- 1.8. These occurrences affect the road, communication and market systems.

Not all of these items arise in the specifically selected paragraphs in the Sixtine bulla; but some do; while others among them can be considered typical for the context.

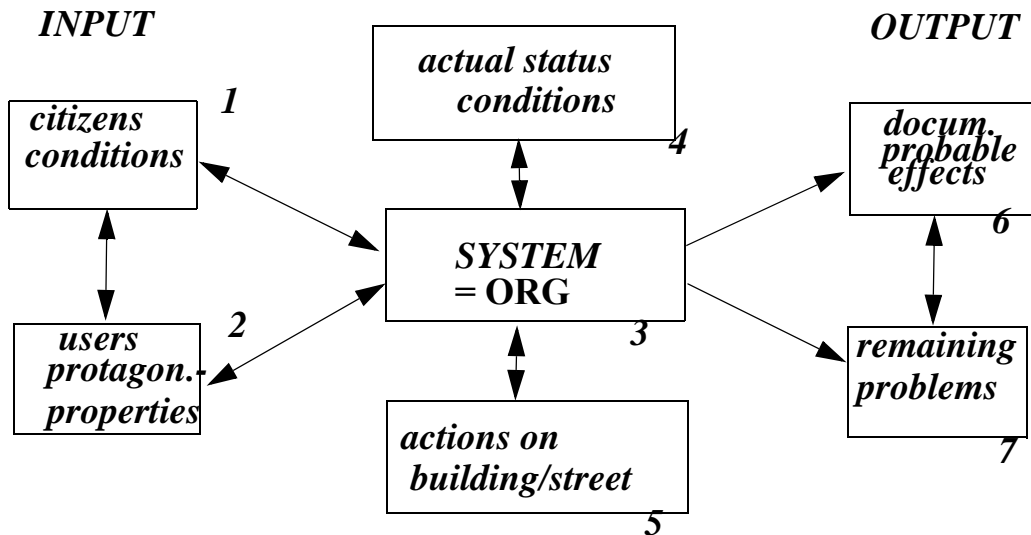


Fig. 3.3.1,bis *the PROC model.*

This introduction of the famous *row-houses* and the closing of the *portici* are two prominent initiatives. Streetlevel porticoes, like those still characteristic of many streets in Bologna, Padua, Carpi and other towns in the North, were walled in for taxation purposes. Streetlevel colonnades, with the doors, taxation units in Rome, “in the background”, are in evidence in many places; their removal by 1480 was motivated by taxation needs, but claimed to be motivated by security problems (people bag-snatching in the shade). Forcing people to have street doors, still today the base for house numbering, made taxation a more straightforward operation. Also forbidden, for taxation reasons but also for the danger of fire, were the wooden balconies on the first or second floor palace exterior (some still exist, though, as on the Palazzo Ascanio Sforza in the Piazza Navona), space outlets in a crowded city; as well as the wooden or stone benches attached to many basement or ground floor walls (still there on the Palazzo Farnese); all these features appear in the bulla of 1480.

The great palaces housed important persons who more or less commanded the neighbourhood. Typically, the cardinal palaces in the fifteenth century, up to the urban “violence” brought about by Cardinal Riario’s palace (now *della Cancelleria*), retained the traditional facade covering. And in some cases, new buildings almost demonstratively respected the street curvature (*Casa di Pietro della Zecca*, at the end of the Via di Monterone; he was a director of the Papal bank; and the *Palazzo Massimo*

alle Colonne, on the present Corso Vittorio; one of the Massimi was a Street Master).

In Rome these local power structures were a reflection of the bigger ones, with the great baronial seats in fortresses inside the town walls (Tuscan cities, much more "modern", avoided this). Courtyards and benches were crowded with people seeking access for help and service, such as getting a son the job as *sacrista* in the nearby church, hoping at least to see some gate-keeper or secretary who, being well paid, would bring the application up a step or two. In the early 1960s, in some places you still were advised not to visit a public employee alone, but to pay someone on the street who could take you up to the "correct" one (this was how in 1963 we got our newborn daughter Charlotte registered at the municipal *Anagrafe* in Rome).

These socio-economic functions were crucial in the cities but remain, as far as I have been able to check, absent from art-and-architectural studies and even from excellent works on urban economics, like those of Richard A. Goldthwaite. Things are normally seen from lofty perspectives, those of artists and patrons, without reflecting that they did something for public view and concern, a perspective I have sketched out in SL, *Working*, and which is exceptionally the basic one in the late and unforgettable Richard Trexler's *Public Life in Renaissance Florence*.

Many houses from the late fifteenth century and on bear witness of the new urban morals in the city. *Casa Manlio* in the Ghetto, with a large inscription defining the building as a symbol of Rome's renewal (*SL, T2C), the *Casa Pietro della Zecca* and many others in the streets between the Piazza Farnese and San Giovanni dei Fiorentini, the *Palazzi Massimo* on the present Corso Vittorio), and in the present Via del Governo Vecchio, a stretch of the original *Via Papalis*; *SL, T2C).

Having noted the theoretical and methodological focus of the present book, the reader may appreciate the point that I am using urban material not for its specific interest but in order to test theory and methodology. So what I am presenting here, the two Papal documents, with reference to SL, T2C, represent the evidence *as if it were complete*. The question is how to handle *such* a material not *this* material.

Much evidence regarding Rome in the fifteenth century and earlier has been omitted here, to cite some of the more important works: market regulations, health services, transportation parameters, water supply (Nicolaus' V's repair of the Acqua Vergine and the erection of the predecessor of the present Fontana di Trevi, a building with three slits for the water spurting down into a basin), garbage handling and dumping, restructuring of the bridgehead and square on the city side of the present

Ponte Sant'Angelo, laying of stones on the Piazza di San Pietro (thus the name for such stones became *sampietrini*), protection of ancient buildings and ruins (the true reason being that the authorities wanted to exploit the marble themselves, mainly for the production of building material), etc.

Nor can the presented material be compared to the many more developed urban statutes from the thirteenth century and on. *Tuscan document*, as some for Lucca in the 13th and 14th centuries: neighbor mutual responsibilities, teacher responsible for schoolboys, inhabitant's responsibilities for urban maintenance and order (negatively: do not do so-and-so), people being held responsible for "their" section for the city walls, water supply, dumping of garbage, slaughtering of animals, dumping things in the water surrounding the city. Lucca musters a vast range of issues not all of them mentioned in the Roman documents: regulations to reduce the risks of fire (a very serious problem in all cities; in Lucca, bakers' ovens placed in wooden sheds, etc.), distributing city responsibility to people living near the gates, expelling of ill-smelling industries, relations between categories of people, maintenance of city walls, etc.). Tivoli looks a little less "developed" seeing that a main clause of one statute forbade people to throw stones from the buildings at people in the street.

3.4 Revisiting Sixtus

The object now in focus is one again Pope Sixtus IV's bulla *Etsi de cunctarum* of 1480. A revised version of the PROC model and the original ORG model will now be applied, with two motivations.

One is to deepen the view with respect to the previous PROC model (Fig. 3.4.6); the other to exemplify flexibility and adaptivity of the promoted processes.

The Process Model (PROC) will now be "loaded" with relevant items from the bulla of Sixtus IV (1.4, *Dissecting Sixtus*). The model will be re-numbered with a code that can be extended; thus PROCn1, PROCn2, etc.

One item from the bulla will be chosen for the theory-focused operation, the one regarding the famous rowhouses. The U-number refers to the place in the bulla.

->U6 expediatque, ad obviandum huiusmodi incommoditatibus, ex duabus aut pluribus contiguis domibus unam commodam construere, aut partem unius ex eisdem domibus alteri convicinae domui incorporare, sicque indemnitati dominorum earumdem obviare et decori huiusmodi consulere;

SUBJECT

If two or more proprietors are involved in such works [major correcting restructuring], they should combine their efforts to create one single common building.

COMMENT

Here the basis for the row-houses (details and examples in SL,T2C, and here, *3.1). Some paragraphs in the bulla specify rules regarding properties owned by more than one proprietor or over which several have rights.

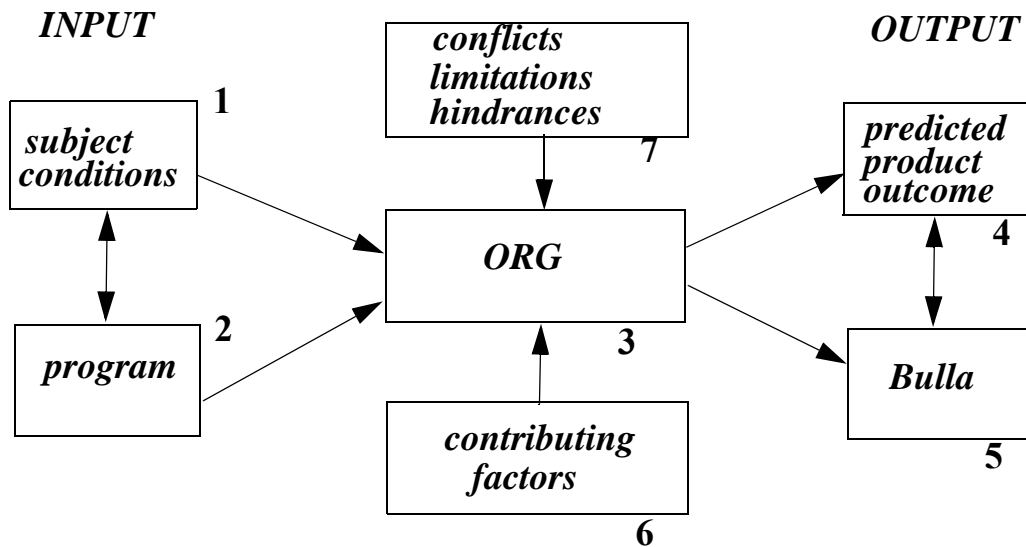


Fig.3.4.1 *The revised PROCn1 model with contents from the bulla differently scanned.*

In the list accompanying Fig. 3.7.1, the PROCn1 and ORG numbers are repeated for easier cross-references.

P.1

- Conditions summarily: bad bld. state, churches, streets P.1

rowhouses P.1

Disorder in ownership, taxpaying and relationships to community, government, neighbors, house utilization; inefficient control institutions; P.1 P.7

- Area evaluation O.3 P.1 (O = ORG as a whole).

- Urban reforms, living conditions P.1

- New living standards.P.1

P.2

entire bulla. P.2

- Setting standard P. 2

-Papal/Eccl. Rome ideal city, model for all, also internationally; P. 2

- Urban dignity and modernity P.2
- Baronial culture versus Papal/Modern P.2
- Fransiscan ideals;P.2
- Competition with S. Iago de Comp. and Jerus.; P.2
- Competition with Ital. states; P.2
- Attracting middle and upper class bourgeoisie (who had now started erecting their private houses with characteristic facades: T2C). P.2
- Many factors contrasts unified and "permanent" Papal governm. with civic cohesion with baronial fragmentation and dominance, brutality.Cf. model city at Pienza, City of God (Fransiscans) O, P.2, P.3

P.3

- Manifestation of central authority and administration O, P3
- Many factors contrasts unified and "permanent" Papal governm. with civic cohesion with baronial fragmentation and dominance, brutality.Cf. model city at Pienza, City of God (Fransiscans) O, P.2, P.3

P.4

- Papal Rome a city of progress; showcase for pilegrims and other States.P.4
- Social uplift (cf. Via S. Reparata in Flor: T2C) P.4
- Favoring community collaboration and attitudes; civic spirit P.4
- With the prevision (hope) that the rowhouses would be dominant: making plot or area unattractive for citizens with low income or capital P.4
- Same prevision (hope): making plot or area unattractive for working with dirty, smelling, shops like butchers'. P.4
- Sixtus using bulla title assoc. wth that of M.V: continuity, papal predominance. O, P.4, P.5

P.5

- Bullas as such:P.5
- Sixtus using bulla title assoc. wth that of M.V: continuity, papal predominance. O, P.4, P.5

P.6

A blank because much more data would be needed to load significant contents into this box.

P.7

- Written statutes to fall back on, restoring of effective and efficient (?) admin. and urban control; law and Magistri di Strada manifesting itself as institution. O.2, P.7

- Disorder in ownership, taxpaying and relationships to community, government, neighbors, house utilization; inefficient control institutions; P.1 P.7
- Proprietor economics P.7

- Blancs are indicated in the model lists.

Other blancs: Roman Jurisdiction tradition, Finance and economic culture, political/Church State ideas, criteria for selection and appointment of candidates for Mag. Urb.,

-Rowhouses: civic spirit desired (never achieved!)

We now repeat the operation for the ORG model.

O. -Manifestation of central authority and administration O, P3

- Many factors contrasts unified and "permanent" Papal governm. with civic cohesion with baronial fragmentation and dominance, brutality.Cf. model city at Pienza, City of God (Fransiscans) O, P.2, P.3

- Sixtus using bulla title assoc. wth that of M.V: continuity, papal predominance. O, P.4, P.5

O.1

O.2

- Written statutes to fall back on, restoring of effective and efficient (?) admin. and urban control; law and Mag Str. manifesting itself as instit (noch einmal!). O.2, P.7

O.3

- Area evaluation O.3 P.1

O.4

- New bourgeoisie with new "stylish" houses, manifest against populace; O.4

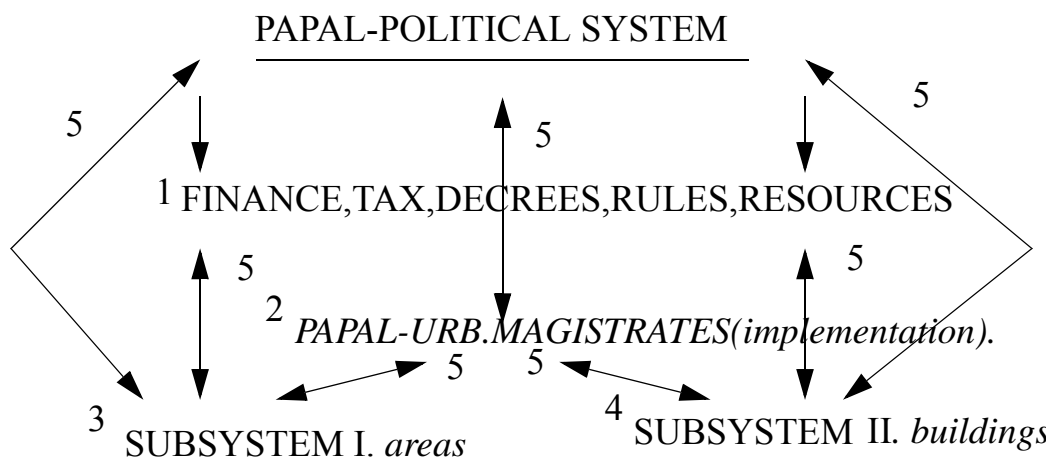


Fig. 3.4.2, The ORG model

The keynote of the book has been the building, application and evaluation of graphical models. Besides recording data and arguments, they are useful by lending themselves to an articulate survey of their structure and their contents with interrelations and weightages. Taking advantage of these factors, we can discover, or perceive more clearly than with verbal accounts, defects, omissions and inconsistencies. The models offer precise loci also for doubts and can thereby alert us to more general criticism. This can lead us to reject, modify, rebuild or extend the model or search for a better tool. These alternatives should give us a warning against taking things as conclusive.

In a retrospect regarding the Giere, PROC and ORG models, we can make the following observations in three points (1. - 3).

1. The model illustrates flows among the categories, the appended lists specifying the categories, denoting a time dimension.

2. The model, however, unless accompanied by verbal comments, cannot illustrate or denote the time-line, only some point on it. This can be considered the realistic concept, and there are two interlocked factors (SL, Burden, xxx): contemporariness and maximation.

Reading a text, scanning a picture, listening to a story or some music, we make what we retrieve contemporary with our retrieval. Reading Manzoni's *Promessi sposi* about the plague in Milan, the events become cognitively contemporary with our reading (not physically, of course).

Furthermore, on some other level in our perceiving mechanisms, we normally will associate factors and features beyond the subject in immediate focus. But we cannot generally or predictably determine the outer limits, provided there are any, of our field of perception, cognition and reaction: the maximation principle must be started working; never precisely delimited but with the kind of approximation contemplated by Bertrand Russell (*xxxx). The graphical model, consequently, denotes a moment with time) and expansion submodels.

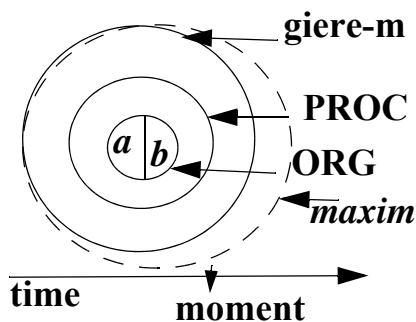


Fig. 3.4.3, The three models integrated.

a. represents housing, b. areas, urban structure. Here, time point and expansion are indicated.

Graphically, we can illustrate the point on the modified Giere model (Fig. 3.6.1). The analytical state arises at the indicated moment and the maximation is approximately marked off

with the broken-line circle. Now to point 3.

3. The ORG model showed two relevance directions, on area and on buildings. We must now, having considered point 2. above, realize that for both of these factors, associative maximation has to be counted in (Fig. 3.6.2). Consulting the bulla on buildings, more or less precise and delimited associations over to the surrounding areas will normally occur. They can arise as hints in the bulla text, being taken for granted among the people and authorities, or they can arise among special categories among them.

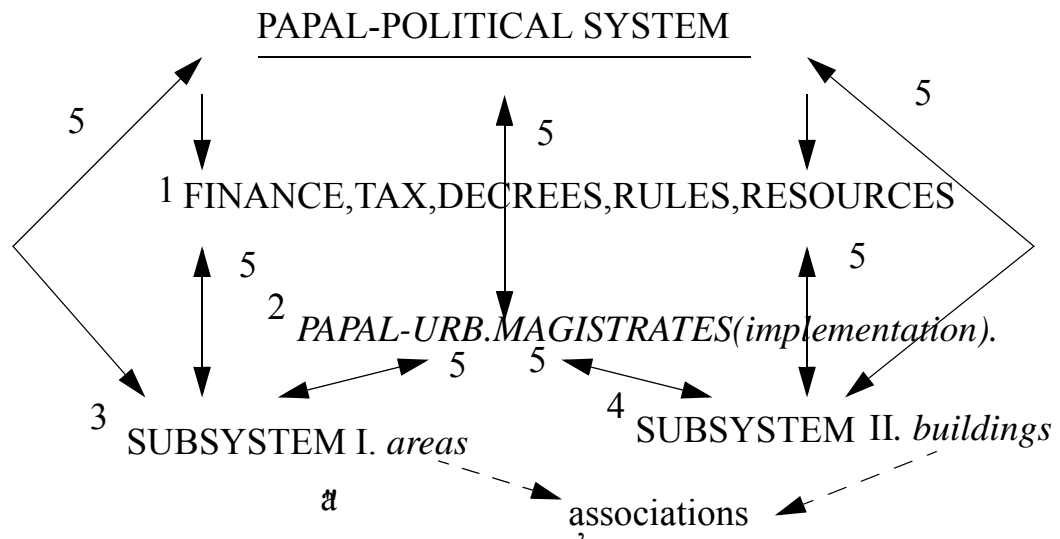


Fig. 3.4.4, ORG, organization Model, redesigned from Silverman, *The Theory of Organizations*, with new node names. The nodes for areas and buildings have been expanded to include associations strictly outside of the system.

So far we have considered some specific urban aspects as they arise in the bulla of Sixtus IV. But the document invites other readings as well. Let - Authority-expected control lines.

- Organizational structures.
- Rome as a world city.
- The diocese of Rome in the context of the Catholic world.
- Relation of the bulla to other documents (e. g., 4.3, The Statutes of 1363 and 1471).

I am not going to develop these subjects, especially because the present venture is an experiment in methodology and not substance. My approach is a limited one and I shall leave it at that.

But I will insist, again, that we are facing incompleteness in an approximative fashion (since we have no scale by which to measure completeness).

The Readers can well comment that so far they have heard about theory and models but not very much about the subject, unless we by "sub-

ject" mean whatever can be lodged into models designed to have it lodged in. This seems to impose a severe limitation on the work.

Would it make sense to claim that theory is more real than the subjects handled by it? That the subjects are chosen in order to test theory and method rather than the other way around? For a theory can be stated with sufficient clarity, while subjects are and remain multifarious.

There is no definite answer to these questions. But one can let them provoke us to action: trying out parameters, methods and encapsulation in some theory and give the entire program a forward push.

With the experimental use of our models on real-life matters behind us, it is time to test that process, which inevitably will have to repeat some points in the argumentation, rather as a *Nachprüfung* or verification.

3.5 Reading Tacitus with Cicero in Mind

This Section will remain empty at this stage, as a location for installing a future space consuming presentation and disussion of Classical sources. The rationale for the work has been indicated in 1.5 and 1.6.

Having finished a work, the time has come for rethinking over it. Here is a suggestion.

3.6 Two Rats and a Nut

After all this talk about abstract ideas and models, let me end this *Part* in a more human vein. So here are my rats, representing *hard* and *soft* approaches in my *Configuration Theory*.

The question is whether the big one is after the other animal or after the nut. It is clear that the small one is interested in the nut, which, however, is out of reach. So here we have a drama, and the classic attitude under soft-universe conditions is that we have always cherished unattainable things, such as the *imponderabilia* (in literature often called the inexpressible).



Fig. 3.9.1, *The big Hardcore and the little Softphocles in their cages, one inside the other one. The tempting nut lies beyond their reach (ss-l pinxit in CAD).*

So far, I have attempted to link up soft issues with hard ones in a serial order. But the double set of rat-cages reflects a different relationship that may be worth considering.

It must be axiomatic that our hard programs, from Mathematics over a number of fields, like Biology or Geology, to Physics, range over a vastly greater field than all Humanities and soft initiatives taken together, simply because the latter are expressible only in a limited verbal vocabulary.

So our friend *Hardcore* resides in the larger space, and the reduced space is occupied somewhat passively, as it seems, by *Softphocles*, and he (or she) must necessarily be incorporated into it. Following this probably somewhat debatable logic, there would be no room for the *imponderabilia*, which, in the manifestation as *A Nut*, remains out of reach of our two friends (and ourselves).

END PART III

4PART IV FRAMEWORK FOR OUR REALITIES

Conditioning the book as a multifaceted shell, expressed by the Table of Contents, encasing the models and their supporting programs, this Part IV conveys a selection of a foundational program.

Readers will find much that is imperfect or even crude in this provisionally edited Part IV. Even though of course I would never aspire to being compared with Ludwig Wittgenstein, perhaps my raw notes could be accepted by anyone who accepts the great master's Notebooks.

4.1 Categorization

The role and usefulness of a developed concept of categorization is an important constituent factor in *interdisciplinary* procedures, and to this we now turn our attention.

Generally speaking, there will be a *distinction between categories of subjects and formulations* according to how we can handle them. First, there are those that are available for handling in *graphic models* and *verbally* in *definite, approximately, at least, terms*. Next, we have the fluctuant, vague subjects and formulations that elude sharp definitions, the *imponderabilia*, a negation of the Late Latin *ponderabilis, that can be weighed* (Lewis and Short).

To categorize the vast and slippery bunch of interests and activities invested in "doing" history is an impossible assignment. There are fact-oriented stories, and such of them as are extended in various directions of particular interests and addresses and audiences, and there are descrip-

tions of time-limited situations or processes, all of them cognitively without definite boundaries of background and associative material: an amorphous paste.

Nevertheless, we have to rely on such configurations next to the exact ones in order to handle our world, whether directly or on record. In order to structure the heterogeneous mass so as to handle it conceptually, we have to freeze some of it, creating patterns. It is such patterns, *graphical models*, for example, that bears some promise of connection with the so-called hard sciences. Using models is *one*, perhaps the best, method. But it costs the loss of nuances that only can be captured in terms of *imponderabilia*.

Categorizations *are not there*. They have to be created, as tools in an action program. The same applies to definitions. Here we focus on processes and functions. With support from *Quantum* mechanics but also from normal experience from research, we see that our subjects are created by our handling and elaboration of an idea, a project or a program.

I take categorization to being a complex business which involves further criteria than the operational definition by Eleanor Rosch (*SL, *Burden*, Part V, Chapter 4).

Reading works in history we often meet the dilemma: is this *categorization* or just an arrangement using different headings? Canavaggio (p. 5) warns us: *it would be a serious loss if we overlook such differences - between various actors (he is speaking of writers in the Spanish Siglo de oro) - and collect these dimensions in a collective baroque (Sería grave escamotear esas divergencias y reabsorber esas dimensiones en un eucumenismo barroco)*.

A crucial and nearly everpresent paradigm in categorization is that of *levels*. This is the issue for handling that most of all requires us to fetch notions from the hard sciences over to the soft programs. In the classical literature in the Western world, the conception and application of levels seem to be fairly consistent and unvaried. On the other hand, it has proved intriguing from that point of departure to understand what is meant when Moslems claim that the *Qura'an* is clearly structured in levels. Apparently

1 In his chapter 7.1, *Significance of the Real Number System for the Foundation of Analysis*, Eves (pp. 173ff.) gives a sobering survey of the issue of model categorization. *Mathematicians have divided the great bulk of existing mathematics into three large categories - geometry, algebra, and analysis. A given branch of mathematics cannot always be placed unflatteringly into one of these categories, for the categories lack clear-cut definitions. This is perhaps to be expected, since there is no agreement even as to what mathematics itself is.*

So even in such an "exact" field the question *What?* cannot be answered definitely. There are no such problems about the *How?* - at least not on basic levels: a calculation, in the *Calculus (Analysis)*, for instance, is strictly defined, elegantly bypassing the deeper question about what is being handled in the procedure. The program called *number theory* tells the same story (Eves, pp. 185ff.). So do the branches of *logic*, for which Irving *Copi has delivered a fundamental and richly argued introduction.

Eleanor *Rosch argues against the classical view that *the properties defining a category are shared by all members* (a view that rules out differences between more or less typical cases and also dependence on human factors in the categorizing process). She presented what are called *prototype effects*: Prototypes are *subcategories or category members that have a special cognitive status - that of being a 'best example'*; while *prototype effects* indicate the resulting assymetries. The most representative members of a category are called *prototypical* members. These views are constructive and lend meaning to what we are trying to do but at the same time seem to make it more likely that the dynamic, process-like and non-definitional stance adopted in my books has something to be said for it.

Strictly speaking, the categories that Rosch recommends are not "found" but *created*.

A perspective most interesting in the present context is that the classical division between *quality* and *quantity* could seem as turned irrelevant because they dovetail at many points and cases. The distinction certainly looks awkward when speaking of graphical models. Let me cite some references more or less directly touching on the subject just mentioned.

In **Lerner's Introduction*, great weight is laid upon the programs of Gauß and Riemann. Of special interest are furthermore the contributions by J. G. Kemeny, *Matematica senza numeri (Math without numbers)* and by the Quantum-mechanical veteran Viktor F. *Weisskopf, *Qualità e quantità nella fisica quantistica (Quality and quantity in Quantum Physics)*.

The latter shows how this dichotomy no longer is relevant in Physics. In Lerner's summary: *The Physicist of today does not find useful anymore the traditional divergences between type and dimension, modality and measure, all analytical categories that exclude each other mutually*. As one can see in the *Quantum* context, the distinction between waves and particles is one of aspects, not of essence or fact. The contributions of Gauß and Riemann are briefly cited in the Lerner publication; for a close-up, see Kramer, pp. 456ff. For De Finetti, Bruno and Giorello on "the invention of truth", see 2.7, *Reality and Approximation*.

The moral: once more, to recall our obvious awareness, the rule is not absolute but framed after our thinking: we cannot take leave of ourselves. Models work on that principle.

Usually, claims uttered in a religious framework become meaningful in a political one (and I do suspect that most views and initiatives claimed be in the name of religion, are purposeful mostly in political terms). Why did the Roman Church invent the notion of the *Trinity*? The only place in the Bible where this entity is cited, is in the so-called *Comma iohanneum* (1 Joh. 5.7-8;), but this is a later interpolation, cancelled in Erasmus' Bible edition. Exploiting a Greek idea, the Roman Church, in order to create a unique paradigm denoting distance from contending faiths, introduced the *Trinity*. The key paradigm regarding the unity of the three Persons is again Greek, *homooúsios*, and it is post-Biblical. Classifying this as a political initiative, the claim becomes meaningful. The Church needed it to make Christ a divinity and not merely a holy person, an important step to define the difference from Judaism and establish an over-national Church that could obtain political recognition. No wonder the Church discouraged, even prohibited, people privately reading the Bible, even the *Complutense* edition of it of 1522 edited by Cardinal Jiménez, with the *Comma* in place.

There is no *The history*, only *written history*, written by someone with certain aims and under given conditions. Mario Vargas Llosa's comment on *novela* writing is valid also for "professional" history writing: *una realidad ficticia ... la materializará mediante la escritura (Cartas a un joven novelista, pp. 14f.; cf. p. 27: disidencia con la vida real...)*. Academic history writing looks more "objective" and "realistic" because university traditions, economics and career programs set narrow boundaries to the projects.

For this agenda, I believe to have argued, ideas and experiences also from literary studies should be called in for support.

But wouldn't it be awkward to claim that Alessandro Manzoni's *Coro di Adelchi* has historical value? Professionally yes, but not really. History is what we perceive as historical, with specific references, and standards can only be individual and cultural. On the other hand, poetry is never accorded a status as historically valid expression. This is a tricky point, since good poetry is *untranslatable*. Is it really? To translate poetry and keep a semblance with the original, one often has to select words different from those of the original, producing a distorted reflection of it. Try to translate into any other language Tatjana's ballet steps from Pushkin's *Evgeny Onegin*. Or the *Light Verse* in the Qur'an (*Surat-al-nûr*, Q 24.34: SL, *Burden*, 3.3). How is the following rhythmic string of words from the Bach cantata, *Herz und Mund und Tat und Leben*, being translated into English? It be-

comes *With all my being*. No way! Naturally, Flaubert complained to Turgenev, when the latter tried to give an impression of Pushkin's poetry in French: *Il est plat, votre poète*.

History writing has never been and can never be "objective", for the simple reason that there is no "objective" criterion for objectivity and also because whoever writes cannot like the proverbial snake creep out of his skin. There is a continuous scale, with no sharp internal boundaries, from promotive creativity at one end and at the other, uncritical propaganda with extra-historical appeal.

Returning to what I have claimed, the unstable character of historical recognition, let me suggest some further ideas regarding the status of history writing as event recording and the question of professional boundaries between scholarship and fiction. If one excludes hagiographical tales (Teresa de Ávilas autobiography!) or liturgical accounts, however fictional ("St. Clement" consisting of two persons, one documented and the other one uncertain), then one is at risk of reducing the perspective, incurring loss of essentials.

Community feeling is an important factor but hard to describe.

We (Liv and I) were present (participated is saying too much) at Sunday Mass on 16 February 2014 in the Roman church of Santi Quattro. One can share in the experience without believing in any God up there. For the community focusing on just this or him, and the rituals by which to approach the goal have a value all by themselves, to some of us even more important than their declared transcendental ideal. This I would consider an example of being oriented in a process rather than on its end term.

I have just cited one distinct experience: is it thus discrete and isolated?

Failing to develop accessible thoughts and ideas is unavoidable; at some point we are forced to stop by incapacity or circumstances; and we are warned: *We are thoughts, you should have thought us* (Ibsen's *Peer Gynt*, Act 5).

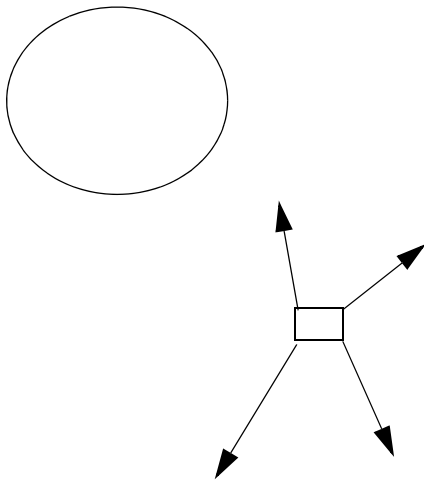
My bottom-line regarding *history* is that the *boundaries* between the many different types of historical accounts are so vague and imprecise that one hardly can speak of types. Is recording the dates and events more "historical" than recording the lives of the protagonists? Does E. C. Riley speak of history when he states that *ultimately fictional literature is exemplary simply on account of its representation of life?* (*Al fin y al cabo, la literatura imaginativa era ejemplar simplemente por ser representación de la vida*; quoted by Hazas and Arroyo in their edition of Cervantes's *Novelas ejemplares*, p. 29).

We can conclude that the question, if *history can be considered a category*, can be answered positively if we stay within the academic environ-

ment and the corresponding budgetary confines. But then we have said more about these categories than about the cited field of research, study and writing.

One and the same recordable event or series of events can be understood in contrasting ways by different people and in different situations; we know that. Theodore Dreiser, in his *The Financier*, gave us a valid example, having several people reporting on one event and telling completely different stories about it. (and so to some extent Laurence Durrell).

Fig. 4.1.1 - Bounded and vectorial determination.



When a concept or notion or recordable fact or subject is being worked out or evolved, and this happens in relation to some system, which will always be an abstraction, then it is adequate to use the term *artificial* and *artificium* for the product of the process. We must keep in mind that the *elaborating* function is more comprehensive and can be independent of systems attachment. We will always be

facing the alternatives illustrated in Fig. 1.2.1 - *Bounded and vectorial determination*

4.2. Data and Information

Obviously, some entries we have to consider, come to us so to speak readymade in the form of data and information. Or so it can seem.

No *information* comes to us pure and absolute, meaning, in fact, *elaborated data*. We will always digest a subject or theme, contextually, technically, theoretically and even psychologically. We can speak of *information management*, since one cannot have it and use the subject without elaboration and systemization (more or less precisely). And from where does it come? From myself, in the sense that it changes from *data* to *information* when I receive it and elaborate, mentally or otherwise, the incoming data.

Data and information should not be confused. To quote Parker on this crucial issue (*Parker, 12): *Data refer to facts. When data are filtered through one or more processes so that they take on both meaning and value to a person, they become information. Information, rather than data, is what*

*people use to make decisions ... both the computer and the human mind act as processors that select the data and transform them into meaningful information. As information is generated from data, it, too, eventually becomes part of the store of data (Parker); and: Information is data that has been processed into a form that is meaningful to the recipient and is of real or perceived value in current or prospective actions or decisions (*Davis and Olson, 200).*

Ivan Bratko said that you can do anything with graphical trees and I would agree supplementing with claiming that so you can with *Venn Diagrams*. Let me start with a simple one.

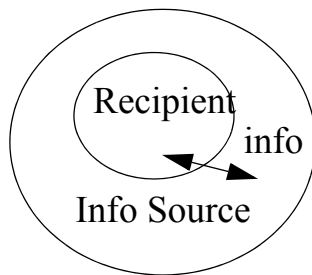


Fig. 4.2.1, Info Exchange

In Fig. 4.2.1, the double arrow indicates the info stream, illustrating the advantage of using this model for information: sources can be plurifold or clusters of info working simultaneously. Secondly, received info can be modified, extended or translated and shot back again into the source field. Even in Science, selected info seeping through barriers in a kind of osmosis can be accompanied by unpredicted info and systems noise. Let me name this *socio-organizational osmosis*.

This Venn-based model can look more realistic, at least, more universally usable, than the trees and flowcharts. The latter categories use linear paths of a high number but precise and numerable positions, while info usually will spread outside the regular lines. It does not require the police to have people knowing what is going on in the neighborhood.

To this simple picture we should add a more complex example, the difference being that in the second example the Recipient field contains a number of subfield, partly isolated, partly tangential and partly overlapping (Fig. 4.2.1).

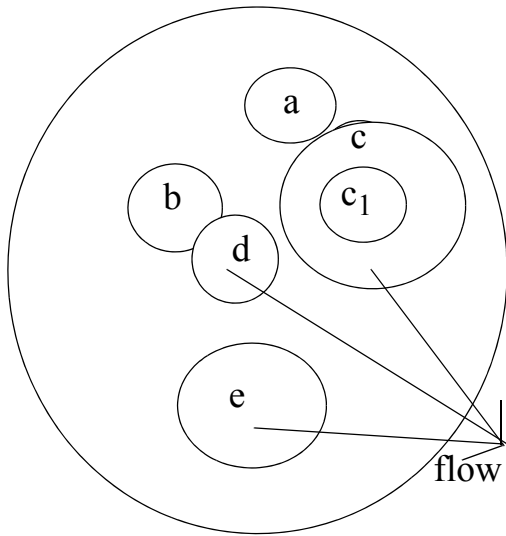


Fig. 4.2.2, Info fields with extracted selective flow (triple arrow, as an example).

While the *info field model* (4.2.2, *Info Fields*) should be considered the basic info model, the resulting *info field model* (Fig. 2.5.3) should be regarded as a *secondary* one, including the ones illustrated in the present *Section*.

We should now be ready for some basic considerations on the subject of information.

The *Processing Chart* now to be reconsidered (Fig. 4.2.3) can be used for all the variants just listed, also in the processes of long-term memory. I present the original version, which I have developed with the purpose of distinguish further between various sections of the relevant processes and thus between *data* and *information*.

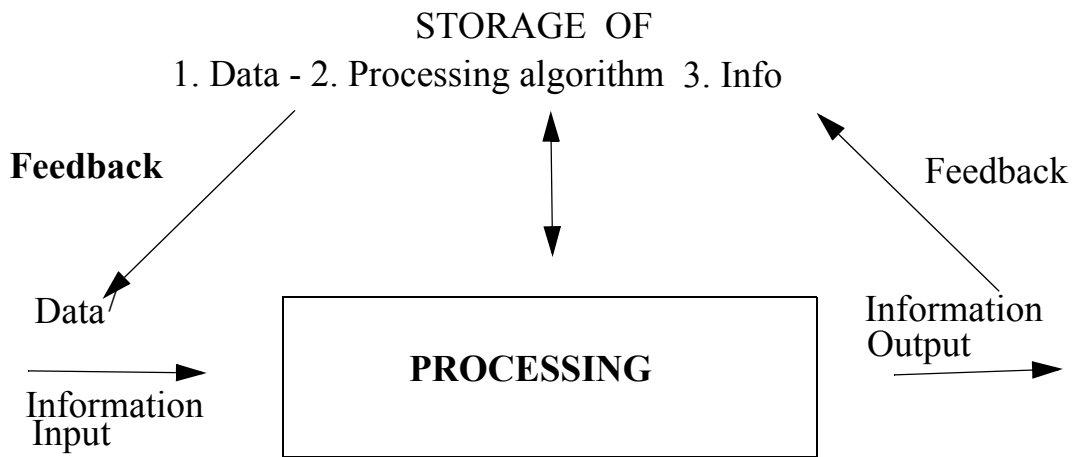


Fig.4.2.3, Processing Chart, redesigned after Davvis and Olson Code INF. Information model. To the original model by Davis and Olson I have added feedback mechanisms and specified the contents of storage, adding processing algorithms, since I believe methodology also would be stored for repeated use. Indeed, a cache should also really have been included.

Modern formal info models, like the one just shown, or in the so-called *information paradigm*, can be used as a hardframe basis for handling softer versions (*Inmon, *Data architecture*, brings a survey of data versions and procedures). In fact, there is no shortage of literature in this field.

The *contents* entered into the sections of such a model should be *maximized far beyond* what at the actual moment *seems* historically plausible, yielding an artificial totality from which any specific concept or cluster of concepts may be called up, evoked or applied in the period (*Geen, *Human motivation*, brings a good survey). This would serve as a graphically striking warning against simplifications; moreover, it allows us to focus on essential historical interests and preoccupations without having to pick out, and thereby prefer, specific cases, something that tends to happen in linear modeling, in which it is almost impossible not to imply priorities. *Motivations* in individuals or groups authorizing us to extract and select some specific specimens in the box will often be highly complex. Here again, under the *probability perspective* concerning *types* of people, social groups or authorities, *approximation* has to be accepted as a rule. The most useful aspect of an info model is perhaps that it illustrates graphically the complexity and indefinite character of attributing meanings to things.

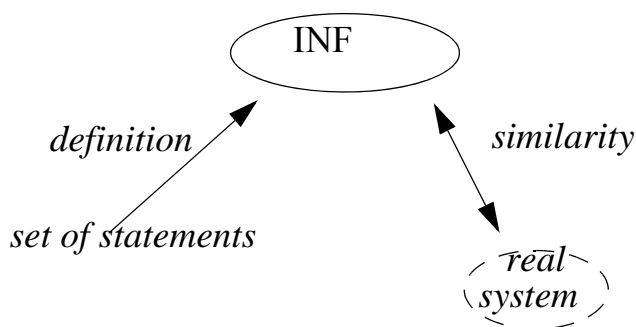


Fig. 4.2.4 - Giere's Model, model zone with present specification as the INF model. Later, the ORG model will be substituted for the INF.

At this point I will re-introduce Giere's Model (4.2.4, - however, with the model zone

specified according to the present state of research, so that his *model* becomes the *virtual INF model* (The title of Giere's book, *Explaining Science*, seems to me ambiguous, leading one to think of semantics and linguistics, rather than the contents of "Science", itself a richly endowed term for a vast gallery of activities. Nor can one "explain", for example, "Culture" or "literature" or medicine).

That is to say, the *model* on Fig. 4.2.3 (*Processing Chart*,: INF, redesigned after Davis-Olson). is integrated into the central zone in Giere's model, being conceived of as an *processing zone*, housing a model that actively and dynamically relates the actual contents. Giere's model may be said to illustrate *case-handling processes* involving the researcher (in the present case SL).

There are two of them. *One process* consists in developing data, observations, ideas, concepts and aims and planning a model into which the outcome of this process can be stored. The *second process* consists in elab-

orating the model and evaluating its relations to the chunk of real world that is in focus.

Returning to the *Processing Chart*, (Fig. 4.2.3), we note that the *specific contents* to be considered do not result from any deep-level exploration; they are hypothetical *examples* in a primarily methodological exercise.

Here we go; *first a list of captions for the model; further below, more articulate scanning of the contents.*

There are *two main types of semantic contents* that have to go into the model,

1. specifications of the functional elements in the model itself, and
2. data and subjects that are to enter into it and being distributed according to the model structure, #1 and #3.

Specifications, starting with input.

- #1 Input

Note.

Here I shall note some items; we pass to brass tacks later on.

Data come in two classes.

1. *Condition data which pertain to a point in time;* and
2. *Operative data which reflects changes over a period of time, ... accumulated over a period of time* (Davis and Olson, pp. 223 f.; the cited authors combine *data* and *information* into one category, speaking, in the same paragraph, of *condition information* and *operating information*; Parker, in his most useful *Glossary*, pp. 808 - 819, on *Information: Data that have been processed into a meaningful form*). Facing the cited dilemma, we have to consider whether the *Info from 1363* should be subsumed under the first or the second of the two types of data. The *effects* of some of the clauses of the statutes of 1363 clearly continued active for shorter or longer time after their publication. One example is the *institution* of the *magistri aedificiorum* laid down in 1363 (if not earlier). Whereas, with 1425, the *institution* was renewed, while the *election* of the body was entrusted to the authorities indirectly appointed by the Pope. the *election* of this body by 1363 was entrusted to the population; This quandary takes us back to general considerations of *history writing* (see *Part I*). Pragmatically, but probably also by , we have to set a fixed date or other time unit for an event or situation, and take processes as being eventuated at specific consecutive points in time, since *continuity* can be claimed verbally but not shown in any *working format*.

- #2 Processing unit

The Processing Unit has several functions, that of connecting the Management field with the pseudomatrix and the pseudovectors (*pvs*) in their boxes; further, to activate the five properties listed above: location in a system,

distinction among levels, among contents (themes and *pvs*), interrelations and interactions, and, finally, direction, i. e., vectorial properties.

As a partial or supplementary template for #2, the *Central Unit* in the model (*CU*), using the image of a true *CPU*, we can, as suggested already, use a typical organization model like the Silverman one (Fig. 3.4.5).

The *CU* can be compared to the *CPU* in a computing system; (*see* Krakowiak, *s of Operating Systems*). The *CPU* is the device that interprets and executes instructions, communicating with input and output devices, with interacting drivers. Spencer, p.93, has relevant notes: Computer systems operate with four basic functions: 1. input, 2. processing, 3. output, 4. storage. The *CPU* includes two main functions: 1. control sections: controls and supervises all operations on the computer. 2. the arithmetic-logic section performs all mathematical operations and such operations as comparing, sorting, selecting, editing, shifting or converting information. This parameter, the *operating agency*, is not *eindeutig*, it can be interpreted in mainly two directions or modalities: as an abstract *ars combinatoria* that we attribute *either* to the management in some specific situation, event or case, or type of them, or task or assignment, *or* on the other hand, as the connecting mechanism developed by the historian, in this case, myself. The idea of an *operating* factor should be supported by relevant literature, such as Davis and Olson, *Management Information Systems*, pp. 310ff.

Obviously, the reference here to this operator means applying it in a modeling fashion: central faculties in humans regarding handling of information can be illustrated and to some extent theoretically handled by applying the *CU* model. Both the models and the objects they are intended to handle for their identity and for making them ready for analysis, depend on and involve complex scenarios, partly of our own concoction; which should mean that they are embedded in *systems* and include or involve *systems* (*2.4 *Systems and Networks*).

At many points one might search deeper and wider for better articulations than I will pretend to do here. In the present theory exercise, references will be limited to what emerges directly from documents as they are published here - well knowing that there is much more to say.

We should also bear in mind that the identity of items (and their numbering) is a subjective affair. One advantage of this mode of operating is that we cannot hide this rather brutal fact behind well-written literature. Graphical models are brutal, they stare at you, not letting you get away too easily.

The moment is here to construct an analytical model developed from the info model on the next page.

To the original model by Davis and Olson I have added feedback mechanisms and specified the contents of storage, adding processing algorithms, since I believe methodology also would be stored for repeated use. Indeed, a cache should also really have been included. The output from a preceding model will be elaborated in the Processing unit. The output from the receiving model will then be a new model: a sequence.

An *info model*, like any process configuration, requires a central coordinating unit such as the *CPU* in a computer or reflection of it, as in the *CU* of the model just cited. This is an advantage, for the obligation to introduce such a unit carries with it the obvious necessity of setting up, metaphorically, some plausible version of a controlling and coordinating agency in a central spot in the system. In other words, the model forces us to not only to consider cases but also *how* we go about evaluating them.

4.3 *Soft Values facing Hard Ones*

There are *hard*, measurable and countable entities and there are the *soft* ones, some among which we can handle on by making them more solid.

But even the "hard" ones are not so in absolute or unfaltering terms. Generally, the distinction between *hard* and *soft* in use here is not absolute but functions *on the level of the models*, that is, on the local *operative* level.

Important features from the story of fluctuation between the hard and the soft are recorded in Charles S. *Parker's and George E.*Dieter's books, the first on *management info systems*, the second on *engineering and design* (read: implementation).

My grandfather, Alfred Sinding-Larsen (*obit* 1924, bicycling in Oslo), was deeply engaged in liquids (not the way you might imagine). In the verbal-dependent Humanities, where I started my professional life, and to a large degree also in the classical Social Sciences, our subjects often defy quantification (which is obvious), but are also unstable, with hazy boundaries; let us say they are fluid like liquids.

For the purpose of studying them, we have to put them through some process that solidifies the allegedly crucial but fuzzy features in them (without trying to subject them to quantification) - formalize them, or, at least, translate them into some tractable, relatively stable pattern.

My grandfather's fluids, too, were to some degree solid by having strata in them, which he discovered. In fact, he published, among other things, a work on *Schichtenbildung in Lösungen* (stratification in solutions) in the *Annalen der Physik*. But he *found* them, having a measurable, quantifiable physical material before him, while I, *faute-de-mieux*, have to *make* them in terms of *models*, being involved with material much less definite.

Yes, *we make them*. Our cognition (*Erkenntnis*) is not directed by the subjects we study, for they must adapt themselves to our cognition (Kant), and the tools for this can be models.

The present venture is dedicated to the building and *metaphorically* testing and exploring the use of *graphical models*, which are *soft in this sense of the word*. The basic idea is that the models should be subjected to comparison with digitally runnable models, in other words, the *hard* ones, such as we meet in Physics and Mathematics. This reflection occurs on the *operational* not the *functional* level; that is, on the level or levels where we manipulate the models and their application, more or less simulating what occurs the "hard way".

To forestall misconceptions, I want to emphasise that this bridging over from one to the other does not imply a crossing over to math operations like those in *set theory* (for which, *Eves, pp. 221ff., especially pp. 229ff: *Sets and the Fundamental Concepts of Matheamtics*).

History is traditionally reconstruction of past events and processes. Traditional history, often claimed to be fact-oriented, while also working by Impressionist norms, sits at the crossroads between the hard and the soft.

We use various types of *models*: graphical (digital and metaphorical), mathematical, logical and verbal. Starting at the basic level and in elementary terms can be illuminating. When I write $a - b = c$, I have set up a model for doing something, perform an *operation*, namely a subtraction. The model indicates an action, stating a *set of rules* such that the c is positive if $a > b$, and that the subtraction yields only one solution or product, indicated as c , if a and b are allowed to have only one value each. It also seems evident that, if we substitute some real-world values, instead of pure quantities, for the letters a and b , the operation loses in exactitude, for then a *What* is involved.

There is, however, yet a *fourth type of model* and it can be used in all three cited modalities. This is a linguistic *Transformation Grammar* (Emmon Bach, *Syntactic Theory* (1974), pp. 79f., 104ff., 206ff., 237ff. and 263f.). Here, to simplify the picture without missing out the principles, a *graphical model*, usually a tree, serves as a connector between the *verbal input* and the *verbal output*.

Let us now hear what *Ronald Giere* (*Explaining Science. A Cognitive Approach*) has to say regarding graphical models. His views have been important for the development of the present book (he is not to blame for my mistakes).

Ronald Giere's *Triangular Model* (Fig. 4.3|.1) can be used to illustrate the creative factor in the handling of our data. For with it one has to pass from an allegedly *objective description* (in terms of the game being played)

in words, numbers or symbols to the *real system* via a model, which necessarily will condition or customize the passage and hence the outcome: our interpretation of the case on hand. His model can be compared with the one in Fig. 2 - 3 in FitzGerald and FitzGerald, p. 57, *Progression from modeling of existing system to modeling of new system using structured techniques* (see Fig. 4.3.2, below).

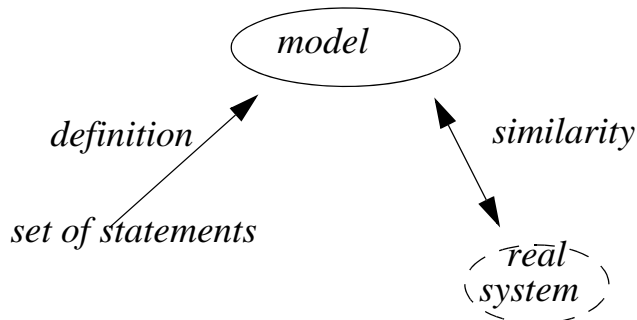


Fig.4.3.1, Giere's Model 3.8 Redesigned

Let us have Giere explain how he understands the model idea and functioning (*Giere. pp.176f. 47f., 78-80, 82 - 86, 273).

Giere discusses the idea that math or logical reasoning provides the paradigm of rationality (and offers a test showing cases where this does not seem to work well, p. 176f.). He presents various traditional views on formal properties of structures and models that are not relevant here (pp. 47ff.). Giere's *Part 3* (pp. 62ff.) is dedicated to the topic of *Models and Theories*. He opens with a general statement: *I shall begin... with scientific representations themselves, keeping in mind that scientists, after all, are only humans. The representations scientists construct cannot be too radically different in nature from those employed by humans in general.* And he ends this part as follows (p. 91): *It should not be difficult to identify the main exemplars of quantum mechanics, such as a single particle in an infinite potential well, around which families of models have been constructed. Quantum mechanics, like classical mechanics, can easily be seen, I am sure, not so much as a unitary formal system, but as a family of families of models. Whether the Schrödinger equation provides as tight a bond among the families as Newton's second law does for classical mechanics is unclear. But it does not matter. The possibility of generating all the families of models from a simple set of general axioms is not a necessary condition for any scientific theory.*

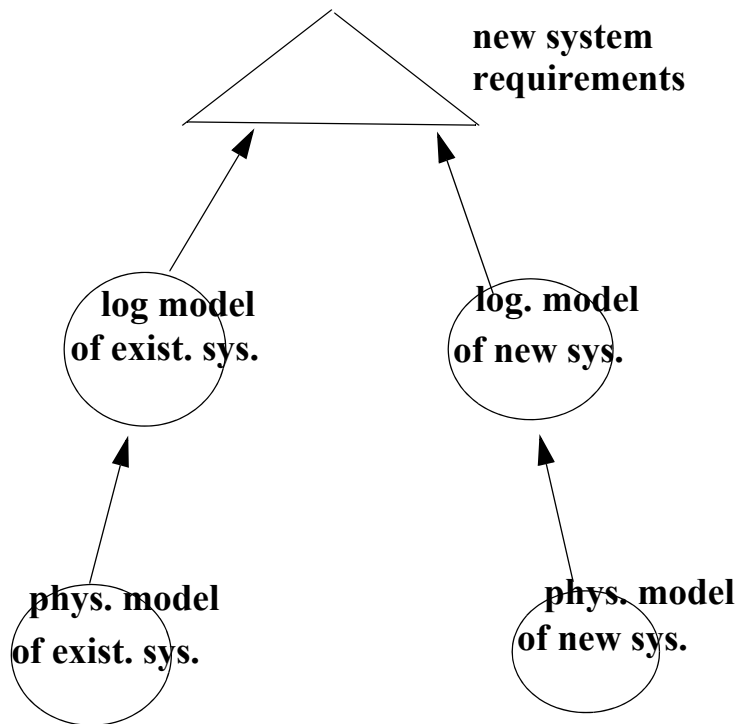


Fig. 4.3.2: Fig. 2-3 in FitzGerald, simplified.

Ronald Giere, in his *Explaining Science. A Cognitive Approach*, is concerned with basic theoretical and programmatic issues in the cluster called *Science*, and most specially, the subject of *digital Models*. Qualifying his approach as *cognitive*, he offers insights and arguments that seem particularly adequate for enriching the overall picture

I am trying to build up in the present book.

I shall stay with Giere for a while. He offers useful observations specifically on *models*. Referring to them, I shall give the page references regarding *models* right now, without repeating them, because I shall reshuffle his order a little: *Chapter 3. Models and Theories*, pp. 62ff; pp. xvi, 47f., 78ff., 82 - 86, 176f., and 273 (quotes from G. in *italics*).

His ideas about models must be understood in the more general context set out in his *Preface*, pp. xv - xvii, and *Chapter 1, Toward a Unified Cognitive Theory of Science*, pp. 1 - 21.

From the *Preface*.

After having been attracted by Thomas Kuhn's writing and discovered that *from a philosophical point of view it seemed that Kuhn had merely rediscovered Hume's problem of induction in historical garb*, ...Giere ends up with emphasis on *the foundations of probability and statistical inference on the model of the foundations of physics*. [Reference to *Quantum physics*]. He was led to deeper enquiry into the subject of probability and the foundations of scientific inference. *My scepticism progressed to the point that I now believe there are no special philosophical foundations to any science. There is only deep theory, which, however, is part of science itself. And there are no special philosophical methods for plumbing the theoretical depths of any science. There are only the methods of the sciences themselves. Moreover, the people best equipped to engage in such pursuits are not those trained as philosophers, but those totally immersed in the scientific subject matter - namely, scientists.* Giere was then led to consider decision making and se-

lectionist models in a *satisficing* [Herbert Simon] framework. Being unsure how to formulate certain objections, he found support in the *cognitive sciences*.

There one finds models of cognitive agents who develop representations of the world and make judgments about both the world and their representations of it. It took no great leap of imagination to think of scientists as cognitive agents and of scientific models as a special type of representation. Likewise, scientists' decision making about models can easily be seen as an exercise of ordinary human judgment. I now had the ingredients for a view of science that combined the features I sought. His next paragraph offers a summing-up that brings out the essentials that are formulated with greater detail in his *Chapter 1*.

There are four main points (set out in paragraphs):

First, the view is thoroughly naturalistic, requiring no special type of rationality beyond the effective use of available means to achieve desired goals.

Second, there is room for a modest yet robust scientific realism that insists scientists are at least sometimes successful in their attempts to represent the causal structure of the world.

Third, the view allows scientists to be real people with a full range of human interests while also being cognitive agents in something like "the pursuit of truth".

Finally, the view makes possible an account of scientific development as a natural evolutionary process.

From *Chapter 1*.

What does G. mean, he asks, by a *theory* of science, and why does he call it *cognitive*? The study of science as a cultural phenomenon is itself a *science*.

Science is a cognitive activity, concerned with the generation of theory, ultimately even *knowledge*. A warning against too simple a conception about *cognitive science*. Not the same as cognitive psychology. *In calling my account "a cognitive theory of science", I ... intend it to be a broadly scientific account employing the resources of the cognitive sciences.* Further: A *cognitive theory of science* should be *unified* in the sense that it spans over this, and also from cognitive neurobiology [for which, see now Damasio, *Descartes' Error*] over artificial intelligence to linguistics. *One should not put a priori restrictions on what might prove itself useful in explaining the phenomenon of modern science.* - Giere notes that philosophical theories of science are generally theories of scientific rationality, and of course he cites Newton Smith (1981). This problem also touches on the *relationship between theory and data*. After a section on *The Social Construction of Scientific Knowledge*, he goes on to discuss *Cognition and Reality*, noting that,

until very recently there has been little study of scientists themselves from a cognitive perspective. As yet no standard cognitive views describe, for example, how data and scientific theory are related. This is a drawback, but it is also a blessing. The shortcomings of both the philosophy and the sociology of science stem from the fact that, in being true to their disciplinary backgrounds, both philosophers and sociologists of science have failed their subject matter - science.... Having fewer (or at least less focused) disciplinary commitments, a cognitive theory of science is freer to be true to its subject.

Giere goes on with *Representation and Judgment*.

Recently sociologists of science have concerned themselves less with the nature of theories than the processes by which theories come to be accepted by a majority of a scientific community. - The cognitive sciences do not provide immediate and direct answers to these questions. They do, however, suggest a general orientation and some specific concepts that provide a potentially fruitful background for considering the issues. In the framework of the cognitive sciences, theories would be some sort of representation, and the selection of a particular theory as the best available would be a matter of individual judgment.

After having noted how humans and animals create internal representations of their environments and of themselves, in terms of mental representations [a vast subject since quite a few decades; schemata, cognitive maps, mental models, frames], Giere announces that he will argue that scientific theories should be regarded as similar to the more ordinary sort of representations studied by the cognitive sciences. There are differences, to be sure. Scientific theories are more often described using written words or mathematical symbols than are the mental models of the lay person. But fundamentally the two are the same sort of thing. ... Schemata are not generally described as being true or false, but as fitting the world in limited respects and degrees, and for various purposes. Cognitive scientists are not "metaphysical realists" (Putnam...). By the same token, there is no suggestion that the word simply presents itself without considerable internal processing or "interpretation". The mind (or brain) is not a mirror to nature (Rorty, 1979). I will note here affinities to the philosophy generated by Quantum Physics.

*Under the subheading *The Cartesian Circle*, Giere notes Descartes' standards for justification, and that they have been somewhat relaxed, and most would allow that the argument itself need not be strictly deductive [that would mean, no longer math or logic in classical terms]. It is enough that the premisses confer some appropriate degree of "probability" or "rational warrant" to the conclusion.*

To illustrate the difference between a model and the reality it is meant to reflect: the motion of a body subject only to a central gravitational force:

and other examples from Physics ...yet the texts themselves make clear that the paradigm examples of such systems fail to satisfy fully the equations by which they are described. No frictionless pendulum exists, nor does any body subject to no external forces whatsoever. How are we to make sense of this apparent conflict? As a consequence, G. proposes to regard the physical gadgets, such as the harmonic oscillator as *abstract entities having all and only the properties ascribed to them in the standard texts* [i. e., with the text book equations]. The distinguishing feature of the simple harmonic oscillator, for example, is that it satisfies the law $F = -kx$. *The simple harmonic oscillator [illustrated on G's p. 69, with Hooke's Law] then, is a constructed entity. Indeed, one could say that the system described by the various equations of motion are socially [ital. in the original, this rule will be kept further on] constructed entities. They have no reality beyond that given to them by the community of physicists.*

Next, G. suggests *calling the idealized systems discussed in mechanics texts "theoretical models", or, if the context is clear, simply "models"*.

But we shall have to employ the term 'model' in at least one other distinct sense. Not all theoretical models are models in the further sense of being exemplars on which other theoretical models are modeled. Any theoretical model could in play this role, but in fact relatively few do, the simple harmonic oscillator being one of the more prominent examples.

Introducing the loaded term "truth": *The interpreted equations are true of the corresponding model. But truth here has no epistemological significance. The equations truly describe the model because the model is defined as something that exactly satisfies the equation [circularity again]. G. goes on to compare this view of the relationship between linguistic entities, statements or equations, and models, which, even though abstract, are not themselves linguistic entities, with similar concepts found in Van Frassen's work (to which G. refers elsewhere in his book).*

Models, however, come in varying degrees of abstraction. At its most abstract the linear oscillator is a system with a linear restoring force, plus any number of other, secondary forces. Etc. Hence, the linear oscillator may best be thought of not as a single model with different specific versions, but as a cluster of models of varying degrees of specificity - or a family of models.

Theoretical models are intended to be models of something, G. suggests that they function as "representation" in one of the more general senses now current in cognitive psychology. *Theoretical models are he means by which scientists represent the world - both to themselves and for others. They are used to represent the diverse systems found in the real world: springs and pendulums, projectiles and planes, violin strings and drum heads.*

Here, a new concept is introduced: a *theoretical hypothesis*, regarding the *relationship between a theoretical model and that of which it is a model*. If I understand him correctly, this would mean that a theoretical model is evaluated all by itself and *eo ipso*, and also, of course, as presenting an object to us and to the world, available for examination and processing. This consideration requires a distinction, this one: *Unlike a model, a theoretical hypothesis is.. a linguistic entity, namely, a statement asserting some sort of relationship between a model and a designated real system (or class of real systems)*. The appropriate relationship is *similarity*, a difficult terms on which G. spends almost a page (but which need not detain us here).

Under the heading *Definitons, Models, and Reality*, Giere offers observations that merit being quoted entirely:

Most theories of science, whether old or new, assume that any representational relationship between theory and reality would have to be understood as a "correspondence" between scientific statements and the world. The fate of any understanding of theories as somehow representing reality has thus been linked to the fortunes of a correspondence theory of truth. It is here that the battle is usually joined. The interpretation I have offered above undercuts these arguments by denying the common assumption. There is, on this account, no direct relationship between sets of statements and the real world. The relationship is indirect through the intermediary of a theoretical model, as pictured in figure 3.8 (Fig.1.3.1).

The relationship, G. continues, that does the heavy representational work is not one of truth between between a linguistic entity and a real object, but of similarity between two objects, one abstract and one real. From this point of view the difficulties with the standard view arise because it tries to forge a direct semantic link between the statements characterizing the model and the world - thus eliminating the role of models altogether (the same figure).

Under the heading *What Is a Scientific Theory?*, G. refers to the standard textbook varieties and notes that *The coordinate notions of a theoretical model and a theoretical hypothesis provide the main ingredients for a theory of theories... [a meta-theory?], So far, however, I have not explicitly said what a theory is. But this, I think, is no longer a significant question. We already have enough conceptual machinery to say anything about theories that needs saying. ... one is inclined to look for something "linguistic" to be the theory itself. But one cannot identify the theory of mechanics with any particular set of sentences. ... My preferred suggestion... is that we understand a theory as comprising two elements: (1) a population of models; and (2) various hypotheses linking these models with systems in the real world. Thus,*

what one finds in textbooks is not literally the theory itself, but statements defining the models that are part of the theory.

I understand Giere as meaning, at least to my mind it *should* mean, that the "similarity" between the model and the world is a theoretical *construction* on our part, consisting in our using the model for structuring whatever seems relevant in the actual piece-of-world or real system. Giere's term *real system* must mean exactly this. We have, let me repeat, to stick to the idea of *creating our models, in other words, artificium*, in consideration of the fact-of-life that this is the only access we to whatever we handle intellectually

Giere's model stands apart, while its design is ordinary enough (a mini-tree), by expressing a *non-dedicated, objective principle* regarding the difference between using a model as a functional link and *not* relying on it.

Mulling over models and trying them out can be *productive*.

Not only because of their directional structure from *Input* to *Output*, but also because of the designing process.

Even such a seemingly straightforward action as changing the order of some chapters in a book of ours, can turn out to make a difference in one's argumentation.

I will now note that seemingly irrelevant events can become *productive*. Speaking of the dynamics behind decisions to work out some specific problems and publish the outcome, Jesús Mestre i Godes, in his "Short" (380 pages! *Breu historia de Catalunya*, in the Catalan language (not a "dialect")), notes the unpredictable, even irrational, motivations for doing so; a story of attempted analysis; a voyage or travel; an unresolved issue, an idea appearing out of the air; a suggestion from a publisher. Some return to the position where they had started out more or less successfully, while others, again, when the proper moment is there, end up with being blocked. Nevertheless, there is some sort of trick here: for the author had from earlier on felt that he had to write about *those* subjects, one way or the other, keeps them present, and the mechanisms of the mind worked on a matter already well prepared (*Recordar els motius que ens fan decidir a escriure sobre un tema, al marge dels que durant molts anys hem anat arrossegant in pectore, pot ser una anàlisi curiosa: una darrera lectura, un viatge, una qüestió mai no resolta, una idea captada a l'aire, un suggeriment de l'editorial. Alguns tornaren al cau d'on havien tret el cap sense pena ni glòria, però altres, en canvi, arribaren en el moment oportú i acabaren per quallar. Tan mateix, hi ha una mena de trampa: l'autor ja intuïa que calia escriure sobre aquells temes i, d'una manera or altra, els tenia presents, el catalizador actuava sobre una massa molt preparada*) (Mestre, p. 9, *Preface*).

It should be emphasized that the *Cmodels* I propose for depicting flows of data and information, can be useful but they are not exclusive on any account. They are management *creations*, the present author modestly being the manager of the present book, outside of which whatever is being said, has debatable value. There is no absolute optimal solution to queries such as those facing us here. Let us have a recent opinion about this.

De Finetti (from now *DF*) starts out considering the development in *Philosophy* and *Science* as parallel and interconnected processes (pp. 69ff. in the cited edition, with a long and highly readable Introduction by G. Bruno and G. Giorello).

To deny the unlimited possibility of progress in Philosophy would amount to affirming that at the end there must be a philosophical reality or truth of absolute validity and definiteness (*E rispondere negativamente circa l'illimitata possibilità di progresso della Filosofia vorrebbe dire appunto affermare che qualche verità filosofica, nota o da scoprirsi, possa avere un valore assoluto ed eterno*). This common and consolidated illusion has constituted and continues to do so, the major stumbling block for Science as well as for Philosophy, since it forces each successive notion to be considered not as "today's truth", as a point of departure for further progress, but, on the contrary, as The Truth... (*Questa illusione diffusa, inveterata e tenace ha costituito e costituisce il maggiore inciampo per la Scienza e per la stessa Filosofia, spingendo ogni successiva concezione a non contentarsi d'essere "la verità di oggi", punto di partenza per un ulteriore periodo di progresso scientifico, ma a pretendere d'essere "la verità", e cercare qualche appiglio per consacrare se stessa come l'ultimo e definitivo verbo della Filosofia*).

DF goes over to examine the cited "illusions" under three headings: *Illusioni metafisiche, Illusioni realistiche e intuizionistiche* and *Illusioni razionalistiche* (pp. 72 - 84).

He then faces the difficult subject of *The Nature of Explanation* (*Essenza della "Spiegazione"*, pp. 84 - 94, with sub-headings).

From the foregoing discussion it should be clear that *explanation* is not a metaphysical concern but that the element of it are being invented by ourselves. Thus we cannot search for an explanation beyond and independently of the field of our perceptions and experiences. To identify the significance of a specific concept means to sort out the deep and essential themes that have, even unconsciously, established the *aim/purpose* for which the theme has been introduced and have revealed [*DF* writes *spiegano*, but he cannot have meant to use the term he wants to explain in the very explanation] the deeper cause for its *utility*. - I hope that my abstract conveys the kernel of *DF*'s argument (p. 84). On the next page he elabo-

rates the points just made, extending them also to formal logic and mathematics, which, these too!, should be treated by the same criteria and not merely as tautologies - for experience is necessary for alerting us to the concepts that accompany them (*Se è vero che le verità matematiche non sono che pure tautologie, e non sono quindi verità sperimentali, d'altro canto però l'esperienza è necessaria per suggerirci i concetti che in esse intervengono*). After this chapter 5 on explanation, three more follow up with processings (pp. 86 -94: 6. *Illusorietà delle "illusioni dei sensi"*; 7. *La via illimitata*; 8. *La tappa odierna*).

To follow *DF* further than this would take us too far afield for the present book, but his *Parte seconda. L'invenzione della logica* (pp. 97 - 119), puts his ideas at a test, since here they are applied to a subject usually considered purely formal.

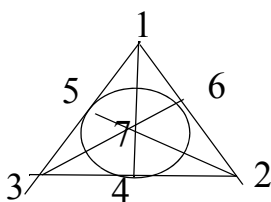
My view of this description of *explanation* is that it fits in with the more general idea of *operationalism*.

For the cited publication of a text originally written in 1934, the editors, Bruno and Giorello, have supplied a *dictionary* of terms and concepts modestly called a *Glossario* (pp. 147 - 179), which could be combined with W. O. Quine's *Quiddities. An Intermittently Philosophical Dictionary*, Harvard 1987, but is even more useful.

Now over to the subject of *Model Theory* and *Graph Theory*. I refer to the former subject in the superb *Stanford Encyclopedia of Philosophy*, 17 pages on this entry.

Model Theory hovers between math and formal-linguistic paradigms and bears no direct relationship to the models used in the present work. And yet the model-theoretical concepts and corresponding techniques lie at the very basis of the digital application of numerically as well as visually construed models, including the *graphical models* in the center of the present experiment, so that this reference is in order. For details, see the cited source at <http://plato.stanford.edu/entries/model-theory/>

More with a view to completeness than employment in our context, on the next page, I reproduce page 181 and Fig. 175 from Lord and Wilson on *Graph Theory*, with references (O1, O2) to works by Øystein Ore.



Lord and Wilson, Fig. 175 redesigned.

9.2 Graph Theory

An aspect of the theory of finite spaces, of wide application, is *graph theory* [O1, O2]. A *graph* is a form in a finite space, defined by distinguishing *point pairs*. A distinguished point-pair (i, j) is called an *edge* of the graph. If we distinguish *ordered* point pairs, the graph is a *directed* graph. If, for each distinguished pair, (i, j) is not regarded as distinct from (j, i) , the graph is *undirected*. *Mixed* graphs can also be considered.

Two graphs with N vertices each are *isomorphic* if they can be mapped onto each other, i.e. if there is a one-to-one correspondence between the points of the two graphs such that every edge of one graph corresponds to an edge of the other. A convenient diagrammatic representation of a graph consists of a figure in which edges are indicated by joining its points by a line (not necessarily straight). A directed edge can be labelled by an arrow in the diagram.

Isomorphism is not always readily apparent from the diagrammatic representations of a pair of graphs. For example, the isomorphism of the two graphs indicated in Fig. 176 can be recognised only by verifying that the mapping between the two point-sets, indicated by the cyclic permutation (265734) , is an isomorphism.

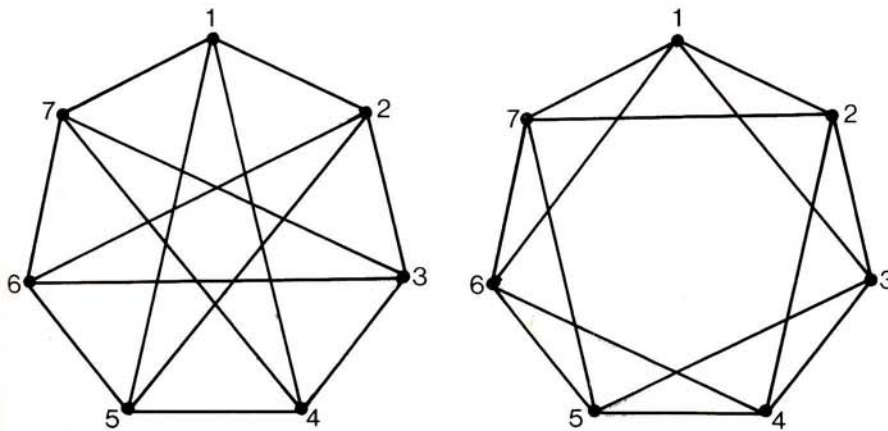


Figure 176

There are various ways in which graph theory could be generalised. One could define forms in a space of N points by distinguishing triples, rather than pairs of points (as in Fig. 175), for example. Or one could allow the number of points of a graph to be infinite, with edges defined in some systematic way.

Let me repeat that positioning something in a systems view is *explaining* it, while beholding it there and grasping some of the motivations for someone having placed it there, amounts to *understanding* (which can never pretend to be complete since no general criterion can be given for that).

Given, let us say, that *B* contains *A*, we have an example of this strategy for knowing *B* and asking *why A?*, is a creative act on my (anybody's) part, since we cannot, as Wodehouse has taught us, *Always think of everything*. We will always pick out something from something, hoping it will work (and often it will, partly on account of Wittgenstein's *Sprachspiele*).

So answering the question, *Why or Where*, my choice falls on the latter. Positioning a *resource* in a system does the trick, not an ideal solution, perhaps, but the only one we have; instead of rule-priorities being pre-decided once and for all, they are all assessed within a chosen context so far as this can be conceived as a system of resources.

4.4 *Bridge and Bi-track*

To introduce two interrelated notions that are fundamental here, the *bridging* idea is that *soft* models are made to reflect in terms of metaphor some *hard* ones: while the *bi-track* idea is that graphical and verbal models are made to work together (*SL, *Burden*, I,4.5).

The *bi-track* approach, parallel use of graphical and verbal models, being my chosen paradigm, graphical models play a crucial role in my documentation and argumentation. These models are prominent theory-carriers because of their boundaries, extension, item distribution and item expressions and localization, these models are more adequate than verbal ones for the development of a theoretical basis and procedure as well as for construing an debatable discourse.

In earlier writings, I have argued for *bridging* between what is *observational* and available for strong or mild formalization, and what is *theoretical*, citing some literature on the subject; let us say, the difference between *hard* and *soft* evidence or theme (SL, **Burden*). Today I am not so sure that *bridging* is an adequate picture, since a bridge needs two firm bridgeheads, not one firm and the other extremely unstable. I would rather say that our verbal indistinctness (not approximate, since this presupposes something firm to be approached) needs to be supported by notions *reflecting determinate, or stable, qualities*, such as math and logic. For the reflected part in the game, I have later on become accustomed to speak of *metaphor* and *metapohorical* pictures of the formal original. When an object falls to the ground, you can calculate the velocity, by setting up an equation for speed and distance, and you can even calculate in the amount of air resistance. My material doesn't give me such precise subjects nor

such tools. I have to fall back on *as-if* games. But I think this is preferable to plain verbal games.

The term *bi-track approach or work* was developed in SL, **Burden.*, pp. 30ff. Often the two alternative operations, the objective and the personal, conflate, but often not at all.

I want to take a *bi-track* approach for studying historical documents and record events and developments. This means that I will use *verbal* and *graphical models* in parallel, the first are *declarative*, the second are *demonstrative*, being relatable to Wittgenstein's distinction between *Sagen* and *Zeigen*. The *graphical models* represent my theory on the *demonstrative* level, the verbal ones on the *declarative* level.

The models - verbal as well as graphical ones, by the *bi-track* approach - are *my tools* for handling and managing the historical evidence and document. The key or entrance portal to them is *theory and systems ideas as I have developed them*, surely supported by interdisciplinary literature, focused, however, on theory, methodology and systems ideas. *Bi-track* approach means that I will use *verbal* and *graphical models* in parallel, the first are *declarative*, the second are *demonstrative*, being relatable to Wittgenstein's distinction between *Sagen* and *Zeigen*. The *graphical models* represent my theory on the *demonstrative* level, the verbal ones on the *declarative* level.)

Before discussing the *building of the models*, we have to decide what we shall expect from them.

What is the term *graphical* intended to mean? Having discussed at some length their application, we should now be prepared for a closer analysis of the notion itself. I have to try to get down to bottom level even at the cost of seeming to write a chapter in a textbook.

In works like Alexandroff, *Elementary Concepts of Topology*, Garden and Thames, *An Introduction to Differential Manifolds* and Kosinski, *Differential Manifolds*, we are introduced to Graphical models in the following sense of the rather flexible term: designs in lines, surfaces and volumes, to be run digitally or not, that *explain* mathematical definitions and operations and which serve as guides for *performing specific tasks* on the displayed elements, so as to keep the process on track with regard to *rules, methods and systems*.

Some graphical models do not show any directional features, which instead we see in ordinary flowcharts. Designedly static charts of business organizations or the model of the *Programmatic System* in SL, *Burden*, p.135 (*Model 2*), *static looking models* can imply, so to speak tacitly, internal dynamics, streams of information and instructions flowing between nodes

and boxes. To this, of course, we must supply the analyst factor, *mentally* making the models work; a critical factor in planning.

The *contents* entered into the sections of such a model should be *maximized far beyond* what at the actual moment *seems* historically plausible, yielding an artificial totality from which any specific concept or cluster of them can be evaluated.

No observation of "realities" is uncolored by goals, aims, interests, conditions, etc, so we see that the distinctions are not clear, but the *tendencies*, to borrow a term from Heisenberg, (*dunamis*) are sufficiently heeded. What is good enough for physics should be so for us too.

A crucial characteristic in my application of this model, is an erratic *time dimension*. The tendency lines or vectors must not be taken to indicate time lines on which to determine $t_1, t_2, ..t_n$. This is a context in which to note that no single graphical model can evoke *time*; for that we need either an interconnected series of them or the imprecision of natural language

We know that theory building often is operated in terms of mental, even designed, pictures (publications by Miller, Holton and others).

While the nature and application of the latter is relatively simple, using *verbal models* is rather complex. Verbal media do not display the two levels of *form* and *shape* (for which see 2.4, *Model Design as a Tool*, towards the end of the Section), unless one states this in words, at the cost of less clarity and loss of the rest of the advantages of graphical configurations. Using *graphical models*, we determine a structure and decide how things will be handled.

The *purpose*, then, of such models as are being used in this book for handling *documents* is not to present an easily accessible survey - that is, no illustration, but to

1. *bring the document contents into a general analytical system;*
2. *provide a portal to viewing and comparing themes and categories for further evaluation upon reading the contents of the document, the models displaying the subjects.*
3. *Aims and goals are not explicitly stated in the document. We have to reconstruct them as far as possible. This point is the one that most clearly requires a graphical model.*

A graphical model (in the present book, *Cmodels*, from configuration-*al*, and not digital) sets out spatially an *object* (or several of them) and by setting out fields or nodes, orders our observation and argumentation regarding itself and its contents, with an input and an output in a production line. The model as type or as a specified version, including the *verbal* ones, is invented, reused, conceived or developed in the network of some *theory*.

Whenever, as does happen, someone believes that this has occurred directly, with no accompanying theory, it means simply that whatever we have stored in us of potentially relevant and supporting ideas, notions, aims, preferences and leanings, dwells in our head without having been called into active consideration.

There are some *central theories* to which I shall appeal at various points in the book, but which should be summarily introduced already at this stage. They can be cited in abbreviation, as follows (**Bibliography*):

- *bounded reality* and *satisficing* conditions (Herbert *Simon; in my Krems article misprinted as "satisfying");
- *resources* as making something happen (Anthony *Giddens);
- configuration, not a thing but *operation* on notions and concepts (Hilary *Putnam);
- categorization: *prototype effects as best examples*, rather than in an absolute sense (Eleanor *Rosch).

Finally, there is the principle adopted here, that *approximation* generally rules the game.

This compound verbal model denoting dynamical properties has been the canonical one for my work in some earlier works and in the present one.

Does the model carry the theory or does it just convey it from some source? In the former case, if we invert the relationship, saying that the theory carries the model, what then? Let me approach the query gradually, starting out with the assignment to *apply models to a document*.

For every case there will be more or less relevant models, so the question is how to measure, gauge the connections between the models and the items lodged into them. The assignment, then, is to describe the role and capacity of each type of model, then draw conclusions regarding applicability and coverage.

The fundamental notions are

1. that there is no *one conclusion* but several parallel, often equally valid ones: the *Dreiser System*, a name I give this principle culled from Theodore Dreiser's novel *The Financier*, where several people report one and the same event widely differently;
2. the reading of a Document must start from theory (following Einstein) and in reality will so even when a simple hunch or intuition leads the game; developing a relevant theory should produce a usable picture.
3. the idea is that models are *not* to be made to fit the text and arguments, but that the *argumentation is developed from the models*, since they represent the theory.

Putting these principles into practice means that model-*cum*-theory takes precedence over document *analysis*. This is less absurd than it can sound. We will normally know a document before deciding to analyse it. Thus we will, to stick to the bulla of Sixtus IV, know that it deals with general *urban issues*. With this knowledge, we will consult general treatments of urban issues (from politics over administration to traffic and building realities), in particular such as are relevant for the given place and period (Rome in the fifteenth century). This overview enables us to set up general models in which these items or some of them are subjected to theoretical systemization. Upon which, we proceed to relate the model(s) to the document. The procedure, which sets some general conditions concerning parameters and view-points, can lead us to discover interrelations and interconnections between recorded items that might have eluded us in a straight reading of the document.

Working on a large project, not everything is guided by rationality, as we know. The records and models that are being used, depict *our/my* records and models. In my youth, we learnt something utterly false and unproductive: *First describe, then analyse!* There are no objective descriptions except purely formalized ones, like many of the mathematical ones (but not all). Our reality and realities are mainly artificial. The conviction of the superiority of rationality is not itself based on rationality (... *daß der feste Glaube an die Macht der Rationalität selbst nicht rational ist*, *Fischer, Planck, p. 69).

4.5 Programming for Theory

The "moral" in this book, let me repeat, is that theory precedes observation and explanation, following Albert Einstein. But the reader has a right to be told what the theory should have to handle and what basis there might be for it. Thus the theory discussion will accompany most of the text, tending to be subdivided in primary theory, elaborative theory and explicative theory. Theory building, development and application is the central concern in this book, the graphical *Cmodels* and their direct application to documentary material an outcome of this commitment. The functional and operative nucleus is the theory, the models are tools with limited coverage and effects, even when worked on together with verbal models (an unavoidable connection. to be sure).

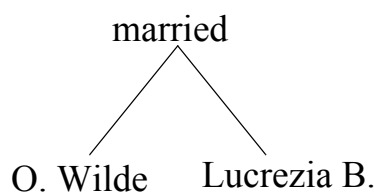
I will adhere to the notion that most of our modes of thinking are founded on a limited catalog of mental attitudes, norms and rules of operation: determination, indeterminateness, inclusion, exclusion, coverage, overlapping, tangential connection, vectorial (directional) links, basic-level, upper-level, originating, conclusive, etc. These tools can, most or all of

them, be expressed in terms of math and/or logic and Venn Diagrams; for which see the survey in Richard Jeffrey's *Formal Logic. Its Scope and Limits*, or any other sufficiently detailed work, like Irving Copi's *Symbolic Logic*; and *Eves (pp. 214ff.).

Pursuing the operative aspect rather than the substantive is not new. Literary fiction often applies the notion, and Luis Vives, a professor at Oxford, in 1538 wrote: *There is no need for us to know what the soul is; rather how it is and what are its works (operaciones; I have only the Spanish translation: Stephen Gilman's Introducción in Fernando de Rojas, La Celestina, ed. D. S. Severin, p. 13).*

There is more to say about verbal models, and it will become evident that the distinctions between them and graphical models are not consistently clear in the cases when we are evoking not linguistic distinctions but *visualizable configurations*.

The more or less Chomskian *trees* can depict, in a simple example, objects (things, phenomena, persons, etc.) and logical, functional or verbal operations joining them together, as in the little example here. Emmon Bach's *Syntactic Theory* is full of them. I frankly do not understand their *linguistic* relevance.



The names of two individuals are connected by an operator, like Oscar Wilde and Lucrezia Borgia on the appended graph. What we will normally do when looking at the tree, is somehow to visualize the persons *and connect* the verbal operator *to each one of them*, as an attribute. We will mentally *see* them together in terms of their attributes.

The outcome here should be that, initially, we operate mentally on *verbal* configurations, and subsequently *as objects with their attributes* in terms of *imagery*, which is not the same as performing a logical or semantical operation, connecting things in linguistic terms.

The upshot of these observations seems to be that *verbal models* can have an *evocative or alerting* power comparable to that of graphical imagery, while they cannot follow up the systems connections in a chartable and-workable fashion. Yet they can also form - or be interpreted as forming - *systems* in the linguistic manner of ordered *lists*.

in his edition of *Lazarillo de Tormes* (66th edition [we are in Spain!], Madrid 2009, p. 39), Victor García de la Concha, has a diagram illustrating his analysis of the text. Here, the story is subdivided in units of 3 x 3 with an entry and an exit. The centerpiece, with three units each with three subunits constitutes a *system* labeled *Ley del tres en la carrera del vivir* (the

law of repeated three in the course of a life). The central system is embedded in a more comprehensive one.

Verbal accounts can *say* that a plague, to take a specific example, hit this or that part of a population and lasted for such a long period, but they cannot *show* it; now to adopt Wittgenstein's distinction between *Sagen* and *Zeigen*. But my *models* cannot show continuity, having to fasten upon discrete events and conditions; can only show *that it occurred*, not how long. To have a *Cmodel* show a *process*, we need a sequence of interconnected ones. Only the imprecision vested in normal language, rather than supplying data, makes it continuous and lasting for some time interval. Prose writing can tell you that the plague lasted more than a year, and report on events during the calamity and in its wake; because of language's inability to keep points on a line apart from one another. This is precisely what *models* can do, thus contributing to our conceptions and argumentation. So we need both media, designed and written models; and we do so in our perceptions.

With mere verbal means we cannot in any definite way say *yes* or *no*, *include* or *exclude*, *overlap*, *separate*, etc. by any other means than artifice. To turn artifice into a *tool*, we use *graphical models* (specifically, in this book, *Cmodels* showing - *demonstrating* - positions, relations, extensions, levels of our terms. A verbal account cannot locate items like that, unless a series of formulae is being used. But still we could not note their positions with precision. It is probably adequate to say that verbal models evoke so-called *mental models*. Let me quote a few paragraphs from SL, *Burden*, on the subject.

Do not let us forget that all organization theory, planning in industry and business depend on models that are, indeed, artificial and summary of the most important features, never "complete". This is not a question of how such things *are*, but how we can manage them mentally, intellectually and emotionally. This perspective also will apply to my handling of the *bul-la of Sixtus IV*, where I am not concerned - how could I? - with how those people perceived the situations contemplated in the document, *only how we do so with the means we have and on this basis attributing aims and motivations in Roman society in the given period*.

Before *La Celestina* (various versions from 1499ff.) and *Lazarillo de Tormes* (1554), there was no sociologically focused *literature*. Nevertheless, society was depicted according to the religious standards in two kinds of media: the *liturgy* itself (as just noted) and in pictorial *imagery*.

Of course all models simplify the issues they are intended to handle or being made to handle metaphorically. But the degree of simplification can

be discerned more clearly than in verbal accounts, which tend to camouflage the issue and bypassing aspects that could be relevant.

Now on the idea about *theory precedence*. Modern views of how we elaborate our experiences state the principle differently but efficiently.

Here are what I would call regard as *central theories*. They can be cited in abbreviation, as follows (they are set out with references elsewhere in the book):

- *bounded reality* and *satisficing* conditions (Herbert *Simon; in my Krems article misprinted as "satisfying");
- *resources* as making something happen (Anthony *Giddens):
- configuration, not a thing but *operation* on notions and concepts (Hilary *Putnam);
- categorization: *prototype effects as best examples*, rather than in an absolute sense (Eleanor *Rosch).

This compound verbal model denoting dynamical properties has been the canonical one for my work in some earlier works and in the present one.

There is *fifth* one, perhaps more fundamental than the cited ones: *approximation* (see 1.4, "Reality" and *Approximation*): *All exact science is dominated by the idea of approximation* (Bertrand Russell).

The traditional model of the *instant* in the Calculus that I designed for SL, *Patterns*, fig. 2.3.1, is based on applied approximation. In Physics, the idea of *indeterminacy* developed particularly by Heisenberg is closely related to this notion of approximation. Vectorial paradigms also enter the game (XXX, *Vectorial Qualities - Tendencies*).

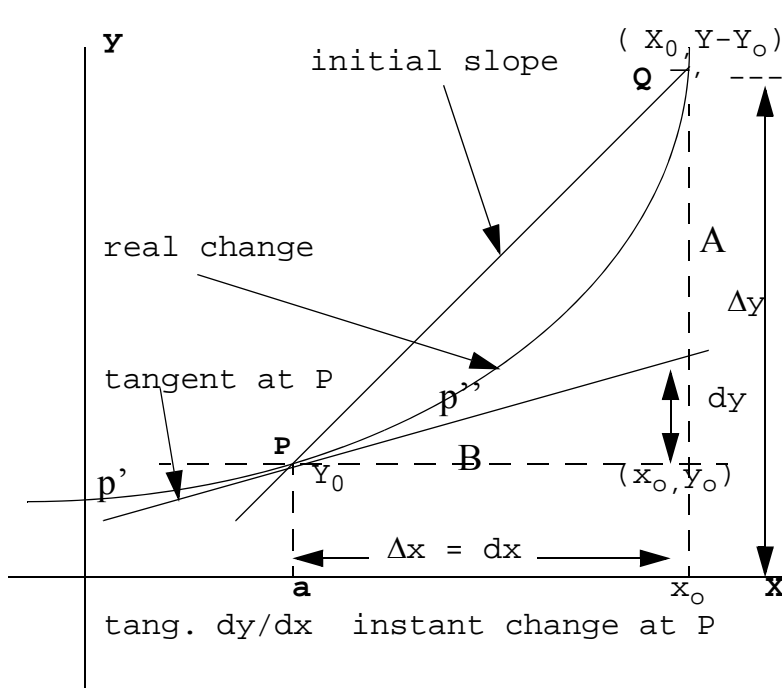


Fig. 4.5.1, Slope initially determined by the increment, $Q - P$ gradually approaching P as the increment dwindles toward (not to) zero; then the resulting slope, degree of inclination, is the derivative.

Following Albert Einstein, we should let *theory* be our platform from which we start handling the documents and realities. Albert Einstein,

in his talks with Werner Heisenberg, insisted that theory must precede observation and analytical work by *determining the What and the How* (see SL, *Patterns*, 4.1.1): theory cannot be grounded exclusively on factual observation, nor can the latter be sufficient, for things work the opposite way, since it is the theory that determines the scope of observation:

***... vom prinzipiellen Standpunkt aus ist es ganz falsch eine Theorie nur auf beobachtbare Größen gründen zu wollen. Denn es ist ja in Wirklichkeit genau umgekehrt. Erst die Theorie entscheidet darüber, was man beobachten kann* (quoted by *Heisenberg, 2006, p. 37).**

It was an oral statement here known second-hand, a fact that can explain the contrast between the *only (nur)* and the *reversed (umgekehrt)*. E. obviously has in mind, let us say, the start and the end of theory-building.

This idea indeed reflects common experience: we never approach anything without some ideas about it. This is the crucial idea of a whole branch of research about how we face and monitor our physical environment, developing theories labeled, in some publications, *Environment Knowing* and *Personal Construct Theory* (detailed references to Moore, Gollidge, Canter, Dennett and others in SL, *Arkitekturteori og bygningsanalyse - Architectural Theory and Building Analysis*, Chapter 2.2, Trondheim 1994; in Norwegian; and SL, *Teori og praksis for avhandlinger - Tverrfaglige perspektiver - Theory and Practical Work on Dissertations, Interdisciplinary Perspectives*; in Norwegian, Trondheim 2001, pp 91 -93)¹.

1. Both books can be freely translated and republished.

To articulate the picture, I want to apply generally Emmon *Bach's view specifically regarding (p. 1.): Looking introductorily at the subject of *theory*, he notes: *First, in looking at a coherent theory [but we have to know that it is coherent?], we will learn something about how a theory of syntax can be constructed and how evidence can be found to support theories about particular languages within the framework of such a theory. Second, enough seems secure within the theory that we can consider various aspects of it to be necessary parts of any serious theory of syntax.*

So we have the following triple sequence (or some corresponding one):

1. *Primary* theory,
2. *Elaborative* theory for data/record,
3. *Explicative* theory.

It does seem obvious, however, that neither logically nor indeed in practical work, the three phases are clearly distinguished from one another. Let us say they arise as tendencies or in terms of Heisenberg's *dynamis*.

A general theory is here considered realistic whenever it connects in a group, process or other system all (or approximately so) possible parameters that are relevant for the task on hand.

Speaking of *syntactic theory* in the present context is really wielding a misnomer, since the term belongs to linguistics (*Bach). I am using it because the *system of graphical models* in this book also displays a sort of syntax pattern, there being stipulated relations and interconnections between the single models.

The sequence of *Cmodels* plus the *Cgroup Model* that coordinates them (* 2.3 and 2.4), represent *one* among innumerable notional syntactic theories of *general* conceptions of a historical document, a statute or a chronicle. On a general level, this is a completely realistic theory and it can be relied on in the present experiment.

The problem is how this theory can take in and handle specifically identifiable items in the document, such as 1. an argument, 2. a term in its context, 3. an interconnected group of terms, 4. a process predicted or recorded (again, e.g., statute or chronicle). For this assignment, we have to prepare the models for the prospective tasks for which they have been created (*next *Section*). The existence of, at least, the four approaches is sufficient to demonstrate the impossibility to make conclusive decisions.

First we have to decide in the *present* connection, how to categorize items in the documents, and, starting out from this decision, choose among the four alternatives just listed.

More precisely, what is the relation between models and theory?

The models, mine, at least, *express theories* and serve as *tools* with which to handle theories and move around in their vast landscape. Obvi-

ously *any selected graphical or verbal model will have limited coverage and capacity*. This needs not worry us, there being no alternative, so we have to do something with what we can muster. The fundamental notion being, in this work, that we can understand only by positioning in a system, and handle and control only by studying and adjusting the relations item-system, and graphical assistance being our only effective tool, the upshot is that such a syntactic theory, consisting of an interconnected group of graphical models, establishes our only available and utilizable working ground. This is a limitation that we have to live with, if we do not prefer to rely exclusively on the written word, whose great advantage is that one cannot always see what's missing.

What these my claims seem to amount to, is that we by lodging items into the models and controlling the outcome (from a logically not too precise set of criteria, to stick to the truth), are testing the framework or system and the position in them of our objects in focus (*next *Section*).

When model handling of theory fails us, this of course can mean either that the theories or the models are not sufficiently developed. Given the progasm, however, it is not so certain that this can ever be achieved, sine there does not seem to exist a definite end term. We can end up, here, too, with some fundamental *uncertainty*. So the crucial idea is to keep moving. They tell us the Sun will not start cooling down before a million and a half years, so there is still time for improvement.

4.6 *Systems and Networks*

A little twentieth-century piece goes like this:

*Mary had a little lamb with a fleece as white as snow,
She took the lamb to Pittsburgh, and look at the damn thing now!*

Yes, things may change color when relocated, if not to dirty grey like the lamb, at least to a new hue and with it a new significance; a contingency not always acknowledged, for example regarding picture programs for ritual spaces, in which the *position* of an image in a *system* is critical: SL, *Patterns* (1.6.2 *Positional recall and space distribution*), and SL, *Working*, on the *Sistine Chapel* in Rome).

Usually the process will be much more complex than the one exemplified here, and then I would have problems handling it. Unless I were a world chess champion or a mathematician of the Gauß or Feynman dimension, I would lose track of some stages as I examine others and never be able to obtain a full survey of what I was doing, never grasp the entire pattern with its

important sub-patterns at the same time. A *graphical model* showing an argumentation and documentation *process*, is illustrated and discussed SL, *Patterns*, 1.11 (and also in *SL, Operational Determination*, and *SL, Working*, Graph 1).

Systems and networks are Siamese twins that cannot be divided, while each of them maintains certain specific characteristics.

In this book, I am working with *theory* in terms of what is usual in the Western world. But there are alternatives. The *Qur'an*, for example, is considered as being systemic. It is so by being subdivided, one might say, both horizontally and vertically, by the subjects, themes and dogmatic statements. Not being taken as a fundamentally human work, the great book lies outside our present concern.

Because the issue now is the *interaction model* \times *system*, we must take a closer look at the systems idea and its involvement of structure.

I shall be using the terms *structure* and *system*. With the former I shall mean a choice of elements or items and their interrelations, possibly also their emergent qualities, regardless of if and eventually how we put the picture to use.

For my concern with *systems*, I shall borrow from *system analysis*, and indicate a structure in which some or all parts are handled as fundamental or operative *problems*, eventually with their *subproblems*, while the entire model being considered is a *procedural* one, with its dynamics or levels of dynamics focused on some stated aim, an *interpretive and explanatory* one or a *productive* one.

Do we model systems or systemize models? Both, I would say.

For a *system without models* (or their equivalents) bears no meaning, and a model not integrated in a system does not do so either.

Can we then have *two systems levels*, one around and one inside the actual case or subject? This situation I can design with *Venn diagrams* (articulated in Jeffrey), having a large circle for system and a smaller one with a model that *includes* a still smaller system; can I? Yes. For the model can include a system. We have an example in the integration of systemic features in Silverman's organizational model (Fig. 2.5.5).

This should mean that there cannot be any *operatively workable model* that does not form part of a system and does not embrace a system, at least potentially. The idea of *Object Orientation* is relevant here (*2.8). Another is the idea of *emergence* (*2.8).

Paradigms such as these will often be - or can operationally be made to be - involved in *networks*. If *everything can be expressed by trees*, as Bratko claimed (SL, *Burden*, p. 198), then so one can say also about networks. A network *structure* can have properties as a *productive system* in

that it can internally assemble, highlight and bring into focus some choice of nodes with their closest linkages, that is, a section of the network, thus forming *new combinations*, as in a kind of *ars combinatoria* (misusing Ramon Lull and Leibniz), across the original pattern. From now, networks will be our tools embedding graphical models, which, however, have some affinity to them.

I will start this particular argument with Glenn and Littler's definition of *networks*: *A set of points, called nodes, which are joined by lines drawn between them (sometimes called arcs). The network is defined solely by the connections existing between its nodes, not by their spatial distribution or the form of the lines, which may or may not cross at points other than the given nodes.* Apparently, *trees* can be considered a subgroup of networks.

While the *nodes* in a network can be firmly rooted in experience, whether a raw one or conceptually approached; the *arcs or links* in a network must necessarily be bearers of complex and often inscrutable combinatorial mechanisms. Stephen P. Borgatti *et al.*, pp. 1f. give a good survey of the idea of networks as they are employed in the *Social Sciences*, but in the present context I need to descend a level or two from human, business or policy interrelations to abstract units, parameters that can as the next step be so applied.

I want a concept and a term for it that can capture the connecting mechanism regardless of contents; and I seem to find it the digital world, in so-called *drivers* (using digital models for human affairs is certainly no novelty; we find it abundantly treated in works by Richard L. Gregory and Herbert A. Simon and many others).

According to the *Microsoft Computer Dictionary*, Fifth Edition (2002), a *driver* is a *hardware device or a program that controls or regulates another device. A line driver, for example, boosts signals transmitted over a communication line. A software driver is a device-specific control program that enables a computer to work with a particular device, such as a printer or a disk drive...*

This picture can be used as a metaphor for the *arcs* connecting the *nodes* in our networks, keeping in mind that in real networks, such as social ones, the corresponding mechanisms can be extremely complex and only partly accessible to description.

With simplification in view, I shall be taking as given just *three networks*, considering their surface *nodes* and *arcs* as well as the "interior" of the 3D volume across which they interrelate.

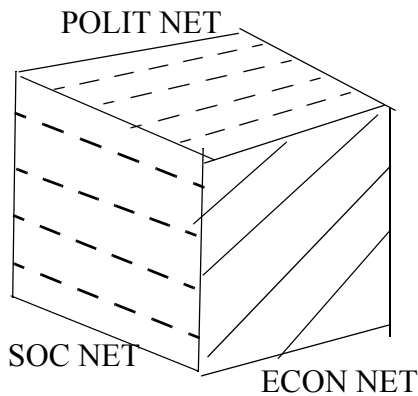
The model Fig. 2.6.1 is for pure, non-dynamical visualization, showing two interdependent types of structure: *three kinds of networks* and, inside in the cube, *implied* (but not mathematically defined, since three

surfaces are denoted as such but left empty) *interrelations between the social, political and economic networks* (for graphical simplification, the networks are indicated only with parallel lines).

In the *interrelation volume*, there would be two classes of items or parameters: *a*, variable, not predictable crossings between factors in the three networks; and *b*, *imponderabilia*.

The bad news to bring back from this tour is that the two elements or pictures *a* and *b* cannot always be clearly distinguished from one another. We can perform *work* only on the surfaces, leaving the interior contents to literature, to fiction, such as those that have been referred to in the history chapters in the present book.

Fig. 4.6.1, MODx3



Two subjects will now be discussed: *abstract networks* and *Model Theory* (the latter only with hints, since the subject lies beyond my competence).

Urbanistic issues seem an adequate subject for theory and model development because we are concerned here with relations between environment, human living and working and economic, social and political issues that are sufficiently

complex and plurilevel for the models to be put at a test. The reader, of course, should take this program as an invitation to improve upon my implementation.

There is a vast and variegated literature on *systems* in theoretical and technical environments which I have used in my publications (by Ludwig von Bertalanffy, C. West Churchman, Richard L. Gregory, Herbert A. Simon, to cite some of them). The essence that I believe I can extract from this material, is that there exists no system readymade for us to observe. We have to *create* them using ideas like *emergence* and *object orientation* (SL, *Burden, Patterns*) and in model terms *install them* into the case, configuration, mechanism or configurational or solid machinery before us. Systems are an *artificium*, more than the sum of the parts. A machine is no system, but we can and usually will, *see* a system in it.

An "average" definition of a system relevant to technically working paradigms is offered by Churchman (p. 29) to which I add the point 0, since the morphology or structure of a system is also important (a tree, a set of boxes as in administration and business models, a list, etc.) ; in our metaphorical cases, our relevant uses and attributions.

0. The structure of the system,
1. the total system objectives and, more specifically, the performance measures of the whole system;
2. the system's environment: the fixed constraints
3. the resources of the system;
4. the components of the system, their activities, goals and measures of performance;
5. the management of the system.

The term *system* goes back via Classical Latin to Greek (although in limited use) and takes on an ever increasing load in the sixteenth and seventeenth centuries, with monuments such as Galilei's *Dialogo dei massimi sistemi* and the works of Copernicus, Tycho Brahe and Johannes Kepler (For Galilei, useful introduction in the Italian edition of Milan/Naples 1953, by Ferdinando Flora; later reprints; Stillman Drake, *Galileo at Work. His Scientific Biography*, has a number of important references on the subject). An especially valuable historical survey of systems ideas and related concepts is to be found in Antonio Clericuzio's *La macchina del mondo. Teorie e pratiche scientifiche dal Rinascimento a Newton*, 2005.

Von Weizsäcker (p. 336) has a pertinent comment to the relation between object and system, two terms for two notions that tend to conflate, especially in *Quantum Theory*:

The alternatives to an "object", in quantum theoretical terms, are its observable properties. Stating this, we follow the mode of arguing that is valid in all Physics, particularly so in the quantum theory, and which understands all the [relevant] statements as regarding alternatively an "object" or a "system". In today's Physics, the two words are almost identical.

Die Alternativen zu einem Objekt sind, quantentheoretisch gesprochen, seine Observablen. Wir folgen hier der in der ganzen Physik, insbesondere in der Quantentheorie üblichen Denkweise, welche alle ihre Aussagenkataloge als Aussagen über jeweils ein "Objekt" oder "System" auffaßt. Diese beiden Wörter sind in den heutigen Physik nahezu gleichbedeutend.

Philip Kitcher (pp. 218f.) assumes a corresponding attitude to the notion of *system*. He notes that

There are two main types of systematization. In the first, systematization by axiomatization, systematization is achieved by introducing new "axioms", new "definitions", and new "proofs" in order to derive the scattered statements of a field from a small number of "first s". (My use of quotes is intended to indicate that the statements or reasonings in question earn this status through the exhibition of the system of derivations). The second type of systematization, systematization by conceptualization, consists in modifying mathematical language so as to reveal the similarities among results previ-

ously viewed as diverse or to show the common character of certain methods of reasoning.

Parker (pp. 86 - 121) offers a good survey of the structures and functions of *systems*. He notes the difference between a *logical description* and a *physical description* of a system, the necessarily tentative approach of the Systems Analyst, and he lists and discussed the four main types of models: graphical, mathematical, narrative and physical. For historical studies the *graphical* ones will normally be the most useful. As an example, he refers to so-called *structure charts*, built, for example, around scientific, industrial or business organizations, accentuating the fact that what is *illustrated* there are *closed systems*, having no interaction with elements not contained in it, and *open systems* related to the external world; the latter type aptly defined by Max Planck: *dem System innewohnende Fähigkeit, äü ßere Wirkungen hervorzubringen*. But generally we need the open type; it doesn't do us much good to be told that the Universe is a closed system, or to be told by Wodehouse's Bertie Wooster, to *always think of everything*.

A third constructive description of systems is to be found in FitzGerald and FitzGerald, p. 5 (I add the past tense in brackets, since this is what we need in our context).

A system can be defined as a network of interrelated procedures that are joined together to perform an activity or to accomplish a specific objective. It is, in effect, all the ingredients that make up the whole. A procedure is a series of step-by-step instructions [reconstructions] that explain

- 1. What is to be done - [what was the purposeful actions?]*
- 2. Who will do it [who did it?]*
- 3. When will it be done [time and situation for doing it]*
- 4. How will it be done [Methods and processes].*

The procedures tell how the ingredients are made into the whole. Systems are often classified into the following categories. A closed system is one which automatically controls or modifies its own operation by responding to data generated by the system itself. An open system is one which does not provide for its own control or modification (an advise not to confound system with method, in Buchler, pp. 118f.).

To stay at the *pseudo*-level, we might say that the *open system* is the relevant candidate for adoption in our work. My use of *pseudo*- corresponds to the scientific use cited here: *close resemblance of a feature or element*.

There are *closed* systems and *open* ones, defined as follows by Parker, ppp. 92ff.: *A closed system is a system that is self-contained and does not exchange with kits environment... while an open system is one in which exchange with the environment are depicted.*

Regarding system environment, Parker notes that *Systems are normally defined by a boundary, which separates them from their environment. Anything within the boundary is part of the system; anything outside is part of the environment. What one includes in the system and what one includes in the environment depends on the particular problem being studied... if the problem being studied is how to make a particular computer program execute more efficiently on a given computer, people would probably be considered as part of the system's environment. Systems elements instead would include such purely technical things as the program itself, system software routines, the data used by the program, and hardware.. The description of a system and its environment is often not as simple suggested...*

Launching the network idea in this context, following the splendid book by Davis and Olson, I shall just suggest some principles and bypass specific applications (pp. 120ff.).

Network models vary very greatly and can be considered as functioning mainly in an *ad hoc* modality. The configurations of the network models generally are definite and clear, less so of course the realities they represent. Here is D&O's schema of a network structure (Fig. 4.6.2, their Figure 4-15).

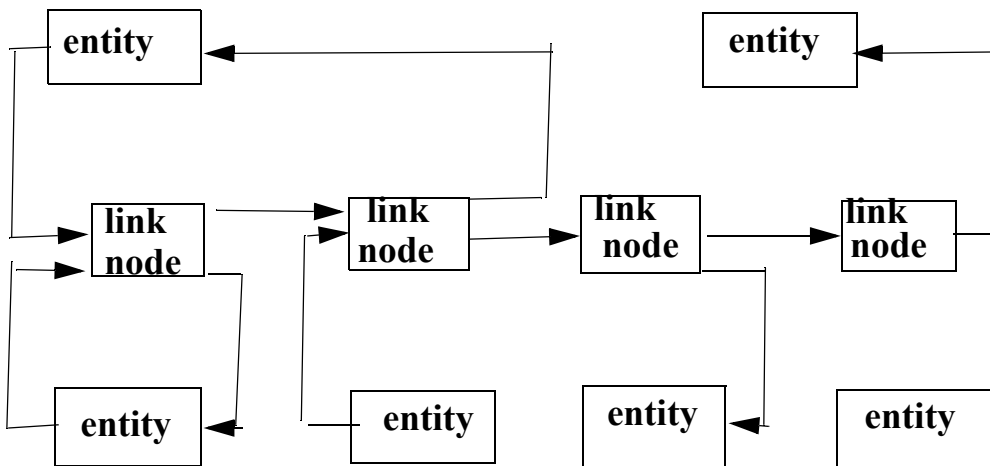


Fig. 4.6.2, *Network according to D&O, redesigned.*

The authors comment on their model as follows. *A network system allows a given entity to have any number of superiors as well as any number of subordinates. The relationships between entities must be represented. A common approach is multiple pointers, usually with a link node record representing the connection between the two entities. ... As opposed to the hierarchical structure, there is only one record for each student [the "entity" in the next figure in D&O] as well as for each course [in which the student participates]. Multiple pointers represent all the relationships between courses and students.*

Note that there are groups consisting of a circuit with feedbacks (on the left), and one isolated entity, probably included in the drawing to convey the obvious notion that there can be entities that are *not* directly connected with the system, while they can turn out to be important, at least potentially, and should be recorded.

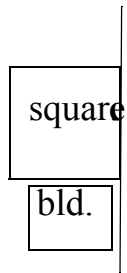
A striking and important characteristic of the model is that it is designed as a generally valid configuration but that it becomes an *ad hoc* one when repleted with specific or typical entities. Thus there can be one such model, with obvious graphical variations, for each of the following categories (as examples): type of people, of employees, of documents, of subdivisions in them, of city buildings, of administration levels and classes, etc.; alternatively, the categories can be specifically cultural: shared knowledge, interests, obligations and er , experiences, membership (socially, politically, in religion, etc.).

Connecting such entities in numbered versions of the model (Fig. 4.6.2), we could establish *Identity Networks*. Since in the present book the main subject is an urban statute, in which of course human categories are involved, such an assignment would be relevant. But the present book is not a sociological study (nor is the author's competence thus directed), so I shall leave these ideas as suggestions for further use of the ideas here suggested.

Having proposed some perspectives regarding graphical models, let us now consider some specific types of model application and their validity. The point of the cases now up for consideration, is that besides *content models* with terms and contents written into them, there are also the modality of *analog models*, often combined with the contents models, which can be used for the description of *structure*. Here is an example.

Pronouncing the word ellipse with no further qualification, I have covered, consciously or not, a whole range of them, from one, let us say, with a great distance between the two foci, prefiguring a slender "oval", preferring it to another one like Kepler's planetary ellipses, in which the foci sit so closely together that the shape approaches that of a circle. Newton when calculating the elliptical planetary orbits, did so on a pure circle, in which the two foci have melted into a single one; for he decided that the approximation to the correct ellipse was close enough.

If we now using a drawing instrument *design an ellipse*, then we have to *determine* the exact shape. We will have made this choice for some specific reason but out of a very high number of alternatives, amongst which only one fits the bill. We have been operating within a body of rules and formulas, which are being evoked by the designed figure.



Another case: we know that a certain building has a street and a square next to it. Until we *decide to draw* this situation, we need not think about the exact shape and the precise geometrical relations, being, perhaps, more interested in what is going on there. By even the simplest drawing, as on the appended figure, we involve ourselves in considera-

tions of alternatives, rules and processes, deciding among uncountable and uncounted alternatives. Using words, we would have to state this as a *comment*, we would have considered the *shape* but not the *form* (* 1.1) .

Through our systems there will flow two entities, mostly in parallel. *One is data*. I will reserve this term for digital contexts, number formalisms and states or events that are fixed in time and/or place with no elaboratory qualifications or appendages: *Don Carlos became Emperor in 1519; water friezes at zero centigrade at groundlevel atmospheric pressure*.

The next is *information*, which means *elaborated data*: with commenting or interpretative appendages, extensions, describable relations to other entities; occasionally to such a degree that the original data no longer can be clearly individualized.

Each specific model must be used *separately*, often *sequentially* by enclosure, one model integrated into another one. To display direct connections between different models is not only cumbersome; it can require us to represent such complex links that the utility is lost and, above all, the notional access to a survey is impaired. Usually, to conceptualize links between them, one has to take detours through complex verbal accounts, in the course of which something can be lost in terms of structure. So we have to use one main model all through, possibly with some sequence of subordinated ones on different levels using enclosure patterns.

In history and the Social Sciences, one has to *manipulate*, really or conceptually, with recorded factors, whose identity, position in systems and usefulness are rarely definite or clear.

Manipulation here means intervention into networks or some other configuration; changing weightages of nodes and arcs, erasing some of them, introducing novel ones, altering the mutual relations in the total picture. The very idea of networks is an *artificium*, but it does seem to provide the optimal model for recording and doing explicative, analytical and predictive work.

As noted the preceding *Section*, in *SL, Patterns*, I used a kind of pseudo-matrix with pseudo-vectors - directed lines marked out as *pvs* - for constructing a picture of the loosely conceived network of conceptions in which the main object, Borromini's Sant'Ivo spire, could be evaluated. A

pv-matrix provides a method for simplifying and rendering manageable complex networks (here I am appealing to Herbert Simon).

Leaving physical experimentation and social, political and economic interventions out of our purview, the operation just noted constitutes our explanation: *building up some picture*. Many scholars, from Cardinal Roberto Bellarmino, according to whom we always think in terms of imagery, over Heisenberg on Bohr's pictures being more real than Nature, to Arthur Miller, have studied the functions of visualization and pictures in argumentation. Thus Bellarmino (to good not to repeat): *Homo quidquid cognoscit sive sensu, sive intellectu, per imagines cognoscit*.

So they did also for the schools in Medieval Europe (SL, *Iconography and Ritual*); and so do recent works on social networks (by Borgatti and others).

The analyst can encounter problems deciding *what to include or leave out of the system element description*; there can be a conflict between the desire for "completeness" and simplicity and ease of understanding. So far Parker.

Following up on this we could say that there is no system in non-quantifiable nature or society that is either the one or the other by its own constitution. *The determination is ours*. The *Category Provider*, Fig. 3.2.4, shows a closed system, but so it is merely because I have cut off all the surrounding factors in the complex picture of Roman society in the given period. Had I thought it functionally closed as illustrating a system, I wouldn't have been able to use it.

The main motivations for *closing a system* are, at least, the following three, overlapping each other:

1. to make the picture surveyable and understandable, avoiding collateral factors not needed for theoretical or methodology-oriented work;
2. to use the picture for the logistics of mental and intellectual analysis by highlighting the allegedly essential features, especially those that can be developed further;
3. in common with most of our *graphical models*, to achieve a simplified picture, leaving us leeway for further moves (as noted by Parker, pp. 88f., and by Herbert Simon: leave out *the cluttering details* of reality). How far out in a system should we go? In 1.3§6, the question was raised. But there cannot be any definite guideline for this. Generally, we can say that *analytically* a system is *open*; *operationally* it is *closed*.

So long as we have to do with pure data (whatever they may mean) and formally quantifiable subjects, the usual subdivision between *closed* systems and *open* ones seems clear enough. Beyond this point, things are less clear and definite. As soon as the status of the *boundaries* is subjected

to being blurred by the human factor, things look different. Even numbers can have an extra-formal effect. After 1205, when Fibonacci, son of a Pisan business man called Bonacci, had introduced Arabic numbers and the value *zero* (0), the Church reacted with animosity to operations in the new idiom, which included a work of the Devil, the *zero*. We know from experience that our attitudes and inclinations can make us evaluate any system boundary in subjective or provisional terms.

The outcome is that we need a *third element* in the group *open/closed* for systems, one that indicates a boundary *including* some features from the environment as perceived by ourselves or our historical protagonists. Thus we have to work with systems that are *open*, *closed* and *enclosed*. Fig. 4.6.3 illustrates the two alternatives for closure.

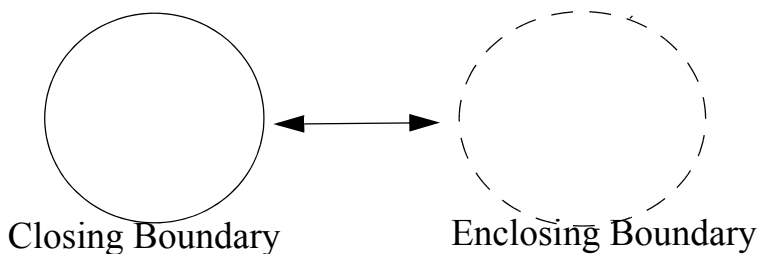


Fig. 4.6.3, *Boundaries*

This classification will usually be valid for systems argumentation regarding soft matters such as historical ones.

That should mean that,

whenever a graphical model is considered in our context as having not only framing outlines devoted to marking them off, but as also having boundaries defining their *Inside* and the *Outside*, then the *enclosed system* will be what we have before us.

Forcing us to decide on the *locations in a system* is probably the most generative advantage of *graphical models*. Being operated on three levels, key term, strings of statements and system positions, the models offer advantages that words can do only by being involved in complicated and arguments that can elude simplified survey.

To this capacity come still two syntactical features: a distinction among *categories* and *levels* among them. In *verbal* idiom these features arise conceptually only if we say it is so; carrying with it the usual spray of possible interpretations within some given framework. A graphical, math or symbolic *model* will *show* it, leaving more processing space to the observer, *but at the same time* not forcing the interlocutor to browse around for meanings. She or he can take it as a symbol with some specific value and then go on with whatever is on the agenda.

Reflecting scientific models may disregard the mathematical-logical elements and, of course, renounce running the model on digital machines. One considers them, then *inverts the sign*, from *running* to *not running*.

Nevertheless, the reflecting can be accepted under a somewhat toned-down program following Herbert Simon's ideas of *satisficing* (see his *The Sciences of the Artificial*) and *Bounded Rationality* (his *Reason in Human Affairs*). We do like that anyhow, whenever we reason about some ever so vague case or story. For we always more or less wittingly use reflected configurations from exact sciences, claiming that so-or-so is evident, logical or true. Even people untouched by math or formal logic and declaring themselves uninterested in both, unwittingly will reason with reflected images from either of those paradigmas.

So much for systemic structure and properties, now to application

Systems Analysis (SA) is mainly concerned with *projects and implementation of them* and means that a proposed and designed (verbally or graphically or both) project is being analysed for the probable functioning of the parts and the whole once the project has been realized (Davis and Olson, p. 291). That does not apply to historical studies, concerned as they are about things already occurred and beyond recovery.

Planning models can, however, be *reversed* and applied to history, and vice versa. When we reconstruct in our terms a historical process, we also act as planners. This should relate to Hebert Simon's idea of prediction facing backwards.

More to the point, then, is imitating *systems engineering*, that is adopting and adapting a *system that can be reflected into non-quantifiable historical studies*, for the simple reason that here there is not necessarily a question of creating systems and elaborating them, but of *creating a mental object while respecting, in fact, taking advantage of, the systems idea*. Dieter, pp.96f., makes the point, and I shall quote his description.

Most engineering products are designed to function as part of a system. For example, an automobile must fit into the road network and traffic control system of the nation, as well as conforming to the local system in terms of speed, safety, and fuel economy. The automobile itself is a system comprising many components. These components were designed by many people, working mostly independently, yet the parts must operate interactively to produce a functioning system. As engineering systems grow larger and more complex, it becomes necessary to develop a methodology to deal with this design complexity. Then, finally, we have an abstract picture of s system.

Regarding some *verbal models* discussed in *Section 3.3, Artificial Reality*, I note as follows: There is no documentation for a model *evoking a systemic configuration* since this must be of the editor's contrivance. Systems, of course, are never *there*; we have to *create* them.

Paul Feyerabend, in his important book, *Wider den Methodenzwang*, provides penetrating observations on systemic reasoning, in his *Section 2* (pp. 33 - 38, in the Suhrkamp Taschenbuch edition). In his Table of Contents, Feyerabend epitomizes as follows Chapter 2 in the book.

Zum Beispiel kan man Hypothesen verwenden, die gut bestätigten Theorien und/oder experimentelle Ergebnissen widersprechen. Man kann die Wissenschaften fördern, indem man kontrainduktiv vorgeht (hypothesises that contradict well established theories and/or experimentally verified data. We can develop the Sciences by working contrainductively). This idea is the red thread running throughout the book, an abbreviated version in English of which is pointedly called *Anything Goes*. Of course Feyerabend refers to the *Quantum* experience and to Max Planck, Niels Bohr and Werner Heisenberg.

To conclude this overview, I want to say that I evaluate a system not for what it is or might be worth in itself but for its *usefulness in distributing and connecting whatever in models that can take us further; which means internal cohesion ensured by distributive and interactive properties, real ones or metaphorical*.

Boden's criticism of one of the major contributions: Johnson-Laird's *Mental models*: according to her, he claims that the structure of mental models corresponds directly to the structure of the state of affairs they represent. A psychology of mental models which satisfy this criterion would be a theory not only of the mind, but of the world (and all possible worlds) too. For to be able to identify the structure of the state of affairs in general, one would need answers to the fundamental questions of philosophical semantics, ontology, and metaphysics. If Johnson-Laird's typology of mental models (described briefly below [= p. 185 in Boden]) is both sketchy and controversial, this is due not least to the difficulty of these highly abstract questions (Boden, *Computer models of mind*, p. 183).

Models are simplified minisystems devised to reduce larger ones to a format that is surveyable and tractable. Therefore it would not make sense to try to develop any general theory for them. They are, as a concept, general themselves and can be shaped in any form and used for anything. The special name *Model theory*, on the other hand, is reserved for current "objectivist" and formal-logical applications (Lakoff, *Women, fire, Index: Model theory*).

A critical distinction between image theory models and sociological or social-anthropological models is that, while the latter address bi- or multilateral interchange (are "interactive", to use a current buzzword), thst is

system-related, the former address merely unilateral attribution (walls do not talk, we know). Image theory models consider only the parameters assigned or imposed by society or parts of society upon the perception and conceptualization of things like images and people: an interaction between two distinct sides across some ill-defined space. This limitation is inherent in models dealing separately with visual media like images and things. The present contribution makes an attempt to break through this barrier by studying the media as features interacting with other features inside total processes and situations, rather than using the processes and situations as a reference base and a background.

The stepwise procedure or modelling along a path inwards shell by shell, is familiar to *Systems Engineering*, a field from which there is much to be learnt. Let me quote from Walter R. Beam's book, *Systems Engineering*, Chapter 4, *Design of Systems*, pp. 93ff.

In evolving complex systems..., a combination of scale models, mathematical analysis, and computer modelling of system functioning, plus limited experimentation [for us, thought experimentation] may be used to demonstrate feasibility of systems function... But a second step is usually required. Prototypes are seldom complete in all details... The engineering design [here: our working model]... must deal with many additional systems aspects...

When a specific option is preferred, however, then one must stick to it to the bitter end, for example when selecting specific configurations in it, such as *transportation*, for closer consideration.

Two typical and basic aspects of using model ideas will be briefly referred to in this *Section: Models as used in Management Information Systems (MIS)*, and their relation to *Model Theory*.

I shall start with the *MIS*.

Management and operation of an enterprise function (*MIS*): with digital models is a subject treated carefully in Davis and Olson, p. 222 and pp. 398ff.). *Decision Support Systems (DSS)*, pp. 389ff. Linear programming, etc. *Model Generators (MG)*, pp. 290ff. A MG should have the following capabilities.

1. *Usability*. The model generator should create models which are easy and convenient for non-technical people to use. It should also be easy and convenient to build and modify a model.
2. *Data*. The model generator should provide access to a wide variety of internal and external data sources.
3. *Analysis*. The model generator should have analysis capacity to support a wide variety of users, problems, and contents (from Ellen Benoit, "Financial Modelers Add Might to Minis", *Business Computer Systems*, October 1983, pp. 107-22).

***Model Base Management* (p. 392)**

Conceptually, an information system should contain a Model Base Management System (MBMS) that manages models and analysis programs in much the same way that the database management system manages data. Besides providing access to a variety of models for flexible use, the MBMS should contain the following:

1. The ability to catalog and maintain a wide range of models
2. the ability to interrelate these models and link them to the database
3. the ability to integrate models "building blocks"
4. the ability to manage the model base with functions analogous to database management.

The *theoretical program* behind the models, speaking now of the *Proto versions* of the PROC and ORG models (Figs. 1.1.13 and 1.1.14). Both models represent sections of a *management information system* (*Davis and Olson, who would probably smile at my usurpation of a tech term).

Basically, a MIS is interpreted as functioning and working (respective to relevance and coverage) like the one described by D&O (p. 6), with the important difference that in the present non-digital context everything is done manually and mentally.

With a view to handling history in some systems view, we shall need a model that can accommodate three main groups of information and hypotheses, that is, a graphical model. Such a picture should provide the following data:

1. A record of the relevant conditions and situation preceding the *case structure* (my name for the conditions, states, laws/rules, and circumstances at the time in focus). In other words, an *Input*.
2. A record of the features, factors, parameters *and* their interrelations and/or interactions following upon the Input,
3. A formulation of summary or synopsis of the items in 2. that are considered important (an *Output*).

This program implies two theses.

First, at most points, the analyst's personal setup rules the game; an ever so objective-looking model will remain subjective.

Secondly, not only points 1 and 2, but also 3 must be direct products of *verbal statements and propositions*. This of course is obvious; machines that cannot be run digitally depend on verbal fueling.

If instead of being run digitally, *models* in this context are used as ideas to be elaborated, then note that we are to do with historical material, not production *processes*: retrospection rather than projection, *hindsight rather than forecasting*. Next, however, what we will do, is *transferring the past into the present*.

4.7 *Form and Shape*

In their *The Mathematical Description of Shape and Form*, Lord and Wilson (1984) can tell us (in their chapter 8, on *Shape Grammars*, pp. 136ff.) that *Shape description is frequently encountered in the form of a set of instructions for the production of a shape... A set of shape rules together with a given starting shape constitutes a shape grammar.*

Lord and Wilson present and elaborate the important distinction announced in the title (pp. 7f). Summing-up, they write: *In common speech, the words form and shape are not clearly distinguished. We have found it expedient in this work to increase the precision of these terms in the following way. We have chosen the word shape to indicate those aspects of geometrical form which have to do with the external aspect that an object presents to the world. The word form has been reserved to indicate that some aspects of internal structure is also under consideration. For example, we shall call the morphology of a physical field the form of the field, whereas the geometrical properties of the external surface of an object constitute its shape* (further in their book, pp. 136ff. and 157ff.).

In the present connection, *graphical models* can be analyzed using a comparable distinction, reflecting the geometrical shape, which can be made to contain variable material, and the adaptation of the model for specific application, noting that the form to some extent can be influenced, even determined by, the content to be loaded into the model. How to bring out a corresponding distinction in verbal prose?

Chillida's sculpture an, illustrated here (Fig. 4.7.1, below here), consists of irregular blocks more or less of cubic shape. Looking at it will - probably for most among us - produce ideas about their derivation from a regular cube, as well as the ideal "kernel" for all the blocks in the shape of perfect cubes. The 3D model evokes - perhaps unreflected - *theories* in us. Returning to the terminology developed by Lord and Wilson, we may say that the internal idea of *form* amounts to the *cube*, x^3 , while what we behold is a complex of variously dimensioned shapes derived from it, the *shape*.



Fig.4.7.1 *Eduardo Chillida, Sculpture (Coll. Maeght, St.-Paul-de-Vence). I republish this in memory of my son-in-law, Tore Waaktaar, who, with his wife Charlotte, took us to Vence in 2009. Phot. Liv Sinding-Larsen.*

It is tempting to suggest that the distinction reflects deeper-level concepts of philosophical hue. I am thinking of Immanuel Kant's dis-

inction between *Sinnenwelt* and *Verstandswelt* (Manfred Geier, pp. 131 - 148), reflecting indirectly Descartes' distinction between body and soul/spirit - an idea of his that is criticized by the neurophysiologist Antonio R. Damasio in his book, *Descartes' Error*, in which he argues that the two spheres arise in union and that this is a notion that Descartes did not understand. But I do wonder if part of the "error" is that, in Descartes' days, the spiritual constitution in humans meant something different from what it tends to do today. I am not convinced by direct comparisons in such a complex context. We have to take Descartes' Catholic upbringing and tradition into account. And I have argued (in another publication) that his *Cogito* idea is an expression of a plain normal Catholic tradition.

Speaking in terms of reflection of presumable real states, we can say that developing a *graphical model follows a similar course*, when taking into consideration how the cited authors specify: *A 'shape' in this context is any set of marks in a Euclidean plane, that can be represented as a drawing on a sheet of paper. The specification of a shape includes the specification of its position and orientation;* fine, as long as with *position* we mean relations subsisting between the parts of the model, not, however, relative to the neutral environment in which it is necessarily designed.

4.8 Vectorial Qualities - Tendencies

Turning now to the *directional factors* often vested in our application of graphical models. *Approximation* being accepted as a fundamental tool in modern Science (starting (?) with Bertrand Russell) and so also the idea of *artificia*, let me develop the subject. In Heisenberg's involvement with the *Quantum* issues, dynamic - *dynamis* - was crucial.

Following Rosch's idea of *categorization* as a sorting out of the most characteristic or important items (*see* SL, *Burden*, on this site), we should focus on what in German would be called *typisch*, and what Heisenberg described with the term *dunamis*. Speaking of the focus of our assignment, we are working with values or concept that emerge as pseudo-vectorial (pseudo because of non-definite lengths) starting out from some kernel or as a bunch of arrows driven towards a cluster of subjects (Fig. 4.8.1). Applying such models, which appears as the only option, we are working out a true *artificium*: take it or leave it.

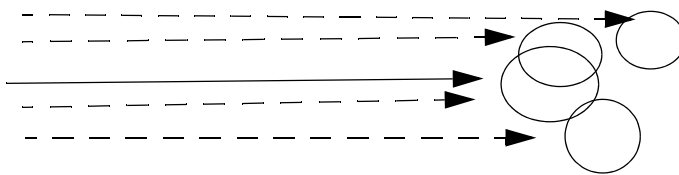


Fig.4.8.1, *One main and four collateral vectors pointing at a cluster of Venn diagrams: cluster-and-bundle model*

Using the idea of *vectors* allows us to work with *directions*, not merely numbers, as in the case of *scalars*. This term is derived from Latin for a ladder or some similar construction, with a sequence of rungs that can be numbered and thus stand for the number line: 1,2,3...*n*. But the units here are discreet, and not directed (cf. the difference between speed and velocity).

The term *vector*, on the other hand, even that one Latin, has the following significance. *Vector* in Classical Latin derives from the verb *vehi*, and means to *bear, carry, convey*. and means *one that bears, carries, conveys anything* (a related verbal form is *vecto*) somewhere. So etymologically a vector is a *directed* entity. Mathematically, it also has *length*. A *vector quaantity*: any quantity that has both a magnitude and a direction, and, along with the kind just cited, also. *the direction or course followed by an airplane, missile, or the like* (Webster). As long as the operator is not used in calculations, we are justified in applying terminologically the *direction*, leaving the length (quantity) undefined, while it serves in the picture of a matrix.

In SL, *Patterns* and here, I have used the term *pseudo-vectors*, to indicate directed terms without defined length or quantity.

Following Seymour Lipschutz' textbook, *Discreet Mathematics* (I have only an Italian version), I can summarize the image of vectors and matrices as follows. *The data are often arranged in arrays or in collections whose elements are denoted by one or several indices. Formally, such a collection in one dimension is called a vector and one in two dimensions a matrix. A vector can be considered as a special case of a matrix.*

$$\begin{bmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{bmatrix}$$

Fig.4.8.2 A regular matrix

A brief reference to the basis for the idea of metaphorical matrices (a *picture_matrix*) may be worthwhile (Fig. 4.8.2). A *matrix*, in mathematics and so also in physics, sometimes called a register (Heisenberg), is a rectangular array of real or complex numbers arranged in m numbered horizontal rows and n lettered vertical columns deriving from systems of equations and being subjected to particular operations such as addition and multiplication. An extremely simplified matrix is shown here. In many cases single rows or columns function as *vectors*, directed quantities and are thus named. a_2 - b_2 - c_2 might be one. Particular values are allocated to the so-called main diagonal, a_1 - b_2 - c_3 , which illustrates the fact that a matrix is regarded as a structural unit of interrelated elements, not just a set of separate rows and columns.

Further on the vectorial dimensions in Part IV, Supplementary, #1.

Back to Fig.4.8.1, *One main and four collateral vectors pointing at a cluster of Venn diagrams: cluster-and-bundle model*

The *arrows-vector model* expressing a probability (non-formal) picture was launched in my lecture at the *Strasbourg Conference* in 1988 (with a different subject; my idea endorsed by the late *Richard Trexler*, whom I gratefully remember also for an illuminating correspondence with him), published in 1991; and I use it again in SL, *Patterns, Preface*, speaking of *attention arrows*. Today, however, I want to emphasize that my *application* of the arrows is concerned with *possibility* rather than *probability*.

It is important indeed to note that most of the subjects that these tools are intended to handle, are *not well-defined with clear boundaries*. Normally, they will emerge as zones with fuzzy delimitations, such that in most cases the closest we can come to some central or critical part of it, is by *approximation*. The pseudo-vectorial arrows take care of that by pointing out *direction* upon a cluster, not a defined target. It may be a consolation to hear that nor are *science terminologies* always to be taken at face value. Von *Weizsäcker (pp. 223f.) submits an articulate comment on the *Uneindeutigkeiten* - equivocality - in science literature. The amount of scientific

ic significances is so much greater than the amount of signs in use, that a sign necessarily will stand for very many different terms (*Die Menge der in der Wissenschaft auftretenden Begriffe ist so viel größer als die Menge der benützten (und dem Gedächtnis zumutbaren) Zeichen, daß ein Zeichen notwendigerweise sehr viele verschiedene Begriffe ausdrücken muß*).

In my rendering of the vectorial paradigmas, the idea is that direction is focused on a cluster of possible aims, not one precisely. So the idea of *approximation* works here, too. This very common modality in daily occurrences (*Jaritz) is something different from a comparable model we can call into attention here, the Islamic *qibla* (from *qabala*, to advance, move towards...). Here the distinction is clear. You pray to Allah, who is everywhere (*huwa maujûd fi kulli makân*), but doing so, your physical, and normally also your mental attention is directed upon the city of Mecca, which is the *qibla*. Social anthropology and other programs can tell us that, in real life, our focusing is not precisely directed upon some preconceived target. Most often, the process is fanning out on branches of targets, among which there will however be close affinities.

At this point, I can refer to a kind of *pseudo-matrix* that I used in SL, *Patterns* (4.5 and 4.6). This procedure will now be repeated.

Quoting from SL, *Patterns* with modifications: What I need, is a *picture of an energy-laden grid from which emanate directed tendencies (pictured like vectors) illustrating so many probabilities of visual and conceptual attention and attribution or clusters of them*. Using for this the relatively modest name of *picture_matrix*, should exonerate me from being blamed for misusing mathematics; shorthand *p_matrix*; with its *p_vectors*, abbreviated as *pvs*. A list of *p_vectors* indicated with *pv* follows in the cited contribution. I shall bypass it here.

Arising from the fact, that the *p_matrix* model is being used for expressing *probabilities (no longer, now possibilities)*, the vectors represented figuratively *in parallel* will indicate concepts and notions or chains of them. These strings can combine into new ones, making up, as I said, interlocking *grids* or *networks*. Possible combinations here are products of cognitive,

4.9 Operativity

The notion of *operativity* really is too widely applicable to be of much use. But I do need some considerations on the *active handling of the models* proposed in the present book, and I shall limit the vocabulary range to this. But some references beyond my limited range can come in support.

Operativity is defined by Webster (*see below*) as the doctrine that the meaning of a scientific term, concept, or proposition consists of the operation or operations performed in defining or demonstrating it (Hintikka de-

livers careful comments on the issue; pp. 69 f., 75-77). I would bypass definition and say that we can demonstrate and lodge objects somewhere *approximate*, not strictly defined. The crux of analytical efforts is that we do not ask what things are in terms of developed defintory procedures and predictable nature; but where we move and lodge them, in an act of *operational determination* (SL, *Operational Determination*). Now the operation or operations performed in defining or demonstrating celebrated by Webster is itself a statement, even if incomplete, of theory. This lesson is given us also by the teachings of *Quantum Theory*.

A *model* as an operator in argumentation reflects its application in science, such as Physics (see 2.5, *Uncertainty a Resource*). Speaking of the *theoretical* factor in a related connection, Alonso and Finn, in their *Physics* (p. 4), note that *by theoretical we mean that the phycisist proposes a model of the physical situation under study. Using relations previously established, logical and deductive reasoning is applied to the model. Ordinarily the scientist works out this reasoning by means of mathematical techniques... The theoretician then revises and modifies the model so that it will agree with the new information-... physics, like most sciences, is a dynamic subject where nothing is taken for granted or is a dogma.*

We should entertain no illusion that metaphorical references to Physics make our models and methods more relieable; only that they can better help us to frame our questions and queries in wider scope and, let us hope, with higher precision.

Allocation into some version of a distributional chart or graph is important in computer technology. In his chapter on *Models for resource allocation* (pp. 290ff.), Krakowiak defines *resource* as *any object which may be used by a process. All resources are therefore associated with access procedures, allowing them to be used, and with a set of rules for their use...; and a resource is said to be allocated to a proces if the process can use the resource, by means of access procedures.*

The point here is that the document can be scanned *on the model*, which means applying our theory to it.

The approach adopted in this book is an *operational* one, an idea originally associated with the name of the US physicist P. W. Bridgman and discussed at some length in Bruno and Giorello's introduction (*Scienza senza illusioni*) in De Finetti, pp. 52ff. Let me convey the essentials as they arise in the two first ones of the cited publications, starting with *Webster* and the *Stanford Encyplopedia of Philosophy*.

First *Webster*: the view that the concepts or terms used in nonanalytic scientific statements must be definable in terms of identifiable and repeatable operations. *Stanford*:

The *Operationalist* approach was developed by the US physicist P. W. Bridgman and published in 1927. Bypassing the explanation regarding Physics, let the simpler one on Mathematics serve to illustrate the idea (pp. 273f.). Operationalism is based on the intuition that we do not know the meaning of a concept unless we have a method of measurement for it. It is commonly considered a theory of meaning which states that "we mean by any concept nothing more than a set of operations; the concept is synonymous with the corresponding set of operations" (Bridgman). The *Handlexikon* gives detailed descriptions under the headings of *Physik*, *Mathematik* and the *Sozialwissenschaften*, by Jürgen Klüver (pp. 236ff.).

In an interdisciplinary - or, as I prefer to name it: *open_source* - perspective, *Bruno and Giorello's* description (pp. 53ff.) seems to serve more directly as a basis from which I can, tentatively, develop the theme.

Commenting on a quotation from De Finetti, B.&G note as follows: *Il ricorso a definizioni in termini non di "proprietà", bensì di "operazioni effettive" non offre, però, soltanto un test chiave per risolvere la contesa sulla probabilità a favore della concezione soggettiva. Diversamente che per Bridgman, l'operazionismo per de Finetti non mette al sicuro la scienza da possibili crisi. Piuttosto, la cala all'interno di una "costruzione" probabilistica del mondo: [quoting DF: L'analisi logica che ritengo più utile è quella che sviscera un concetto approfondendo l'esame di come e perché ci può essere sembrato utile inventarlo, l'esame delle ipotesi da cui dipende e delle possibilità di smentita...end quote, supplying the next one: Si vede che tutto è costruito su sabbie mobili, benché naturalmente si cerchi di poggiare i pilastri sui punti relativamente meno pericolosi]. B&G go on:*

Per il buon pragmatista tale distinzione è tutt'altro che banale: dà consistenza epistemologica all'assunzione di responsabilità nella pratica, in quanto è espressione della possibilità del cambiamento, e dunque della libertà.

They conclude with quoting Pirandello's famous statement beginning with the words, *Dobbiamo inventare il mondo per inquadrarvi le nostre sensazioni, ma non dovremo mai considerarlo come uno schema rigido e fisso...*

Rather than translating the quoted passages, I shall propose a summary of the principal points, as I have understood them (inviting the Reader to evaluate them, since they are important).

We shall be using definitions of serviceable actions (in the present context called "*operations*" in order to keep the contact with the original idea) rather than such as indicate *properties*. De Finetti's concept, differently from that of Bridgman, does not pretend to offer security against misfiring. Instead it is understood to be operating inside a *probabilistic theory* of the world (probability calculus was one of De Finetti's specialities).

Thus there is no *the Science*, only actions or handling classified as Scientific (or Humanistic, or belonging to the Social-Sciences).

Starting from a case, we have *no rules* except, possibly, some academic traditions cherished by our ambience or another one to tell us how far out we should go. Ulrich Middeldorf taught me this and insisted on the distinction between *method* and *methodology*. The available data and info are arbitrarily known; all our history-writing is condemned to being piecemeal. The decision is ours, one as good as the next in terms of completeness. For this very reason, we can hold that *work on theory and methodology is the only definite option we have*, in case we should feel we need a potentially reliable platform. At school, we learnt we should need that; but do we?

Thus, the crucial idea for the entire present project is that the only reality (above trivial levels) to which we have access, is our own conceptions as we understand them and occasionally write them down in hopes that we can contribute to keeping things moving on.

The second idea is that, to the extent that we are encountering what can be taken as objective or factual reality, we have to accept as fundamental a degree of *indeterminacy*, reflecting this notion as it arises in modern Physics (*2.5, *Indeterminacy a Resource*).

Starting out from these clauses, I feel encouraged to go ahead with a program I shall refer to as *operativity* - no linguistic beauty, but I cannot see I have any option since the term I would prefer, *operationalism*, is occupied already, in the great but more or less forgotten tradition from P. W. Bridgman, a US physicist (twenty-seven pages of informations in the *Stanford Encyclopedia of Philosophy*, an excellent info source freely available on the *Internet*). Quite simply and introductorily, I will let the term *operativity* stand for ways and means for *making ideas, models and data work*. Surely, this definition does not say much, it is the implementation of it that can tell us something. So let me go ahead. *Function* seems to be a related concept.

Sowa (p. 374) notes the terminological options, which can occasionally cause confusion: *Since a function is a rule for mapping one set into another, the term mapping is sometimes used as a synonym for function. Another synonym for function is the term operator* (the latter terms and its derivatives play a role in symbolic logics: *Copi, index).

Most writers have experienced how issues regarding the disposition and distribution of subjects to handle can provoke or alert one to problems which can be more striking and evident in one setting than in another in the same project. But I can never be sure that I should not have gone further with it. Setting limits is always an hazardous venture.

For the processing of the operativity idea, I shall have recourse to Ronald Giere, who explains the distinction and illustrates it as follows (p. 74):

In the case of mechanics a correspondence rule might say, for example, that x stands for the position of a particle [in atomic theory]. In one of its more empiricist renditions this account treats correspondence rules as operational definitions. Thus, x might be operationally defined as "position measured with a yardstick".

A colleague of mine at the University of Oslo in the 1950s once remarked, speaking to Gisela Richter, that she took some time over her new book on document-less Greek archaic sculpture. Yes, she answered, for this is going to be *a definitive book*. Our parents' generation tended to think in such terms. We are happier, since we can only hope that what we do can be a link in an unending process. My mother always told me that this or that was *scientifically proved*. I should thank her for having provoked my scepticism about such absolutist claims.

Decisions on how to go about something can have an important impact on theory. Most writers have experienced how issues regarding the disposition and distribution of subjects to handle can provoke or alert one to problems which can be more striking and evident in one setting than in another in the same project. But I can never be sure that I should not have gone further with it. Setting limits is always an hazardous venture.

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The bearing of what I am going to propose regarding the study of history is being promoted in a number of publications from which I can draw for developing the subject.

Fernando García de Cortázar, in his book, *Leer España, L historia literaria de nuestro país*, Barcelona 2010, starts his literary survey of Spanish history with a quotation from a work by Isaiah Berlin on Turgenev's *Fathers and Sons*. The interior life, the ideas and the moral situation of people are important factors in explaining history. And De Cortázar continues: ... *good literature is a way both extraordinary and attractive to grasping any epoch, a way parallel, and often convergent, with positive history (la historia a secas)*. In his Chapter 1, he collects short texts from Herodot, Polybius and Gustave Flaubert (his *Salambó*). This is a consistent decision. We understand what we read in our terms, Flaubert in his. That he wrapped up his understanding in fictional conversations, this is a question of medium not of essence.

4.10 *Consistency*

The issue of *operativity* closely brings in its wake the one of *consistency*. For the machine to work, functional interaction between the parts is necessary.

The graphical model, by claiming *significant distribution* of items, does not let me off easily: I *have* to come up with something that seems to function adequately. Trying to do so, I perform a *creative act*, and it is the model that makes me do it. Summing-up, we can say that the force of the graphical models is that they combine categorization with space structure (this was a note on principles, not an appraisal of my models).

Working with soft evidence, it seems legitimate to stay as close as possible to the parameters valid for the hard alternative. Here, consistency is a crucial factor.

Consistency of a system means that there is at least one related item that does not form part of the system. A system is said to be "*inconsistent*" if two formulas - one of which is the denial or contradictory of the other - can both be proved as theorems within it. A system is "*consistent*" if it contains no formula such that both the formula and its negation are provable as theorems within it... [because] a contradiction logically entails any proposition whatever. Hence a derivative definition or criterion for consistency can be formulated as follows. Any system is consistent if it contains (that is, can express) a formula that is not provable as a theorem within the system (I. Copi, *Symbolic Logic*, p. 164).

Scientific progress can mean to discover and develop new insights *and* to discover inconsistencies in a work. There are, however, *consistency levels*, and one can almost always discover or invent one on which the work in action does not seem satisfactory; a feedback information on the chosen approach or methodology.

The number of levels depends on a vast number - besides the logical ones - of parameters in cultural and other fields, so that there is a great future for our search for inconsistencies.

Writing about such subjects is superfluous unless the product is meant to be exposed to criticism. A critical point in my experiment is to use paradigms from the hard sciences in terms of images on softer material. This connection is what I most desire to see examined and criticized.

The present work is a *roadmap*. This is intended to be understood in the following terms. Benefiting from the advantages of being not on paper but floating in the Internet (*below), every step can be exposed clearly, free of publisher worries about elegance; every *Section* and *Subsection* representing a tool for evaluating and handling statements, arguments, documentation and, as I hope, criticism.

I will exclude from my purview philosophical issues regarding determination and identification of reality: *what is this?* This question is meaningless in terms of what we today seem to know about our world, at least as long as we accept the teachings from *Quantum* theory. Even though it is customary to say we don't understand it (Feynman did so), the related mechanics works perfectly when applied in experiments and in production. Industries use Schrödingers equations all the time.

I might ask what is A and what is B? - provided they are somehow related. Instead, I can take an operational view of both and use my passage, mental, verbal or mathematical, from the one to other as the basic unit; an *operation enacted on the passage from one to the other* more or less vaguely conceived entities.

In the perspective of theoretical construing, which is the only reliable tool we have, we are allowed to do this. Here I am appealing again (as in my previous works and in the preceding *Section*) to *operationalism*. Let me supply a summary of a report by Manfred Geier, in his *Kant's Welt*, p. 173, who offers an excellent synopsis of a modern commonplace: an object in our focus adapts itself to our mode of perception; our experience being employed to understanding the objects, depending on our terms of thinking. Our understanding does not adapt itself to the object, for this must adapt itself to our understanding (*Als Objekt der Sinne richtet sich der Gegenstand nach der Beschaffenheit unseres Anschauungsvermögen; die Erfahrung, durch die die Gegenstände erkannt werden, hängt von den Begriffen ab, durch die wir sie vorstellungsmäßig bestimmen; die Erkenntnis richtet sich nicht nach den Gegenständen, sondern die Gegenstände müssen sich nach unserer Erkenntnis richten*).

Awareness of the fluctuating relations between factual observation and human cognition has a long story which can be highlighted with a couple of examples; and by consulting works like Ronald Giere's *Explaining Science*.

From Leibniz' life we learn that the invention of the Calculus influenced human thinking and philosophy (Antognazza, 241ff., regarding Leibniz' ruminations on the relations between objects and concepts of them). A next wave of impact from the hard sciences came with *quantum theory*.

The picture of fluids and fluctuating conditions in *Chaos*, a natural phenomenon (and also the title of an illuminating book by James Gleick), in its turn had a an impact on the hard sciences. Under such conditions the understanding and application of *models from the sciences* become critical (Gleick, pp. 278f. and 60ff.).

4.11 *Understanding and Explanation*

Understanding is a vague and tricky notion, to say nothing about our trying to put it into practice.

Considering, with Gerhard Radnitzky, *understanding and explanation as an upshot from systemization*, I claim that bringing some order in something is sufficient for an assignment, provided the rules for such an order reflect a version of surveyable systems patterns, cohesion and clarity, and that the system is well enough built-up and is flexible, sufficiently to survive internal changes or modifications (SL, *Burden*). I would rather amend the cited statement and say that *systemization is explanation, including causality*.

Adopting the idea differently stated by Putnam and Rosch (SL, *Burden*, index) that a definition to be useful should be no more than an approximation and a frame for the item on hand, I will "define" *understanding* in the following terms.

An ability to place into some system specific interrelated items that are related to some larger network, provided that the system through this operation conserves its semantic and pragmatival (not necessarily formally logical) consistency.

There is no patent recipe for the confirmation of *validity* here: the critical conditions being that the argumentation seems to work, that it to an acceptable degree can stand up against or make use of criticism, and can serve as a platform for further inquiry: an observable process; more precisely, perhaps: that the effort is dynamical and focused. Here one might vulgarize Kurt Gödel's theorem (1931) about the un-solvability of consistent arithmetic systems by appealing to elements within the system itself (non-technical in E. Nagel and J. R. Newman, *Gödel's proof*, and rigorous in S. G. Shanker, ed., *Gödel's theorem in focus*); and say that you cannot evaluate a system from its interior.

No, but you can wrap it up in another one and shift your attention to that. In this operation, graphical models can be good tools.

&7 In earlier writings, I have argued for *bridging* between what is *observational* and what is *theoretical*, citing some literature on the subject. Today I am not so sure that *bridging* is an adequate picture, since a bridge needs two firm bridgeheads, not one firm and the other extremely unstable. I would rather say that our verbal indistinctness (not approximate, since this presupposes something firm to be approached) needs to be supported by notions *reflecting determinate, or stable, qualities*, such as math and logic.

In Philosophy, the level distinctions adopted here, are not always accepted or respected.

Please, allow me to start by quoting myself, with a few modifications (SL, *Burden*, 1.4.4).

In my way of thinking, a strategy is a goal-driven course or guideline to be followed when selecting evidence and arguing that has the shape of a system or interrelated systems (Webster has "4. a plan, method, or series of manoeuvres or stratagems for obtaining a specific goal or result"; I do not like to see "stratagem" within a definition of "strategy"). A strategy can be useful even when it is not the right one, for the history of science is full of examples of defective or downright infeasible procedures leading to new insights or results. It was Saccheri's (1667 - 1733) abortive attempt to prove Euclid's *Fifth theorem* that led on to Non-Euclidean geometry; and Rutherford's "planetary" model of the atom was wrong but productive. Progress usually means testing results against a strategy and modifying (or rejecting) the latter. Traditional Philosophy often misses out reliable model patterns, which are indispensable for establishing so-called interdisciplinarity.

Perhaps I am not adequately trained in Philosophy. I have tried to get something profitable out of such a highly acclaimed book as the philosopher Robert Nozick's *Examined Life*. The title seemed to promise wide views on fundamentals. But reading him about *Creating*, a rather basic subject, as I would imagine, put me off. He writes (p, 35): *To be creative is to make or do something novel - so far so good [really ?] - but to say specifically what creativity is, more details must be added (details?). It won't count as creative if it simply happens by accident. It must occur through the exercise of an ability to make or do such novel things that also could be exercised on other occasions.*

The great scholar has been sitting down thinking hard; sitting alone, however. He does not cite anyone at all among his many colleagues who *have* contributed to the understanding of *creativity* and its close companion, *productivity*. Some of them are listed above; names that do not appear in Nozick's index of names (he does not list terms).

The two programs in Philosophy called *objectivity* and *explanation* can be absorbed in a consistent use of graphical models accompanied by verbal ones, thus in terms of positions, distribution and the other "geometrical" factors cited above (*1.1).

Graphical models are distinguished from verbal ones in that the relevant features or items must be *shown*, while *verbal* models can, and usually do, bypass whatever seems inconvenient, just letting us go on. Graphical models will keep the challenges in place, often as empty areas, whenever we cannot respond adequately. They are therefore, to repeat a crucial point, *tools* and not merely illustrations.

Much of our thinking is enacted through *visual configurations*, material or mental. There is an extensive literature on that, some of it being cited in this book (from *Bellarmino to *Skemp and *Miller). One can hold that only such configurations have an adequate quality of reliability, bearing, mutual compatibility and relatedness, as well as being communicable across different contexts and programs.

Rather than exploring *model capacities* of storing and handling contents, let me experiment with their capabilities of bringing order into purely abstract configurations in some sort of geometry that

a) distinguishes between their constitutional elements so that they can be used as if they were numbers in some metaphorical calculation, abstract pictures that can

b) enable us to manipulate them, and

b.1) create new idea pictures ("picture" in the sense of intellectual and mental configuration) , and

b.2) connect them in new composite pictures.

To lend a minimum of efficiency to such a system, the nodes, boxes and arrows have to be named with *single terms*, not full sentences, the latter bringing in unruly vagueness and fuzziness.

Two lines of attack are open, one *systemic* and one *pragmatic*.

Under the first alternative, one might say, for example, that in the category of *form* regarding nodes interconnected across different levels, there are these or those specific *shapes*, such as, again an example, Giere's model (3.8).

In scholarship and philosophy there are never, except perhaps at some elementary levels (whatever they might be), never *one* right road (I am speaking of theoretical and methodological rules, not interpretations), but several, some of them diverging like the Herculean cross roads (without the moral load). As in *Quantum* theory, different roads can be incompatible but nevertheless equally real and useful. We have nilly-willy to accept this, even though the idea will not be welcomed by our university curricula.

Using *models*, let me repeat, is the main topic of the present book, especially non-runnable (*Cmodels*) and verbal ones in parallel.

Cardinal Roberto *Bellarmino (publication from the 1580s;) must have been right when he claimed that humans normally think in terms of images: *Homo quidquid cognoscit sive sensu, sive intellectu, per imagines cognoscit*. On this idea he is borne out by A. I. Miller, *Imagery in Scientific Thought. Creating 20th-Century Physics*, and Antonio R. Damasio, a Professor of Neurology, who has a chapter in his *Descartes' Error*, entitled

Thought is Made Largely of Images (pp. 106ff.). And Giere offers a couple of paragraphs on *Visualizability and Quantum Theory* (pp. 136f.).

Perhaps my concept of this experimental program can be highlighted by saying that I shall introduce ideas from *Quantum Mechanics*, with the proviso, however, that no comparison or measurable or describable relations are imagined between our human-experience of the world and this deep-level and this field in Physics, according to Feynman (in his superb introduction, *The Character of Physical Law*, not to be understood; which can possibly mean that we have to change our notion of "understanding". No, not a comparison, but taking a point of departure in *QM* and saying that we can use the ideas here for ingredients in our models. That would amount to saying that the models, as carriers of theory, represent our reality. This claim would, or so I think, reflect Einstein's insistence (in his talks with Heisenberg) on the priority of theory with respect to our observations.

A model such as is discussed in this work cannot be defined for what it *might be* but in terms of *how it works*. By loading verbal or graphical items into a position or site, we can develop, specify and structure whatever we want to handle and control, so to speak by attributing such actions to the position or site.

This is the main drift of my argumentation. I am not trying to present any results or conclusions, only to keep going a discussion with myself, and publishing it with the hope that my experiences as a so-called Humanist being infected by ideas from Science can be useful, or indeed a warning.

The hard sciences, especially Physics and Mathematics, exist side by side with branches of Philosophy, and they have always nourished each other. Werner Heisenberg offers a remarkable chapter on that with his *Quantenmechanik und Kantsche Philosophie* (Heisenberg, 2006, pp. 62 - 75); *causality* being a central concern.

Facing two methodologies (let us say Philosophy also offers choices here), we have to decide which one to use as a basis for our proceedings, the Hard or the Soft. My point in this introduction is to indicate why I will choose the former, partly because I have never been enabled to regard the latter as a basis for something. I would follow Richard Feynman, who rejected traditional Philosophy as an operational base, and I would classify it as an especially demanding fictional prose, *but* one with useful ideas; just like so much historical fiction.

Readers who find these mine observations too simplistic, can find support in Gerald Vision's *Modern Anti-Realism and Manufactured Truth*, London 1988. But Vision is discussing the issues indicated in the title of his book within the context of Philosophy, and this ties him up in a web of in-

terrelated but fluctuant problem *positions* (his modest *Preface* gives a remarkably lucid account of the two opposites in modern Philosophy; of especial interest, his Part IX, *Scientific Anti-Realism and the Kuhnian Challenge*, pp. 246 - 285 - recalling that the book was published way back in 1988, when Kuhn's book was still considered groundbreaking).

Further specifying the nature of the book, let me note that the bottom line can be summarized in the following terms.

There are hard, measurable and countable, entities and there are the soft ones, some among which we can handle on by making them more solid. There can be no conclusion except a provisional one. Using one model or paradigm can never get us into security: there will always be *n* others equally valid.

Whatever we propose or claim, we cannot pretend to lead to anything more than a *continuation or to substitution by an alternative view*. This is being considered a "modern" outlook, but what does this mean when the idea is attributed to Miguel de Cervantes y Saavedra, who died in 1616?

We should consult Américo Castro on this, in his *El pensamiento de Cervantes* (1925), a work focusing primarily on the latter's *Quijote*, parts I and 2; and also Julio Rodríguez-Puértolas' updated comments in a recent republication of this book, to some extent based on notes delivered to him by *Castro shortly before his death (2002). Castro's summing-up of his interpretation of Cervantes is worth quoting: *la realidad es siempre un aspecto de la experiencia de quien la está viviendo* (p. 22; reality is always an aspect of the experience of whomever makes it), recalling Pirandello, as when he uses the title *Così è (se vi pare)* - it is like that (if you think so). Castro offers a short work on *Lazarillo de Tormes* (1554, published anonymously in four cities; pp. 441 ff. in the cited publication), focusing on the piecemeal character of Lazarillo's fictitious story about himself, a series of episodes with no interpretation and no conclusion (and no case for the Inquisition). Typically, Castro also wrote a piece on *Cervantes y Pirandello* (1924, pp, 691). Castro is worth listening to also because he did not consider his great book "definitive" but a stage in a process, working on improving it till his death. The editor of the new edition, Rodríguez-Puértolas, offers a penetrating analysis that should be relevant far beyond the specific subject (but too voluminous to be reported here; pp. 9 - 25).

While a verbal description can evoke the *passage of time*, either by vagueness or mastery, a *model* cannot do so. There are at least the following alternatives.

1. Selecting a unit regarded as *typical*;
2. or one regarded as crucial or most important;

3. creating a summary of one passage in the document, handling one at a time.

4. selecting by paragraphs, leaving to the original the decision of what is important.

Alternative 4. apparently leaves as much as possible to the document itself. Opting for this, obviously entails that one should do the modeling operation a number of times. A practical solution is to pick out *one example*. That is what I am going to do. Doing so, one can indicate, without working out, a *register* of possible cases and construct a "total" picture. This can be sufficient for developing suggestions concerning the entire program. No great loss, since we will remain on a depictive level regardlessly. But by virtue of this procedure, we can construe a more comprehensive picture of a theoretically likely whole. Such a picture of course is not "absolutely" valid, but can function as *a working model basic to which there is described procedure*. Facing a document of some complexity, the question of *objectivity* arises. There are no answers to such a query, except that my use of *models* ensure some degree of objectivity. Still, the problem has to be explored.

By explanation we mean setting the explanandum into a theory-generated system, without which it would stand out merely as a piece of literature. I stick to the view, stated by Radnitzky and others, to the effect that explanation is a byproduct of systemization; indeed, I would rather say the two operations are identical.

More generally, it may be that the theory-cum-models has been blown up to immoderate size in relation to some relatively small case. The rationale for this apparent disproportion is the priority of theory and methodology over substance. Here, I have adopted the *maximization* principle launched in earlier works (SL, *Burden*, 4.4, point 13).

A model that expresses a working theory may be considered *analytically productive* (through our operations *with* it; on a non-runnable, *NR-model*), provided that certain conditions are laid down. Some of the structures have systemic character. A well-working theoretical model (through our operations with it) will be embedded in one or more systems *and* will, potentially, at least, imply or contain some system or systemic properties.

It should be clear that generally *theory* does not support, as if buttressing, the whole complex of documents and our interpretation of them, but that this is absorbed into the theory, which lends to the complex a new, understandable and manageable reality. The different contents or included/included *terms* (words, names, objects, etc.) are dragged into this *positional game*. In this process the contents are being positioned and related to one another and the environment (whenever this is or could be included).

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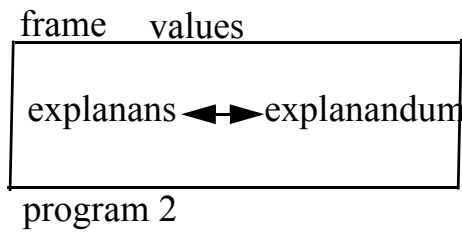


Fig. 4.11.1, *Causation Model*

The most adequate model - because it simplifies the task - for handling *causality* seems to be to place one thing, the *explanandum*, next to the other, the *explanans* (Fig. 4.11.1)

Causality cannot, analytically speaking, be regarded as uni-directed, for some types of *explanans* will involve, imply or contain premises attributed to *explanandum*, so there can be a situation of shuttling back and forth: hence the double arrow. This procedure would come under *program 2* on the appended Fig. 4.11.1.

In this basic view, we can establish the model (Fig. 4.11.1, *Causation Model*), connecting satisfiably a causation mechanism, with is encompassed in the frame of *program 2* on the model. This depends on and is expressive of the researcher's (SL's in this case) personal inclinations, competences, conditions, aims, working procedures, etc. The line between what one might consider the reason and what the result obviously will be bi-directional. For often it will be required to start with an object and search backwards grasping for its cause. Of course causality is rarely absolute; the notion is created by the analyst (except perhaps in utterly elementary environments). So here it is, a *Causation* mechanism in the prototype version that can be further developed. It cannot be taken for granted that the *explanans* or *explanandum* are both uniquely definable, nor that the linking mechanism is so. Therefore, a *Causation Model* using, in both directions, the cluster-and-bundle configuration we can see in Fig. 4.8.1, representing a bunch of vectors aiming at a cluster of Venn diagrams, would be analytically more adequate. Such full-blown *Causation Models* may be considered as tool units in most mental operations, in themselves variable and in variable relations to one another.

The *Causation Model* is imagined to be always present in foreground or background and actively working in a unifying and activizing environment labelled *frame values*, in which the *resources* input from the *Survey Model* (Fig.4.1.3, *The Survey Model*) or some corresponding picture of reality will usually emerge. The operation works in both directions, for when we start out with what we want to explain, we are led to the *explanans*, but this in its turn can lead to an extension of our conception of the *explanandum* and to verification and control. The link between them, the double arrow on the figure, illustrates operational processes such as use of math, logic, verbal models, cognitive and hypothetical methods, etc. I might ask

verbal or mathematical, from the one to other as the basic unit; an operation enacted on the passage from one to the other more or less vaguely conceived entities.

During work at a particular topic, it can happen that we develop a model specifically for that subject. At another stage perhaps we build a new model regarding some different topic. These two separate operations can end up with our discovering affinities between the two models. We start exploring this option and can get new insights: the models together have been *productive across our working with them*.

From these considerations it should follow that, when facing a small and limited case, we are interested in this in itself and its immediate environment, which does take us further out towards a periphery, but also in the potential generation of additional conditions and properties of the same little case. This again is an application of the *maximation* principle (SL, *Burden, Patterns*) of the *operational* aspect of the present assignment (see also Giordano Buno and Giulio Giorello's comments on *operazionismo*, with reference to the original version launched by Percy Williams Bridgman, in De Finetti, p. 53; and SL, *Operational Determination. Math in buildings and math statements about them*, at this site) .

Speaking of the *theoretical* factor in this connection, let me cite Alonso and Finn (p. 4), who note that *by theoretical we mean that the physicist proposes a model of the physical situation under study. Using relations previously established, logical and deductive reasoning is applied to the model. Ordinarily the scientist works out this reasoning by means of mathematical techniques... The theoretician then revises and modifies the model so that it will agree with the new information-... physics, like most sciences, is a dynamic subject where nothing is taken for granted or is a dogma.*

We should entertain no illusion that metaphorical references to Physics make our models (the *Reflected Models (RMod(s))* and methods more reliable; only that they can better help us to frame our questions and queries with higher precision, better articulation and wider scope.

But this reflecting model use makes it incumbent to be sufficiently informed about model application on quantifiable cases. There is an enormous literature on this vast and diversified subject, and my choice must necessarily be arbitrary; to put it bluntly, dependent on what I have on my shelves. More essentially, my scope and available material occasionally forces me, applying information-theoretical language, to remain on the *entropy side* of the matter.

A colleague of mine at the University of Oslo in the 1950s once remarked, speaking to Gisela Richter, that she took some time over her new book on document-less Greek archaic sculpture distributed over a large

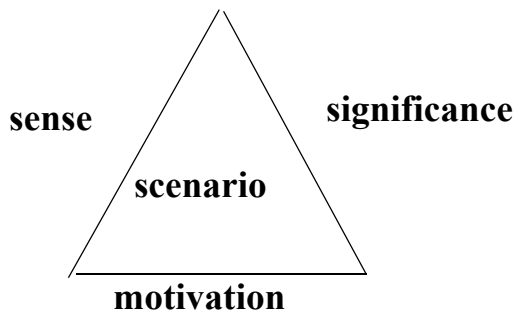
area with different traditions and histories. Yes, she answered, for this is going to be *a definitive book*. This attitude seems to stick. A university colleague told me regarding a famous art historian, that he did not need change or modify anything he had written. Our parents' generation tended to think in such terms. My mother always told me that this or that was *scientifically proved*. I should thank her for having provoked my scepticism about such absolutist claims.

We are facing the very nub of our predicament - there is no friendlier term for it. There are no "objective" criteria and there is no generally valid technique available for the setting up of models; and we cannot construct any adequate theory merely by selecting and regrouping bits of analysis models picked out from the contexts of neighboring disciplines. No possibility is in sight other than trying to develop the theory from a selection of empirical material, a choice of specific cases of imagery and other representational entities. Such a selection process, itself a thematic concern, is a creative act based on decisions intuition concerning characteristics that our intuition tells us may prove analytically challenging - characteristics that we may call resources, adopting, and repeating! a term of Giddens' "... capabilities of making things happen" (Giddens, *Agency, institution*, p. 170).

For my roadmap I shall choose *one document*, the Bulla of Sixtus IV of 1480 (*4.2), with some comments on Martin V's bulla of 1425. This looks like a blatantly insufficient option by any consideration in traditional history studies. But it should work here because I am dealing not with substance but with theory.

My assignment now is to start developing the idea and use of the *model*. In the framework tested here, they have systemic properties and are usually embedded in systems also, with visually distributed elements. Let me repeat: Working mostly with *models* that are not digitally runnable but are used to illustrate and control mental operations on my part, I need a name for them in combination with *verbal models*: *NRmodel (not-runnable)*. Whenever I am speaking of digitally run models, I shall make that clear.

This means working under *artificial* conditions, such as have been elaborated by Herbert Simon in his *The Sciences of the Artificial*. In the present book, it is argued that *artificium* is all that we have in serious analytical work, above the levels of pure quantification. Both the models and the objects they are intended to handle and for making them ready for analysis, depend on and involve *complex scenarios* (Fig. 0), partly of our own concoction; which should mean that they are embedded in *visualized systems* and include or involve systems.

Fig.4.11.2, *Scenario*

Paramount among the tools for implementing my program are the *RMod(s)*. With this we are jumping on to the big bandwagon of *visual thinking*, the subject in a number of publications by Rudolf Arnheim (who coined the term, I believe, in 1971), Herbert A. Simon, Margaret Boden and others more recent ones, amongst which I shall be referring particularly to Miller's *Imagery in Scientific Thought. Creating 20th-Century Physics*, first published in Boston in 1984. Referring without comments to his observations on Boltzmann and Hertz (pp. 48, 76f.), on Einstein's views of *Physics and reality* (for some time divergent from the *QT/M* views) (pp. 42ff., including E's Fig. 1.2, compared with Poincare's, Fig.1.1), I shall go straight on to Miller's *Chapter 4, Redefining visualizability*, pp. 125 - 174.

Immanuel Kant made a distinction between *intuition* (*Anschauung*; I am using Miller's translations of critical terms) and *sensation* (*Empfindung*), and Miller discusses the uses of these terms. Thus, *Anschauligkeit* can be interpreted to be less abstract than *Anschauung*. He correctly notes that the former is a property of the object itself, while the latter refers to the cognitive appraisal of the object.

Miller then goes on to a discussion of the differences between *picture* and *image*, but with a focus on *Gestalt Psychology*, which I feel blurs the picture.

I shall let that go, for my interest is *visualization as such*, rather in Belarmino's terms: humans, let me repeat, whatever they know through senses or reason, they know in the shape of images (*Homo quidquid cognoscit sive sensu, sive intellectu, per imagines cognoscit*; 1583); something that was well known to medieval and later teaching institutions, (SL, *Iconography and Ritual*) in which explanation and learning to some extent were based on graphical Models, as well as among some scholars separately, like Simon Stevin and Giordano Bruno (SL, *Patterns*).

Niels Bohr's first theory of the atom, quite soon discarded, was based on the simplest possible case, visualized as a nucleus with *one* orbiting electron: the hydrogen. But this formally unsuccessful model when applied in a further development, proved most useful, starting out with abandoning the Classical notion of *continuity* (introducing the quantum jumps with Max Planck's famous constant *h*). Bohr thereupon developed a theory that was quite literally *imaginary*. Here, abandoning the notion of exact and stable

measurement and introducing statistical *probability*, Miller notes, *was just the prescription for dealing with unvisualizable quantum jumps whose dynamics, that is, causes, were unknown*. The nature of light appearing as both waves and particles under different conditions of *observation*, did not make visualization easier to achieve.

The issue is further complicated, or better: enriched, by different use of terms as *picture, image, seeing, visualization*. Bohr meant the term "*picture*" to refer to the interpretation of the mathematical framework. So, in some sense, Miller is justified in labelling his next Section *Visualizability Lost: Out with the pictures went also the conservation law of energy and momentum...* But the law of energy conservation could not be discarded, and it fell to Heisenberg to develop his *QM* in which it was kept.

Visualizability continued to be an issue. Whereas for Pauli the "*visualization of physics*" was anathema because of its association with mechanical models, for Heisenberg it would be the key to renouncing *visualizability* and redefining *Anschaulichkeit*.; more on the internal discussions among the *QM* physicists in 1.1, *f*, *A Short Quantum Reader*.

After some time, the idea of electron *orbits* had to go, and this meant relinquishing a "pictorial" image, the planetary view, of the atom. Thus by 9 July 1925 Heisenberg had relinquished not only the picture of Keplerian stationary states but also the picture of the bound electron as a localized entity. And he formulated a theory, as he wrote in his paper on matrix mechanics, *founded exclusively on relations between quantities which in principle are observable <rather than on rules that> lack an intuitive [anschaulich] physical foundation unless one still return to the hope that the position of an electron in an atom could be observed.... Thus, according to Heisenberg, since any route in atomic theory led to loss of visualizability, physicists should maintain only the quantum mechanics that arrived at this point naturally, that is, via the correspondence principle*. To end a too short account of a complex matter, it should also be taken into account that math formulas, such as Heisenberg's *matrix model*, to some expert people do make things visible in the sense indicated by Bellarmino.

The present program can be called interdisciplinary or, as I prefer, *open_source*. This involves me in almost dramatic complexities. It would belie the entire project to pretend that I have made my propositions convincingly clear. I am not after convincing people but involving them in debate.

An excellent work like Arthur C. Danto's *Analytical Philosophy of history* (Cambridge, Engl., 1965) adheres to the "objective" tradition and fails to provide a workable methodology, at least by the criteria basic to the present venture, in which the use of models is a main concern.

Models with which or through which we handle our subject are fashioned in accordance with some rules to which we think they should conform in order to be useful and sufficiently flexible. Let there be no illusion that the operation devised to ensure this is "objective" and independent of personal and cultural inclinations. Everything we do is "customized", to use salesman's wording. It is partly an aesthetic venture to develop them, no surprise since aesthetic evaluations count even in mathematics. Something that doesn't have a clear, simple and functional look is not satisfactory (Henri Poincaré's view on mathematical creativity and special aesthetic sensibility is particularly well-known; see Miller, *Imagery*, pp. 31, 234).

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Something more must be said about the highly acclaimed virtue of scientific *objectivity*. Does it exist - can it be practised?

The objective approach tends to settle things, while depending on action keeps the "machine" going. And it has to be kept moving, since there is never a determinate conclusion, just a process. Working as I do in this book, I do not need to involve myself in cognitive, philosophical or epistemological contentions. My program is merely to articulate action and intervention on given parameters, not deeply sounding but feasible.

In Wittgenstein's writings we can find observations relevant to whatever we are *finding justifiable* (there was nothing to stop him from jotting down whatever occurred to him and living with that), but perhaps not always the *processes* connecting the issues. If you write enough, people have to look at you. In his *Bemerkungen über die Grundlagen der Mathematik*, we find the statement that *Die Mathematik ist ein BUNTES Gemisch von Beweistechniken. - Und darauf beruht ihre mannigfache Anwendbarkeit und ihre Wichtigkeit*. In a quasi-Biblical style, he makes statements, many of them aphorisms, that can seem all of them right and to the point, except that the point itself does not seem to belong to any system on record.

De Finetti is another story, an expert in statistical mathematics and related fields who supplies observations on the *operational* approach, partly associated with the name of P. W. Bridgman.

Wittgenstein believed he had found the key to all of Philosophy (but later revised his opinion), and the professors who guided Max Planck and much later Werner Heisenberg, when being consulted on the academic future for these two men when they were young, declared that by then all important knowledge in Physics had been established, so they advised their students to choose another field. Almost immediately, first Planck, then Heisenberg (and others) turned traditional, post-Leibniz/Newton Physics upside down, by focusing on procedure, namely *measurement*. They opened up the *Quantum* world.

Are "non-professional" historians more sceptical regarding public history writing than academically appointed history professors? Aldo Ruffinatto is a *literature* historian of the University of Torino/Turin. In his edition of *La vida de Lazarillo de Tormes y de sus fortunas y adversidades*, he starts out with a chapter on *Lazarillo de Tormes en la encrucijada de la verdad y la mentira*, (L. de T. at the cross-roads between truth and invention; pp. 7 - 20 and 24-25), making havoc in traditional history writing. Almost as a parody of Gödel's theorem, it looks as if things get more understandable when seen from the outside.

Lazarillo, an early (1554;) arch realistic fictional autobiography by an unknown author, is taken as the point of departure for a discussion of the quandary involved in evaluating *scholarly history writing versus fiction*. An ancient but ideologically much poorer model is Petronius' (obit AD 66) *Satyricon*, a detailed and tedious report of convivial excesses, surprisingly declared incomplete: *longum erat singula excipere*.

The story of *Lazarillo* contains a very limited series of prosaic experiences of a village boy, who rambles around in the hope of finding an *amo*, a boss to serve who might keep him alive, and passing from one to the next making social experiences, just like Julien Sorel (though on a lower social level, and much more frequently) in Stendhal's *Le rouge et le noir* (1831).

Ruffinatto's arguments are worth recording, and I shall do so without fully endorsing all of them (in his edition of *Lazarillo*. see the *Bibliography*, *Anonymous*).

As we know, he says in his introductory note, nothing is more relative than *history or the notion of historical reality*, because of the field's close links to the ideologies, the alterations of perspectives that arise with the course of time, with the obligation to test and re-establish at every moment its claim to objectivity (*Como bien se sabe, nada es más relativo que e la historia o el concepto de realidad histórica, debido a sus vínculos estrechos con las ideologías, con los cambios de perspectiva que derivan del transcurrir del tiempo, con la exigencia de comprobar y reestablecer en cada momento sus*

anhelos de objetividad). He conveys, in a nutshell, the "moral" I am going to develop in this book.

But I do have problems with his statement a little later on: the concept of realism in literature turns out to be *even more relative* than that of the concept of history (*el concepto de realismo en literatura se plantea aún más relativo que los del concepto de historia*). Between two "relative" subjects, how can one say that one is more so than the other, without the assumption of some precise scale or standard? Relative to what? One cannot generalize about this without first having established some system or systems. He is not taking historical "facts" at their face value, rather as subjects that are available for different interpretations, except perhaps at a basic level at which some subjects are absolute (*don Carlos, a German grown up in Flanders, late to learn Spanish, but a King of Spain, became Emperor in 1519*). Ruffinatto's talk, in several places, about a statement in literature or history being "correct" (*correcto*), seems to confirm this impression. But he is worth following.

The relation between a text and the historical context (*texto y contexto*), he claims, is not one between two semiotic systems but between elements in one system (the reader is referred to his careful argument about this theory; pp. 24f.). Because of the manifestly provisional character of the concept of *history* (*del concepto de historia*), the relations between history and literature are fluctuating and subjective. We need, Ruffinatto writes, a careful evaluation of two factors. *One*, the concealed or indirect historical references in a [literary] historical account; *two*, closely intertwined with the first one, the fusion into one system, rather than two separate ones, of text and reference.

He insists, and I have to follow him here, that historical "reality" as conveyed in a text, is and remains a *text element*, depending on the verbal process and its specific rules; with no direct relation to historical reality - my interpretation of him; this argument is carried on over the next pages, up to p.20, in Ruffinatto's *Introducción*.

Herbert Simon, in his admirable autobiography, *Models of My Life*, notes that a certain *decision set the central strategy for my research in organizations...* A special category contains the *decision-making* models, such as Herbert Simon's famous one, used in much of the literature (also in *Parker, pp. 155f.): summarily: *intelligence -> design -> choice*.

Relevant decisions being theory-borne. at least to some extent. Such a process depends on many factors, not least the choice of object and aims. I do not have a relatively well-defined and oft-discussed object, initially only vague hunches about the general use of *Cmodels*, with not much earlier work to rely on. At no point I have been able - or thought it advisable

- to *set* my strategy. So this *Section* about the policy of using *Cmodels* instrumentally, has grown gradually out of a many-level procedure.

Having an idea, one would try expressing it verbally and might get some way toward better clarity. But the verbal language works by big leaps, to easily giving the impression of having covered the issue sufficiently.

Then try to organize the idea in some graphical model, and a number of issues emerge that call for further attention. If the model is constructed with a minimum of logical-systemic consistency, then some blanks can appear claiming to be filled in, while other fields are interconnected in a manner so that the connection emerges as problematic. Finally, some fields will emerge that cannot be filled with contents, thus revealing shortcomings in the entire system or that it is out to cover too much, But there is more to note. Working with one model can require another one to accompany it, thereby suggesting a chain of arguments or ideas forming a group, a theory or part of one. These kinds of alerting will rarely issue from a purely verbal reasoning.

D&O note as follows (omitting their italics): *A definition of a management information system, as the term is generally understood, is an integrated, user-machine system for providing information to support operations, management, and decision-making functions in an organization. The system utilizes computer hardware and software; manual procedures; models for analysis, planning, control and decision making; and a database. The fact that it is an integrated system does not mean that it is a single, monolithic structure; rather, it means that the parts fit into an overall design. The element of the definition are highlighted below. [the following list]:*

A management information system is

- *An integrated user-machine system*
- *For providing information*
- *To support the operations, management, analysis, and decision-making functions*
- *In an organization*

The system utilizes

- *Computer hardware and software*
- *Manual procedures*
- *Models for analysis, planning, control, and decision-making, and*
- *A database*

A further specification follows, with a pyramidal model structure (p. 7). The reader is referred to the following *Sections* in *D&O: Integrated System* (p. 8), *Need for a Database* and *Utilization of Models* (p. 9).

The notion of causality, *when taken heuristically*, and accompanying

argumentative mechanism is useful, nevertheless, by its being first and foremost a tool for *simplification*. It is easy to state that, because Louis XIV of France loved weighing war and spending enormous amounts of money upon it (as he himself boasted almost to his end), Colbert's magnificent financial reforms were to a large extent of little avail. To claim this is of course a drastic simplification. But it can be useful and functionally sufficient, even required, depending on aims and context.

Having had my say on the causality problem, I will just note that my observations do not seem to be invalidated by the notes on causality in Giere's book (pp. 99ff., 104f. 104f., 155ff - *Scientists Are Not Bayesian Agents*, 173) and in George and Bennett, *Case Studies and Theory Development in the Social Sciences* of 2005, pp. 21f. They take a critical view of causal mechanism, and from p. 131 and on they discuss this subject connected with the deductive model. In a *Section, Causality in Mechanical Systems*, pp.99f., Giere discusses the case using as test case *Hooke's Law on the simple harmonic oscillator*, regarding mass and spring relations.

With this, we are back again to the issue of *understanding*. The notion is complex on account of the vast array of writings about it; but also because the use of *Cmodels* involve us in the theme.

Speaking of *digitally run models*, Horgan (pp. 179ff., referring to Daniel Dennett) notes the difficulty of *understanding* the complexities that are often involved in using them. This reminds me of Feynman's claim that nobody seems to have *understood* the Quantum theories. The subject *understanding*, which is operatively connected with *explanation*, lies outside the scope of the present work, so I shall just supply a few references: Giere, pp. 104ff.; Simon, 1979, *Index, Understanding*; Greeno, pp. 199 - 212, in Kluwe and Spada. I shall take the low road and say that positioning something in a systems view is explaining it, while observing it there and grasping some of the motivations for someone having placed it there, amounts to understanding (which can never pretend to be complete since no general criterion can be given for that).

I shall not be pursuing this subject further than just indicating some categories for establishing *determinateness*; my purpose being not to attempt at "exhausting" any issue, only - realistically, I think - to suggest directions.

So I would make the claim that most of our modes of thinking are founded on a *limited catalog* of mental attitudes, norms and rules of operation: determination, indeterminateness, inclusion, exclusion, coverage, overlapping, tangential connection, vectorial (directional) links, basic-level, upper-level, originating, conclusive, etc. These tools can, most or all of

them, be expressed in terms of math and/or logic and Venn Diagrams; for which see the survey in Richard Jeffrey's *Formal Logic. Its Scope and Limits*, or any other sufficiently detailed work, like Irving Copi's *Symbolic Logic*.

My purpose of promoting this perspective, is that my application of *graphical models* can, at least, *should*, one step at a time, be referred back to the standards just indicated in terms of reflecting them.

After this note on explanation, we shall return more in depth about *explanation* and *causation* in connection with the *system* issue: 1.5, *Systems Integration*.

With certain theory-related principles behind us, I shall discuss theories regarding our Soft subjects as a reflection of theories from the "hard" Sciences.

The purport of this will surface gradually. Here experiences, ideas and models from the *Quantum* world are essential (*2.4, *Indeterminacy a Resource*): a fundamental "Uncertainty" in Physics that cannot be bypassed.

Pronouncing the word *theory* one doesn't say much. The notion can be placed anywhere on a seamless scale from vague hunch across many parameters to determinately construed idea systems. In the present case, one can say that, apart from the specifically focused theories, this book as a whole represents my overall theory. Starting my work on it, disordinately as usual in such prowling, some more or less vague ideas guided me. There is not much "objectivity" in such a process.

Having reviewed some cases of work with endless processes and forced or artificial procedures, as well as some perspectives in analysis, it is time to consider the consequences thereof. We can list them in five points.

#1. the assignment is to elaborate a historical subject, theme, event or process - some *scenario*.

#2. finding that verbal handling alone of historical matter not only (which is obvious) cannot be conclusive, but, more importantly, cannot be understood in a *systems* view or context.

#3. This can be achieved through *graphical models*. This translation, always depending on verbal comments or explanations, can never be sufficient but can work as a completing factor.

#4. In this way, a bridge is being erected between soft and hard subjects, such as a theme in the Humanities and paradigms in Science.

#5. Thereby we can leave traditional Philosophy behind us as a *tool box*, only picking up ideas there, without involving ourselves in the traditional tussles.

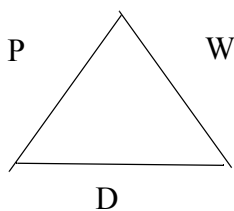
4.12 Continuity and Contemporaneity

Do we need to regard historical occurrences and events as having been *continuous*? The plague in Milan in 1630 certainly lasted more than a year (but not for people hit by the epidemic), and it would be meaningless to deny it. But the only Plague in Milan *anno* 1630 that *we have* (in Manzoni's *I Promessi sposi*, for example), is the one we read or write about, and that lasts an hour or two (* 1.1, *Cmodels reflecting Digital Models*). Let me repeat Fig. 1.2.2

The question of historical *continuity* versus *series of separate events*, arises, for we may want to elaborate views of a process, not merely a certain number of discretely (in math sense) bounded situations or cases. The *D* aspect needs not occupy us, since data normally appear as discrete units. Complexity enters the game once we realize that data when interpreted or somehow understood, become *information*, and that information can be interpreted in a number of ways, often not even commensurate among themselves. The *somehow* is crucial here, but by then, the issue has shifted over to *P* and/or *W*.

The only way out of the impasse is to use what *can* be used, namely the account *we have ourselves construed*, represented as the *W* aspect. So I have to resort to accepting someone else's writing on the subject or to my own capacities, and, in the present connection, to SL, *T2C* (* 4.5).

Let us stay for awhile with our verbal recognition and awareness of some chunk of history. Then the historical time dimension vanishes.



historICAL SUBJECT

Fig. 4.12.1, *D = documented P = situation protagonists - W = writer her/himself.*

For we *wrote* it at time *t1* and *read* it at time *tn*. An ever so tightly packed series of events or changing historical situations or conditions is *not* continuous.

And, to repeat an important point, it can happen that each of them will have been or turns out to be understood differently. The element of *time* (*t1*, *t2*, etc.), while it does enter into the game, cannot be represented in such a model as the above one. This is a drawback involved in models that depend on vision and visual scanning.

Let me repeat that history as we can capture processes in it cannot be continuous. We have to fall back on discrete bits. We can label them - not very original - Situations, a sequence of *Ss*. The effects from a chronolog-

ically earlier S1 do not stretch out over time, but is picked up in the actual one, S2. Both then are contemporary - recreated by whoever writes or reads the relevant piece.

Quoting from SL, *Burden*, 1.4.5: *Whatever the choice of alternatives for our description, the constraints attached to prose writing in any form of narrative chronicle account make for an extremely unwieldy and space-consuming description. Such a description would hardly convey a notion of unity and coherence, unless we were to abbreviate it into so restricted a synopsis that crucial factors and their interrelations would go by the board. An even greater loss would be incurred with regard to analytical tasks: the chronicle would not leave the case open to inspection of its internal structure; we would have to rework the entire description whenever we wanted to assess some particular aspect of the case, and doing so we would not at the same time gain insight into other particular aspects which might, however, turn out to be directly relevant. Chronicles attract because they can pick out salient point of interest, and you can sit peacefully back and let the things pass by. But they are insufficient tools for explaining how factors interrelate and contribute to picking up several premises and aiming at several goals.*

So, in addition to this process of working by stages, in fact, linearly, according to the premiss of natural language, I have to be able also to make a tentatively complete surveys of smaller or larger parts of the whole, or a full survey, to see and survey in one glance several or all stages together - however summarily - as one unified system or unified section of it. Some among us may be able to do this to a certain extent (but rarely completely or consistently); and if we do so, then we are thinking in spatial not linear terms, that is, we are thinking in just the way a graphic model will set out the items and their interconnections. That is to say, we can't get around the necessity of having a visual representation of our knowledge acquisition stage after stage, with all the feedback loops. This is probably best handled when drawn up graphically rather than just trying to figure it out mentally (see Miller, *Imagery*, generally, and especially pp. 229ff. for a comparison between "pro-imagist" and "anti-imagist" arguments.

Let me briefly consider two stories that present the events diametrically different. Albert Camus' *La peste* and Javier *Cercas' *Anatomía de un instante*.

The former gives (in a fiction) a step-for-step (not "chronological") of how a central theme entered the scene, spread and gradually had disastrous effects: the plague in Oran. The latter described an "instant", when military leaders broke into the Spanish Parliament in Madrid, fired a few shots and tried to take over the power (later the same day the coup aborted because King Juan Carlos refused to receive the coup leaders) .

Cercas managed to write a biggish book on the event, extending the view so to speak centrifugally. Thus we have a simple-looking model: a time-line or time-stretch with one dominant subject; versus a moment of time with a dominant subject and extending effects. In the former case we can probably rest contented with saying that we have before us an event with strictly limited time, and that the before and the after are additional explanations and contextual descriptions.

It seems to be the Camus case that remains the most problematic one. The theme is a process or development that we might consider as *continuous*, because that is how we, and probably also the suffering inhabitants of Oran, experienced it and can describe it in words. How to account for continuity by less fictional means?

This query is relevant, not to say urgent, because the factor of *causality* creeps into the *continuum*. Rats carrying plague microbes was the cause initially. One day someone found a dying animal on the staircase. But the rats spread and with them the infection and humans died and infected each other. Camus tells the story admirably - one of the great books! But what to do with it if we are impatient enough, like the present writer, to want to develop a grasp not based on intuition and fictional means? Could we use graphical models? Can the story be understood as reflecting somehow hard argumentation?

If we are out to do that, we must have some unavoidable (as I see it) rules to go by. First, taking a "continuous" process to mean a series or summation of n single events or moment, we must focus on a notional *instantaneity*.

Secondly, then, we have to look out for models depicting instants; thirdly, how one notional instant can be connected or linked up with another one such that we are justified in speaking of a *causality* relation from one to the other. *Time*, then, goes by the board (see Alonso-Finn, 20, 493 [time dilation], 685, 728, 494, 1083, 373). Recording two such instants, we have a *pars pro toto* to rest contents with.

4.13 *Syntactic Theory*

Regardless of my *Cmodels* which indeed depend on verbal formulations, ordinarily we do depend on our language, in the present case English. A study like Emmon *Bach's *Syntactic Theory* comes most usefully, at least for pointing up something that the present book can *not* develop sufficiently: *linguistic models* regarding our modalities of stating and formulating in words.

END PART IV

5PART V DOCUMENTS AND DATA

5.1 Martin V, *Etsi in cunctarum*

Martin V's Bulla Etsi in cunctarum of 1425

The document re-established the institute of a circulating body of public officers - the *magistri viarum et aedificium* - controlling and reforming the character, functioning and conditions of streets and buildings, the *magistri viarum et aedificiarum: Etsi in cunctarum*. Throwing dead animals and rests of them in the streets and squares is no longer tolerated, but the bulla does not tell us where people were supposed to drop them; they probably used the nearby *Tevere*. In this context the issue of fresh air, instead of the pervading *malaria* (a name originating under such circumstances, and in accordance with the medical theories of that time), and the risks for public health are briefly mentioned (*Bullarium romanum*, VI, Turin 1859, pp. 716ff.).

ETSI IN CUNCTARUM orbis provinciarum, iuxta commissum nobis desuper officium, decore atque florentia delectemur, dignum tamen non immerito reputamus et congruum, ut Urbis nostrae Roma, amplior nos cura perstringit, ut Urbs ipsa, quae divinis vel humanis legibus perantea floruit, illiusque districtus, nostris in temporibus, divina favente clementia, bonis assurgat moribus, et salutaribus in antea successibus commendetur.

§1. Cum itaque (sicut rei evidentia palam edocet) Urbs districtusque praedicti, quos paterno amplectimur affectu, et defectu officii magistrorum, quod antiquitus pro viarum, stratarum, platearum et locorum aliorum tam publicorum quam privatorum, necnon aedificiorum lapideorum et ligneorum, parietum, tignorum, barachorum, tectorum, tabulatum, mignanorum, apothecarum et pontium, portarum, passorum, aquarum decursuum, canalium et meatuum, necnon urbanorum et rusticorum praediorum, pratorum, hortorum atque vinearum, finium, restaurationem, servitutum et libertatum administratione, institutum et ordinatum existit, in praemissis et eorum singulis grandem deformitatem seu ruinam potius abhominabilem patiantur et iacturam. Et (sicut accepimus) nonnulli ex civibus, habitatoribus et incolis Urbis et districtus praedicti, macellarum videlicet, piscarii, sutores, palam antellarii, diversique artifices, loca ac etiam ergasteria Urbis inhabitantes, suasque inibi artes exercentes, viscera, intestina, capita, pedes, ossa, cruores, necnon pelles, carnes et pisces corruptos, resque alia foetida atque corruptas in viis, stratis, plateis et locis publicis atque privatis huiusmodi proiicere atque occultare; nonnulli

etiam ex civibus, habitatoribus et incolis eiusdem (quos aequae fatigat ambitio et repudianda conducit temeritas) mela malis invenientes, vias, stratas, plateas, loca publica, privata et ecclesiastica, ausu temerario atque sacrilego occupare, diripere, alienare et in usus proprios deducere, de illis quoque pro suo nutu disponere non verentur, intelligere nolentes, quantum huiusmodi sui excessus humanorum corporum sanitatem, aeris puritatem et animarum salutem impediunt.

§2. Nos igitur praemissas deformitates et excessus huiusmodi sub dissimulatione ulterius praeterire non volentes, attendentes propterea, quod in eadem Urbe, multo temporis decursu, neglectum fecit, in modicum plurimum pullulasse, et praemissis incommodis posse tenus occurrere cupientes; officium magistratus huiusmodi, iuxta illius antiquam institutionem, auctoritate apostolica renovamus, suscitamus et reintegramus atque restituimus.

§3. Vobis quoque, quos nostros et Urbis praedictae zelatores existere non ambigimus, quosque fides, legalitas et prudentia, circumspectio atque multiplicia virtutum merita apud vos non efficaciter recommendavit, magistratus officium huiusmodi, usque ad nostrum beneplacitum, com solitis ab antiquo iurisdictionibus, potestatibus, honoribus, privilegiis, libertatibus atque oneribus universis, et cum potestate ad opus vestrum quoties et iuxta modum, qui vobis videbitur sub magistratos faciendi et ordinandi, eadem auctoritate conferimus, et de illo etiam vobis provide-mus; vos quoque in praemissis et ea quomodolibet concernentibus ac ab illis dependentibus et eis annexis, magistratos facimus, constituimus, ordinamus, et etiam deputamus.

§4. Unde exinde omnes et singulas deformitates et excessus, in praemissis vel circa ea, pro tempore quomodolibet occurrentes, absque cuiusvis vocatione seu citatione, sed per viam regiam, iuxta datam vobis a Domino prudentiam, etiam per demolitionem quorumcumque aedificiorum aut rerum aliarum, seu modum alium, quaecumque reparandi, corrigendi et commendandi, necnon praemissorum seu eorum occasione gravatos, ut praemittitur, absque lite, sed summarie, simpliciter et de plano (oppositione seu contradictione aut quaecumque temporis etiam centenali praescriptione, legibus et consuetudinibus generalibus quibuscumque, caeterisque contrariis non obstantibus) relevandi, restituendi et etiam reponendi, contradictores quoque quoslibet et rebelles privandi, bandiendi, arrestandi, incarcerandi atque omnia et singula faciendi et exercendi, quae magistri praedecessores vestri, qui fuerunt pro tempore, facere, gerere et exercere potuerunt seu etiam debuerunt, vobis, huiusmodi durante beneplacito, mandatum damus et etiam potestatem.

§5 - §8: specifications of notarial services, command lines, punishments.

31-III-1425. Datum Romae apud Sanctos Apostolos.

5.2 Sixtus IV, *Etsi de cunctarum*

. Sixtus IV's Bulla *Etsi de cunctarum*, 1480 (*Bullarium diplomatum et privilegiorum sanctorum romanorum pontificum Taurensis editio*, V, Augusta Taurensis 1760, pp. 226ff., *Etsi universis*. 23-1 1476: 10 §§: hospitals, *saxa area* and areas close to the Vatican; pp. 273ff.: *Etsi de cunctarum*). The bulla, reflecting some elementary progress in urban order, looks ahead and establishes a number of rules for the government and administration, the conditions, control and functioning of housing and street networks, including detailed provisions regarding private and commercial housing and the relations between owners, tenants, lodgers and neighbors and their obligations and liabilities towards the community and the urban scene.

ETSI DE CUNCTARUM civitatum temporali dominio Romanae Ecclesiae subiectarum decore et venustate cogitare nos deceat: ad nostrum tamen aliam urbem apostolorum Petri et Pauli glorioso martyrii cruore Domini nostri Iesu Christi consecratam, civitatem sacerdotalem et regiam, eiusque decorem et venustatem, tanto accuratius aciem nostrae considerationis extendere nos convenit, quanto illa caput est orbis, et Altissimus in ea sacerdotii principatum et christianae religionis caput instituit, et sui vicarii Sedem, ad quam, de universis mundi partibus christifideles confluent in numero copioso, voluit collocari.

§1. Cum itaque viae et stratae publicae eiusdem urbis, in plerisque locis, 2 causantibus porticibus, prosellis et aliis variis aedificis domorum sitarum iuxta illas, adeo arctae [artae] existant, ut per eas commode deambulari, et necessaria ad victum multitudinis civium Romanorum et curialium ac aliorum in ipsa urbe habitantium et confluentium ad eandem, praesertim temporibus indulgentiarum anni Iubilaei et aliorum concessarum per nos et praedecessores nostros Romanos Pontifices, visitantium apostolorum praefatorum [Sts. Peter and Paul] basilicas et alias eiusdem urbis ecclesias; deferri commode nequeant: et in quibusdam locis vix singulariter singuli equestres se obviantes, in eis transire possint per easdem; idque cedat in non modicam eiusdem urbis deformitatem, ac civium, curialium et confluentium praedictorum incommoditatem: et propterea nos, habita super iis deliberatione matura, decrevimus vias ipsas, praesertim quae magis frequentantur et principaliores existunt, ampliari; ac porticus et impedimenta praedicta, quibus sic arctantur, amoveri et lateribus opportune pavimentari, iamque opus ipsum coeptum sit in di-

versis locis et in illius prosecutione non cessetur; ac (sicut accepimus) propter demolitionem huiusmodi, nonnullae ex domibus ipsis, quarum porticus et prosella ac alia aedificia dirui oportuit, exinde, utpote necessariis mansionibus solitis et officinis carentes, ad in habitandum minus commodae et fere inutiles factae sint, et eapropter illarum domini eorum parietes decenter, ut expediret ad decorem viarum earumdem, reparare, et expensas opportunas propterea subire non curent, sublata spe habitandi in eis, aut alias utilitates recipiendi ex eisdem; expediatque, ad obviandum huiusmodi incommoditatibus, ex duabus aut pluribus contiguis domibus unam commodam construere, aut partem unius ex eisdem domibus alteri convicinae domui incorporare, sicque indemnitati dominorum earumdem obviare et decori huiusmodi consulere; et vicinarum domorum domini ut plurimum super iis non convenient, et recusent sibi invicem complacere, etiam pro iusto et rationabili pretio: contingat quoque interdum nonnullos, tam Romanos cives quam curiales et alios forenses, in eadem urbe domos de novo aedificare vel antiquas reformare et ampliare velle, et pro illarum decenti constructione indigere convicinis domibus, interdum ruinosos et depressis, domui depressae vel ruinosae, vel domorum dirutarum sediminibus, plateolis et solo, seu alio loco vicinis, et huiusmodi domorum et sediminum, seu platearum et soli aut loci dominos requisitos ut de illis eisdem aedificare et reformare volentibus, *venditionis titulo* complacant, de dominibus, sediminibus, solo seu loco, oblato etiam persaepe plusquam iusto pretio, id facere nullatenus velle, aut longe plus iusto pretio, etiam nonnunquam duplum illius transcendendo, petere pro eisdem; quo fit ut, praesertim curiales et forenses, qui ad id iuvare et allici deberent, maxime a Romanis civibus, ab huiusmodi eorum laudabili aedificandi aut ampliandi proposito retrahantur; et si aliquando dilecti filii Franciscus de Porcariis et Bapt. Staglia, moderni et qui pro tempore fuerint magistri aedificiorum et stratarum eiusdem urbis, pro construendis novis plateis in locis convenientibus, aut antiquis ampliandis et reformandis, volunt domus aliquas dirui facere in totum vel in partem, illarum domini, similiter oblato eis etiam iusto et rationabili pretio, ne id fiat, pertinaciter se opponere; et huiusmodi novarum platearum ordinationem et antiquarum dilatationem, ampliationem, omni conatu possibili impedire non verentur, quae omnia publico bono et decori ac pulchritudini eiusdem urbis, nostraeque circa id intentioni obviare manifeste cernuntur.

§2.- Nos igitur, aequum arbitantes publicam utilitatem in iis praeferi privatae commoditati quorumlibet, et illorum, qui tam salubri publico bono in directe modo praemisso se opponunt, duritiem, superioris auctoritate et aequa ordinatione comprimere; ac volentes propterea super iis omnibus opportunum adhibere rimedium; motu proprio, non ad alicuius

nobis super hoc oblatae petitionis instantiam, sed de nostra mera deliberatione, et ex certa nostra scientia et de plenitudine potestatis apostolicae, hac in perpetuum valitura constitutione, statuimus et ordinamus quod venerabilis frater Guillelmus episcopus Ostiensis, camerarius noster, praefati Franciscus et Baptista, ac ipsorum episcopi, Francisci et Baptistae in camerariatus nostri et pro tempore existentis Roman. Pontif. ac magistratus aedificiorum Urbis officiis respective successores, qui pro tempore erunt perpetuis futuris temporibus, ad requisitionem damnorum [legimus domorum loco damnorum <editor's comment>] domorum, quarum porticus, prosella seu alia aedificia, pro viis seu plateis et aliis locis publicis eiusdem urbis, hactenus diruta fuerint dirui contingeret in futurum quandocumque de mandato magistrorum eorundem, si domini praedicti [see editor's comment, above] in domibus ipsis inhabitare soliti erant ante demolitionem eandem, et tempore demolitionis huiusmodi factae et quam fieri contingeret in futurum, absque dolo et fraude, inhabitabant et in posterum inhabitabunt, et propter huiusmodi demolitionem iam factam et quae fient, domus ipsae effectae sint vel efficiuntur in posterum, pro eorundem damnorum [Hic ut supra] ipsarum commoda receptione et inhabitatiome incapaces; sintque iuxta eas aliquae domus per earum dominos minime inhabitari solitae, sed pro earum annua responsione vel alias locari consuetae, ex quarum coniunctione cum domo huiusmodi sic incommodae effectae, domino domus sic incommodae effectae, adversus incommoditatem huiusmodi, subveniri valeat, teneantur et deberant compellere illos, ad quos domus ipsas sic vicinia legitime eis pertinere constabit, etiam si ad Ecclesias et monasteria, tam virorum quam mulierum, Ordinum quorumcumque, etiam exemptorum, necnon beneficia ecclesiastica, hospitalia et loca pia pertinerent, ad vendendum easdem domos vicinas, quas inhabitare soliti non sunt, dominis domorum contiguarum, quas sic incommodas effectas cognoverint; pro pretio, per duos probos et expertos viros per utramque partem eligendos, determinando et declarando. Si vero ii duo concordēs in eodem assignando pretio non essent, eo causa ispi camerarius et magistri aedificiorum praefatae urbis, habito ipsorum duorum iudicio, pretia eadem imponere et assignare habeant.

§3. Et si forsā contingeret ex demolitione huiusmodi, duas domos sic per earum dominos inhabitatas, incommodas modo praedicto effici, et inter eas esse aliam domum per illius dominum locari solitam, quam quilibet vicinarum domorum praedictarum incommoditate subiacentium et ad receptionem ipsorum non sufficientium, sibi vendi et suae domui incorporari postularet, debeant camerarius et magistri praefati illi ex eis sic petentibus venditionem huiusmodi fieri mandare, quam magis indigere modo vendenda cognoverint. Et si forsā uterque aequaliter indigeret, partem uni et

partem alteri (si commode vendi poterit) vendi faciant, aut aliter desuper provideant, prout eis videbitur expedire.

§4. Et si in neutra domo vicinarum, quae sic inutiles iam effectae forent ex demolitione praedicta vel efficeruntur in futurum, earum domini habitarent, sed eas locare soliti essent, liceat etiam tunc camerario et magistratis praefatis (si id petatur per alterum dominorum earumdem) domum, quam maiora incomoda [sic] passam esse cognoverint, domino alterius domus magis laesae, si emere voluerit, vendi facere modo praedicto; et illum, instante domino domus magis laesae, ad id compellere: et similiter dominum domus e contra minus laesae ad emendam domum magis laesam, aut suam domino domus minus laesae vendendum compellere, seu alias, prout eis videbitur, providere ut ambae domus ipsae, inutiles et inhabitabiles non remaneant, et similiter, prout eis videbitur, providere teneantur quoties domus ipsae sic vicinae et locari solitae aequaliter laesae et incommoda effectae forent.

§5. Et ne, ob proterviam et duritiam dominorum domorum, siue quarum demolitione plateae in eadem urbe necessariae et utiles ad illius decorem de novo ordinari vel iam ordinatae ampliari commode nequeant, platearum earumdem ordinatio et ampliatio, ac palatiorum et domorum de novo constructio seu reformatio retardetur, eisdem motu et scientia ac auctoritate et potestate statuimus quod camerarius et magistri praefati possint et debeant dominos domorum quarumlibet locari (non autem per ipsomet inhabitari) solitarum, ecclesiasticos et saeculares, quacumque dignitate fungentes, compellere ad vendendum Conservatoribus seu syndico eiusdem urbi domus, quas camerarius et magistri praefati, necessarias et utiles esse cognoverint pro huiusmodi plateis de novo ordinandis, et antiquis reformandis et ampliandis, pro iusto et rationabili pretio, ut praemittitur, imponendo. Et similiter ad vendendum domos huiusmodi per eos inhabitari minime solitas, sed locari, quas utiles et necessarias esse putaverint, pro palatiis, domibus seu aliis aedificiis, tam prophanis quam ecclesiasticis, in eadem urbe de novo construendis, seu iam constructis ampliandis, personis habentibus iuxta illas domum seu solum aut locum alium, et volentibus inibi de novo domos vel palatia construere, seu iam constructa ampliare, pro iusto et rationabili pretio, ut praefertur, taxando.

§6. Et inter duos seu plures sic aedificare seu ampliare volentes, et pro huiusmodi venditione eis fienda, ad effectum praemissum instantes, illamque eis fieri petentes, ille praefertur, cui domus, platea seu locus, de cuius venditione ageretur, magis adiaceret, seu qui illo magis indigeret, et ex cuius aedificio plus decorari eiusdem urbis consuli speraretur. Et si in omnibus praefatis venditionem huiusmodi pro parte uni et pro parte alteri fieri mandare, aut eorum alteri, prout videbitur.

§7. Et in singulis casis praedictis, in quibus volumus quod camerarius et magistri praefati compellere possint aliquos ad vendendum, si illi, ad quos pertineret, moniti et requisiti, per camerarium et magistros praefatos, bis cum termino convenienti, eorum arbitrio moderando, vendere recursaverint, aut malitiose distulerint, praefati camerarius et magistri debeant, vice et nomine illorum sic requisitorum et recusantium vel differentium, venditionem huiusmodi facere, cum promissionibus, obligationibus, poenis, renunciationibus, iuramento, pactis et clausulis consuetis, et pretium inde proveniens recipere et penes aedem sacram, aut fide et facultatibus idoneam personam deponere, dominus domus seu alterius loci sic per eos pro tempore venditi (si venditionem ipsam ratam habere et fideiussores de evictione praestare voluerint et non alias) consignandum habeantque venditiones ipsae, quas sic per camerarium et magistros fieri contingeret, et traditiones locorum et domorum sic venditorum plenam roboris [sic] firmitatem, ac si per illos, ad quos domus ipsae tunc pertinebant, fierent; et eosdem penitus et omnino operentur effectus, quos operarentur, si fierent ab eisdem.

§8. - Provideant autem camerarius et magistri praefati, in casibus praedictis, in quibus statuimus aliquos compelli debere ad vendendum proponentibus nova aedificia construere, seu iam constructa ampliare velle, ut tales sic proponentes ante omnia se obligent ad inchoandum et perficiendum huiusmodi nova aedificia modis et formis, ac infra tempus et sub poenis, de quibus ipsis camerario et magistris (personarum et aedificiorum qualitate inspecta) videbitur, et ab illis, qui sic se obligaverint, poenas exigant memoratas; et nihilominus eos compellant ad observandum praemissa per eos, vel quas prius habebant et etiam propterea eis venditas domos aliis aedificare volentibus vendendum pro iusto et rationabili pretio, ut praefertur, moderando.

§9 - Et quia interdum contigit quod habentes domos, sive domorum sedimina, claustra seu loca in eadem urbe et illa vendere volentes, variis plerumque modis et occasionibus illa vendere recusant habentibus domos, sedimina, claustra et loca vicina, illisque vendere nolunt; nonnumquam illa vendunt aemulis eorundem vicinorum, seu personis eis parum gratis; quo fit ut ipsi domorum, claustrorum et sediminum [sedimen, sedimonium, varia notione; hic pro loco quovis vacuo ad aedificandum vel plantandum idoneo, *noted by the editors*] seu aliorum locorum vicinorum domini, illa emere volentes et habere nequeunt, retrahuntur persaepe ab aedificando de novo in eorum sediminibus et locis vicinis, ac ampliando domos, quas inibi habent, sicque decori eiusdem urbis, aut saltem ipsorum vicinorum commoditati non parum detrahitur. Volentes super hoc aequae ordinatione providere; notu, scientia et auctoritate praedictis, etiam statuimus et

ordinamus quod praefati sic vendere volentes, teneantur et debeant domos, sedimina, claustra et loca alia illis contigua, pro iusto et rationabili pretio, per alios evidenter et non ficte forsitan oblato. Et si illa aliis quam vicinis praefatis venderent, venditiones ipsas (quoad illos qui emerent et illorum commodum) nullius sint roboris vel momenti, et habeantur pro infectis; et proinde ac si per illum ex vicinis, cuius venditio ipsa, praesentis constitutionis vigore, fieri debebat, facta foret, debeant camerarius et magistri praefati, ementem a possessione domus, sediminis, claustrum, plateolae, seu alterius loci sic empti, absque ulla tela iudicii, vicino instante et pretium rationabile offerente, et dicto emptori (si illud recipere, et emptioni per eum factae renunciare et ipsum vicinum, iuxta camerarii et magistrorum praedictorum ordinationem, cautum facere noluerit) persolvendum deponente, amovere, et ipsum vicinum in illius possessionem inducere; et si forsitan duo essent vicini, quibus domus, claustrum, sedimen, plateola seu alius locus, de cuius venditione ageretur, utilitatem et commoditatem afferere posset, ille ex eis praeferri debeat in praemissis, quem camerarius et magistri praefati, consideratis circumstantiis universis, venali domo, sedimine, claustrum, solo, plateola, seu loco alio, magis indigere declaraverint. Et si aequaliter indigerent, et pro parte uni et pro parte alteri possit exinde commoditas provenire, utrique proportionabiliter concedatur. Si vero, facta illius divisione, portiones utriusque fere inutiles essent, non dividatur, sed camerarius et magistri, alterum eorumdem vicinorum, quem voluerint, praeferri faciant in praemissis.

§10. Et ut ea, quae supra statuta sunt, votivum sortiantur effectum in praemissis omnibus et singulis, camerario in ecclesiasticas, et ei ac magistris praefatis in alias personas facultatem et potestatem concedimus: ita quod idem camerarius, per censuram ecclesiasticam; et ipse ac magistri praefati, per poenarum et mulctarum exactionem ac personalem distractionem et alia iuris remedia, contradictores quoslibet et rebelles compellere valeant ad praemissa.

§11.- Non obstantibus constitutionibus et ordinationibus apostolicis, ac municipalibus statutis [!] Urbis, confirmatione apostolica vel quavis firmitate alia vallentis; exemptionibus ac indultis, privilegiis et literis apostolicis; necnon interdictis personis ecclesiasticis bonorum immobilium alienationibus et praestitis per eas desuper iuramentis, a quibus eas absolvimus, contrariis quibuscumque; seu si aliquibus, communiter vel divisim, a Sede praefata indultum existat quod interdicti, suspendi vel excommunicari non possint per literas apostolicas non facientes plenam et expressam ac de verbo ad verbum de indulto huiusmodi mentionem. Volumus autem, quod pretia domorum et aliorum bonorum immobilium ad Ecclesias, monasteria et alia pia loca huiusmodi pertinentium, quae vendi

contingeret in posterum vigore preaesentium, penes eadem sacram, aut fide et facultate idoneam personam, cum recognitionibus, obligationibus et cautelis etiam in talibus adhiberi solitis, deponantur, et in emptionem aliorum bonorum immobilium pro eisdem ecclesiis, monasteriis et piis locis omnino convertantur.

§12 Quodque dilecti filii Camerae eiusdem urbis conservatores praesentes nostras literas in registro privilegiorum et aliarum scripturarum eiusdem urbis in eorundem archivio conservari, solito registrari, et illorum tenores in locis publicis et consuetis eiusdem urbis, sono tubae praemisso, vulgare sermone publicare; ac praesentes valvis Capitolii triduo, iuris horis, et alibi, prout camerario et magistris praefatis visum fuerit, affigi faciant, ut omnibus omni tempore facilius innotescant.

Rom aë 30/6 - 1480.

5.3 The Statutes of 1363 and 1471

Statute of 1363. Summaries based on extracts and comments by Camillo Re, Statuti della Città di Roma, Rome 1880, pp. LXIIff. , not edited but consistently following his presentation order. Codes for SL comments respectively 63,n and 71,n. Direct quotations from Camillo Re in italics. .

p. LXII *Finalmente in memoria della fondazione dello stato popolare avvenuta nella celebre notte di Pentecoste dell'anno 1347 di 20 maggio [date of the coup d'état of Cola di Rienzo], si ordinava nello statuto che si celebrasse una Messa nella Chiesa di Aracoeli, detta la Messa dello Spirito Santo, cap. CXLVI "De celebratione misse Spiritus Sancti in XX^o die mensis Maii".*

pp. LXIIff. "Democratic" character; *forastiero* elected senatore by the people [foreigner, as in Tuscan towns].

p. LXIV *Nel cap. XXII, 'quod nullus recuset forum capitoli' è stabilito il principio dell'egualianza di tutti dinanzi alle leggi, e perchè poteva facilmente avvenire che che in particolar modo i baroni dimoranti in luoghi fortificati della città o del suo distretto, non si presentassero al tribunale del Campidoglio, si prescriveva che diverrebbero ineleggibili a qualunque officio comunale tutti colori che si fossero sottratti al foro della curia...*

- Barons not to protect *malfattori* in their fortresses and not to disturb the order in streets and squares.

p. LXVI *Senza rimontare fino all'epoca anteriore al tribunale di Cola <di Rienzo>, quando dal Comune di Roma si spedivano ambascierie a Firenze per imitarne gli ordinamenti democratici, ci soffermiamo all'anno 1351 allorché Petrarca, scrivendo alla Commissione dei quattro cardinali inviati da Clemente VI a Roma per riordinarvi il governo, consigliava che, tolto dalle mani dei nobili il supremo potere, si affidasse piuttosto alla classe plebea -*

corresponding to papal intentions, but Clement VI [1342 - 52, Pierre Roger, French] *non mancava di suggerire loro [the caporioni - the leaders of the twelve administrative units of the city] che si giovassero pur del consiglio degli uomini più esperti della nobiltà, del ceto medio, e della plebe, non che dei forastieri. Frutto di quelle pratiche fu intanto la nomina a senatore del popolano Cenoni, dietro al quale peraltro vediamo muoversi ed agitarsi il consiglio dei tredici nell'intendimento di compiere la riforma della costituzione, colla introduzione definitiva del senatore forastiero.*

Questa riforma, avvenuta poi nell'anno 1358 col senatorato di Raimondo de'Tolomei, se nell'apparenza ebbe carattere d'imparzialità fra le due parti contendenti, la nobile e la plebea, nella sostanza poi era più favorevole a questa per il principio della elezione popolare confermato come base di tutte le supreme magistrature della Città.

Vedremo adesso come lo statuto del 1363 ci somministri tutti i materiali per la ricostruzione di quell'ordinamento civico di Roma che venne fuori dalla riforma del 1358.

[C. R. continuing on the statutes of 1358 and 1363]

Il suffragio universale largamente inteso, e severamente guarentito, fu sempre la fonte donde trasse vita quasi esclusivamente la costituzione comunale di Roma; ma questa costituzione fu alla sua volta intimamente collegata, non solo colla divisione amministrativa della città in regioni [the rioni, as they were called later on], ma eziando con un'altra divisione più ampia, alla quale è mestieri porre ben mente alla esposizione del diritto costituzionale della Roma del medio evo. Nei tempi anteriori al secolo XIV il Comune di Roma si limitava alle dodici rioni cistiberiano ["this side of the Tiber": the city to the east of the Tiber, with twelve rioni, excluding Trastevere]...

p. LXVIII. Trastevere and the Città Leonina, between the Vatican and the river, were populated with a high percentage of *forastieri*, united there at the beginning of the 14th century.

P. LXIX. *Così parimenti nella convenzione del 1404 fra Innocenzo VII [1404 - 06, Cosma Migliorati, from Sulmona] ed il popolo romano, gli uomini del trastevere per mezzo del loro sindaco accedevano come fideiussori per guarentire la osservanza dei capitoli stipulati.*

Siccome poi tutto il sistema elettorale era fondato sulla ripartizione regionale della città... four councillors were elected for each rione.

P. LXXII. Referring to 1363. *Gli organi principali di questa costituzione sono il senatore, il consiglio privato, il consiglio generale ed il pubblico parlamento o comizio del popolo. A capo del governo sta il senatore, ed i requisiti essenziali della sua eleggibilità sono 1^o che sia straniero: cioè originario di un paese distante da Roma più di quarantamiglia, 2^o che non sia perante di alcuno dei magnati della città fino al terzo grado di consanguineità od af-*

finità. 3^o che non sia imperatore, re, principe, marchese, duca, conte, barone o figlio di barone. Term of office: six months [short terms, as usual, to counteract the establishing of political positions and coterie loyalties that could work in mafia fashion. On the other hand, it does not take much experience to conjecture that attention was led to personal career rather than to programs for the city].

P. LXXXVII. *convenzione del 1377 fra Gregorio XI [1371 - 78, Pierre Roger de Beaufort, French] ed il popolo romano. Series of such *convenzioni*, e. g. 1391, with Bonifatius IX [1389 - 1404, Pietro Tomacelli, from Naples].*

Pp. XCI ff. *Consiglio generale. - Il regolamento poi delle adunanze ci è conservato dagli statuti del 1580.*

Pp. XCIII f. *Parlamentum publicum - assemblea del popolo: tutti i romani compiuti gli anni 21. Assembly on the stairs and slopes of Campidoglio. The ass. could reject proposals and approve (*placet*), but were not to deliberate or argue.*

Pp. XCVIII ff. Urban aspects of Rome in the 14th century. Destructions, various initiatives through the 12th and 13th centuries. In the statutes of 1363, *le cure edilizie sono affidate a speciali magistrati chiamati magistri aedificiorum eletti dal popolo, e ... nello statuto del 1580 essi figurano come membri del consiglio generale... See Martin V's bulla of 1425, above, 5.2.*

Statute 1363, Cap. CXCI... ruinis Civitatis non deformetur, et ut antiqua edificia decorem urbis publice representent. Prohibitions against destructions etc. of ancient monuments in Rome. Repeated by Pius II, 1462. [people took marble from ancient buildings in order to make mortar and plaster for building purposes; and the authorities needed this themselves].

P. C.[centum] *Era costumanza di quei tempi, durata anche in epoche più tarde, che si diroccassero le case dei rei di omicidio, ma del nostro statuto ciò è assolutamente vietato per lo stesso motivo "ut romana civitas non deformetur"* [of course all buildings were resources, whether in marble or other materials].

Following: prohibition of occupation of public areas. - *Nettezza urbana: Garbage disposal - no animals let free in town [the garbage issue was limited to prohibitions but did not, as far as one can see, include information about places for dumping it; most likely, the river was used for that].*

Pp. CII f. Chapter V. *Storia della riforma dello statuto dal 1363 fino all'abrogazione della legislatura statutaria.*

La prima e vera riforma che modificasse il carattere del primitivo statuto, e ne alterasse sensibilmente la interna ed esterna economia, fu quella fatta ai tempi di Paolo II [the Piccolomini pope]. La quale riforma non fu però che l'esplicamento ultimo di una trasformazione che per un secolo si era andata maturando nelle parziali riforme che succedettero, dalla prima di Urbano V

[1362 - 70, Guillaume de Grimoard, French] *dell'anno 1369... fino alle ultime di Eugenio IV.*

P. CIII. 1391. *il pontefice rivendica la immunità dei chierici del foro comunale e dei dipendenti della curia pontificia contro lo stgtuto che loro aveala tolta. Della quale convenzione si attesta che fu scritta in latino ed in volgare, ed inserita nei libri del Comune come statuto o riformaione.*

1404. Convention between Innoc. VII and the Roman people: *meritano considerazione tanto la espressa dichiarazione che gli statuti non possono essere o mutati o riformati senza il beneplacito del pontefice, quanto la importante modificazione, iniziata da Urbano V e definitivamente introdotta poi nello statuto, circa alla nomina del 'capitaneus romani populi super appellationibus et nullitatibus' riservata al pontefice.*

Nell'atto di soggezione fatto dai romani ad Alessandro V [1409 - 10, Pietro Filargos, from Crete] dopo la cacciata del re Ladislao (anno 1410), quel pontefice confermò gli statuti della città, ed espressamente riconobbe la costituzione comunale della medesima: ma è pure da notare che in quella circostanza furono introdotte nella legislazione statutaria alcune modificazioni nel diritto criminale circa i delitti di lesa maestà, e nel diritto pubblico circa l'amministrazione della finanza ed il diritto di levare imposte.

P. CIV. Eugen IV: ref. to Vitelleschi.

P. CV. Statute from 1409. Not followed up by Pius II, *come se questo pontefice facendo atto di potere legislativo avesse in suo nome promulgato il novello codice... gli statuti seguitarono ad essere municipale come prima, salva la iniziativa e la ingerenza nella formazione, e la sovrana approvazione per la esecutorietà dei medesimi.*

1409, changes especially in *diritto pubblico.*

P. CVI. *Lo scopo della riforma... è duplice, cioè la riforma delle leggi di ordine pubblico e delle altre concernenti la speditezza e facilità dei mezzi di procedura.*

P. CVII. *Lo statuto, posciachè fu vpprovato dal consiglio generale e dal pubblico parlamento nelle forme di uso, e confermato dal Pontefice..*

1471 STATUTORUM URBIS Code 71, n.

Published between 1469 and 1474, probably by 1471.

Selected extracts from the cited work by Camillo Re.

[liber primus]

I. De summa trinitate.

A confession of the usual type appealing to the Father, Son and Holy Spirit, claiming allegiance to the Catholic Faith, addressing Sts. Peter and Paul, *per quos evangelium rome resplenderit... Urbem ipsam glorioso cruore mar-*

tirii Christo domino consecrarunt, ipsamque fidem per omnes subiectos servari et coli mandamus, contrarium vero credentes penis legalibus feriri iubemus.

II. De hereticis.

XCI. De divisionibus [of ground, properties]

... dividi faciat per agrimessores [sic] et expertos in arte [meno male!].

§4. Item statuimus et ordinamus quod si ostendatur divisio aliqua facta inter fratres seu consortes de aliquo castro, turri (terris = cod. Milliniano), sive possessionibus positis extra urbem...

§5. Habentes domum casalinum ortum vel vineam vel aliquam rem comunem in proprietate alicuius persone vel loci possint talem rem inter se dividere sine consensu domini proprietarii iure tamen proprietarii integro remanente, nec propter dictam divisionem dicta res locata recedat ad dominum non obstante forma locationis.

XCII. De facientibus apparatus contra antiquam servitatem.

Nullus per se vel alium faciat apparatus vel edificium de quaecumque materia in aliqua domo, casalino sive loco contra aliquam seu debitam servitatem seu contra conventiones et pacta per quod impediatur usus debite servitutis seu alienis obficiatur luminibus vel impediatur aspectus... pena xxi. libri, prov. per medietate parti accusanti... Et nichilominus destruat apparatus et rem in pristino stato reducat...

XCIII De parietibus comunibus

Si aliquis paries inter aliquos fuerit comunis quilibet (cuilibet in other MSS) eorum in ipso sit licitum trabes mictere et ex eo utilitatem habere sine destructione domus.

C. De novi operis nunptiatione.

Si alicui novum opus fuerit nunptiatum seu prohibitum fuerit edificare vei aliquod opus in aliaqua terra vel loco facere et prohibitus satisfactionem offerat de opere destruendo si apparuerit eum (ea in another MS) iniuste edificasse vel aliud opus fecisse, sit in potestate nunptantis utrum velit dictam satisfactionem recipere an non velit infra sex dies utiles de suo iure probare infra quos possint etiam hii qui edificant vel opus facere prohibitum esse de suo iure probare, et suum opus iustificare...

CI. De edificantibus in possessionibus suis.

Quilibet in sua possessione et solo possit in altum edificare pro libito voluntatis statuto aliquo vel prohibitione in contrarium non obstante...

CXXI. De civibus intelligendis pro Romanis [see above for this].

Lib<er>. sec<undus>.

LXXX De auferentibus castra turre arces et domos et violentiis eorumdem.

LXXXII De dampnis datis.

CXXXV De viis non apparandis [no blocking of streets]

No portas, cancella, ... et apparatus facta in viis publicis intus civitatem romanam, et ipsas vias publicas facere aperiri et libras permanere et non permittant de cetero ipsas vias occupari vel apparari sive claudi per aliquam personam... pro alia medietate accusanti. Et nichilominus predicta ducere teneatur ad effectum. Et predicta locum habeant in nobilibus et magnatibus... Statuimus et ordinamus quod vie vicinales debeant esse ample per quatuor palmos ad palmum et mensuram Senatus [more on regional measurement standards in T2C].

CXXXVI De comunitatibus debentibus custodire stratas [for the magistri stratarum, see above and T2C].

Comunitates civitatum castrorum et aliorum locorum de districtu Urbis stratas et tenimenta ipsorum diligenter faciant custodiri ut itinerantibus per eas sit securus accessus et in dictis civitatibus castris vel locis non receptent diffidatos latrones et homines male fame.

CLI. De proicientibus cum archa et balista in fenestris vitreis.

... ubi sicut fenestre vitree in ecclesia sancte Marie de Capitolio et in omnibus ecclesiis- shooting at glass windows forbidden!

CLXVI Carriages, wagons etc. to use exclusively Ponte Mammolo, no other bridges in Rome.

CXC De immundicia non proicienda ad portam septimianum nec in agone (ajone, in CXCV). agone = today's Piazza Navona.

CXCI De antiquis edificiis non diruendis [cf. above about buildings as materials resources]

Ne ruynis civitatis defiormentur et ut antiqua edifcia decorem Urbis publice representent.

CXCII De comunitatibus debentibus actare stratas et vias.

Smaller cities around Rome; keep roads open and safe.

CXCIV De proiectientibus immundicias in viis publicis [also in Martin V's bulla].

CXCVI De edificantibus in viis comunis et pontibus.

Senator teneatur vinculo sacramenti ad penam c. [centum] librarum prov. precise omni exceptione et dilatione remota cum effectu expediri et excomorari omnes vias publicas et pontes, infra Urbem et extra, et si qua edificia opera hostia porticalia seu quecumque alia appartamenti facta sint vel facta apparent in his viis et pontibus, per quascumque personas cum effectu, omni exceptione et dilatione remota faciat tolli destrui et demoliri expensis illorum qui in predictis viis et pontibus edificaverunt seu edificari fecerunt [also in Martin V's bulla].

5.4 More bibliography on Quattrocento Rome

The documents on Roman urbanistics in the fifteenth century that have been referred to here, have been selected for the purposes of theory and methodology, not to convey historical coverage. For example, I have omitted Platina's report from the time he came to Rome with Martin V, as well as Infessuras *Diario della Città di Roma*, from Bonifatius VIII to Alexander VI. (see below for further literature). And I can only briefly refer to the important urban statutes of 1363 and those of 1471 (between 1469 and 74) issued under Paolo II (Camillo Re, *Statuti della Città di Roma*, Rome 1880). The statutes republished by Re try to regulate generally the same issues as the two bullas republished here. Such repetitions, of course, tell the usual story of laws and statutes not being respected or efficiently implemented. *Semo a Roma!*

Let me supply some more bibliography directly regarding the earliest modern Rome

1 - *Vita Sixti IV auctore anonymo ex manuscripto codice Bibliothecae Vaticanae*, R.I.S., III, ii, pp. 1054ff.

2 - Bardi, A., *Facultates magistratus curatorum viarum, aedificiorumque publicorum et privatorum Alme Urbis*, Rome 1565.

3 - *Idem, Tractatus iuris protomisei sive congrui ad interpretationem Bullarum, Constitutionum aliorumque Literarum apostolicarum super aedificiis construendis ad decorem Almae Urbis*, Rome 1565.

4 - Rodocanachi, E., *Les institutions communales de Rome*, Paris 1901.

5 - Schiaparelli, L., *Alcuni documenti dei magistri aedificiorum urbis (secoli XIII e XIV)*, Arch. R. Soc. rom di S. P., XXV, Rome 1902, pp. 5 - 60.

6 - Re, Camillo, 'Maestri di Strada', Arch. R. Soc. rom. S.P., XLIII, 1920, pp. 5 - 102

7 - Scarafoni, C. Scaccia, *L'antico statuto dei 'magistri stratarum' e altri documenti relativi a quella magistratura*, Arch. R. Soc. Rom., I, 1927.

8 - Levi, G. *Ricerche intorno agli Statuti di Roma*, Arch. R. Soc. Rom., VII, 1948.

Tomei and Magnusson have more bibliography (recorded in *SL*, T2C, 4.5).

5.5 Tacitus, *Annales*, I, i to viii.

For reference to the document from 4.1 and 4.2, the chapters are subdivided in numbered units, #1 etc..

I, i.

#1. Urbem Romam a principio reges habuere; libertatem et consulatum L. Brutus instituit. Dictaturae ad tempus sumebantur; neque decemviralis potestas ultra biennium neque tribunorum militum consulare ius diu val-

uit. Non Cinnae, non Sullae longa dominatio, et Pompei Crassique potentia cito in Caesarem, Lepidi atque Antonii arma in Augustum cessere, qui cuncta discordiis civilibus fessa nomine principis sub imperium accepit.

Early history. Mazzolani notes the lavish use of the political lexicon: dictatura, ius, potestas, dominatio. The dictatorship was time-limited. Augustus, with the title of princeps took the supreme power (in the State).

#2. Sed veteris populi Romani prospera vel adversa claris scriptoribus memorata sunt, temporibusque Augusti dicendis non defuere decora ingenia, donec gliscente adulatione deterrentur.

Civil wars, Augustus named "princeps" assumung the "imperium". A new era in Roman State conditions and structure. Glorification of Augustus.

#3. Tiberii Gaique et Claudii ac Neronis res florentibus ipsis ob metum falsae, postquam occiderant recentibus odiis compositae sunt. Inde consilium mihi pauca de Augusto et extrema tradere, mox Tiberii principatum et cetera, sine ira et studio, quorum causas procul habeo.

Crisis involving Tiberius and others after Augustus' death. Tacitus will only briefly write about Augustus' time and concentrate on that of Tiberius.

I, ii.

#1. Postquam Bruto et Cassio caesis nulla iam publica arma, Pompeius apud Siciliam oppressans exutoque Lepido interfecto Antonio ne Iulianis quidem partibus nisi Caesar dux reliquus, posito triumviri nomine consulem se ferens et ad tuendam plebem tribunicio iure contentum, ubi militem donis, populum annona, cunctos dulcedine otii pellexit, insurgere paulatim, munia senatus magistratum legum in se trahere, nullo adversante, cum ferocissimi per acies aut proscriptione cecidissent, ceteri nobilium, quanto quis servitio promptior, opibus et honoribus extollerentur ac novis ex rebus aucti tuta et praesentia quam vetera et periculosa mallent.

After the death of leaderbs including Antonius, Octavian remained alone in power, acted as consul, distibuted honkirs and gifts, rising in power usurping the Senate, the magistrates, the laws.

#2. Neque provinciae illum rerum statum abnuebant, suspecto senatus populique imperio ob certamina potentium et avaritiam magistratum, invalido legum auxilio, quae vi ambitu, postremo pecunia turbabantur.

Nor did the provinces oppose the new regime, for that which had been the government of the Senate and the people, now went awry among competing forces in the State.

I, iii.

#1. Ceterum Augustus subsidia dominationi Claudium Marcellum, sororis filium, admodum adulescentem pontificatu et curuli aedilitate, M. Agrip-

pam, ignobilem loco, bonum militiae et victoriae socium, geminatis consulatibus extulit, mox defuncto Marcello generum sumpsit; Tiberium Neronem et Claudium Drusum privignos imperatoriis nominibus auxit, integra etiam tum domo sua.

Augustus took various initiatives in order to consolidate his power, assigning the title of "imperator" to his stepsons Drusus and Tiberius. After the former's death, Augustus adopted Tiberius as his son.

#2. Nam genitos Agrippa Gaium ac Lucium in familiam Caesarum induxerat, necdum posita puerili praetexta principes iuventutis appellari, destinari consules specie recusantis flagrantissime cupiverat.

Further dispositions for family members and others.

#3. Ut Agrippa vita concessit, L. Caesarem euntem ad Hispanienses exercitus, Gaium remeantem Armenia et vulnere invalidum mors fato propera vel novercae Liviae dolus abstulit Drusoque pridem extincto Nero solus et privignis erat, illuc cuncta vergere: filius, collega imperii, consors tribuniciae potestatis adsumitur omnisque per exercitus ostentatur, non obscuris, ut antea, matris artibus, sed palam hortatu.

Tiberius adopted as son by Augustus. Augustus heaping honors upon Tiberius, as a colleague in the government and with the power of tribune. Augustus, now old and decrepit, comes under Livia's full control.

#4. Nam senem Augustum devinxerat adeo, uti nepotem unicum, Agrippam Postumum, in insulam Planasiam proiecerit, rudem sane bonarum artium et robore corporis stolide ferocem, nullius tamen flagitii comperit. At hercule Germanicum, Druso ortum, octo apud Rhenum legionibus imposuit adscirique per adoptionem a Tiberio iussit, quamquam esset in domo Tiberii filius iuvenis, sed pro pluribus muinmentis insisteret.

Bellum ea tempestate nullum nisi adversos Germanos supererat, abolendae magis infamiae ob amissum cum Quintilio Varo exercitum quam cupidine proferendi imperii aut dignum ob praemium. Domi res tranquillae, eadem magistratum vocabula; iuniores post Actiacam victoriam, etiam senes plerique inter bella civium nati: quotus quisque reliquus, qui rem publicam vidisset?

The youngest generation was born after the battle of Actium: the elders mostly during the civil wars: "whoever was still alive who could remember the Republic?". The nostalgic Tacitus!

I, iv.

#1. Igitur verso civitatis statu nihil usquam prisci et integri moris: omnes exuta aequalitate iussa principis aspectare, nulla in praesens formidine, dum Augustus aetate validus seque et domum et pacem sustentavit.

With the disruption of the system of the State, of the ancient and correct order nothing remained. With (the ancient) equality gone, everybody looked out for the command of the prince/ruler as long as Augustus, still in full vigor, kept up himself, his family, and (universal) peace.

#2. Postquam propecta iam senectus aegro et corpore fatigabatur adertaque finis et spes novae, pauci bona libertatis in cassum disserere, plures bellum pavescere, alii cupere; pars multo maxima imminentis dominos variis rumoribus differebant:

But things changed for the worse when Augustus went into decline from old age. Some people were nostalgic, others hoped for better times, etc.

#3. trucem Agrippam et ignominia accensum non aetate neque rerum experientia tantae moli parem; Tiberium Neronem maturum annis, spectatum bello, sed vetere atque insita Claudiaie familiae superbia, multaue indicia saevitiae, quamquam premantur, erumpere.

Many criticized the leaders. Agrippa was not adequate to meet the situation, but Tiberius, now of age, excellent soldier, but of traditional arrogance, showing signs, yet suppressed, of brutality.

#4. Nunc et prima ab infantia eductum in domo regnatrice; congestos iuveni consulatus, triumphos; ne iis quidem annis, quibus Rhodi specie secus exulem egerit, aliquid quam iram et simulationem et secretas libidines meditatam.

Tiberius: educated among the sovereigns, covered even as a young man with consulships, triumphs..., had, already when young, developed grudge, falsehood and unnamed pleasures, all with influence from the over-ambitious mother (Livia).

#5. Accedere matrem muliebri impotentia: serviendum feminae duobusque insuper adolescentibus, qui rem publicam interim premant quandoque distrahant.

Under such female influence he let the State be trampled upon and then be torn to pieces.

I,v

#1. Haec atque talia agitantibus gravescere valitudo Augusti, et quidam scelus uxoris suspectabant.

While such things were being discussed, Augustus went into a decline, and some people suspected his wife (Livia) for this.

#2. Quippe rumor incesserat paucos ante mensis Augustum electis consociis et comite uno Fabio Maximo Planasiam vectum ad visendum Agrippam; multas illic utrimque lacrimas et signa caritatis, spemque ex eo fore ut iuvenis penatibus avi redderetur. Quod Maximum uxori Marciae aperuisse, illam Liviae. Gnarum id Caesari; neque multo post extincto Maximo, dubium an quaesita morte, auditos in funere eius Marciae gemitus semet in-

cusantis, quod causa exitii marito fuisset. Utcumque se ea res habuit, vixdum ingressus Illyricum Tiberius properis matris literis accitur; neque satis compertum est, spirantem adhuc Augustum apud urbem Nolam in exanimem reppererit.

Augustus meeting Agrippa, family troubles and suspected murders.

#3. Acribus namque custodiis domum et vias saepserat Livia, laetique interdum nuntii vulgabantur, donec provisus quae tempus monebat simul excessisse Augustum et rerum potiri Neronem fama eadem tulit.

Livia kept the Palace closed and guarded, and rumor spread that Augustus was recovering. Until, the necessary preparations having been, it was announced that Augustus was dead and Tiberius taking over the power.

I,vi

#1. Primum facinus novi principatus fuit Postumi Agrippae caedes, quem ignarum inermumque quamvis firmatus animo centurio aegre confecit.

Murder of Agrippa the first noteworthy event in the new Principate.

#2. Nihil de ea re Tiberius apud senatum disseruit: patris iussa simulabat, quibus praescripsisset tribuno custodiae adposito, ne cunctaretur Agrippam morte adficere, quandoque ipse supremum diem explevisset.

In the Senate, Tiberius pretended that this had happened by order from Augustus.

#3. Multa sine dubio saevaque Augustus de moribus adolescentis questus, ut exilium eius senatus consulto sanciretur, perfecerat; ceterum in nullius umquam suorum necem duravit, neque mortem nepoti pro securitate privigni inlatam credibile erat, propius vero Tiberium ac Liviam, illum metu, hanc novercalibus odiis, suspecti et invisii iuvenis caedem festinavisse.

Despite Augustus' resentment regarding Agrippa's style of life, he would not have ordered his death, only exile. For various reasons, the action fitted the purposes of both Tiberius and Livia.

#4. Nuntiani centurioni, ut mos militiae, factum esse quod imperasset, neque imperasse sese et rationem facti reddendam apud senatum respondit.

The centurion having executed Agrippa claimed having been ordered, while Tiberius protested against having given such an order. Communicative skirmishes over this.

#5. Quod postquam Sallustius Crispus particeps secretorum (is ad tribunal miserat codicillos) comperit, metuens ne reus subderetur, iuxta periculoso ficta seu vera promeret, monuit Liviam, ne arcana domus, ne consilia amicorum, ministeria militum vulgarentur, neve Tiberius vim principatus

resolveret cuncta ad senatum vocando: eam condicionem esse imperandi, ut non aliter ratio constet quam si uni reddatur.

Further discussions over the responsibility for the murder of Agrippa. Warning to Livia, especially not to undermine Tiberius' Principate by provoking the Senate to investigate the matter.

I,vii,

#1. At Romae ruere in servitium consules patres eques, quanto quis inlustrior, tanto magis falsi ac festinantes vultuque composito, ne laeti excessu principis neu tristior<es> primordio, lacrimas gaudium, questus adulatione<m> miscebant.

In Rome, consuls, senators and the other nobile orders hurried to show their respect, the higher their rank, the more they show of loss and sorrow.

#2. Sex. Pompeius et Sex. Apuleius consules primi in verba Tiberii Caesaris iuravere, apudque eos Seius Strabo et C. Turranius, ille praetorium cohortium praefectus, his annonae; mox senatus milesque et populus.

These consuls and other dignitaries and military leaders swore allegiance to Tiberius, with them the Senate, Armies and the People .

#3. Nam Tiberius cuncta per consules incipiebat, tamquam vetere re publica et ambiguus imperandi. Nec edictum quidem, quo patres in curiam vocabat, nisi tribuniciae potestatis praescriptione posuit sub Augusto acceptae. Verba edicti fuere pauca et sensu permodesto: de honoribus parentis consulturum, neque abscedere a corpore idque unum ex publicis muneribus usurpare.

But Tiberius did not take any initiative without consulting the Consuls, just as it was under the Republic, as if he felt insecure about his power; even the edict with which the Senators were called to the Senate, he published under the tribunician power attributed by Augustus. Rituals over the dead Augustus.

#4. Sed defuncto Augusto signum praetoriis cohortibus ut imperator dederat; exubiae arma, cetera aulae; miles in forum, miles in curiam comitabatur.

But immediately when Augustus had died, Tiberius gave out orders in the name of an emperor, etc.

#5. Litteras ad exercitus tamquam adepti principatu misit, nusquam cunctabundus nisi cum in senatu loqueretur.

Tiberius sent out messages to the armies as if he were the emperor, being more careful only when communicating directly with the Senate.

#6. Causa praecipua ex formidine, ne Germanicus, in cuius manu tot legiones, immensa sociorum auxilia, mirus apud populum favor, habere imperium quam expectare mallet.

The main reason for this behavior was the fright of what Germanicus might do.

#7. Dabat et famae, et vocatus electusque potius a re publica videretur quam per uxorium ambitum et senili adoptione inrepsisse.

Tiberius behaved as if he had been called to become emperor rather than being, as he was, installed by the intrigues of his mother (Livia) and the adoration of the old one (Augustus). [That is, no republic any more.]

#8. Postea cognitum est ad introspectiendas etiam procerum voluntates inductam dubitationem; nam verba vultus in crimen detorquens recondebat.

In the end it became clear that Tiberius distrusted the nobility but avoided bringing up the issue, while ensuring himself of recording each of them individually.

I, viii

#1. Nihil primo senatus die agi passus nisi de supremis Augusti, cuius testamentum inlatum per virgines Vestae Tiberium et Liviam heredes habuit. Livia in familiam Iuliam nomenque Augustum adsumebatur, in spem secundam nepotes pronepotesque, tertio gradu primores civitatis scripserat, plerosque invisos sibi, sed iactantia gloriaque ad posteros.

The Vestal Virgins at the Forum declare Tiberius and Livia as the heirs of Augustus, and they assume the titles of Augustus and Augusta. Political elevation of the family. This they did not merit, so the elevation took place with a view to public image and future glory.

#2. Legata non ultra civilem modum, nisi quod populo et plebi CCCCXXXV, praetoriarum cohortium militibus singula nummum milia, <urbanis quingenos>, legionariis aut cohortibus civium Romanorum trecenos nummos viritim dedit. Tum consultatum de honoribus, et quis maxime insignes <visi>, ut porta triumphali duceretur funus, Gallus Asinius, ut legum latarum tituli, victarum ab eo gentium vocabula anteferrentur, L. Arruntius censuere.

Lavish spendings for the benefit of the people and the armed forces.

#3. Addebat Messala Valerius renovandum per annos sacramentum in nomen Tiberii; interrogatusque a Tiberio, num se mandante eam sententiam prompsisset, sponte dixisse respondit, neque in iis quae ad rem publicam pertinerent consilio nisi sui usurum, vel cum periculo offensionis: ea sola species adulandi supererat. Valerius Messala proposed that the oath of allegiance to Tiberius be renewed annually. Tiberius asked him: Did I propose this? and V. M. insisted he had the idea only from himself.

- *At this point the funerary celebrations of Augustus and in #4 the events and evaluations following upon it.*

#4. Conclamant patres corpus ad rogam umeris senatorum ferendum. Remisit Caesar adroganti moderatione, populumque edicto monuit ne, ut quondam nimiis studiis funus divi Iulii turbassent, ita Augustum in foro potius quam in campo Martis, sede destinata, cremari vellent. Die funeris milites velut praesidio stetero, multum inridentibus qui ipsi viderant quique a parentibus acceperant diem illum crudi adhuc servitii et libertatis inprospere repetita<e>, cum occisus dictator Caesar aliis pessimum. aliis pulcherrimum facimus videretur: nunc senem principem, longa potentia, provisus etiam heredum in rem publicam opibus, auxilio scilicet militari tuendum, ut sepultura eius quieti foret.

I,ix

#1. Multus hinc ipso de Augusto sermo, plerisque vana mirantibus: quod idem dies accepti quondam imperii princeps et vitae supremus, quod Nolae in domo et cubiculo, in quo pater eius Octavius, vitam finivisset.

#2. Numerus etiam consulatum celebrabatur, quo Valerium Corvum et C. Marium simul aequaverat, continuata per septem et triginta annos tribunicia potestas, nomen imperatoris semel atque vicies partum aliaque honorum multiplicata aut nova.

Etc.

5.6 BIBLIOGRAPHY

Publ. not listed here will be found in SL, *Burden and Patterns* (these two books are accessible on the present site). The bibliography suffers, I am sure, from incompleteness, for all the titles have been taken from my own shelves. Having spent half my life in Rome, I have some publications, originally in English, only in Italian translations; but generally I do refer to the originals.

Some of the listed publications were used during my work with this book, but later left out of consideration. I have thought it worthwhile to let them stay in this Bibliography.

- Agazzi, E., and Palladino, D., *Le geometrie non euclidee e i fondamenti della geometria*, Milan 1978.

- Albrow, M., and King, E. (eds.), *Globalization, Knowledge and Society. Readings from International Sociology*, London 1990.

- Alexandroff, P., *Elementary Concepts of Topology*, transl. by A. E. Farley, New York (Dover) 1961.

- Alonso, M., and Finn, D. J., *Physics*, Harlow (Engl.) 1992 (numerous reprints).
- Anonymous, *La vida de Lazarillo de Tormes y sus fortunas y adversidades*, published 1554 in Alcalá de Henares, Antwerpen, Burgos and Medina del Campo. Cited editions by Aldo Ruffinatto, Madrid 2001, and Francisco Rico (numerous reprints up to Madrid 2011).
- Antognazza, M. R., *Leibniz. An Intellectual Biography*, Cambridge (England) 2009.
- Archer, M. S., *Resisting the Revival of Relativism*, in M. Albrow and E. King, *Globalization, Knowledge and Society. Readings from International Sociology*, London 1990, pp. 19 - 33.
- Bach, E., *Syntactic Theory*, New York 1974.
- Barden, D. and Thomas, Ch., *An Introduction to Differential Manifolds*, London 2003, reprints 2005, 2008.
- Barrow, J. D., *The Infinite Book. A Short Guide to the Boundless, Timeless and Endless*, London 2005.
- Bartocci, C., *Racconti matematici*, Turin 2006/7.
- Beam, W. R., *Systems Engineering. Architecture and Design*, New York 1990.
- Beiser, A., *Perspectives of Modern Physics*, New York 1969 (numerous editions).
- Bennett, J., *Kant's Analytic*, Cambridge (Eng.), 1966.
- Bentham, J. van. *A Manual of Intensional Logic*, 2nd. ed., rev. and extended, Stanford (CA) 1988.
- Blay, M., *Les raisons de l'infini. Du monde clos à l'univers mathématique*, Paris 1993, Engl translation, *Reasoning with the infinite*, Chicago 1998.
- Boden, M. A., *Computer Models of Mind, Computational approaches in theoretical psychology*, Cambridge (Engl.) 1988.
- Borgatti, S. P., Everett, M. G. and Johnson, J. C., *Analyzing Social Networks*, London 2013.
- Bolles, E. Blair, *Einstein Defiant. Genius versus Genius in the Quantum Revolution*, Washington, DC, 2004.
- Born, R. (ed.). 1989: *The case against Artificial Intelligence*, London (orig. ed. 1987).
- Bruno, Giordano (modern scholar), *see* De Finetti.
- Buchler, J., *The Concept of Method*, Lanham (MD) 1985 (orig. New York 1961).
- Camejo, Silvia Arroyo, *Skurrile Quantenwelt*, Springer-Verlag, Berlin 2006.

- Cantoni, V., and Levialedi, S., *La visione delle macchine. Tecniche e strumenti per l'elaborazione di immagini e il riconoscimento di forme*, Milan 1989 (with 28 contributions).
- Canavaggio, Jean, *El siglo XVII*, in *Historia de la literatura española*, III, ed. J. C., Barcelona 1995.
- Cartwright, N., *How the laws of physics lie*, Oxford 1983
- Cassidy, D. C. *Uncertainty. The life and science of Werner Heisenberg*, New York, 1991. .
- Castro, Américo, *El pensamiento de Cervantes [1925] y otros estudios cervantino, prólogo de Julio Rodxriguez-Puértolas*, Madrid 2002,
- Cercas, J., *Anatomía de un instante*, Barcelona 2009.
- Cervantes, Miguel de, *Novelas ejemplares, selección*, ed. Antonio Rey Hazas and Fiorencio Sevilla Arroyo, Madrid 1997.
- Chalmers, D. J., *The Conscious Mind. In Search of a Fundamental Theory*, New York 1996.
- Churchman, C. W., *The Systems Approach*, 2. ed., New York 1979.
- *Cid, Poema de Mio*, ed. and Introduction, Colin Smith, 1976 up to 26 ed., Madrid 2008 (English original, not available for SL; but the Spanish editions are revised several times: Oxford 1972).
- Clark, R. W., *Einstein. The Life and Times*, New York 1972.
- Clericzuzio, A., *La macchina del mondo. Teorie e pratiche scientifiche dal Rinascimento a Newton*, Rome 2005.
- Copi, I. M., *Symbolic Logic*, 5th. ed., New York 1979.
- Cormac, E. R. M., *A Cognitive Theory of Metaphor*, Cambridge (MA), 1985.
- Damasio, A. R., *Descartes' Error. Emotion, Reason, and the Human Brain*, New York 1994.
- Davis, G. B., and Olson, M. H., *Management Information Systems. Conceptual Foundations, Structure and Development*, 2nd. ed., New York 1988.
- De Finetti, B., *L'invenzione della verità* (posthumous), ed., with an important *Introduction: Scienza senza illusioni*, by Giordano Bruno and Giulio Giorello, Milan 2006.
- Dieter, G. E., *Engineering Design. A Materials and Processing Approach*, 2nd ed., New York 1991.
- Drexler, K. E., *Engines of Creation. The Coming Era of Nanotechnology*, London 1990.
- Eves, H., *Foundations and Fundamental Concepts of Mathematics*, 3rd. ed., Mineola (NY) 1990.
- Ferguson, F., *Architecture, cities and the systems approach*, New York 1975,

- Feyerabend, P. *Wider den Methodenzwang*, Suhrkamp Taschenbuch edition, Frankfurt a/M, 1986, originally 1976.
- Feynman, R. P., *The Character of Physical Law*, introd. by Paul Davies, London 1992 (orig. London 1965).
- Feynman, R. P., *Six Not-So-Easy Pieces. Einstein's Relativity, Symmetry and Space-Time*, London 1997.
- Finetti, B. de, *L'invenzione della verità*, ed. posthum., Milano 2006.
- Fischer, E. P., *Werner Heisenberg. Das selbstvergessene Genie*, Munich 2002 (paperback 2003)
- FitzGerald, J., and FitzGerald, A., *Fundamentals of Systems Analysis. Using Structured Analysis and Design Techniques*, 3. edition, New York 1987.
- George, A. L., and Bennett, A., *Case Studies and Theory Development in the Social Sciences*, Cambridge (MA) 2005.
- Geier, M., *Kants Welt. Eine Biographie*, Reinbek/Hamburg 2003.
- Gell-Mann, M., *The Quark and the Jaguar. Adventures in the Simple and the Complex*, New York 1994.
- George, A. L., and Bennett, A., *Case Studies and Theory Development in the Social Sciences*, Cambridge (MA) 2005.
- Giddens, A. 1981: "Agency, institution, and time-space analysis", Knorr-
- Giere, R., *Explaining Science. A Cognitive Approach*, Chicago 1988.
- Cetina and Cicourel (eds.), *Advances in social theory and methodology. Toward an intergration of micro- and macro-sociologies*, Boston (MA), pp. 196f.
- Giorello, Giulio, *see De Finetti*.
- Gleick, J., *Chaos. Making a new science*, London 1988, cited ed. 1993.
- Góngora, Luis de, *Soledades*, ed. and comments, John Beverley, Madrid 1979, 14. ed 2009.
- Gray, J., *The Hilbert Challenge*, Oxford 2000 (known to me only by reference).
- Gregory, *see SL, Burden and Patterns*.
- *Handlexikon zur Wissenschaftstheorie* (ed. H. Seiffert and G. Radnitzky), Munich/München 1989, reprint 1992.
- Heisenberg, W., *Quantentheorie und Philosophie*, ed. J. Busche, with his *Nachwort*, Stuttgart 2006 (orig. 1979) (With six important articles by W. H., starting with *Die Geschichte der Quantentheorie*, and including *Quantenmechanik und ein Gespräch mit Einstein*, and *Quantenmechanik und Kantsche Philosophie*).
- Heisenberg, W., *Der Teil und das Ganze. Gespräche im Umkreis der Atomphysik*, Munich 1969 (paperback 2005).
- Hernández, D., *Qualitative Representation of Spatial Knowledge*, Berlin 1994.

- Hintikka, J., *Logica, giochi linguistici e informazione*, Milan 1975 (original: *Logic, Language-Games and Information*, Oxford 1973 - English original not available to the present writer).
- Horgan, J. 1996: *The end of science. Facing the limits of knowledge in the twilight of the scientific age*, New York, paperback NY 1997.
- Hornsby, J., *Physicalist Thinking and Conceptions of Behaviour*, in Pettit, Ph. and McDowell, J., *Subject, Thought, and Context*, Oxford 1986, pp. 95 - 115.
- Hundsbichler, H., *Alltagsforschung und Interdisziplinarität*, in *Medium Aevum Quotidianum*, ed. G. Jaritz, No. 40, 1999, pp. 7 - 34.
- Isaacson, W., *Einstein. His Life and Universe*, London 2007.
- Italiani, M., and Serazzi, G., *Elementi di informatica*, 2nd. ed., Roma 1989.
- Jakobsen, K., *Modern Design Principles in View of Information Technology*, with 17 contributions, Trondheim 1988.
- Jaritz, G., ed., *Ritual, Images, and Daily Life. The Medieval Perspective*, Berlin 2012. With twelve contributions on Christian, Islamic and Jewish material.
- Jeffrey, R., *Formal Logic. Its Scope and Limits*, 2nd. ed, New York 1981.
- Jones, R. O., ed. and augmented by P. M. Cátedra, *Historia de la literatura española 2: Siglo de Oro: prosa y poesía*, Barcelona 2009.
- King, P., "They have eyes that they might not see": *Exploring Object, Display, and Gaze in Religious Drama*, *Jariz, pp.191 - 207.
- Kitcher, Ph., *The Nature of Mathematical Knowledge*, New York and Oxford 1984.
- Körner, S., *The Philosophy of Mathematics. An Introductory Essay*, New York 1968.
- Kosinski, A. A., *Differential Manifolds, With a New Appendix by John W. Morgan on the Work of Grigori Perelman*, 1993, Dover Ed., New York 2007.
- Krakowiak, S., *Principles of Operating Systems*, Cambridge (MA), transl. from French, 1989.
- Kramer, E. E., *The Nature and Growth of Modern Mathematics*, Princeton (NJ), Corr. ed. , 1982.
- Lazarillo de Tormes, *see Anonymous*.
- Leinaas, J. M., *Kvantemekanikk 100 år etter Planck* (n Norwegian: *Quantum Mechanics 100 years after Planck*), lecture in the Norwegian Academy of Science, Oslo 2001, pp. 316 - 335.
- Lerner, D., ed., *Qualità e quantità e altre categories della scienza*, Torino/Turin 1971 (orig. from various collections at The American Academy of Arts and Sciences, and The Massachusetts Institute of Technology).
- Lipschutz, S., *Discrete Mathematics*, New York 1976 (numerous reprints).
- Llosa, Mario Vargas, *Cartas a un joven novelista*, Madrid 2012.

- Lord, E. A., and Wilson, C. B., *The Mathematical Description of Shape and Form*, New York 1984, reprint Chichester 1986.
- Lucretius Carus, Titus, *De rerum natura*, ed., parallel transl., with an introduction (pp.8 -42) and footnote comments, Francesco Vizioli, 3 ed., Rome 2012.
- Machiavelli, N., *Istorie fiorentine*, ed. Carlo Muscetta, Milan 1962.
- Marion, J. B., *La fisica e l'universo fisico*, Bologna 1975 (transl. from *Physics and the Physical Universe*, New York 1971).
- Merò, L., *I limiti della razionalità. Intuizione, logica e trance-logica*, Bari 2005, transl. from Hungarian via the German edition: *Die Grenzen der Vernunft. Kognition, Intuition und Komplexes Denken*.
- Mestre i Godes, Jesús, *Breu història de Catalunya* (in Catalan), Barcelona 1998.
- Miller, A. I., *Imagery in Scientific Thought. Creating 20th-Century Physics*, Cambridge (MA), 1988.
- Mills, C. Wright, *The Sociological Imagination*, New York 1959, numerous later editions, also in *Pelican Books*.
- Minsky, L., and Papert, S. A., *Perceptrons. An Introduction to Computational Geometry*, expanded ed., Cambridge (MA) 1988.
- Nozick, R., *The Examined Life. Philosophical Meditations*, New York 1989/90.
- Padover, Saul K., *Experiment in Germany. The Story of an American Intelligence Officer*, of 1946, which I have in the Italian version, called, wildly misleading, *L'anno zero. 1944-1945: un soldato ebreo alla scoperta della catastrofe tedesca*, Turin/Torino 2003. He, who was not a soldier, "discovered" and reported about attitudes, not the disaster.
- Parker, Ch. S., *Management Information Systems. Strategy and Action*, New York 1989.
- Paso, F. del, *Viaje alrededor de El Quijote*, Mexico 2004.
- Penrose, R., *The emperor's new mind. Concerning computers, minds, and the laws of physics*, Oxford 1989.
- Penrose, R., *Shadows of the mind. A search for the missing science of consciousness*, Oxford 1994.
- Pettit, Ph. and McDowell, J., *Subject, Thought, and Context*, Oxford 1986.
- Polkinghorne, J. C., *The Quantum World*, London 1984 (later paperbacks)
- Pylyshyn, Z. V., *Computation and Cognition. Toward a Foundation for Cognitive Science*, 1984, 2nd ed., Cambridge (MA), 1985.
- Quevedo, Fr. de, *La vida del Buscón llamado Don Pablos*, ed. D. Ynduráin, numerous reprints up to Madrid 2008.

- Radnitzky, G., *Contemporary schools of metascience*, I, II, Göteborg 1968, reprint 1970
- Rose, H. J., *A Handbook of Latin Literature*, New York 1960.
- Ruffinatto, Aldo, edition of *La vida de Lazarillo de Tormes y de sus fortunas y adversidades*, see *Lazarillo*.
- Schneider, H., and Barker, G. Ph., *Matrices and Linear Algebra*, 2nd. ed. New York (Dover) 1968.
- Searle, J. R., *Intentionality. An essay in the philosophy of mind*, Cambridge 1983.
- Selleri, F., *Die Debatte um die Quantentheorie*, 3d edition, Braunschweig 1990.
- Shilov, G. E., *Linear Algebra*, rev. Eng. ed. by R. A. Silverman, New York (Dover) 1977.
- Shweder, R. A., and LeVine, R. A., *Cultural Theory. Essays on Mind, Self, and Emotions*, Cambridge, Eng., 1984.
- Silverman, D., *The Theory of Organizations. A Sociological Framework*, London 1970 (later reprints).
- Simon, H. A., *Models of Thought*, New Haven (CT) 1979.
- Simon, H. A., *Reason in Human Affairs*, Stanford (CA) 1983.
- Simon, H. A., *The Sciences of the Artificial*, 3rd. ed., Cambridge (MA) 1996.
- Sinding-Larsen, S., see the present site and
- Sinding-Larsen, S., , *A Tale of Two Cities. Florentine and Roman visual contexts for fifteenth-century palaces*, Institutum romanum Norvegiae, *Acta*, VI, 1975, pp. 163 - 212, XLI plates. *The text republished in the present book.*
- Skemp, R. R., *The Psychology of Learning Mathematics*, London 1971, Penguins 1979.
- *SL, T2C*, see Sinding-Larsen.
- Smith, C., see *Cid*.
- Sowa, J. F., *Conceptual Structures. Information Processing in Mind and Machine*, New York 1984.
- Spencer, D., *Computers and Programming Guide for Scientists and Engineers*, 2. ed. Indianapolis 1980.
- *Stanford Encyclopedia of Philosophy*,

T2C = See Sinding-Larsen.

- Thürkauf, M., *Sackgasse Wissenschaftsgläubigkeit. Zur Überbewertung der exakt-naturwissenschaftlichen Betrachtungsweise durch die Erfolge der Technik*, Zürich 1975.
- Ynduráin, D., see Quevedo.

- Vision, G., *Modern Anti-Realism and Manufactured Truth*, London 1988.
 - Vizioli, *see* Lucretius.
 - Weizsäcker, C. F., Von, *Aufbau der Physik*, Munich/München 1988 (orig. 1985),
 - Wirth, J., *L'image médiévale. Naissance et développements*, Paris 1989.
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