INTERACTIONS OF ACTORS, THEORY AND SOME APPLICATIONS

A SERIES OF VOLUMES
By Gordon Pask and Gerard de Zeeuw.
OOC/CICT/Universiteit Amsterdam
Volume 1 of this series, an introductory monograph OUTLINE AND OVERVIEW
Gordon Pask.
Latest Edit. Nov.12.1992. Nov. 17th. 1992
latest dec 23 1992
Completed, June,1992. Filename.Gordonsbook, in WN.2.0.

This version now with table of contents, index, numbered paragraphs is edited by Nick Green This material was in unfinished manuscript form and references are incomplete. The quirkiness of Pask's draft style has been kept eg the use of "??" and upper case. Suggestions for corrections willingly accepted. The plates 1 and 2 have not been found and references to missing material have been kept. As in the manuscript subscripted notation has been avoided. This is an aid to email format discussion.

There is no section 2.1 in Chapter 1 or point 2 in Chapter 5 (II) SOME FUNDAMENTAL NOTIONS OF C.T., Lp AND OF I.A. THEORY.

Only Figures 12,13,14, 15, 16, 17, 19, 28 and 35 are known and have been included.

They key innovations seem to be represented.

IA theory developments from 1993- 1996 are covered in Green "Axioms from Interactions of Actors Theory" (to be published in Kybernetes)
http://www.nickgreen.pwp.blueyonder.co.uk/PIA2.PDF.

Recent reference to the unpublished commercial memo on the Chicago axioms established the primacy of coherence and differentiation as potentially generative of the IA axioms. Gordon listed
a. Coherence
b. Differentiation (Distinction)
c. Evolution
d. Activity (internal and external)
e. Communication and Ability to Learn.
See Footnote 11 in "On Gordon Pask" Kybernetes vol 30 vol. 5/6 2001 pp673-682
The importance of this was not realised until a literal interpretation of coherence was undertaken based on Pask's citation of Rescher ie all the set theoretic requirements of Rescher apply to the quantum coherence vector. This is work in progress.
Last correction 8th April 2004

nick_green@blueyonder.co.uk

INTERACTIONS OF ACTORS, THEORY AND SOME APPLICATIONS 1

INTRODUCTION

1. A separation of the variant from the invariant is, very often, taken to be the first and the main step in mounting a rational study. Only when this much has been accomplished, usually in terms of a conceptual model, is further, more discriminating and deeper enquiry or experiment justifiable; for that matter, more systematic research work of any kind worthwhile and practicably possible.

2. Such a large step, does, on the whole, take a long while to achieve. For example, the century-long march of Newtonian-Science, revised but not entirely rescinded by Einstein, Bohr and Planck ... not to mention Schroedinger, Penrose and others ... could only begin after Newton's insight of excluding or, in one sense, coalescing the multiple variance of volitional influences. Most other disciplines have tried to obtain, have managed, at least, to emulate general invariants, for example, by the conservation of energy.

3. Invariance assumes a dominant position if one wishes to improve one's own activity, to use the results of rational investigation, in order to do so. USE constitutes a MAJOR conditional prerequisite, if the results obtained are to remain invariant. In fact, if invariance has been established under ALL possible conditions, then there is a warrant or guarantee that usability will NOT become exceptional. For example, most people would find it difficult to live in a world where the (probably inaccurate, but never mind that), law of gravity did not apply. It is a useful approximation, of course, but we have graviton particles and fluctuating gravitational fields (down deep mine shafts and up high towers), so that the useful law must stand up to the critique of rational approximation if we are to reliably send rockets, even to the moon.

4. Strangely enough, in many social or psychological environments, this kind of enigma is exactly that which people do experience. Perhaps because of that, their experience is neither unexpected nor does it attract much attention. People know well that whatever is demonstrably invariant can neither, in practice, be used to maintain this very invariance nor to contravene it, by injecting variation. Patterns of behaviour, for instance, are changeable, to an astonishing degree by agreements, covert or overt, and by rules, tacit or announced; these, in themselves, do not have to be, frequently are not, linked in some clearly explicated manner to the manifest patterns. Further, the range (Kelly G.) or realm of usefulness of fiats, edicts or principles turns out as being hard to specify if it is, very reasonably, required that we incorporate properly formulated tests for invariance.

5. One consequence of this kind of experience in the social and psychological domain (uniquely, perhaps, but in the broadest possible sense, to include political, national, industrial systems, also), is that it becomes exceptionally difficult to gather "hard" data or to make "hard" observations. In order that a datum or observation be HARD, in the generally accepted sense, implies that the observation must be repeatable under numerous different conditions, of space, moment, for example, but especially, of USE. In a social context, this requirement has, at most, been marginally satisfied, in the main cases, such as those of psychotherapy, of education, of social helping and of societal planing, hardly at all.

6. The problem of invariance under use is the core problem faced by the OOC/CICT/programme, University of Amsterdam. Here, it is regarded as the most important problem addressed by all present day work in the social and psychological sciences. Several approaches are being developed, in a wide range of research projects, empirical, interventional and theoretical.

7. It was in this context that Gerard de Zeeuw asked me, nay virtually demanded, that I should help by developing an already existing theory, (Conversation Theory and Lp, (Daniel,J..S,1975,Entwistle,N,1978,Pask.G.1961-1992a-to-y Pask, et al,a-to-f) due to my colleagues and myself, already a locally useful theory, if applied in education, decision making, design and the like) into something able to tackle the much wider issues of societal, organizational, national and international significance. The foundations of this enterprise have already been laid, they are sketched out in this first, monographic volume. They will be greatly amplified, greatly refined and variously discussed in the other, promised, volumes of this series.

8. As the name of the first theory indicates, it stresses the conversational nature of use and of knowledge, more precisely of coming to know both "something" and "one and another", of variance and invariance. It is thus believed capable of encompassing many of the problems considered by the projects in hand and those, many more, seen upon the horizon. Its elaboration, evolution, reincarnation and development, both contemplated and in progress is titled, for fairly clear reasons, "Interactions of Actors Theory". Just as Conversation Theory is often known as C.T., a similar abbreviation is adopted for the novel theory, it is abbreviated to "I.A", as an amiable inversion of "A. I.", since both make use, copious use, of computers but, generally, in quite distinct situations and different manners.

9. From time-to-time people express surprise at the diversity, even the disparity, of the projects in the OOC/CICT/University of Amsterdam research programme. They do so politely, of course, as befits academia, but are manifestly puzzled, as though we had rabbits in our hats, like conjurers, or maybe trick-cards up our sleeves.

10. I confess that this reaction surprises me (Pask) and, so I imagine my co-author in this series, (de Zeeuw). So far as I am concerned, the programme is entirely coherent, that is, it forms a unity with sufficient difference, variety if you prefer it, between researchers, methods and aims to avoid the damning fate of uniformity. By that means it sustains its impetus, of making and improving social support systems, often with computational tools as an asset, also its evolution as a viable entity.

11. For all that, it cannot be denied that some people, in some contexts, do not grasp the coherence which seems so blatantly obvious to the participants. Perhaps, one lesson to be learned is that you MUST participate and that if you do participate, then you ARE responsible.

12. It also appears that one, possibly fundamental reason, why some people do not see the coherence of our programme, is a prevalent but fixed idea of "hard data". The fixed idea is that of "external observers", simply typed, in a familiar and so- called, "objective manner", and this idea, with all of its over-simplifications and sheer absurdities, furnishes ALL the "hard data" so that it is ALWAYS "objective data" or, if imported into

the context of human and social affairs, the numerical measurement of places or of response latencies or whatever, veering to ever increasing refinement.

13. With some outstanding exceptions, such as the determination of receiver operating curves, short, incisive perceptual experiments, even much of ergonomics, for example, this attempt to harden human and social data objectively (that is, as an outside, impartial observer, taking the subject or society as "it referenced") is bound to fail, if only because it leads, even in terms of classical observation, to a reductio-ad-absurdum, of one kind or another. More importantly, the attempt fails because the hard data sought after are "subjectively hard" and are to be discovered within a different epistemological frame where observation necessarily entails participation, in and as part of, the observed system. For instance, a Piagetian interviewer, interacting with a child, often aided by building bricks or LOGO and a turtle (the invention of Feurtzig and Pappert), used, for instance, by Howe and others,(versions from 1973) is one special case. A depth interview,(of the type carried out by Braaten,S,1978, with people or groups of them), is yet another one.

14. That sort of evidence is deemed acceptable, perhaps grudgingly, in the nowadays prevailing intellectual climate, and I can see no reason to reject it, nor ever could do. But to the scientific establishment of the middle 1960's and the early 1970's it was far from palatable, at best dubbed "merely clinical" and, often enough, "apocryphal drivel", or some similar derogatory title.

15. In those days, when we did establish in the frame of C.T., at least, the existence of hard valued psycho-social-subjective data, as hard as the data of physics, though of a distinctive kind, we had to employ all manner of electromechanical, later computer regulated, interfaces in order to show the existence of such stuff as agreements, agreements to disagree but know why, of understandings-that incorporate having come to know, to know how to do and to know why you came to know, in that way.

16. It would be inappropriate to burden the reader with the details of it all, at this juncture or in this volume of our joint series, especially since there are numerous more-or-less detailed and long since published accounts, amongst them the books and papers by Daniel, Entwistle, Pask(1961-1992) and Pask et al, (1965-1992), already noted. These comments appear, superficially, as strictures from a lunatic nursery school teacher; they are not so intended. Rather, they are an appeal to a reader that he or she join in the interaction needed to bring a still developing programme of ideas, experiments, praxis, test and test of usefulness to fruition., to agree or agree to disagree and know why, to our mutual enlightenment. But I take the liberty of inserting some photomontages of the plethora of equipment and the years of painstaking experiment, needed to establish the reality of psycho-social-subjective hard data, (Chapter l. Plate .1. and Plate. 2.), which is one essential constituent of the enterprise. When we speak of data, we mean hard data of this kind.

17. A further reason why confusion may exist is the varied use of the term "information" all variants being invoked, from time-to-time. The best discussion of the well known combinatorial form of Ashby, R,(1956), of Gabor and McKay's "Logon and Metron" theory and Shannon's statistical information is still to be found in Cherry .C, (1957). However, one less common usage is that of Carl am Petri, and it is primarily this which

we intend, when equating the quantity of awareness or of consciousness to a Petri type of information transfer, the exchange relation of physics.

18. Another common reason why people do not see the inherent coherence of the programme is its apparent lack of integration, or orchestration. They could probably be persuaded otherwise by appeal to reason, or the factuality of improvements, or by a demonstrable ability to muster localised resources. It would, however, be far better to invite whoever may be in doubt to enter the front door, to participate in the interaction which leads to the growth of this programme of research and to partake in its evolution . By so participating, agreeing or agreeing to disagree over the resolution of causes for disquiet, their possibly justifiable critiques might, very likely. be converted into positive contributions to buttress, maybe in novel and quite unexpected ways, the resolution of what everyone takes to be distressing situations.

19. All of these capabilities and possibilities call for a human interface, like the Piagetian interviewer, or a mechanical interface, like CASTE or THOUGHTSTICKER, (Plate. 1. and Plate .2.), it is informative to estimate its necessary magnitude. Some kind of quantitative comparison, albeit approximate, is more readily examined in terms of the mechanical alternative, in terms of what, necessarily, is needed to capture the interactions, conversational or not, between the actors involved, further, to do so realistically.

20. The job can be fudged, of course, by using virtual-realities, various hyper-media, and so on, to render the otherwise incomprehensible clear. These devices are very impressive and valuable and should be employed rather than derided. Further, their implementations require, in professional form, only about 10 megabytes of RAM and 50 megabytes of hard disc storage, together with a few background processors or an itty-biity connectionist machine to act as a competent interface. But, taken alone, they ARE fudges, that only, however valuable. For the main interfaces between people and societies, are systems using, in one technique, virtual machines as surrogates for elaborate numbers, vectors, matrices and so on, often non-linear, for computation and used as the basic substratum. In this idiom, other machines, acting upon them, that are productive and, incidentally reproductive, machines, and, being virtual machines in their own right, serve well as the computational elements.

21. This is only one method of achieving the concurrency required of a genuinely evolving interface system. But it is a useful exemplar, since it is necessary, still using the multimodal- hype rmedia interfaces, to multiply the 10 megabyte and 50 megabyte figures suggested, by about 100 and, as a result of doing so, intelligently, their efficacy is increased by about 2500, or more. It is possible to justify these rough-and-ready numerical comparisons, far from the best and amongst the more conservative, but it would detract from the main line or argument, to do so, at this point. That is particularly so, because a cartload of technical systems, interfaces or not, mingled with a few interesting ideas and results, are scarcely enough to convince those skeptics, who do not see the coherence of our programme, the OOC/CICT/Univsiteit Amsterdam, of the fact that it IS, coherent. This, perhaps, is why Gerard de Sew asked me to start and to mount a convincing argument, distinct from his own, (for example, Zeeuw, G. de1985 or Zeeuw, G. de 1990), with which I am in accord, in this FIRST volume of our series and to assist in the preparation of other VOLUMES in that series, presaged by de Zeeuw, G. and Pask G., complied by Glanville R.,(1992).

22. Finally, the development of a rather specialised theory, namely, I.A. Theory, has given rise to a number of useful by-products. Some of these have a wider-scope, beyond the expected compass of I.A. and some features, having applications that are virtually universal.

23. The enterprise was not contrived for this purpose, but the outcomes, detailed in Chapter I. do not altogether surprise either de Zeeuw or myself. In essence, the outcomes concerned are

24. (a). That as the development of I.A. theory went on and still goes on, the more its FORM approaches the FORM of a well kiltered scientific theory, (having, for example, principles of conservation, of symmetry, of complementarity, of duality, parity, exclusion, indeterminacy, essential singularities), and alternative interpretations, (such as the fact that quark-gluon -plasmas are isomophic or nearly so to the notions associated with strings and superstrings). Of course, the content is different, (which is not to say that the contents will never converge), since we deal with hard subjective data and physics, for instance, operates within a distinct epistemic frame, affirming its conclusions by hard objective data albeit emerging, as the content of Bunge's (Bunge. M. ,1967), "Scientific Knowledge" from the multilemmas and problems of the "Common Knowledge", which primarily concerns us.

25. (b). This point is aptly phrased by Stephen Hawkins in his most recent book, (Hawkins,1992), when he distinguishes between a universal theory, on the one hand, and its enlivenment by understanding, on the other. The commonality asserted makes sense, since I.A. is chiefly a theory of understanding, especially your understanding of me, mine of you, both of us, our shared understanding of those universes in which we live and have our being.

26. But it is only so by virtue of a participation, which promotes evolution. Our thesis is so general, but also so rigorous, that it might be expected to have a pervasive influence upon many, so called-disciplines, or areas of study.

PLATE.1. PLATE.2., IN HERE

CHAPTER 1. PRELIMINARIES

27. This monograph stands, in its own right, as a book. But it is more profitably regarded as the prologue to a series of books, by Gerard de Zeeuw and myself, as Volume 1 of that series. All of these volumes are concerned with concepts of organizations, systems of belief, cultures and civilisations; concisely, about andragology, if you accept the Dutch meaning of the word; that of enquiry and intervention research into society, support systems in or between cultures, of their concrete manifestations, be they architectural or intended for transportation of people, goods or data or relying upon computational artefacts, needed to maintain the precious jewels of civilised life.

28. I have subtitled this book a monograph, since I accept responsibility, alone, for its idiosyncrasies and dogmas. But, insofar as these dogmas prove to be effective, even salient, then it may, more properly, be titled, volume 1; of a series written by Gerard de Zeeuw, by myself, colleagues and friends. In that respect, this volume 1, my preferred entitulation, is a terse, in places historical and in other places arid and formal prerequisite for scrutiny of the other volumes in a series, which is an evolved but, thankfully, still evolving endeavour, and long may it remain that way.

29. In large measure, though not exclusively, it is focused upon the work of those at, or passing through, the OOC/CICT/ University of Amsterdam, the Netherlands, also those at, or having passed through the Architectural Association School of Architecture, London, U.K.

1.1 SPECIFICATION OF THE FIELD

30. The idiosyncrasy brought to bear upon this first volume (my responsibility, but, it seems, a point of view compatible with the views of many colleagues), is this. Andragology, in common with REAL architecture, that of HABITATION in a society, the civilisation of a culture, is comparable to if not identical with the Cybernetics of inter-personal and intra-personal interaction, of society and its organization, usually entailing media, computation, mechanistic devices and the like. It is biased towards, primarily focused upon, such matters as pedagogy, education, lifelong learning, creativity, self regulation and evolutionary self-organization of human and societal systems, politics, commerce and industry, albeit catalysed or promoted by often-mechanical inventions. Yet, insofar as the theoretical constructs needed and the conclusions reached in this sensibly wide domain, of andragology, architecture and Cybernetics are utterly general, these domains are interleaved with many others. Quite frequently, these others are not human-in-themselves, even if they are forged, in some biological or physical Smithy, by Smiths with human ingenuity. If they are general, as asserted and believed to be, then so they should be and the underlying principles, not so often the data, should have the form and symmetry of a science.

31. Consequently, one centroid id of this enterprise (there are many centroids, such as the alleviation of sufferinq, the catalysis of emerging support systems, the solution of problems and the resolution of problematic situations, the creation and sustenance of langua ages, be they verbal. visual, behavioural or whatever which form essential

ingredients of such endeavours) is, as follows. To demonstrate unequivocally that those fields often alluded to as SOFT sciences, or SLOPPY sciences, are neither soft nor sloppy. A convincing argument for this aspect of the enterprise (as above, not the only aspect), calls for a radical reinterpretation of many attempts to render studies or interventions respectable, by placing the sheep's clothing of statistics, in one form or another, over a body of so-called-factual data which is, on the whole, neither data nor factual. This, obviously, recalls the "subjectively hard" and, (in this context, "objectively hard" data, noted in the Introduction). Frequently, one is not the other, whatever the ticks and crosses distribution. May we, once again, emphasise that OUR "hard data" is seldom "objectively hard" data. As an apologia, objectively hard data is legitimate, if obtainable, but is still based upon the bounding perimeters determined by "subjectively hard", if only as a method of supporting the validity of hypotheses and tests, formulated notions of "agreement" and "agreement to disagree", all subjective and hard, so far as reasonable implicating the interested populace, the body politic, but logically prior to the posing and testing of objective hypotheses. As a point of common sense, the hardness of data, be it molecular and nmr spectra, be it understandings in a conversation, is dependent upon its us usefulness and use It is useful just insofar a it can be knit together into a jersey or a framework, be it tangible and it referenced and objective or a conceptual framework, like a theory or a body of knowledge, signifying nothing of necessity except coming to know. But that, of course, signifies a lot.

32. Here, for example, I allude to statistical methods applied to the ticks and crosses of questionnaire type interviewers and pollsters. Whereas the opinions of the test administrators about those questioned may have great significance, the ticks and crosses they are instructed to record are, for the most part, aleatory. Now, in REAL statistics,we are required to justify the validity of the data underlying the counts we submit to the elegant mathematical techniques of statistics, checking such matters as the independence of evidence, the ultimately reducible-to-dyadic form of relations and so on. THESE crucial steps are, not infrequently, omitted. The fact is that standard statistics takes these judgement for granted, it can apply, in the abstract, to anything having the well specified properties it demands of data. In reality, we are the beings responsible for the exercise of this methodology, and the propriety of the data involved.

33. For example, if monkeys are playing with a typewriter and someone counts the number of keys they press and calls that number the data, so let it be. Well, if those kinds of observations really are data, then it is possible to garner interesting results, mostly that there is no correlation between the data obtained over a myriad trials with a legion of monkeys. Or, if there is some correlation, or an interesting analysis of variance, then it shows something about who manufactured the typewriter and how battered it became, as a result of being thrown upon the floor, in natural irritation, by the creatures. It rarely reveals anything, by way of a conclusion, about the intellect of monkeys, which the experimenter is primarily concerned with Seldom are such misperceptions deliberately fraudulent, they are understandably careless, but nevertheless damaging, consequences of an unthought-out-attempt to make a study of monkeys, or people, look scientific and respectable by applying methods which would be elegant and applicable to appropriate facts, counts, and so on of evidence if it DID have the kinds of factuality required by the scientific method or by the statistical method.

34. In this context it is important to stress that there are several uses of the term " probability", each involving some notion of "likelihood". One of them, the one open to

criticism as often misused, refers to the "chance" of something-or-other, for example of a dice falling on one or other face. The other, immediately significant, usage, employed in quantum mechanics or, for that matter, in our discussion of resonant forms of analogy in Chapter5., is a "disposition" of some event to take place. The latter is, frequently, immune to the criticisms which have just been leveled against the former.

35. Next, it is important to examine the urge to respectabilise most experimental studies or socio-technical-interventions as BEING scientific. Perhaps it is a matter of aesthetics, for scientific and mathematical arguments are undoubtedly beautiful and reveal symmetries of great power and subtlety. Also, of course, there is a less laudable rationalisation; that you are prone to be funded by the establishment if you are regarded as scientific; provided, of course, that science is misconstrued as some sort of technology, the hodmanlike variety, which almost guarantees a product within one, or a couple of years, at most. Personally, I subscribe to a somewhat different view, namely, that there is not an iota of fundamental difference between -art., philosophv and science provided they are all conducted with an appropriate degree of delicacy and integrity. As such, these studies are unlikely to produce scores, at any rate numerical and properly statisticised scores, within a readily predictable interval and there is the risk that an honest investigator will opine that numerically quantified results are not the appropriate findings to search for, at any rate, not the most informative. After all, qualitative findings of equal or greater rigour do, very often, have greater value, unless the sponsor of the research is after Brownie Points, obtained by presenting tables of figures which may be cast into the garbage bin, or else discretely shredded.

36. Clearly, the attitude I have just outlined and countered by a parody, would have been generally regarded as curious a few decades past. The opposite view, still calls for defence, even though, in this year and age, it is becoming increasingly pervasive. Of course, the day to day activities of an artist, fiddling with brushes or musical instruments or dance steps; of philosophers, debating language or the character of the cosmos, reality, mind and all that; of scientists preoccupied with particle accelerators, test tubes, chemicals, Wimshurst machines and so on DO differ, but, also, ARE very similar.

37. To me, maybe it is a matter of personal experience, combined with preference for the eclectic. The similarities are more salient than the evident differences. It is not, perhaps, so surprising that the similarities are prone to stand out more obviously in the domain of intra-personal and inter-personal systems, of social systems and cultures, of organizations and systems of belief, of mind, thought, action, the interaction of actors, in general, and in conversational interaction between various participants. The points which, most likely, require stressing are, apart from some perfectly clear differences in technique, like paint and musical scales and drama method, compared to chemicals, test tubes, cellular culture dishes and so on, are as follows

38. (a).All of them can be formalised, further, formalisation is fruitful. Under certain conditions. In this respect choreology, 7 tone scales and the like, can be invoked, as may Lie groups, or Algebraic Topologies, or Category theories, with roughly equal rigour and their invocation justified, insofar as this degree of rigour is of value.

39. (b).Rigour tends to have great value when discursive expression would be unduly ambiguous, turgid or tedious to handle in recording, so that a symbolic formalism is practically essential. (c). Formalism, let it be stressed, is not restricted to quantitative solutions, qualitative solutions being of equal propriety and often greater profit. It is entirely legitimate to use methodologies, formalisations as a support for many types of rigour. Numerical, quantitative, rigour has its appropriate place in this spectrum, but is often of local usefulness.

40. (d).Art, philosophy, science and the rest are bound to coexist, if any of them have genuine meaning. Upon even casual scrutiny, it would be impossible to understand one without comprehension of the others. To cite but one familiar exemplar from mathematics and science, how else could most people understand the indefinite iteration of non-linear equations, in the complex plane, unless assisted by artistry such as that of Peitgen et al (Pietgen et al, 1991).? They could, of course, parrot out strings of meaningless symbols and perform specific operations, prescribed by a rule book, upon them. That kind of rote repetition is sheer twaddle, not mathematics.

41. (e).Very likely, art, philosophy and science DO have the character of programmes of research, in the sense of Imre Lakatos,(Lakatos.l.,1968), or constitute what we shall call P-Individuals, with Organizational Closure and, if viable, the Informational Openness, originated by the self-organization of Heinz Von Foerster (Von Foerster.H.,1959.a.) However, in the often vaunted disciplines, called by the high sounding names of history, or biology, as used in a curriculum, syllabus or department title and that are imposed as arbitrary distinctions, in order to fund the presiding hierarchy, high or low; rather than to encourage the intended activity in question these disciplines are the merest piffle.

Page 12 Missing

42. Case when psycho-social-educational systems are concerned. The greater part of their data, being of a strong SUBJECTIVE rather than of a strong OBJECTIVE kind, are surely not amenable to these elegant techniques. They are not, even on mathematical grounds, to do with irreducible adicity, (Atkin,1973,1975), let alone that the facts of value are obtained by dint of PARTICIPATION, impartial, maybe, rather than some EXTERNAL type of observation, disconnected and controlled, which, by definition, minimally influences the observed system. There is nothing misbegotten about one kind of data or the other, but it is positively stupid to maintain their identity, deliberately or not. It is misleading to dress them up like dummies, so that they seem to be the same. That is the genesis of fake science, just as an ink splodge in a Rorschach Test might be misconstrued as a piece of modern art. It is particularly irresponsible and irritating when some investigators indulge in a habit which some others fall for, of using the paraphernalia of science proper, statistical methods culled from gaming saloons as one instance, independence of observations as another instance (there are many more of them), in order to respectabilise, as scientific, whatever it is, merely because it is cheap and simple to do.

43. For example, the elicitation of George Kelly-like-personal constructs, in psychology of one-or-other kind, as is done by Sheila Augenstein and Laurie Thomas (in Thomas and Augenstein 1992), is entirely defensible (even if I admit to some very minor quibbles over their methodology). On the other hand, it may or may not be valid to

employ the factor analyses of Osgood's scaling (Osgood..C.E,et a1,1976), or, in a different context, Eysenck's factor analytic and often multidimensional but Cartesian scaling, Eysenck.F,1968,), which demands obedience to various caveats and is liable to be misleading, unless cases are critically examined. In some cases, no doubt, these elaborate statistical techniques and the assumptions underlying them, make good sense, in others less good sense. In either case, an outright acceptance of whatever results are obtained, lacking an appreciation of the methods and the assumptions involved, is a bad, sad, parody of reason, especially if it is taken to justify certain findings as scientific and, thus, respectable.

44. This kind of thinking is also culpable, insofar as it leads others to conclude that there is a sacrosanct method called the scientific method, just one such method. Indubitably, there is a scientific method and it is very elegant, employed with the proper type of evidence. But the elegant is defaced, becomes nauseating and ugly, if misused in order to ape, with gestures, grunts and grimaces the respectable character of otherwise untenable findings or displays.

45. Upon the next point, that of predictability, it is often claimed that every bit of research should lead to predictable results. Clearly, there is some sense in this contention, but limited sense. Suppose, for example, that you are in charge of a production line with operatives doing repetitious jobs, be they manual or clerical (like the check out juniors, at a Supermarket). In that case, it is very likely that various psychometric tests will predict, quite reliably, the willingness of people to act like automata, even to predict their intelligence (not their intellect), that is, how bright an automaton you are likely to obtain. Roughly speaking, these comments apply to those folk who are employed in linear and hierarchically ordered jobs, of the kind that are susceptible to Elliott Jaques's time span analysis (Jaques.E, 1970), where a great deal of meaning can be attached to the preferred time of unsupervised, no feedback, activity. In a linear-hierarchical setting. Here, it is sensible to say that a measure such as the one proposed by Jaques, usually indicates the maximum extent to which potential employees are anxious to accept personal responsibility, indirectly, in such a context, the remuneration they deserve and usually expect. But, thank heaven, such occupational settings are relatively scarce and are, thankfully, less often encountered. More and-more organizations are becoming, at least, heterarchically structured. Humans are being used, as Norbert Wiener put it, for human purposes, (Weiner.N, 1965,), rather than as inefficient robots.

46. Now, in a situation of the latter kind, what does it mean to predict? Further, if you are a manager of the latter sort of situation, do you want to predict? Consider one extreme case, there are plenty of other less dramatic exemplars. Suppose that you have a firm, an organization of any sort, and that this firm or organization needs to improve or diversify its products. For one reason or another, because you run the firm or are assigned decision making responsibility, you are required to employ someone with inventive talent. It might be sensible to look for someone capable of invention, they have demonstrated their capability by inventing, preferably having the perseverance needed to bring their invention to fruition through a nexus of production engineers and an inherently conservative bureaucracy, a process requiring tact and also a degree of determination. But to this extent ONLY, do you seek predictability since, by definition of the job, you do not wish to predict their innovations. If you could, you or one of your colleagues, would have done so, by measure of their own intuitions. Now the inventor

you elect to engage, is not predictable. If he were, you would not really want to employ this person, for there are many whom you do not wish to employ, who will, in their lifespan, have but one invention to their credit, the one you reasonably use as a guideline in selection.

47. Much the same applies, also, to the criterion of repeatability. Do you wish that, under the same or similar circumstances, someone who will give the same response to a superficially similar question, or the same kind of solution to a superficially similar problem?? If you are seeking an elaborate kind of robot, then, maybe, you do. But if you are after a sentient being, flushed out with intellect, then you do NOT.

48. Supposing you are this hypothetical manager, what DO you want. Equisignificantly, supposing that you are a researcher, one in the enormously wide field of concern, addressed by this book and the series of books to come, just what DO you want? I submit, and this IS a slightly Maverick point of view, that you want, nay require, an utterly devoted enthusiast, having a different since all embracing perspective upon art, philosophy, science and the rest. Further, pardon the dogmatism, you NEED it.

49. In this preliminary book, I shall attempt to delineate such a person or, more likely, group. That material is, largely, embedded in the formal part of this monograph. It is, of necessity, introduced by some historical account, showing when, how, and why such a perspective was envisioned. It is gratifying that the development of this one perspective gave rise to a formalism which, as it evolved, more-andmore assumed the form, not so much the content as the beautiful symmetries of a scientific theory. Finally, since this monograph is a book which introduces a series of books, it is reasonable, if not mandatory, to provide a tentative overview, tentative since it treats of an evolution.

1.3. ESSENCE OF CURRENT STUDIES

50. The essential theme of our current studies, needs, if only as a matter of convenience, to have a name. It has been called Interaction of Actors theory, or merely I.A. theory, as a humorous but friendly juxtaposition with Artificial Intelligence, or A.I. theory, which it is not, even though they both make prolific but quite different use of computers in their practice. Their practice, of course, that and their methodology, also have a part to play in the theatre of this exposition. Before embarking upon the promised, historical account, of what we may now condense to I.A., it is prudent to spend a few words upon the nature of history itself. That is so, if only because the nature of history, perhaps an outlandish view of it, is one and an important ingredient of the theory and praxis to be scrutinised. Yes, a quite essential one in the outer reaches of the territory we cover of sheer, even if embarrassing, necessity.

1.4. HISTORICAL DEVELOPMENT IN GENERAL

51. To speak of history, any history, as though there was but one somehow canonical history, diligently researched and meticulously carbon dated, for example, is misleading. Such an utterance may be imaged by one of the idols, in the temple of conventional wisdom. But, usually, also, these utterances are segments of

respectabilised blether. The following assertion, that any entity, culture or civilisation, for instance, carries innumerable, in some ways differing, histories, is a deviant, possibly arrogant, assertion, but it is made, at this point, with all consideration and seriousness.

1.5. UNAVOIDABILITY OF MULTIPLE HISTORIES

52. This multitude of histories exists, for several reasons. In the present context, it is appropriate to dwell upon a pair of them, only.

53. First of all, there is a deeply entrenched idea, buttressed by the majority of text books, that history is JUST chronological, a matter of recording and recalling which King, Queen or President reigned or ruled when and where. Now, if we subscribe to this view (which is by no means useless), we are bound, in all honesty, to consider the uniformity or not of temporal succession. Is time the same commodity in South America, in China, in India, Africa, Greece, in Italy, in the rest of Europe, in Bali and Surinam (further, has it always been so). No one, physicists and geneticists apart, seems to question the possibility that time is not uniform throughout these domains or during these very different periods.

54. Well, I do, not because I disagree with or even contest, its validity and manifest convenience, but simply because I can see little other than-limited experiential evidence in favour of this elegant but possibly over-rated, even if undeniably-useful, hypothesis.

55. In contrast, we can imagine history as a systematic enactment of how people, Kings and Potentates included, conceptualise, feel, think and act; of how societies do the same; if you like, the study of a reenactment, an enactment of aeons-to-be; of futures. Or if temporal succession is occasionally tied into knots explicating how these activities recur, then you may be immersed in a wonderment over how there is history at all. Just consider, for a moment, the days of Druids, of Roman Britain, of Nordic York or Norman York, the age of the Stuarts and their Masques, of the London Mob, or, after the Peelers came along, of stage coaches and the railways, the resurgence of the early Victorian from the sombre shades of the next half generation into the gay but evanescent Edwardian. These juxtaposed points of view upon history are complementary, not contradictory. They have and should have the quality of life, surely supported by chronological tables, as right as a table can be.

56. I am stressing these matters and differences, if only because they become outstandingly significant in delineating a history of I.A., theory and practice and method. Here, I know, from personal although necessarily limited experience, that there are many different histories. I shall essay to indicate a few, some of greater value to some people, some of greater value to other people. None of them are canonical, but all of them are valid and, in their own way, by comparison and contrast, very illuminating.

57. More dramatically, since it explicitly invokes evolution, compare and contrast the hoary, doubtless veridical chronology most often passed around. There were animals, some became people, some people formed nomadic hunting groups, others, of less

peripatetic inclination, settled down as agricultural groups; both formed cultures with languages, however of different kinds. The former were satisfied by sign signification, the latter formed cultures having a fixed territory in which they built houses and cities; these, being inhabited as well as protective, gave rise to civilisation with symbolic value attached to the territory and the artifacts they erected. But, conversely, how could animals have been people unless they had a mind containing a germinating seed of people, culture and civilisation, the logical priority??

58. As a curtain call, if there be one, after the first scene it is seemly to present the arguments of Collingwood.R.G,(1990) and Collingwood.R.G,(1990), Oxford University Press.

CHAPTER 2. I.A. HISTORY IN OUTLINE

59. One history, a perfectly valid one, is that I.A. came into being as an innovative extension of conversation theory (henceforward, C.T.) and its proto-language or proto-logic (henceforward, Lp). This development was, in large measure, due to the invaluable help and provocation provided by Gerard de Zeeuw, in respect to social support systems, with a bias (emerging more clearly in a later book), to the field of engineering management (instigated by Larry Richards), for academic precision, see, for example, Richards.L, (1992).

60. In the role of a rational being, it is my task to say what C.T. and Lp are. Given the added role of historian, to say how C.T., Lp, also I.A. theory, emerged. The latter role is a difficult part to play, even to write for reasons which the reader may well have culled from the lengthy preamble upon history, exposed in the last chapter. It is so, even though I am possibly the first and main protagonist of conversation theory and have as much personal experience as anyone of its origins.

61. So far as chronology is concerned, it is easy enough to cite manifestos and research programme outlines, dating from the very late 1960s and the early 1970s, with the names Conversation Theory and Lp (or its slightly misnomered predecessor, entailment mesh), printed in bald capital letters. But it is surprising to this author, at any rate, to discover, afresh, one's own papers or one's own articles (for example, in Dialectica, pp. 167.-pp. 202, Vol. 2, Vol. 3, Neuchatel, 1963, "The use of analogy and parable in Cybernetics, with emphasis upon learning and creativity", or, in Wiener and Schade, Eds, Progress in BioCybernetics, Elsevier, 1966, pp. 158.-p250, " The Cybernetics of Social and of Ethical systems". There are many more, pre-dating and post-dating these papers, which entail the IDEA, of, although rarely the NAME of conversation.

62. It should be evident that history is not a neat and linear chronology, even to its participants. Similarly, let me state that none of these notions, initially of making bizarre chemical and biological machines, able to compute, in order to philosophically demonstrate the sheer, asinine, fatuity of supposing there to be any input or output apart from those determined, as a matter of convenience, by some external observer, to an assembly of fabric called a computer or controller.

63. Such assemblages arose, together with clouds of nitrogen peroxide, from other-than-laboratory studies, excepting those in our basement, kitchen, or a lock-up-garage. Similarly, the most telling demonstrations of interaction, albeit human interaction through machinery, hybrid but less bizarre, arose from the worlds of cabaret, of music hall, of theatre and the like, where, under the stress imposed by the pressing necessity of putting on a show, if only to earn a living, my colleagues and I came to realise that it IS possible to couple people together with multiple mode oscillators, responsive to and regulating music, performers, lights and motions, provided that the people are participants, as they were at Churchills Club and the Streatham Locarno. There is NO reward or punishment, neither explicitly nor observably.(for an historical summary see Pask.G., in Reichardt.J., Ed,1971).

64. At that juncture, knowing it all worked in the deep end of the swimming bath, we ventured into the paddling pool of the experimental laboratory, first in the context of interactive and adaptive human machine systems for training, vigilance control, work loading and the like, later into systems for human groups and adaptive machinery through which the groups could interact. In those days we could not afford computers, and they were tetchy things anyhow.

65. The machinery we did employ was, even so, much more sophisticated even if slower and less reliable, for certain, than most of the piffling, pardon the term, highly vaunted technological wonders of today. Only very recently has it been possible to observe the emergence of something more imaginative and better, it is encouraging to see it being developed and downright outrageous to hear costeffectively-minded loons suggest that it might be a good idea to simplify and disseminate some picayune systems in order to show the populace the ideas of computer assisted indoctrination. No, absolutely adorable Kelly girls, hired as consultants, by an office near to Victoria Station, circa 1990, it would NOT, even if you DID have the remotest idea about what you were talking so glibly. It would dissuade them, again, of the teaching machine fallacies of the late 1950s, possibly increasing the recession rate, or whatever economists call it. From all this, it is legitimate to infer that history is a matter of living. Further, it must be apparent that life is neither sequential nor lacking in emotive reaction, hence barren.

66. However, there are certain points at which organizations form. Many of them being institutes and laboratories. They naturally apply constraints to those participating in them, System Research, of Richmond, Surrey, the B.C.L., of Illinois, Brunel University and so on.

67. Now, I speak of those contexts but confess that none of them were so well ordered as they may, superficially, appear to be. Regarding C.T., it became evident that people, groups of them and small societies, do not work by the in-those-days presumed method of emitting and receiving stimuli, emitting and being receptive to responses, or manipulating reinforcements or determining the regularity of operants, one way of patching up complete lack of motive. Whilst, within special and useful limits, folk might interact with an adaptive machine and be trained by it, outside these limits, any inbuilt distinction between trainer and learner became hopelessly blurred. The people or groups of people taught the machine, just as much as it taught them, they co-learned and the neat and tidy black-box boundaries simply evaporated as the result of an activity which can only be called play, in Huizinga's sense, of children's play, in a street (Huizinga.J, 1949). To phrase it differently, they became, in part, as one. That is, these people or groups of people, simply conversed with each other.

68. There is a big difference, which has to be respected. If speaking as a strict behaviourist, then I should be bound to believe that the more accurately I control the conditions of a black box: called the subject and another black box called the, possibly mechanical, environment the more, precisely may I make sensible observations of the stimuli/responses or inputs/outputs, the more readily, given luck and perspicuity, is it possible to infer the mechanisms, otherwise hidden, by fiat, inside the opaque boundaries of the black boxes of subject and of environment. Or, taken to a different level of liberalisation, the more accurately I may construct some normal-form-model, say a computer program, beloved of artificial intelligence, which simulates what the black boxes do.

69. If, however, I am neither a strict behaviourist nor a strict cognitive scientist, then it is permissible to propose that both of them, behavioural and cognitive-without-conation, have grasped wrongly chosen branches of a tree's twig and could, more fruitfully have acknowledged that elaborations of their data will lead them nowhere, excepting into confusion, of increasing intensity. The stem of that twig leads to the living tree, from which it was snatched and dried out as a static, impoverished, specimen in a fossilised arboretum. For all their pretensions, that is what these specimens are and I doubt if anyone wanted to collect such things, apart from the undoubted fact that because they are kinematic frames, rather than the kinesis of life, there lingers a seductive idea that because they are readily slotted into a twig and smaller twig taxonomy, they are easy to classify and deal with, heaven forbid it, to claim to somehow explain.

70. What is an alternative, that is, to the stimulus/response or input/output type of observation, elaborated by all manner of sophisticated model types? I submit that it is a transaction, an interaction, usually multidirectional, which we choose to call a CONVERSATION between PARTICIPANTS. Emphatically, it is NOT generally, though it MAY be, conducted in written or verbal terms. Equally, the relevant languages, employed by the participants may be visual, musical, poetic, balletic, behavioural, the sign language of airports or the sign language of railway trains, boats, spacecraft or inter galactic debate and intercourse. It IS, however, a natural language insofar as, crudely or with immense refinement, it can accommodate questions, commands, entreaties, replies, obediences or not, desires, metaphors and allegories designating analogies of greater or lesser elaboration. In brief, all such natural languages are founded upon the primitive or proto-language Lp, or the primitive or protologic, bearing the same title, of Lp, whereby its expressions may be manipulated.

71. What is a participant, further, what is a conversation, between participants. It seems to be, but ultimately is not perverse, to insist upon the utmost generality.

2.2. PARTICIPANTS AND THEIR CONVERSATIONS

72. I can participate, so can you, by way of a conversation about something, be it riding, driving, walking, rhetoric, a tree, an idea, a belief, a conversation, a shrub, a chair, a dog or cosmology, biology and the rest. In doing so we generally ostend, point at, a thing or the name of a thing, event, scheme or whatever, of which we are, in very different ways, aware. In the course of our conversation, we share our own concepts, your concept of a tree, say, and my concept of a tree, for that matter of anything, any event, or so on. For brevity, let us call it T, if you like the target of a conversation, like the targets with a dot surrounded by circles, used by archers, and dartspeople, for practice. An odd and fascinating feature of this conversational activity is that in the conversational process of concept sharing, you and I may learn quite a lot or quite a little about T, in the sense of a philosopher's definition of T, but supposing that our conversation goes on, I learn a great deal about YOUR concept of T and you learn a great deal about MY concept of T. Neither one nor the other of us may have the remotest idea, least of all the philosopher's definitional idea, of a T. In that respect one or both of us may entertain massive misperceptions, for example, you thinking that T is a static unicorn and I thinking that T is a coat and hat stand, the text books insisting

that it has leaves and roots and bends in the wind. On the other hand, you, as one participant (say, A) do learn a great deal about me, the other participant (say, B). That seems to be the main point of a conversation, that one participant, say, A, learns about B, how A differs from and is similar to B, the ostended T acting, primarily, as a pivot.

73. However, this tacit identification of conversational participants as people, like you and I or A and B, is not entirely satisfactory. It ceases to be veridical even in the laboratory or institute, where it becomes clear that groups and coalitions converse with other groups and coalitions, just as much as people converse with people. In general, we should like participants, such as A and B, to be identified not only with people but societies and cultures and nations, with analogous, similar but different, systems of belief lodging in the same brain, with the inhabitants of Mars or some other planet, in some other galaxy, with any other not necessarily biological entities, like pinched plasmas, alive but differently fabricated. Further, it is most desirable to have an indefinitely large potential colloquy of A's and B's, say Z = A, B, ... and so on.

74. How to attain this measure of generality remained an unformulated problem, a problem to be formulated over several years. It first appeared in an almost obsessive preoccupation, at the age of about 16 years, as I recall it.

75. So much for the history of straight chronology, carbon dating and so on. My friends and I, my family must have been bored out of their minds with it, knew there was a resolution. One obstacle which stood in the path of attaining the goal of an adequate resolution until 35 years ago, roughly, was the fact that there are innumerable ways of characterising individuals, participants like A and B. If they are people, it is, for instance, possible to refer to their photographs, their anatomical or physiological boundaries, their psyches, fingerprints and, in context, their personalities. But even within one classification, I can recognise a person by their immune system, even part of it, their genetic profile, their scent. Regrettably or not, none of these are canonical in the required sense, though all of them are perfectly legitimate. That is to say, and this turned out to be the essential clue, they are legitimate to an impartial, external, observer. They are not, however, dependent upon the distinctions cloven by an observer. Whilst observer recognised, these beings are self generated, created by the life of some participant organism him or her self. It matters little whether he or she is a person, or a society, or organization.

76. What is canonical is an invariant, described by Kurt Lewin as genidentity, (Lewin.K, 1922), the fact that you are observed AS YOU and believe you ARE YOU, still, even if you have slept, been anaesthetised, suffered concussion, coma, or been in deep hypnosis.

77. What is the YOU which does have this property, a property which is self creative and which observers must respect in the relatively arbitrary demarcations they opt to make?? I called it, our group calls it, P- Individuation. meaning psycho-social-individuation, sufficiently general to characterise all of the entities so far noted and others to add. It is usefully contrasted with M-Individuation, or mechanical, including biological as a peculiarly elegant special case of incarnation.

2.3. P-INDIVIDUALS

78. A P-INDIVIDUAL is a PRODUCTIVE and, incidentally, a REPRODUCTIVE system. It is organizationally-closed, informationally-open, and in this case, at least, self organising. Characteristically, it is specified as follows. There exist productive operators which MAY be applied to entities belonging to a domain, or substrate, and which, if so applied, yield products. AMONGST these products (perhaps after several series of transformations), this iterated activity gives rise to products that are the productive operators, themselves. Although MAY does not imply MUST, there is a principle, governing the system, say a conservation principle, such that at some stage, ALL productive operators must be applied and, further, that at ANY stage SOME productive operator MUST be applied to the substrate. It is worthy of notice that these simple specifications yield. reproduction, as a necessity, and that the mandate of AMONGST guarantees the appearance of other products, some or all of which may be shared, as a form of Petri-type-information transfer with systems of a comparable kind. (Petri.C.A, 1963, see also commentary by Holt.A. in Bateson.C, Ed,1978).

79. Since I formulated this idea, of P-Individuation, in the domain of psychological, educational or social affairs, it seemed sensible to use the term P-Individual for the entities in question. From an ordinary standpoint, my formulation was independent. But, within a few years of each other, Humberto Maturana came up, primarily in the domain of biology, with the term autopoiesis,(Maturana.H.R, 1975,), which combined with structural openness, for example, in molecular exchange, is equi-significant with informational openness; similarly in domains of immunology and even biological cognition, Francisco Varela,(see Varela.F.,1975), came up with organizational-closure and co-ontogeny. The fact is that they all describe the same fundamental phenomenon of life, albeit with minor variations. I doubt if any of us are so precocious or arrogant as to bid for priorities, and I am pretty certain that all of us doubt an absolute independence. The fact is that all of us worked with Heinz Von Foerster, at the B.C.L, University of Illinois,(Von Foerster.H.,1981,b,). Further, prescient work on self organization, his invaluable guidance and support are really at the root of any and all of these notions. Since, however, I formulated the idea of P-Individual in the psycho-social domain of education, complex decision making, creativity, design and the like, the substrate upon which the productive operations act is conceptual. Similarly, these productive operations are, also, conceptual operations. This formulation is open to the obvious criticism of talking about P-Individuals as disembodied-minds (floating around, presumably, in some kind of ghostly limbo). It is not too difficult to counter this potential criticism, by saying that it so much nonsense, or, if needs be, showing it (for instance, by the argument that such minds would have no order to accommodate the most liberal of productive operations). However, there is probably no need to adopt such a stringent, nay pedantic, expedient. The fact is, any P-Individual is embodied in or incarnated in some one or more M-Individual. The idea of a purely disembodied mind is almost as absurd as that of a dis-enminded body, the prerogative of a few extravagant reductionists adhering to the belief that if someone decomposed a brain, for example, into its components (neurones are popular candidates) and traced their connections (which would have changed over-and-over again since starting the investigation and the assiduous investigator had expired of utter exhaustion), the hypothetical investigator, would not have gained an inkling of the quirks or curiosity of the mind, maybe embodied in a specimen, until overcome by fatigue or fatality.

80. The important point about P-Individuals, taken in an other-than-fatuous sense is that they ARE, surely, embodied or incarnated but that they may be embodied or incarnated in ANY appropriate fabric. For example, the very diversity of possible fabrications makes us recognise that artificial INTELLECT is far more apposite than artificial INTELLIGENCE and why in the world, IF such creatures DO exist, should they be dubbed ARTIFICIAL, any more so than people or Dolphins or horses, or dogs or other biological constructions. Here, I promulgate a point of view which may be deviant, but is not INTENDED to be a heresy, and on deep examination, believe is NOT one.

81. Some may regard it as revolutionary, I prefer to regard it as evolutionary, perhaps one of those hiccup-like bifurcations which from time-to-time beset an iterated-evolutionary process. These occurrences typify any other-than-dogmatic evolutionary process, the dogma of pure Darwin and natural selection or that of the captain of the Beagle, subscribing with a different dogma to the same data.(Darwin, Dent, Everyman edition, 1972,).

82. Professor Brainstawm, an inventor with whom most of us were familiar when more youthful, is credited with the invention of an abolisher. As I recall the matter it was intended to abolish the dust from his workshop, which irritated his otherwise very tolerant housekeeper. Set in motion, the contrivance abolished the professor who was only reconstructed by the rapid and ingenious action, taken by his housekeeper, in order to disabolish him and what little remained of the machine. I would like to abolish, reversibly or not but for preference without the Brainstawm contraption, both dis-en-minded bodies and disembodied minds. One is complementary to the other, if one exists, then so does the other, mind and body go hand in hand or glove in glove. This assertion appears in differing guises, notably as an exclusion principle, to the effect that there are no Doppelgangers. But, as we shall see later, the consequences of this and similar denials are dramatic and penetrate the most remote depths of existence.

2.4. LANGUAGE, PROTO-LANGUAGE, INTERFACES AND PROTO-LOGICS

83. It is opportune to dwell for a slightly longer interval upon PIndividuals, surrounded, as they have been, by a host of caveats. That is because P-Individuals are conversational participants, conversing in languages of various forms and modalities. If we are to capture at least some of their discourse, we need an interface between the conversational participants, for use under a rubric such as making a dynamic inscription of some of the concepts they share. An interface, formal or not, computer implemented or not, is needed in order to exteriorise some, at least, of the joint mentation going on. It is at this point, also, that the protolanguage, Lp, on which I claim all natural type languages to be founded, may be realised as a protologic the manipulations of which do, in a primitive, poverty stricken manner, reflect mind, thought and, in I.A. theory, the genesis of action as well.

84. After some other considerations have been dealt with, I shall say much more about Lp, in particular. For example, it will be hypothesised that Lp is a kind of linguistic field, that operations generating thoughts and penetrating conceptual boundaries within participants, excite the concepts bounded as oscillators, which, in ridding themselves of this surplus excitation, produce radiation in this field. It may encourage some

readers to continue with this book, but it would be premature and it would seem zany to embark upon these fascinating matters until it has been possible to cover rather more ground.

85. Regarding conversation, why should participants converse. There are doubtless several reasons, a very minor one being the often cited encounter by accident, of A bumping into B in the street. Apart from this happenstance, usually rare, there is the provision of an interface that catalyses, encourages and facilitates their interaction. The point is most cogently made in pictures such as Fig. 1.(a), where the rectangulated enclosures represent the bounds of an M-Individual and the splodge like enclosures the bounds of P-Individuals, such as A and B. The interface, labelled as I in Fig. 1.(a), must surely be attractive, since the participants A and B, being housed in one brain, say, as partly autonomous but coupled mental organizations, could engage each other through transactions, internal to this organ. But, in fact, they often do exteriorise the concepts they share in external conversation through I, not by experimental coercion but provision of a properly and sympathetically designed interface. It is true that hypermedia, Dataspace and Cyberspace, aid the design and its efficacity, but it seems as though one ingredient, essential to the moderately consistent exteriorisation of shared concepts, is the fact that any interface incorporates a dynamic form of Lp. These comments apply to Fig. 1.(b), to Fig. 1.(c), and so on, but here their significance is obscured by the fact that the P-Individuals, engaged in conversation, occupy distinct M-Individuals.

86. In practice, it does not matter, greatly. There are, for sure, many other reasons why participants converse, for example because there is some kind of conflict, requiring conflict resolution and because of a fundamental affinity, an interaction of P-Individual and M-Individual, which amounts to a willingness to speak to and hear from, to interact mutually, existing between A and B. This propensity 1 called amity but Humberto Maturana has the courage to call it love, its rightful name. To these matters we return, as the substance of I.A. theory emerges.

2.5. WHAT IS A PARTICIPANT?

87. A participant is a P-Individual, as stated previously. But, in greater detail, what is it? It is a, knit together collection of coherent but distinct concepts, themselves distinct within their coherent and distinct clusters, which may, within limits to be specified, overlap. All of these entities have the properties of the participant, they are organizationally closed, informationally open and distinct for, if they were not, if they formed a uniform smudge, why should they converse at all, how could they do so?

2.6. WHAT IS A CONVERSATION?

88. Supposing that we do not inhabit such an obnoxiously amorphous countryside, it is not only possible to observe, and gather affirmatory observations to the effect that conversations DO take place, between participants of any type, but, also, to show that conversations MUST take place, amongst other, comparable interactions. Fig. 2.' shows, in slightly greater detail, the interaction of participants A and B, through an interface labelled I. This, of course, is a special case and the most readily depicted.

The languages, L, used by A and B, are derivable from Lp, but are, otherwise, unrestricted with respect to form or modality. In fact, more fundamentally, a conversation is a larger closure of participants, a larger closure of P-Individuals. In greater detail, the truth value, equivalent to the existence value, of a conversation is an analogy, having at least one similarity and at least one difference and designated by a metaphor or allegory. It is peculiar insofar as, in the case of a conversation between A and B, the difference is between A and B, the participants, and the similarity is composed from the concepts that A and B share.

2.7. WHAT IS AN M-INDIVIDUAL?

89. Strictly, any dynamic fabric able to accommodate a P-Individual. It would be stupid, however, to be so undiscriminating. There is not the slightest doubt that the body, brain, humoral and related systems constitute an M-Individual of immense delicacy and refinement. As later, it is able, so are societies of people able, to frame, as in a picture frame, the otherwise unframed variety of a haphazard environment. How far this depends upon our familiarity with our own species, how much upon our pride in being people, I am not entirely sure., on this score.

90. No one denies that stars shine more brightly than people, emitting brighter light. The following proposition is less commonly accepted, but is far from outlandish, taking a star as a potential M Individual. It might be that stars are also brighter and more subtle in a mental sense, but not knowing them so well, it is hard to say. Regarding people, on the other hand, one indisputable fact, poignant for observers, is this.

91. They may choose, aware of the consequences of their choice. It is certainly legitimate for a scientist, having knowingly excluded consciousness from that which is, consciously, observed, to adopt an impartial, external, irresponsible stance, knowing and admitting full well that his or her reports are confined to a limited domain viewed through the spectacles of a deliberately limited methodology. It is a very different matter if someone concerned with the larger arenas, of society, organizations and so on are irresponsible enough, a pejorative in this context, to ape the manners of impartiality. Yes, scientists they may be, but scientists who claim, with no sound cause, to encompass consciousness in any enquiry of sensible consequence. Those who adopt that safe and faceless stance, are grotesque, pretentious and cowardly knaves, worthy of derogation.

92. Those who have the courage to participate with others in a culture, society, enterprise or organization under scrutiny, deserve respect. For in doing so, maybe as scientists, they bear the flag of J.B.S. Haldane, in the field of physiology, (Haldane,J.B.S, Biog, 1992). as actors in a proper company of players. These actors have, willy nilly, taken on full and unconditional responsibility, accepting the risks involved, for their actions and interactions.

2.8. A TRANSITION

93. At this juncture, it is opportune to make a transition from C.T. and Lp to I.A. and a somewhat enhanced form of Lp. It sounds very trivial, but, in fact, it is rather

complicated and its reverberations build up as they echo through the caverns of our intellect. The simple sounding statement is that an actor in I.A. theory is a participant, certainly, a variety of P-Individual, the M-Individuated embodiment of whom is able to act. Similarly, actors can interact, often in conversational interaction and the varied languages invoked are, as before, modality free and derivable from an underlying Lp. But, fortunately, there is more to it than there seems to be.

94. Fig.1, and Fig.2., IN HERE.

CHAPTER3. REVISITATION, PRIOR TO ELABORATION.

95. What actually happens in a conversation, through an interface, between participants, who are realised as P-Individuals, A and B, embodied or incarnated in one or more M-Individuals, say, in brains. Insofar as there IS a conversation. If the previously stated dogmas are accepted, then there MUST be from time-to-time, and the participants use languages, L, derivable from Lp, in order to reach agreements.

96. It has already been noted that the term agreement, includes agreement to disagree, over something pivotal, like T. This may be,conversation about the "it" rather than "personally" referenced participants, like A and B, themselves, or any other participants implicated in the discourse.

3.1. DIALECTICAL AND DIALOGICAL PARADIGMS

97. This dialogue usually takes the form of a dialectical, or dialogical debate in which the merits of various hypotheses are weighed up. Ideally, one collection of hypotheses is a thesis, proposed, by one of the participants as a protagonist, whereas another collection, of OPPOSITE form, NOT usually a mere NEGATION, is espoused by other participants. The A, B, dialogue may be heated, possibly acrimonious. But, more fruitfully it is not, permitting ample deliberation, in place of flagrant polemic. Given that, outright rejection of thesis or antithesis is replaced by the creation of a synthesis, in fact, to the creation of an analogy which is entirely novel. Of course, there are other modes of dialogue, polarised from the mundane to inspirational rhetoric. But there is a good sense in which dialectic or dialogical discourse is paradigmatic of conversation, especially as its form varies from the idealism of Plato and to the more pragmatic, where theses, antitheses and syntheses, alike, but especially potential syntheses, must be demonstrated, as demanded by Aristotle, St Thomas Aquinas, Abelard, Lullius and Marx, though somewhat neglected in favour of idealism by Hegel, or a curious vacillation he adopts in this matter not to mention the up-and-coming schools of modern French philosophy, a popular appellation, these days.

98. If, for example, in the conduct of discourse over possible urban structures, you arrive at the synthesis" a city of paradise", then it must be demonstrably buildable, perhaps contingent upon the invention of entirely novel tower cranes and bulldozers, and open to habitation as at least one form of paradise. It would be useful to explain how the equipment neccessary for construction is manufactured, to explain why the inhabitants of this conurbation regard it as a paradise, rather than another Brasilia. But, strictly, it is only necessary to demonstrate the form and possibility of construction and habitation of this "city of paradise" in one of very many realities or universes of discourse.

3.2. KINEMATICS AND GENERAL PUNCTUATION

99. If exchanges of a conversational type are paradigmatised as dialectical or dialogical dialogue, then they are punctuated, in the broadest sense of this word, by agreements and agreements to disagree. If it is felt that punctuation is too strong a term, then

replace each occurrence of the word by segmented, at certain junctures. In THIS respect, at least, conversations prove relatively easy to deal with in a formal manner but are not fully representative of all interactions between actors (the participants).

100. Such unlimited interactions do not generally have a start and finish, a well specified beginning or ending. It is not intended to overstress these equi-significant points of punctuation (or segmentation), of starting and finishing. In the first place, the restrictions are not so rigid as they sound, for example, a continuous conversation may be interrupted by phone calls that are irrelevant to the points under debate, however much momentary irritation they are likely to cause the participants. Similarly, no real loss of continuity is engendered if A and B are, for some reason or other, geographically displaced and unable to communicate, there are many exemplars of participants who, upon re-encounter, resume their conversation at, or near, the point at which they left off, since the main threads of discourse hung end to end, usually twined or braided, are identifiable, A and B do have conversations.

101. Consequently, conversation and that portion of its theory to be developed in detail, is, even within the constraints just outlined, a valuable way of imaging many social situations, far beyond the limits of the computer implemented laboratory interface or those in which a participant observer, such as a Piagetian Interviewer (Piaget.J, Eng Trans, 1952,)„ plays the interface role. The segmental continuity prevails and the punctuation is that of agreement, or agreement to disagree, in short of meaning.

102. The idea of a continuous conversation is parodied in Fig. 3, and the supposed results of a successful transaction, in which at least one concept, here, a concept of T is shared, as a result of an A, B, conversation, by the participants, A and B, in Fig. 4. At this juncture, a deliberately simplified and inadequate notation is employed, in order to express some salient points as lucidly as possible. But the current notation IS and is KNOWN to be, an altogether inadequate representation of the underlying reality. In Fig. 3, we suppose that participants A and B have concepts TA and TB, their personal concepts of T which, whatever else, are distinct as A and B are distinct. An A,B, conversation goes on through an interface I at or in which a shared concept, designated T, without suffix, is dynamically inscribed. This conversation, which is, here, depicted as having a start, say s, and a finish, say, f. But even in this simple interaction, it is evident that some concept T is shared, that TA at the start will not be the same as TA, at the finish, the same applying to TB. In the figure, this fact is symbolised using the notation of TA(s), TA(f), which are NOT the same, of TB(s), TB(f), which are NOT the same, neither that nor is TA(s) the same as TB (s) or TA(f) the same as TB(f), if only by virtue of the fact that there is a shared concept, the concept of T. The greatly stripped down depiction of Fig. 4, is an attempt to show the bare skeleton of the most primitive mechanism. At the start of a conversation between A and B, the participants, A's starting concept of T, that is TA(s) is derived from A's starting concepts of Q, P and U, a mutually productive and reproductive concept cluster. Similarly, B's starting concept of T, namely, TB(s) is derived from a different cluster of starting concepts, from R and S, say. As the conversation finishes, A will have derived novel means of deriving T, influenced by but not identical to B's preferred meaning and, vice versa, B will most likely have done the same, only with respect to A's meanings, the productive and reproductive clusters in which A's concept of T and B's concept of T reside.

103. The important feature, apart from showing one skeletal mechanism of concept sharing, is that all the concepts productively and reproductively related are changed as a result of any conversation that does take place between participants A and B, the entire process is dynamic and such interactions will, later on, be represented in a much more satisfactory form. Further, if we imagine (there is no good reason for doing so), that A and B are synchronous, it is possible to present figures such as Fig. 5.

104. As a matter of fact, there is every reason to suppose the contrary (that A's temporal succession and B's temporal succession are very different, at most locally synchronised) and we shall soon drop this tacit assumption of preordained synchronicity. It may be added that some emphasis upon the or dynamic of continually changing concepts is intended, in part, to remedy a defect in many or most of my previous publications. There I have frequently adopted the laudably intentioned path of assuming an impossible kinematic image, under the false impression that it would make matters more lucid.

105. Quite the contrary obtained, the apparent stasis associated with transformational pictures, dynamic flow, however inadequate, left out, served to confuse people. The simple kinematic image, is an inadequate picture of mentation.

3.3. SOME RESULTS

106. It is, however, a useful temporary expedient to suppose that the t's of A and of B are held together by the t-like-succession of some external observer, insofar as it allows us to furnish results of the kind in Table 1, which are useful approximations. All findings, of C.T. and I.A. theory are PREDICTIVE those in Table. 1, amongst them. As a cautionary reiteration, however, this claim does not usually mean numerically predictive, but predictive of some well specified configuration, a QUALITATIVE prediction but a rigorous one.

107. They are NOT mere descriptions, of what has been previously observed. Further, they hold under far less rigid conditions, those of I.A. theory even, than the restricted conditions under which they are readily obtained. One major criticism of such prediction s, once the investigator has argued persuasively enough that they ARE predictions, is that they seem to predict the self evident, the OBVIOUS.

108. Very likely the same comment applies to any science of consequence, or at any rate to consequential and interesting findings within any frame of reference having symmetries and connections which render it worth serious consideration. Whereas it is easy enough, if you enjoy trifling experiments, to reject, or tentatively accept small, slightly deviant, hypotheses, it takes hard thought, to come up with truly novel predictions.

109. The former pursuit can often be conducted upon a technical basis, using tried and tested methods. It seldom calls for the invention of novel equipment, even novel techniques and, of course, it is essential work to do. It has the advantage of safety, since whatever the outcome of an experiment, it is unlikely to rock the boat, for it is addressed, mostly, to some matter of local significance.

110. The latter pursuit calls for a lot of innovation, intellectual and by way of methodology. It is risky, the investigator is liable to make a crashing bloomer, rather than a small mistake. It characterises, in varying degrees and in various ways all those groups in which I have participated. Above all, the emerging predictions are prone to meet with a "so what" reception. We reply, "yes, but is it OBVIOUS, to all??"It may be, from one point of view. For example, it is experientially obvious that I become unaware of a well learned skill, like walking, unless I stub my toe in the process. It is a very different matter to rationally predict, on the basis of a theory, that awareness is prone to evaporate under some conditions and reappear under others. I may even become conscious of the event, share my awareness with others, passing strangers or the houseman on duty in an outpatient department. All this is experientially obvious, of course, experientially, but just WHY it is obvious remains far from clear, especially if people who resort to the "well, it is obvious" tautological, claptrap, are asked to essay some explanation of WHY or HOW. The established position in such matters is dogged, like the exponents of "nothing-but-tery", criticised by that brilliant thinker, Donald McKay, who I greatly respect but whom, when living, so I am told, regarded me as a minor devil incarnate. Hopefully he has revised that view, if he ever really entertained it.

111. Similar comments apply to the other results, noted in Table. 1. They are all taken as obvious, at any rate most of them are. To our credit we DO essay some resolution of the problems proposed, to our discredit, these problems all deal with fairly circumscribed positions, important in education, design and complex decision making, but rather narrow.

112. Whilst these resolutions may be so very obvious to scientists who often prefer to opt out of mind and consciousness, to regard psychology as the maze running of white rats, I suspect that their reason for doing so is a little cowardly. Such questions as those of consciousness have answers, if any, bearing real political, social and organizational implications.

113. Scientists MAY adopt the safe and steady stance, but, if they do so, then they can neither ascertain why or how, for example, we remain ourselves, after anaesthesia or concussion or sleep, even though it is a manifest and self argued, scientific fact that no cell in our body is the same (but a reconstruction), that no molecule in our body, built as the reductionists would have it, from a colligation of molecules or something, is the same (but, instead, a replacement). These comments apply, more vigorously, to the field of I.A. theory and its application.

114. For, as stated already, this field encompasses societal, cultural, urban, national and international problems which are seldom well specified, but which remain intractable, chiefly because they suffer, immensely, from the obvious of platitudes and ideologies, so beloved as easy to comprehend, but not really obvious in the very least degree. Some, out of many, are tersely exemplified in Table. 2, but, here, I also refer to the appendix note on Stafford Beer and his viable system models. Why, for example, is it obvious that nations gnash their teeth at each other, that as an E.C. citizen, the social imperative is to take up arms against or even kill a person who is my friend but is called German or Russian as the political fashion has it, this season. You know and I know the insanity of war, above all, the professional military people know its insanity. But, as in restraining mad dogs and dangerous lunatics we are, all of us, aware of the

atrocities going on and seek, by force if needs be, to eliminate the horrors of torture, persecution, pre-emption, terrorism, sadism, born of some powerful and power hungry caucus within one or any nation. Of one thing, at least, we are sure, that if conflict occurs amongst the obviously formed power blocks, be they national or multi-national-corporate, which go along with civilisation, it is not resolved by methods like more-and-more arms, flag waving and rhetoric, in short, of the same thing. This is a critical point, a point at which an appropriately different, innovative, method must be employed.

115. At any rate, if that inventive act cannot be done in the slightly more cribbed, cabined and confined forum of a support system, then it is obvious that civilisation will collapse to yield a life, if any, not worth living. In fact, it seems to me, there would be the void.

116. Maybe, it is obvious that conflict must occur in organizations of any magnitude, that it is required in order to inject difference, an ingredient just as important as coherence, since it has been stressed that unity is not uniformity. But its essential resolution at any level, critical at the level of larger and coherent systems, depends upon an ability to explain, even partially, the manners and mechanisms which currently prevail.

Fig.3.,Fig.4.Fig5., Table.l., Table.2., in here.

CHAPTER 4. A BROAD OUTLINE OF I.A. THEORY.

117. It has already been stated that an ACTOR is a PARTICIPANT, thus a PIndividual but embodied in an M-Individual capable of ACTION and a very general form of many languaged conversation, known as INTERACTION. It is, however, necessary to enlarge the field encompassed by I.A. theory, beyond the bounds which are conveniently handled by C.T. and an unmodified form of Lp. At a theoretical level, novel postulates must also be introduced and justified if only to represent a broader methodology and to adumbrate phenomena which have not, hitherto, been brought into the limelight.

4.1. SOME DIFFERENCES

118. It seems perverse, at first sight, to set out certain differences between C.T. and I.A. theory, if only because their justification rests upon theoretical statements which have, so far, only been promised. However, if the reader will accept that this promise is fulfilled, mainly in Chapters 5, 6, then it renders the text more readable to do so. This bald statement rests, chiefly, upon the views expressed by a number of colleagues who have been kind enough to scan earlier versions of the manuscript and to discuss this matter. Their consensus is in favour of introducing the differences between C.T. and I.A., and a dynamic Lp, informally, at this point and to present the theoretical axioms, inferences, and so on at a later stage, notably in Chapters 5, 6, some short appendices or summary figures and later volumes, a choice which seems to be determined by the form of the theories. A few months worth of intermittent thought, is called for. These are to be months spent in learning NOT to take-for-granted deep ideas which we DID take-for-granted, and this is a view which tallies with experience in other presentations of parts of these theories, which seem to be obscurely mathematical to those unfamiliar with mathematical or formal philosophy and both arcane and outlandish to the mathematically ept, until, that is, they have either discussed them, personally, or thought about them. Hence, Table 3 is offered, at this point, as a cursory outline of C.T. and I.A. differences and some readers may wish to elucidate its content by reference to the later material.

4.2. IMPLICIT ETHIC

119. Research in the OOC programme is clearly intended to be of use, at once or in the future. This, perhaps, is pre-supposed by one original meaning of Andragology, as the science of societal helping-systems, for example, with human organizations or human interactions through computing systems. It may, as in several ongoing or near completed projects, be addressed to systems immediately in operation, with the objective of improving performance, both of the people involved and the entire system.

120. However, apart from this important caveat, there are certain criteria, greatly expanded in later volumes of this series, but, for the moment, hinging upon at least the following. Namely, upon (a) and (b), as they are stated below.

121. (a). The research is participatory, this applying, a fortiori, to researchers in the OOC programme, itself and

122. (b). The notion of Andragology as a science, in contrast to a vaguely do-goodie-like activity, is emphasised.

123. By SCIENCE, I do not necessarily, not usually, mean a pursuit such as chemistry or etymology. There is nothing wrong in doing so, if parts of our studies verge upon the classically scientific. Neither that, nor is there anything wrong with doing-good, quite the reverse, in fact, especially if that is appropriate to a particular project. Rather, I mean that our research is open to theoretical, if you like, to formal development, upon which it is possible to mount further research and, at least, make clear the meanings and intentions of what is in progress and what has been discovered by dint of current research.

124. Very often, this calls for uncommon or novel theoretical tools and these may have value in themselves. Often, also, the scientific goal is an aim that is not, as yet, achieved in practice, still remaining in sight. But, interestingly enough it seems that the FORM of our theories approach, as in Chapter 5, the form of scientific theories.

4.3. OUTLINE STATEMENT

125. Rather than burdening the reader with a great deal of verbiage, to spell out the research criteria precisely, an attempt is made to summarise them. This summary is the intended content of Table 4. and may be elaborated, considerably, for the most part in later volumes of this series. Although much of the tabulation is clear, it is worth bringing special attention to the need, in order to render a proper formalisation, to muster several unusual logical and mathematical devices. These include, for example, a calculus of distinctions, (Spencer Brown.G, 1966), of dynamic coherence, (Rescher.N,1966.a,1980,b), of strict hermenutics, the progressive refinement of meaning, as in (Taylor.C,1964.a,1973.b.) and, independently, myself,as refd), of logics such as those of Gothard Gunther,(as in Gunther.G., 1960) of paradox, as in Hellerstein,(1981) of action, as in Von Wright,G.H.(1963) of self and other reference, Maturana, Varela, and myself,(as refd) the mathematics of Knot Theory, due, mainly, to Louis Kauffman,(as in Kauffman.L,1987.a.,1 987.b.) to the Algebra of Conscience, due to Lefebrve,(as in Lefebrve.V,(1982), to McCulloch's redundancy of potential command (McCulloch,W.S.,1959), and, above all, to Heinz Von Foerster's self organization(Von Foerster.H,1960.a.,1991,b.), which, in common with many of the others, keys into the Glanville theory of objects(see Glanville.R, 1991, for a condensation of his much earleir thesis).The diverse and captioned contents set out in Fig.33., somewhat elaborate upon this tabulation.

4.4. FURTHER EXPLICATION

126. It would be usual to expand upon these less common calculi, logics and theories at this juncture. Whereas all of them are simple, once appreciated, they are often based upon unfamiliar foundations. For instance, even the arithmetic of distinctions has a clearly stated but readily overlooked injunction. This is "draw a distinction", simple enough, by drawing a bounded figure in the sand, say. But if, in haste, one fails to recall that this

injunction, "draw a distinction", prefixes every occurrence of a distinction, that the drawing surface might be spherical rather than planar, if so, then you are liable to fall into the fatal trap of supposing that the calculus is a fancified form of Sheffer Stroke algebra, which it is not, even though the works of Sheffer, Boole, de Morgan and many other great mathematicians may be veridically modelled in terms of the calculi of distinctions.

4.5. REGARDING DETAILS

127. For this and comparable reasons 1 was persuaded to relegate expanded discussion of unfamiliar calculi, logics or theories for the most part to other volumes, giving only some bare essentials in Chapter 5. and Chapter 6. In fact, those colleagues who were kind enough to read earlier versions of the manuscript, positively insisted upon that arrangement of material. They pointed out, unanimously, that any attempt to do the usual would merely confuse the reader.

128. There are only some terse, Appendix like Notes, in this volume. They will, hopefully, prove useful in themselves, also whilst reading Chapter 5. and Chapter 6., both of which are unashamedly, since unavoidably, slightly obscure.

4.6. SUBSEQUENT ORGANIZATION

129. Henceforward, this book consists in Chapter .5. in which it is impracticable to avoid a modicum of symbolisim, in fact it is positively stuffed with symbolism. It delineates the bases of C.T., rather briefly, but in its latest form, similarly, Lp. It also contains those axioms, propositions and postulates needed to deal with I.A. theory and a few additional indications.

130. Before moving on to Chapter 5 and its overt formalism, which is to me, at any rate, indigestible material, it seems prudent to enlarge upon the complete but terse summaries, presented in Table 3 and Table 4. Consequently, let us decorate these tables with certain ancillary comments. After all, our often-puritanical-Victorian ancestors, felt obliged, out of decency, zealotry and the like, to clad the parlour chair's wooden legs with little skirts of fine silk-cloth, matched to that of the antimacassars, in order to hide these indecent members from overly-sensitive visitors.

131. This, also, is decoration. Readers with formally biased intellectual prowess are likely to find the bald tables, hard to stomach. But it was virtually impossible for me to articulate the bare claims at all adequately, before constructing a mental bridge between the tabulated statements and their formalism until their relations had received attention and a measure of careful rumination.

132. In this case, it is not prudery that counts but. rather, the sense and intelligibility of the entire manuscript. In particular, I allude to the next Chapters 5, 6, at most summarised in the tables, which I, at any rate, find to be dense reading. The fundamental IDEAS behind C.T. and I.A. Theory have very similar roots, but both refer to variants of Lp.

133. Initially, Lp implementations should be released from their, currently kinematic, forms into the wider domain of kinesis and the dynamics of life. That is a project underway, entirely realisable, but, as yet, not satisfactorily completed, except, perhaps, in part.

134. To phrase this matter in slightly different terms, a dynamic mesh or Lp representation, essential to I.A. theory, can be used as it is, for all C.T. interactions. That is because of the tacit assumption that conversations have a "start" and a "finish", however much they may be interrupted, in between. It is also quite possible to freeze or fix the values of certain mesh parameters, using the mesh as an approximate frame of reference, in C.T. based studies. That is, in fact, because, of the inherent C.T. punctuation, a matter considered earlier. Using this, and several, closely related notions, it is entirely possible to convert statements, theories, findings and so on, into the jargon of C.T. Not infrequently, the reverse process of translation, is in a more pernickety sense, also, possible.

135. The theories in question, C.T. and I.A. theory, have, naturally enough, much in common. They commensualise, if the following. important. matters are kept very firmly in mind.

136. (1). The conservation of permissive application, of mandatory application, and difference are common to BOTH theories.

137. (2). Concepts applied, permissively or by mandate, give rise to products and a process-product complementarity also applies to C.T. and to I.A. theory. Similarly, both theories rely upon SIMILAR though not entirely IDENTICAL notions of concept production, reproduction and deflection to maintain distinction, (and thus, identity), distinction conserved over concepts, any participant or group of them. This requirement, it will be shown, requires the conservation of an orthogonal operator, "Un", to be identified with thought, in contrast to mentation.

138. (3). The form of the recursive specification of a concept or a PIndividual is much the same in both theories but the base specification differs because of the essential multiplicity of temporality or succession in I.A. theory which may (but need not always), be obtrusive in C.T. So is the specification of any MIndividual, able to incarnate or embody P-Individual-minds.

139. (4). Even in C.T., we must acknowledge that the programmatic or algorithmic part of a concept is continually rewritten, especially so whilst this concept is being applied. In this sense a concept MUST evolve. But, in I.A. theory, it is necessary to recognise that the one or more M-Individuals which embody the P-Individual, also, of necessity, evolve.

140. (5). Further, concepts are continually constructed and reconstructed from other concepts with which, because of this, they form coherent clusters of various kinds. However, the concepts belonging to such a cluster, entire bundles or meshes of which constitute a minimal P-Individual, retain their integrity as distinct concepts. In other words, distinction is preserved, a fact which may be imaged by an oppositely oriented cohesive force, - holding concepts together and representing their adherence in clusters as a distinction conserving process, acting in a (topolgically) orthogonal direction (see.2.) to cohesive forces of any orientation, clockwise or anti clockwise as

it may be, penetrating the distinctions created by the conceptual-processes, themselves. I used to employ the phrase"at right angles to"(and wish to thank Peter Martyns for indicating possible confusions, as with Euclidean Vector Spaces). We return to these points, in (10), below.

141. (6). In I.A. theory, it is also important to recognise that the PIndividual evolution and the M-Individual evolution are inextricably coupled, since this is where we MUST, not only may, implicate AMITY or LOVE, as a willingness to engage in interaction, to socialise. There is no brain cell making you love me, interact with me, or if there is, then, like the unique pleasure centre, or the unique homunculus, it is an accident, perhaps it is a very expedient one. But it is not required for personal affection and sentience, the main qualities/quantities, conserved and perpetually evolving/developing, in the dynamic of C.T. or I.A theory.

142. (7). All of these dynamic and evolutionary processes are, very often, usefully visualised in C.T. by a start and a finish paradigm. In I.A. Theory it is rarely, if ever, possible to recognise the start and the finish of an interaction.

143. (8). In some interactions, this is due to the irregular and often enough knotted strands of a temporal or causal co-ordinate. Thus P-Individuals, however embodied, MUST evolve. Similarly, the embodying M-Individuals, MUST evolve. Their evolution and their relative rates of evolution are not, on the whole synchronised, as by a clock which is common to all of them, neither that, nor are they somehow pre-set. The otherwise asynchronous is rendered synchronous by the necessities of interaction, ordaining local synchronicity, only. If needs be, we may note the non-linear dynamics of any productive and reproductive process, concurrent with the processes that are reproduced, applied to form ordered pairs, that is, concepts. It is clear that haphazard perturbations, from beyond the horizon of the distinctive carapace, symbollically the product of conceptual processes, an organism itself, may contribute variety to the system, but they are inessential, the predictable chaos of non linear, iterated, processes, approaching a chaotic attractor would provide sufficient variety to suffice, were there no perturbations from an outside.

144. (9). These facts give rise to a necessary awareness (that is, a Petri Type information transfer). In I.A., also C.T., a measure of consciousness, is a (Petri type) information exchange relation, in or between participants. This is an index for the amount of awareness, or the amount of informational interaction. The MEANING, invariably attached to this AMOUNT, depends upon the concepts envisioned by one participant, or shared between several participants who are interacting.

145. (10). In C.T. and in Lp there is a process of unfoldment (see.2.) which is conserved, and orthogonal to the oriented dynamic of mentation. Since it crosses the distinctions created by conceptual processes (hence, as later, directional in contrast to oriented), but bears the orientation signature of its origin. It excites processes within the self created boundaries of concepts or the participants, composed of them. It is interpreted as thought, and its subsequent emission is radiation like. Hence, transactions in C.T. may be regarded as a resonance, in some Lp linguistic field shared by the participants. In C.T., we may, but need not necessarily, deal with action as the coalescence of distinctly oriented unfoldments, determining, by their orientation signatured direction, and an ordered domain of interpretation. Usually this domain is generated by a

prepositional operator mesh, analogically related to some characterising mesh, but of opposite orientation, as, also, are the signatures of its directed unfoldments. If directed unfoldments of opposite orientation signature impinge, together, upon the same opaque distinction, then they cancel, to produce action of the actor in whom this event takes place.

146. (11). In I.A. Theory, action, the absolute, must depend upon a prepositional operator mesh, determining the meaning, direction in a given domain, of actions generated by streams of thought, under some legitimate unfoldment. Formally, action is characterised by the cancellation of orientations attached to directional unfoldments.

147. (12). In I.A. theory it is possible to handle intra-personal and interpersonal interaction. The basis of this facility is that we may write expressions, comparable to TA=A(T), or TB=B(T), like AB=B(A) or BA= A(B), or, in general, expressions like ZZ = Z(Z) and so on.

148. These few clauses, namely clause (1), to clause (12), offer but a vague, unduly global, overview. Their stated intention is to provide such an overview, not a cack handed attempt at explanation of the contents of Chapter 6.

149. Only by examination of Chapter 5, or its equivalent, is it possible to gain an appreciation of the theories in question, namely C.T., Lp, and I.A. Theory and, since analogies have a peculiar significance in this undertaking, there is ample justification for the fairly large portion of the Chapter which is devoted to analogy and metaphor. It is assumed that allegory, like metaphor and anaphor, designate immediate and past referential analogies. That is, to demonstrate some sequence or story dominated by analogies.

150. Quite often, the term analogy is used for any kind or collection of analogies, all having a specific similarity and a specific difference or named distinction. The next volume in our series will show, as concisely as possible, explications of notions which appear in the forthcoming discussion but which are, very readily, overlooked.

Table.3., Table.4., in here.

CHAPTER 5 SOME SYMBOLIC NOTATIONS REQUIRED FOR TERSE EXPOSITION.

151. In order to avoid, so far as is possible, repetitious and unduly embedded statements, a modicum of symbolic notation (and, along with it, some formalism), is required at this point in the discussion. The extent of this proliferation is limited by consigning much of it to the later volumes and Fig.33.. This is a possibly worthy but also rather inept effort to get around a maxim (recommended to and promulgated by Steven Hawkins in his recent," A brief history of Time"), a book about the genesis and character of Time, (Hawkins, S.W., 1988), to the effect that for every equation or mathematical symbolic-expression you introduce, as an author, you are likely to loose half your potential readers. Neither he nor, on a lesser scale, I, DO wish to LOSE readers.

152. For myself, I have adopted the expedient of providing a rather liberally sized further volume in the series, to which is allocated much of the fundamental argument in favour of certain, otherwise platitudinous derivations, inferences and the like. Briefly, this Chapter 5, also, Chapter 6, are intended to furnish the minimal requirement for rational development of the notions proposed. The parts missed out, since experience has shown that they are apt to be misleading initially, whilst exhilarating later on, are alluded to, if at all, as further volume matters. At any rate, this expedient, of scuttering around the significant to begin with, though approaching it later on; or, of carving up the field of enquiry in a somewhat arbitrary manner; are, largely, fabrications.

153. !n any case they yield the following subdivisions, distinctions made by observers, for their own convenience, rather than hewn from the rock of intellect, BY the intellect, and FOR cogent observation. They are mere differences, possibly distractions. But, all the same can be useful and of value to observers and participants and actors, alike, if aware of their limitations.

154. It is a little ironic, since in the following clauses and paragraphs we distinguish certain context dependent styles of learning and creativity, to point out that people, taken as a whole, tend to be analytic, to dissect their worlds in the manner of the clauses to follow, and order them linearly. Personally, I find the layout anathematic, but that is probably because I have lived with the stuff for so long and prefer to see it globally.

155. One way of subscribing to this prevalent and linear fashion is to number the stepwise arrangement of bits and pieces from the dissecting table, using Roman Numerals as sufficiently dignified to be main headings. THIS is what we shall do, in the present Chapter, and THAT is why we do it. So, let us proceed.

(I). DEFINITIONS OF MAIN TERMS.

156. (1). Let Z=A, B, ... and so on, index participants.

157. (2). Let T, Q, P, R, S, U, V,..... stand for the NAMES of CONCEPTS, insofar as real concepts, bearing but NOT at all BEING this name or label.

158. Let T be a representative symbol, over the set of NAMES or LABELS. Let i, j, such that i is not equal to j but, also, such that i has a range from 0 to a finite number, say n, and

j has a range from 0 to some finite number, say m, be auxiliary indices, employed to give specificity or particularity to any one-or-other entity.

159. (3). Let Prog(T) designate an algorithmic like entity, or a collection of them, such as Prog i (T), Prog j (T), ..., which, if compiled or interpreted (in the broad and philosophical sense) gives rise to a product, named T.

160. (4). Let Proc(T) be the compiled or interpreted form of Prog(T), that is a form capable of application, as it stands interpreted in any competent, appropriate and dynamic medium, to yield a product, namely, D(T).

161. (5). Let ProcZ(T) be a procedure, namely, such an interpretation in the fabric of a participant, Z, which is applicable to yield either DZ(T) or else dZ, a member of the set DZ(T).

162. (6). Let it be ORDAINED that D(T), d member of D(T), or dZ of DZ(T) contains as a member, or includes as a proper or improper subset one or more Prog(T), for Prog(T), are one or more strings of symbols, albeit instructional, upon interpretation. As they stand, however, they are surely set members or subsets, perhaps of an arbitrarily large Cartesian Product set. On the contrary, ProcZ, especially since modified under application, most certainly is not a set element or a subset. Some explication is needed, at this juncture, in order to avoid possible confusion. Whereas Prog(T), Prog i (T) and so on are indubitably set elements or subsets, Proc(T) or Proc i (T) are definitively NOT such things. For example, whilst it is harmless jargon in computer science, having a computer, operating system and programming language in mind, to say this program may be executed or that it is under execution, it is, in the general case, utter NONSENSE. For, in the computer science case, operating system, programming language and so on, are, rightly enough, taken for granted, they are not so, in the case of brains and societies. That, incidentally, is why we consistently employ the somewhat broader application, or Ap, in place of Execution or Ex, implying not only that execution is in a computer of some kind but, also, in a serial machine, built to satisfy the essentially serial algebras of Church, Markoff, Turing, Von Neumann and others. In contrast, Ap permits activation in any system, a brain, a society, a Petri Net, as a limiting case, in a standard computing machine.

163. (7). Let Con stand for a coherent, serial, parallel or concurrent colligation of Proc, as the name suggests, a concept procedure such that if Ap(Con(T))==>, then D(T), so that the complementary pair <Con(T), D(T)> indicates a Concept, proper, as represented without subscript, at an Lp interface. Also, let Con' be of the form concept, but a concept that acts upon other concepts to produce and, incidentally reproduce the same or fresh ones. That is, for any viable or stable concept, we have, given Ap occurring Ap(Con*(<Con(T), D(T)>))==><Con(T), D(T)>, for any T, or, in general, that there is a complementarity of the type <Con', Con>.

164. (8). Let ConZ(T) signify one of Z's concepts, here of a concept, equisignificantly a skill, named T.

165. (9). Let Con*Z be a productive and, incidentally, reproductive operator of the form Con but peculiar to participant Z, such that Ap(ConZ'(<ConZ, DZ>))==>some <ConZ,DZ> such that it is coherent with Z's repertoire of concepts and their clusters (as below), It

follows, from the previous clauses, that there is a complementarity, Con*=<Con+Z, ConZ>. Further, regarded in its CANONICAL form, a MINIMAL P-Individual, a minimal participantZ's extent, IS the SCOPE of Con*Z, although more extensive forms may, obviously, exist.

166. The complementarity ConZ* = <Con+Z,ConZ> accounts for the prediction, in C.T., that P-Individuals or context-dependent participants may have dominant learning and innovative styles, in much of the literature Con+Z being written "Description Building", or DB and Con-Z being written "procedure building ", or PB types of mentation, these predictions being verified by empirical evidence. There is even stronger empirical support for the fact that both modes of conceptualisation are needed to acheive understanding of a concept, which once understood may become more difficult to acess but is ineradicable.

167. (10). Let Ap(....) be a permissive, that is MAY not MUST operator, conserved or evolving over any P-Individual. Let the composite form, namely of &(Ap(.....)), be an imperative operator, conserved or evolving over any P-Individual, signifying that at least one of those things, permitted by Ap, given an & prefix, must in fact be done.

168. (11). No concept may exist upon its own, only in a collegiate relation to other concepts which form a cluster (as above) and are mutually responsible for production and reproduction.

169. (12). Any concept encompasses an indefinitely large number of refinements, of the concept. Any concept is, also, a generalisation. As the value of a conversation is analogy and any analogy has a generalisation, C.T. and I.A. also, are recursive.

(II). SOME FUNDAMENTAL NOTIONS OF C.T., Lp AND OF I,A, THEORY.

170. (1). Conversation theory is about conversational interactions, concept sharing, between several participants and Interaction of Actors theory about more general interactions between actors, generalised participants. All participants have one canonical specification as P-Individuals, indexed, as above, by Z but all of them are embodied, incarnated, or interpreted in one of more substrates, brains, societies, or whatever.

171. Any conversation, any interaction for that matter, is punctuated. In essence it is punctuated by agreements or agreements to disagree. It is convenient to use the term agreement for both, so that agreement does not imply accord. Such an agreement is aptly imaged by a dynamic form of coherence, provided we bear in mind that the agreement to disagree component has an equal if not greater significance than the component of accord.

172. After all, it is this which maintains the distinction between the participants, say Z=A and Z=B, which is the rationale of their discourse in the first place. This punctuation, intended in the broadest possible sense, has a great deal to do with the multiplicity of types and modalities of language in which conversations, interactions, or whatever take place. For, whilst it is hard to deny that A and B, say, might indulge in the painful

experience of trepanning each others skulls and injecting bits of brain tissue, they do not, in recent experience, often do so. There is, of course, historical evidence that primitive men did trepan skulls, but the historians appear to believe that this operation was performed in order to release malicious daemons. So, in general, we converse in symbols and set theoretically tractable entities, descriptions and so on, the DZ(T). But, in this context, recall, from (I), that any DZ(T) includes or has as a member, each Prog(T) entailed, upon interpretation, in its production, but most certainly, does not include or have as a member any not-set theoretic ProcZ(T), or ConZ(T). Due to the complementarity ConZ(T)=<Con(T), InterZ> the interpretation of Z=A and Z=B, exchanging strings like Prog(T) or descriptions in D(T), are different. The connotation ascribed by A, to "T", for example, is not the connotation ascribed by B, whatever the denotative properties of "T" may be.

173. At any rate, in language of whatever kind, the idea that punctuation in conversational or other interaction waxes and wanes, the norm nowadays, is of greater importance than had been, previously, recognised. It may take many forms, such as fluctuations, with gaps filled by high sounding platitudes between mutually comprehensible dialogue. It may take the form of start and finish markers, interpolated in a generally sensible flux of speech or action. It may mark sentences, phrases, stanzas, scenes, acts, plays stories or polemics. It IS, in fact, invariably a punctuation of MEANING and it is, so to say, the outer husk of a quantisation of meaning, to which we soon return. At such marks of punctuation, it is reasonable, nay necessary, to face the truth valuation of a conversation.

174. We do NOT mean the truth value of metastatements, made by an observer in a metalanguage, ABOUT a conversation or other interaction, for example, that A and B did converse or interact at such and such a moment or in such and such a place. We DO mean the truth value of the conversation, in particular an agreement or an agreement to disagree, revealing that it is a certain kind of EVENT. This kind of event is an analogy (that which has a similarity and a difference). Here, in the simple but primordial case of an A, B, interaction, the DIFFERENCE is that which renders A and B distinct participants and the SIMILARITY consists in the CONCEPTS they have SHARED (as a result of the conversation), in their interaction.

175. (3). It has already been indicated that the external dynamics of a conversation or an interaction strongly resemble the microdynamics of the internal interactions, coherencies and distinctions, of an actor or other participant. In order to delve into this matter, it is convenient to make a few arbitrary distinctions. These arbitrary categorical distinctions are as follows, namely

176. (a). Conceptual Flux, to include the production, reproduction and creative innovation of concepts, as well as concepts themselves as complementary process-product-pairs.

177. (b). Directed thought.

178. (c). Action and Interaction.

179. There are many ways of dealing with each, several of which will be explored, since some are more generally facile than others. Further, a great deal of personal disposition for one-or-other kind of exposition is involved and we shall take the

opportunity to note others, which are not dealt with in this volume, but deserve scrutiny.

180. (4). One approach to conceptual flux is by a permissive, if you prefer it, a multi-causal-algebraic form. Given, from (I), how a concept is specified, we need to describe its stability, resilience, memorability or its production and reproduction from other concepts. Starting with the applicability of interpreted concepts, thus from Ap(ConZ(T)==>DZ(T) or the process-prod uctcomplementarity of <ConZ(T), DZ(T)>, we specify the base and the iteration of a recursive form, namely, for the base

ConZ(T)=ProcZi(T) BNF, OR[ProcZi(T)]BNF, OR<ProcZj(T), [ProcZi(T)]>

181. in which [and] enclose entirely parallel and already synchronous processes or procedures, i is not equal to j and the last term expresses the fact that the synchronous coherence of a not necessarily compatible procedure involves a Petri-like information-transfer, which IS, henceforward, interpreted as one kind of AWARENESS on the part of the participant in question. For example, ProcZi(T) may be a series of instructions, say for knitting, and equated with ConZ(T), the introduction of ProcZj(T) as due to a mishap, concerning the use of an instructed skill or concept, and the entirely coherent and parallel collection as the automatic and probably unconscious performance of this skill. Concepts are, amongst other things, skills. The base, is such the
        Ap(ConZ(T))==>DZ(T).
The iteration is under the operator Con*Z, so that

Ap(Con*Z(<ConZ(T), DZ(T)>)) = Ap(Con*Z(Ap(ConZ(T))==><ConZ(T),DZ(T)>.

182. Finally, in a permissive logic, <Con*Z, <ConZ, DZ» is AMONGST the products. There may be OTHER products, stable if and only if caught up in an organizationally closed system of concepts belonging to a participant or actor, otherwise evanescent. It becomes evident that a further index of succession, t will suffice, immediately avoids the cumbersome notation which indicates that T at the start and the finish are different, because of the conversation or the interaction. That is a valid statement, but the evolution and development of a concept is, in fact, continual. So, minimally, we write the iteration as

Ap(Con*Z(<ConZt(T), DZt(T)>))==><ConZt+1(T),DZt+1(T)>.

183. Next, it is evident that Con*Z acts upon arguments of different type, so that, really, Con*Z, being amongst the products

Con*Z= <ConZ+, ConZ-->

184. where, for any U, V, ..., we have

Ap(ConZ+(DZ(U), DZ(V).....)-=>DZ(T)

185. and that

Ap(ConZ-(Any ProcZ's in Z's repertoire)==>ProcZ(T)in ConZ(T).

186. Hence, the production and incidental reproduction of concepts has been, in outline, demonstrated. Let us proceed, however, to organizational-closure and informational-openness and P-Individuation. These are properties that permeate conversation and other modes of interaction, essentially of self organization.

187. (5). From previous specification, a system is organizationally closed if and only if it is a dynamic system, involving the production of products, AMONGST which are the productive operators themselves. In this case, of dynamic conceptual systems, the products are concepts and the productive operators, acting upon the concepts, are AMONGST the Con*Z responsible for the productions and, incidentally, reproduction of the system. In fact the amongst clause also admits not only the possibility of organizational-closure but, also informational open-ness, so that organizationally closed systems may interact with each other in the same participant but also between participants, forming larger and still informationally open closures. Since the amongst clause may give rise to novel products, since the productions have singular resolutions and bifurcations, it accounts for one kind of creativity or innovation. There are other types of creative evolution, more readily dealt with using a different notation. Immediately, we confine attention to a minimal conversational interaction between A and B, using a graphic form of the present notation. Fig. 7. shows an organizationally closed conceptual system in A, Fig. 8. shows an organizationally closed system in B, Fig. 9. depicts an A, B, interaction and Fig. 10. One possible outcome of concept sharing if A and B have quite different concepts of some concept they name T. The double arrows, like =_> represent productions, the ordinary arrows, such as --> the return paths of products to productive operators and it is assumed, in each case, that Con*Z is amongst the products of each system, although Z=A is not the same as Z=B. The interaction shown in these pictures results in A and B sharing concepts and learning something more about what they call T, so that their concepts of T evolve. More importantly, or of equal importance, A learns about B and B learns about A, in particular how they are distinct, using the shared concept of T as pivotal in doing so.

188. (6). Before embarking upon several other notation methods, it is appropriate to introduce some definitions which yield abbreviations that will prove invaluable when dealing with those interpersonal interactions upon which Bateson and Laing have focused their attention. These are the many layered interactions typified by what does A think of T and what does A think B thinks of T up to what does A think that B thinks of T and, vice versa, starting with what does B think of T. Of these, the what, how, and why questioning and replying, shown in Fig. 2, is a special case, but an important one.

Our abbreviating definitions are, as follows. They are, of course, merely representative of a thoroughly general scheme.
TA=A(T)=<ConA(T), DA(T)>, A's Concept of T,
TB=B(T)= <Con B (T), DB(T)>, B's Concept of T,
or, in general
TZ=Z(T)= <Con Z (T), DZ(T)>,
also, in general
AA=A(A)= <ConA(A), DA(A)>, A's Concept of A,
AB=A(B)= <ConA(B), DA(B)>, A's Concept of B.
and vice versa, or, in general terms
ZZ=Z(Z)= <ConZ(Z), DZ>,
given that for all Z and all T, the concepts

TA = A(T) is not equal to TB = B(T)
and that
AA= A(A) is not equal to BA = B(A) and vice versa, hence, there are no
Doppelgangers. .

189. In Fig.11. is shown a minimal interpersonal interaction, between participants A and B, of this type. The pivotal focus may be any, personally relevant, event, of concern to these participants.

(III). ORIGINAL AND LATER REPRESENTATIONS.

190. (1). In the late 1960s and the early 1970s it was recognised that studies of conversational concept sharing called for a means of representing the concepts that are shared by the participants, further that this representation should image what could be known about their conceptual processes. The first way of doing so (still valid but exceptionally cumbersome) employed entailment meshes (Fig. 12A, to Fig. 12F.), directed graphs and certain attachments, having the property of local cyclicity, represented between re-entrant arcs to depict the fact that a collection of concepts were mutually productive, incidentally reproductive, also. The name mesh was, perhaps, misleading, insofar as it suggests a static structure akin to an associative network, which it is NOT because

191. (i). each node, representing a concept NAME, is associated with one or more models or explanations of the concept it names and the fact that this model is necessarily applicable to it a slightly diluted image of a shared concept,

192. and (ii). Because this shared conceptual image is mutually productive and, incidentally, reproduced from other concepts, as indicated by the local plexi of cyclic arcs (of course, there may be other-than-local cyclicities, as well, but the local cyclicity property is mandatory). Fig. 12A„ 12B, a distributive form, the A and B shared concept (here, of T) with many productions and, incidentally, methods of reproduction, or, if preferred, derivations. Both of these pictures show applicable models, which. upon application yield descriptions or products. However, both are shorn of the local cyclicity which is amongst their essential properties. Since the locally cyclic structures amount to dynamic and coherent clusters of shared concepts, the notation employed in Fig. 12D. and in Fig. 12E, is much more facile, especially if other than local cyclicity is also involved, as in Fig. 12F. Other disadvantages of the original kind of representation are the fact that it fails to emphasise the essential dynamism intended, that meshes are prone to be confused with associative networks and the like, static or at best kinematic entities not really representing shared concepts except in a naively fixed definitional sense, that they are not readily manipulable and, finally, that the representation of analogy relations is arbitrary and far from being adequate. It would have been better to use Peter Burch's name, for these plexi, Mailles d'entrainement. However, as it stands we opt for meshes seen as kinetic and legally connected conceptual clusters, the minimal mesh being a collective cluster and, somewhat later, for analogically connected mesh families. In each case, a mesh is Lp LEGAL, if and only if it is Unfoldable from ALL concepts entrained in entrained Here it is quite essential to insist that concepts, as intended in a mesh, are not just concept names and that clusters or productive and, incidentally, reproductive clusters of them are NOT merely splodges

filled with concept names, ad libitum. They ARE topological systems and, in the following clauses, we shall assert and seek to justify their validity and rectitude.

193. (2). Graphically, it is possible to represent the process

&(Ap(ConZ(T))==>

as a line extending into a void, as in Fig. 13, provided that

194. (i). we appreciate that the line may be clockwise oriented or anticlockwise oriented and

195. (ii). that the line is not homeomorphic upon a geometric line but is like a strand of rope or many cored cable.

196. I DO appreciate that, for manipulative purposes, these ropes or many cored cables may, for such PURPOSES, only, be made homeomorphic upon lines in a richly marked and directed graph, as in Kauffman's theory of knots. The product of this process may, similarly, be represented by a cylindrical carapace or distinction, as in Fig. 14, the distinction of DZ(T). Thus, inscribed upon paper, this process line goes into the void, to the right or to the left and the process is given a sign+, clockwise,+, or, anticlockwise. By comparable token, the distinction, cylindrical in shape, exerts a deflective force, denoted orthogonally, but bearing the signature, clockwise or anticlockwise, of the process which creates it. These constructions are shown in Fig. 15A. and in Fig. 15B, and are, if it is accepted that -, whatever its orientation signature, is orthogonal to +, then it is the case that it deflects similar concepts, and that it is directed into a not void, or a something.

197. If and only if a process line loops back upon itself to produce a circle and if, as a result the product, represented as cylinder becomes a torus, then a concept exists, assumes the value of a dynamic coherence truth (Rescher, as refd) or a hermeneutic truth (Taylor, as refd), in the rigorous sense of an iterative refinement of meaning. Manifestly, this type of truth has clockwise and anticlockwise variants, the distinction conserving and orthogonal forces have clockwise and anticlockwise signature variants, as shown in Fig. 16A. and Fig. 16B. which indicate forms of self reference. Further, since under certain circumstances, refinements of a concept may emerge from the torus and re-enter it by some, possibly devious routes, these emergent and reentrant forms assume truth values of clockwise or anticlockwise other-or-many reference, as in concepts shared by a society. This possibility, a very important one, is shown in Fig. 17A and in Fig. 17B, as below. It has been argued that no concept may exist upon its own, only within some cluster.

198. A collective and minimal cluster is shown in Fig. 18, a minimal distributive cluster is shown in Fig. 19.In Fig. 20, we note the essentially horizontal and vertical sections of a torus of any genus, or number of holes. We shall elect to call the half section derived from the vertical slice section canonical, since, from it one can most readily reconstruct the topological properties of the image. Thus, in Fig. 21. is a canonical section of a collective form and in Fig. 22. of a minimal distributive form, more elaborate mesh types being shown in Fig. 23. and a realistically complicated mesh, for a design, in Fig. 24. A mesh picture is not, as previously insisted, an arbitrary collection of overlapping bags and baubles. It is a canonical section through the kinetic systems exhibited, of

process and products or distinctions. In fact, rather more than that is involved in this matter.

199. (3). Let us concentrate upon directed thought, following the signatured deflections which are maintained from an origin or focus, say from concept "o", across distinction. This operation, called Un, or unfoldment, is also conserved over a system.

200. There are several kinds of unfoldment, here we only address two of them. One of the two (classical naming), is called PRUNE and the other (classical naming), is called selective prune, or SELPRUNE. These unfoldments have, as their arguments, a shared concept and a mesh in which it resides. They follow the directional-but-signatured arrows, relating shared concepts and clusters in the direction of "into something" or, the "not void", a space perhaps. When an unfoldment impinges upon any concepts, in the neighbourhood, the bounding distinction of the origin it activates them, renders them applicable and thus potentially reveals the products of the conceptual process responsible for creating these products, or distinctions. Such activated concepts behave like the origin concept, "o", with respect to their own neighbourhoods.

201. This is a fruitful mode of contemplation, provided that we have in mind a couple of basic riddles, namely

202. (i). What is meant by activating, or equisignificantly, a concept, apart from the fact that it may be applied to produce a product or distinction, hence thought-of from a given direction and

203. (ii). How does one locate the origin-concept?

204. The thin coating of gilt paint is substantially removed from the gingerbread by noting, as follows, that neither (i) nor (ii) are proper questions, evocative of proper replies, that no mesh is static but dynamic and continually evolving, finally, at any rate an this moment, there is neither an assured theory saying how the origin concept is selected, that is, of what do we attend to or what is our focus of thought or at what point is an unfoldment truncated, as it often is. For that matter, what is awareness, on the part of a participant or actor (of whatever kind) or what is consciousness, between participants, or actors (of whatever kind)? Of course, there are plenty of ad hoc resolutions to these problematic situations.

205. For example, if someone explodes fireworks in the vicinity, I am likely to attend to where the fireworks were let off and made their explosions, if someone sings a beautiful song or shows a magnificent painting, then I am likely to listen or look attentively. If I am bored or realise that I am perseverating, then I am likely to seek grassier fields across the hill, like the proverbial donkey. If I feel apprehensive about a place, then I am likely either to dull the apprehension or cast around for the source of it. But these are ad hoc resolutions and unless unrepentant and downright behaviourists, we cannot take a plethora of stimuli, operant or not. as any more that incidental reasons which introduce a motive into an otherwise sessile organism.

206. On the positive side, it IS possible to say that unfoldments MUST occur when singularities in an evolving mesh, resolved by analogy creation, (as later), give rise to

an information peak, a step function of neccessary information input or creation. Further, these are not the only peaks in a potential distribution over the mesh, (which I strongly conjecture to be an information potential). Finally, that the quantity of information transfer, in the sense of C.A.Petri, is a measure of awareness and that it occurs whenever some distinction is crossed, being the directed awareness of thought and often consciousness. However, a considerable measure of ignorance still exists, it would be spurious to deny it.

207. Admitting that measure of ignorance (or ascribing a fundamental indeterminacy, at this point), Fig. 25. and Fig. 26. are introduced in order to illustrate the MECHANISM, not the RATIONALE, of unfoldments. There is (and, so I am inclined to believe), there always will be, an underlying indeterminacy in these matters, that of free will, which it is demeaning and false to substitute by dice throwing. However, I shall conjecture about the excitation of concepts

208. My conjecture is this, that The directed but orientation signatured unfoldment invoked by

$$\&(Un<\text{Origin or focal concept, mesh}>)$$

209. is a means of introducing a need for distinction crossing and meaningful information transfer, pumping directed energy into an otherwise disorderly aggregate of concepts. Obviously, the term "energy" is used metaphorically. Those concepts touched upon become excited, rather after the manner of atomic oscillators. Here, once again, is a deliberately metaphorical usage, since a concept is NOT an atomic oscillator, it is neither particularly "atomic", in the sense of fundamentally staid and particulate but nor, for that matter, are real atoms. I maintain, however, that by virtue of its position amidst and its juxtaposition with other concepts, it realises this distinction crossing and meaningful information, metaphorically, energy. Further, that by virtue of excitation, it is placed at discrete and context dependent levels of meaningfulness, a function of its condition and the context in which it is excited. It thus releases its surplus meaning in quantised, though context dependent, jumps. This emission is characteristic of any kind of language and any action, it is, not quite so metaphorically, a radiation emitted in meaningfully quantised packages. Emitted into what, though. Do we need some kind of aether as a medium, an Lp processor at an Lp interface, for example, or can we simply say that it goes into the curious topological manifold which extends from something into the void.

210. Lp as an abstract entity, is like a dimensionless space. It is odd, possibly maverick, to speak thus. But it is not lunatic, even if you deem it grossly misguided. The fact is, if concepts of different meaning were indistinguishable, like particles of distinct type, then it would not be difficult to develop a quantum dynamics of thought, conceptualisation and action. Happily, concepts are not so uniform. Distinction, of type but, also, of particulars are conserved. Therein lies the mystery, magic and urge to explore the caverns of an abyss called individual, organizational and social mind.

211. However, let us end this section on a note of greater certitude, namely this. Whatever else, the UNFOLDABILITY of a Mesh or of a mesh family of analogy related meshes, is the criterion for Lp LEGALITY of the mesh or family of meshes. This, incidentally, underlines the importance of representing mesh analogies in a comparable topological

manner to meshes simpliciter. This capability is of particular significance in respect to analogies relating meshes representing participants, conversing or interacting. Recall that the value of a conversation, an interaction also, between participants is an analogy relation .

(IV). ANALOGY RELATIONS ORDAINED BETWEEN CONCEPTS AND MESHES.

212. (1). There are many differences between the use of analogies that are GIVEN, for example, that the laws of mechanics and the laws of simple electrical circuitry are similar, but that there is an immense difference between them. The material universes of discourse, appropriate to resistances, impedances and capacitance are DIFFERENT to those of entities like springs, weights, and dashpots.

213. Also, the CREATION or DISCOVERY of analogies is distinct from their use. Both situations, analogies pointed out and those discovered and created are relevant, notably in education, learning, complex decision making and design. Here, however, we are mostly concerned with analogy creation and how it takes place.

214. (2). So far, we have presented the form and unfoldment of well behaved meshes, all of which have an outer husk or distinction which has the characteristics of a torus. In the case of a minimal mesh, a collective cluster, it is irredundant insofar as ALL of its unfoldments must be superimposed to obtain the original mesh. Others require that only SOME be superimposed, for this specific purpose. Meshes having outer or peripheral husks are toruses of genus O, if they are not other-than-locally cyclic and others, having non local cyclicity have peripheries forming toruses of genus greater than 0. None of them present situations in which one torroidal husk penetrates the surface of another such husk, until, that is, we come to analogies and families of meshes.

215. The depiction of these requires, in projection, a Kleine Bottle, or Doubly Twisted torus representation. Possibly the simplest configuration which contravenes the basic fiats for well behaved meshes is the unambiguous ambiguity (Dik Gregory), since it is ambiguous insofar as there is insufficient distinction to counter or accommodate the coherence asserted.

216. A useful dynamic image is as follows, that if the resultant orienting force of a concept is <+,clockwise > and the deflective, distinction making,-force is signed <-, clockwise>, then the cluster of concepts is held together by a <+,anticlockwise> force. In the region containing, as in Fig.27., both the concept of "T' and the concept of "M", the anticlockwise resultant is too strong to permit the distinct existence of both the concept of "T" and that of "M", hence, further distinction must emerge by the emergence of refinements of T or M or both This is shown in Fig. 27 (together with the possible resolutions of this ambiguity). The image denies the rule of Genova. due to Vittorio Midora of Aldo Sanna's institute, in that city.

217. These transformations are offered at an Lp interface, in the absence of genuine information, the only mechanical resolution being the last one proposed in the picture. Here, the only way to resolve the dilemma is to recognise that a concept is a generalisation of its refinements and, to achieve resolution, induce a singularity, here a

bifurcation, which renders the refined concepts explicit by a number of doubly-twisted, surface penetrating, re-entrant minor toruses.

218. With Fig. 28. it is possible to model the topological reality of surface penetration, using topological projection models, one perspective and a pair of sections as constructions for the sparse notation initially employed in the previous picture. It is not intended to use these accurate but admittedly complicated representations at this juncture, but it is important to recognise that, given tricks such as surface penetration at infinitely small points, these representations exist, may be constructed and render the notational schema of well behaved meshes congruent with aberrant or not well behaved meshes. This possibility is of especial significance, on considering the unfoldability of analogically connected mesh families.

219. Some, in fact many, depictions are ambiguously ambiguous and all of these situations may be disambiguated, by recently discovered forms of analogy that are, on the one hand, tautomeric (to use a metaphor from chemistry) or resonant, like a benzene molecule (to use another metaphor, culled from the domain of quantum chemistry and distribution theory). Some interesting exemplars, with their conceptual equivalents, are shown in Fig. 29, which indicates and illustrates a possible uniform approach, at the level of resonance. It is, also, intriguing to relate this fact to the quantisation of meaning, in Chapter 10. In order to avoid mixed metaphors, the reader is asked to refer back and forth between this facile exposition and the deeper, albeit utterly inadequate, presentation of Chapter l0.

220. Anyhow, most analogies are probably of this, resonant, type, so are most, if not all concepts, and a type that, as later, lies at the roots of organization and society, as well as creativity and innovation. One further, essential point, needs emphasis. Due to its character, topologically speaking, the number of twists required in a relational minor torus and its return path any analogy relation may retain, invert, or transcend orientation. This is why, for example, it is possible, as in Chapter 11. to couple meshes unidirectionally or bidirectionally or symmetrically. The unidirectional, inverting, form enables the coupling of a normal mesh and a prepositional operator mesh of opposite orientation.

(V). ESSENTIAL GENERALISATION.

221. (1). Any coherent cluster, like any concept, may be regarded as a generalisation if its distinctive boundary is labelled uniquely. If it is so labelled, then one may unfold from clusters as well as concepts, an operation illustrated in Fig. 30.

222. (2). It is, in addition, possible to unfold from P-Individuals, with certain caveats due to their necessary M-Individuation. This is of particular significance, as argued in the next chapter, when the participants are actors, playing roles in an organization or a society, for it allows us to identify organizations and societies with analogy linked, topologically representable, families of analogy related meshes.

223. (3). However, a generalisation MUST be constructed when there is in Dik Gregory's(as in Gregory.D, 1988) and Paul Pangaro's terminology, (as in Pangaro.P, 1986) an

ambiguous rather than an unambiguous ambiguity. In practice, such configurations are very commonly encountered.

224. (4). In these cases, the overlapping and partially ambiguous cluster or clusters, must be designated as generalisations. For this reason, we call them essential generalisations.

(VI). THE TEMPORALITY AND LOCAL SYNCHRONICITY OF ACTORS.

225. Think on this, one, point. Why is most scientific thought besotted by the idea that actors have comparable, even the same kinds, of temporal succession. For, quite manifestly, they seldom do have this property.

226. (1). This fact, alongside a reappraisal of succession, essentially writing the index t as a vector of vectors is essential to the construction of a respectably defensible interaction of actors or I.A. theory. It is essential, to is its firm foundation. The truth value of a conversation, even, renders such an assumption suspect. Of an actor, culture, or population the assumption is absurd and slipshod.

227. (2). In conversation theory, we tacitly assume not only start and finish but, also, a Congruent Iso-Inter-Family, that participants have NOT the SAME but a congruent interpretation of messages. This, rather brash, assumption no longer holds for actors-as participants, be they players-on-stage, or people in roles, like air traffic controllers, passengers, pilots and ground staff, also in differing roles and restricted by duty cycles. As in (1), above, there is little or no justification for believing that the occupants of these roles have the same temporal index, t, as before. That is manifest, if only because of the very different tightness and regularity of couplings between the role determined occupations of the actors in question. For the fact is, an ACTOR in I.A. theory does not necessarily belong to the SAME iso-inter-family, although such families tend to converge as work goes on and actors form coherent teams. So, from (1), we must, at very least, replace our index, t, by a vector, say Theta, where Theta(<A, 1 >, <A, 2>) is itself multiple, where A alludes to the P-Individual A and Theta (<B, 1 >, <B, 2>) refers to the P-Individual B and "1 "refers to Con A, Con B, their, most likely different, temporal conceptions, whereas "2 "refers to the, possibly independent, evolution of the Inter of A and B or the M-Individuation of A and the M-Individuation of B. Further, the entire scheme must be prefixed by a system reference, say Lambda, and its relation to distinct roles and their local or global synchronicity.

228. (3). These comments lead, minimally, to a matrix like representation of actors, some considerable extension of which is required in order to deal with coherent systems. For example, quite apart from using a colligative Lambda, it is, in most cases, neccessary to invoke a plurality of them, as pointed out by de Zeeuw in a recent research seminar, thus giving vectors of matrices, in fact, having components of the form Lamda, say, of

229. <Lambda<LambdaA(ThetaA(<A,1 >,<A,2»)),(ThetaB<LambdaB<B, 1>,<B, 2»)).....>.

230. At least as much is demanded of the mesh representation of such things, their evolution, in particular. We comment, rather later, upon the wisdom of using state

space or phase space representations at all, and venture into a hitherto barely explored region where they are relinquished in favour of a fundamentally event representation.

231. In this, the first book of our series, we have the caution to venture gingerly. We only conjecture about the possibility, quite a maverick one for all that, of taking the carapaces, the distinctions generated by the acts and interactions of actors as they conceptualise and, crossing their conceptual distinctions, think about them AS the COORDINATES in which it is appropriate to embed the actors and their actions and interactions, to forecast some of them, as well as may be.

Fig.6. up to Fig.30., in here.

CHAPTER 6. MIND, THOUGHT, ACTION AND INTERACTION.

232. After scrutinising Chapter 5, many readers will have concluded either that I am a lunatic or possibly the eccentric representative of a group which has established the basis for a fundamentally novel paradigm. To give this liberty of choice was the main reason for subtitling this book, Volume.l of a series, a monograph. You may consign me to the asylum, without regarding the other members as worthy of the same committal.

233. Of course, I hope that you will neither do one nor the other, preferring the title Volume 1. Most of all, I hope that you will not throw the book aside, as so much repetitious trash. Suppose, for an instant, that you opt to take this book as a serious work. If so, it seems to me that certain relevant points emerge from our developments of and additions to C.T. and Lp, in order to construct the embryo of I.A. Theory. It is opportune to present a selection of these points, in the following paragraphs.

6.1. INTERNAL DEPENDENCIES

234. An actor is a participant and a P-Individual, but in the case of an actor it is essential to notice that the M-Individuation of the participant has considerable significance. The notion of P-Individual was devised to permit embodiment or incarnation in any appropriate and dynamic M-Individual, one or more of them, such as a person, group, culture or organization, all of which may converse. So far as participating actors are concerned, it is also crucial to consider, carefully, the kinds of M Individuation at stake.

235. (i). That is so if only because of the types and rates of adaptation, on the one hand of the P-Individual constituting the participant and the M-Individuated part. These, often different, types of adaptation are critical determinants of the evolution, even the survival of the participants in question. They are, above all, of immense significance if guiding or aiding the design of a social support system. It is of no great consequence, WHICH social support system is alluded to. For example, it might be a support system for the H.I.V. infected, even those dying of AIDS or various other terminal diseases, like some, incurable, barely retardable, cancers. It might be a support system for the industrially misaligned, people in the wrong jobs like square pegs in round holes, one exemplar, constructed by members of our group, being a game-like system, the game-like, level sensitive, "Switcher". It might be a support system to maintain the power supply under gross overload, support to maintain citizens deemed "Schizophrenic" within society, rather than incarcerated within geriatric, a convenient ambiguous term, in benign but, actually bestial, hospitalisation or it might be support for the overload situations encountered in airports, where overload is the breeding ground for malice and terrorism. For that matter, it might be an urban support system, intended to obtain, or maintain, harmony between different ethnic minorities, or rival factions in a community which exists or has been displaced, by the equally pernicious happenings of accident and planning.

236. The facts are that all such systems are characterised by different roles, filled by different people or groups. For example, one we cited previously, in an airport, there

are roles such as air traffic controller, ground staff, reception staff, security, loading controller and so on. Increasingly, as we become accustomed to living in an information environment, these roles are aided or unified through communication and conversation channels, computerised interfaces and the like. Since these channels exist, their presence serves to underpin the pluralistic character of the causal and temporal types and scales appropriate to the participants who occupy them, for the roles must exist, even if the people or groups have well deserved holidays. For example, in an airport, the air traffic and loading control groups must be, though in different ways, more tightly coupled, not only within one particular airport but between control stations, than, say, the ground staff who face a quite extraordinary mixture of travellers. Similarly, although with less differentiation, the cabin crew are less tightly coupled than the flight deck crew. That is, contingent upon circumstances.

237. As you will know, if you have suffered the misfortune of being highjacked, then the liaison is, suddenly, close and intense. Never, after that, could you think of a cabin stewardess as a kind of low grade waitress, in a fast food joint. Again, in the different context of a home, for otherwise homeless youngsters on probation after one court appearance, there is a difference in role and in coupling between the resident social workers and the other inhabitants.

238. This is all fairly obvious, so, also, is the fact that the temporal and causal types and scales of these differently coupled groups determine differences in languages. That is especially so, for the types of language, emphasised by Gerard de Zeeuw, called problem solving languages. With a few exceptions he takes, as the extremities of a continuum, externally defined problems (I am apt to call them problematic situations, causes of anxiety or disquiet, crying out, clearly and loudly for problem formulation) and internally defined problems. (which I am prone to call just problems, either open to solution or demonstrably unsolvable). In either mode of expression it is clear enough that some kind of gap exists, further that in either mode the gap is essentially linguistic. That each role group uses different kinds of languages (de Zeeuw calls them, very appropriately s-languages) which could equally well be the languages of designers and planners or, on the other hand, of potential inhabitants of whatever structure is built, which (not uncommonly) are mutually incomprehensible languages. That is, unless they are linked by a d-language (de Zeeuw), not just a metalanguage for talking about them.

239. In the relatively restricted arena of C.T., it is often possible to concentrate upon the adaptation of P-Individuals. If so, mental procedures are rewritten, at least, their algorithmic or programmatic part is rewritten, often whilst under application. If so, for any given participant, Z, then it is legitimate to regard the InterZ as invariant, hence, to regard the corresponding evolution of Z's M-Individuation as real, but of relatively small significance.

240. However, such a cavalier assumption is manifestly unfounded in the case when different people occupy similar roles, as in the exemplars just noted. That is the rule, rather than the exception, in I.A. theory.

241. Underlying all this, there is a more fundamental reason why the usually distinct adaptation types and rates of the P-Individual and the M-Individual aspects of an actor and participant, must be respected. It is that the internal interaction between the P-

Individuated and the M-Individuated facets of a participant interact, in a subtle and possibly unique-to-the participant manner to create the essential quality of amity, because of which actors are willing to speak to each other and to listen to each other.

242. Whatever the particulars of internal-to-participant interaction, it seems clear that the quantity of this commodity, amity, is conserved in any interaction between actors. Perhaps this is most lucidly demonstrated in "An algebra of Conscience", due to Vladimir Lefebrve (as refd). This masterly but much neglected work deals with ethical systems, under the polar opposites of good and of evil which, rightly, remain undefined, just as the particulars of internal-to-participant interactions remain, quite properly, undefined. But the calculus, introduced by Lefebrve is exact, a form of Boolean algebra which is enhanced by the adjunction of an exponential notation and, in the immediate context, would be further enriched by the use of a modal logic.

6.2. ACTORS AS SPECIALISED PARTICIPANTS

243. Here, I return to the habit of enumeration. It is convenient to do so, since what follows has a technical flavour but a very tangible substance.

244. (i). Assume invariance, on the part of an observer. Let this observer elect to call (at the grain of observation chosen) any concept a + clockwise oriented entity.. If a deflective "-" indicated force following unfoldment of any evolving mesh, signed by "+" clockwise (or vice versa), impinges at a boundary or distinction crossing, the product of a conceptual process, then there is a cancellation of signatures.

245. (ii). Formally, there are solutions 0 and 1, or positive, and these are interpreted as inaction and action. Such a collision may only occur through an analogical mesh, also evolving, since an unfoldment of one signature may not penetrate a mesh characterised by an invariant observer of the other signature, excepting through evolving analogical meshes, as they are demonstrated in Chapter 5. Yet, actors are participants who may act and interact.

246. (iii). Further, under the conservation of Ap(....) and of &(Ap(.....)), required by the conservation of Un and Distinction, they must do so. Hence, actors are minimally P-Individuals who are M-Individuated in such a manner that they consist in at least one evolving and characterising mesh (see 6.3., below), one evolving analogical mesh, linking it to a further evolving mesh, which due to a suggestion from the Lansky family of Paderborn, discussed in Montreal, I call a Prepositional Operator mesh, of different orientation to the characterising mesh. This type of mesh is so called because it contains common or invented prepositional concepts, like before/after or above/below, not necessarily, however, of dichotomous form but determining the domains of application of characterising concepts.

247. PLEASE READ, AND REFER TO, THE CONTENT OF CHAPTER 11 . FOR THE SAKE OF CLEAR CONTINUITY, THIS, ESSENTIAL, MATERIAL IS DELIBERATELY DISPLACED, FROM THIS POSITION.

248. (iv) Conversely, assume covariance, on the part of an observer. Essentially, this means that an observer may and must adopt differing points of view and perspectives.

249. (v). However, at least one such point of view must be that of a participant in the observed system. That is fortunate, since it commits the observer. Without that status, namely, participant observer, it would neither be possible to garner meaningful information from the system, to interact with other actors, or to influence what takes place.

250. (vi) In particular, it would neither be possible for an observer to understand the quality of amity, which we stress in 6.3., below, nor for the observer to foster its conservation and development. Such a catalytic activity, as recent events have amply demonstrated, is the main objective of observing at all.

6.3. AMITY GENERATION

251. It make strike the reader as curious that a symbol ridden creature like myself should bother about amity, let alone assign it a position of primary significance. After all, as noted already, Maturana has the courage to call amity, the selfsame thing, by the more accurate name of love.

252. Neither Maturana nor I mean, falling in love, although I write saleable lyrics for love songs, and maybe, so does he. I DO mean CARING, not in a mawkish way, characterised by ladies bountiful, but by bringing principles of up-to-date Cybernetics and andragology to bear upon issues of societal concern, often with computing systems as very useful tools. Perhaps it is best to use one pertinent illustration, in order to demonstrate the generality. For this purpose, I shall use the abbreviation spelled out in Chapter 5, regarding the Bateson and Laing material, (Bateson, G, 1974, and Laing.R., (1961) It may be sufficient to say that A and B are not merely tags, neither that, nor is T just a tag for their evolving meshes, seen from one point of view.

253. Some development of this idea is propitious, of use and of value, at least in reminding us that we are, in fact, dealing with actors who interact and their evolving meshes are BOTH themselves, however incarnated or embodied, and so are the ROLES they play in the courtly masque of life . The quality and quantity conserved and generated in this interaction is AMITY, or, if you prefer it, LOVE. Reduced, which it cannot really be, to formal terms, let Omega represent the coupling between the algorithmic, symbolic, descriptive aspects of an actor and this actor's interpretative aspect. Clearly, all this presupposes an innate ability to be a participant, neither a disenminded body nor a disembodied mind. Clearly, also, it leads us into the domain of Lambda, the theta and lambda vectors of a participant and, a fortiori, an actor, expounded in Chapter 5. These, like Omega, are not truly calculable, (for example, as functions of intellectual performance and of physiological state), but we may approximate them after the event. All safety regulation rules, (permissible duty cycles and so on). are based upon such calculations, poverty stricken though they are. An attempt is made in Fig.31., to illustrate an A, B, interaction over T and an unrestricted one, that is, an interaction where A is learning about B, simpliciter, and, of course, vice versa.

254. As a result of either process A and B may learn about a concept of T, or of each other, more effectively, just insofar as their internal interactions produce or become part of an existing iso-inter-family. The manifest danger is that they coalesce, but the NO DOPPELGANGER edict, with the entire ENOUGH DISTINCTION to counter coherence, is usually sufficient to ensure this condition. However, system designers of organizations, in particular, should be on the lookout for this pitfall. Given these caveats, I maintain that the main PURPOSE of life is the generation and conservation of AMITY, or, if you will take it, of love.

6.4. QUALITY OF AN INTERACTION.

255. Another way of looking at Fig.31. is as follows, namely, to ask "What is the quality of an interaction", what, for example, do A and B get to know about T, or "What does A get to know about B, and vice versa??" The facile replies to these questions are that A's gain, in respect of TB, over an interval which should be associated with the complex Lambda vector, but is written loosely, in the notation of a interval t=1 to t=r, is

256. Diff(<A(T)t=r,A(T)t=1 >)¢ Diff(<A(B(T)),A(B(A(T)))>)

257. where Diff stands for difference and "¢" for composition, of some suitable kind.

258. Similarly, for B, it is

259. Diff(<B(T)t=r,B(T)t=1>)¢ Diff(<B(A(T)),B(A(B(T)))>) .

260. The corresponding, less specific expressions, since a specific T is replaced by some event or events of interest to A and some event or events of interest to B, an interaction obtainable if and only if there is or is evolving some iso-inter-family to which these actors belong is, for A

261. Diff(<A(B)t=r,A(B)t=1 > ¢ Diff(<A(B),A(B(A))>), and, for B, simply

262. Diff(<B(A)t=r,B(A)t=1 > ¢ Diff(<B(A),B(A(B))>).

263. As a rough guide, it seems that Diff could be a subtractive quotient and "¢" could be a Lie Matrix operation, but I refer to Lefebrve, in particular, for more precise terms and also the notions of David Bohem, on implicate order and those of Kilminster and others in his recent Festschrift "Quantum Implications", also with notice of our discussion in Chapter 5. to Roger Penrose, in "The Emperors New Mind", (Penrose.R., 1989), for they and others are far more expert in matters which we shall discuss in the next volumes of our series.

6.5. ACTORS, COLLECTIIONS OF THEM, AND SOCIETIES.

264. Conversation theory and Lp, even more so I.A.Theory, were put together with the intention of entire generality They are not intended as a universal theory, because of certain moral and aesthetic qualms, expressed in a forthcoming publication, but they are intended to, and do adumbrate the personal, social, organizational and belief systems which exist.

265. At this point, it is virtually mandatory to employ symbolism, much of which is depicted in Fig.32., 33, in order to show, for example, how actors are more lucidly represented, how each "self" has at least one "other" and how it is a collection of actors differs from a society or an organization. It would be unbearably tedious to express these formal ideas in lengthy verbal terms, without the aid of a symbolic shorthand . Much of this is given in Fig-32.,33, enough to serve as an introduction to the next volume in our series.

266. For instance, we need a constructible (not assumed, as axiomatic) "void", neither "0" nor the empty set, "{ }" together with a not void, or "something". We need concise and derivable signs for self, other, and society or organization, for a culture and a civilisation. Further, since each of these entities is represented by dynamic, evolving, meshes, NOT, thank heaven, by arbitarily collected (even if useful) collations of nominal concepts, (static as a cold collation of meats), we need to consider their unfoldment in various ways, amongst others, through the analogical relations coherently unifying participants and actors alike. At this juncture it is essential to drum in the fact that unity is NOT uniformity which strikes me as an horrendous sludge in the bilges of a ship.

267. Kindly, inspect Fig.32, 33, and the numerous captions. Having done so it will be evident that an actor, being a participant, is characterised by one or more meshes of, say, clockwise orientation, by a prepositional operator mesh of opposite orientation and an internal to the actor analogical mesh, all of which are evolving. By virtue of this, the actor is able to act, clearly to interact with other actors, through yet another analogical mesh of their transactions. But there could be just collations of actors, their meshes linked by some kind of analogy relation.

268. If an unfoldment, properly signatured, takes place in an actor and if the actor linking meshes are such that the unfoldment has only local cyclicity, then the actors form a collection. We noted, much earlier, that unfoldments from participants, as from generalisations, are possible. If all unfoldments are of meshes, in A and in B, say, and the unfoldments passing from A to B and vice versa are of this type then the actors are animated but not orchestrated, self organising, but not as part of a larger closure. If so, then they are just THAT, a collection.

269. On the other hand, if some unfoldments are other-than-locally cyclic, on penetrating the linking analogy relations, between our paradigmatic A and B, then the actors, A and B form a SOCIETY, an organization, system of belief or whatever which is self organising and evolving in its own right. That is what makes social minds, cultures, and civilisations interacting with each other and, of course, with actors as simple and unique participants. In fact, this is the world as we claim to know it today and in its genesis.

6.6. THE REPRESENTATION OF PROCESS.

270. If we had a state space or a phase space, then the microdynamics of mentation would be easy, for example a collection of possibly competing stable attractors (dynamic equilibria) could be equated with conceptual fixities (periodically engaged in or

perverted by the cognitive dssonance of Leon Festinger). In contrast, a collection, of amongst them, chaotic attractors, possibly competing and co-operating, could be held responsible for all manner of creativity and innovation, an urge to learn, explore, discover and the rest. That idea is clearly stated by Ashby, for example, and his axiomatic form of Cybernetics as well as more recent representations in dynamic system theory (Ashby.R., 1956,). Upon a few occasions, we do encounter situations which may be represented in this manner. More often, over enthusiastic people SEEM to THINK they have such frameworks, but with little warrant. For example, are "motivation" and "extroversion" and "satisfaction" really represented by orthogonal co-ordinates in Euclidean Space. I can see no other-than-arbitary, or possibly post hoc, justification for imagining that they are.

271. Well, suppose we do NOT have a respectable state space or phase space, do we NEED one, in order to represent the gurgitations of mind?? My reply to this rhetorical question is, " probably not", since we DO have a process/product complementarity and a production/reproduction comptementarity, set aside it. Just since THAT is so, and is augmented by conservation principles for coherence and diversity and action, namely "boundary distinctions", why not use these products, the distinctions generated by conceptual processes, as the coordinates in which to represent mental and societal activity??

272. Implicitly we do so in a lot of science, although it is often regarded as slightly deviant and under-the-counter to admit this fact. There are deeply entrenched, in their place by no means perverse attitudes in favour of maintaining a more-or-less traditional point of view and, obviously Lorenz Frames and the like are admirable if available to an observer. It would, however, be stupid to believe that drawing a line in Euclidean Space really represented a PROCESS, since it really represents the PRODUCT of that process, which may be a faithful estimate of the process itself. In psychological and social affairs, there is seldom much choice. Either we are overtly phoney, adhering to Quasi Cartesian orthogonal scales which are, in fact, interttwined and knotted into bizarre contortions or we are honest and say that the products and complementarity principles suffice to furnish a mode of representing what goes on in the minds of people and societies.

273. Admittedly, we enter into a strange world, continually evolving but continually conserving all that has gone on, as fractal traces. It is, for all that a very beautiful world, at least insofar as I am able to glimpse it. This is one, of many matters, relegated to more extended discussion in a later volume.

274. At this juncture, in this monograph, I can only make some cursory comments upon this matter. We are well aware that this is not the first occasion upon which the idea has been mooted, the only odd idea being the existence of a "void", as in Fig.33. within which the structure of complementary products of processes can assume the status of a skeletal coordinate system. Previously, however, this possibility, although known, has been conveniently put aside, since it presents many mathematical difficulties.

275. We are aware, also, of these difficulties. For the most part they emanate from a predeliction for "kinetics rather than for kinesis", an understandable aversion, also, to departures from static frameworks that adequately adumbrate so much of classical science.

276. That reference frame is not, however, enough to support the arguments already sketched in Chapters 4, 5, and 6 of the organizationally closed and informationally open character of a P-Individual, his/her M-Individuation as an actor, that a social organization, though not of entirely he/her quality has the same status and that an interaction of actors MUST take place. Let us say, it is not enough unless one has been extremely lucky in choice of co-ordinates and is content to deal with very specific instantiations of such organizations.

277. In particular, a fixed reference frame, however complex and contorted, does not do justice to the evolution of a social system. A main difficulty, the interknitting of societal and other events, is approached, descriptively, in Chapter-7. We have said, quite rigorously, what a SOCIETY is, in contrast to one or many of its participating actors. In Chapter 7. we point out that a society, like participants and their interactions, evolves. It does so by a braiding of self-organising actors and interactions and the self-organization of symbolic cycles, rituals and the like, by virtue of which SOCIETAL evolution usually occurs.

278. That, for example, is why some systems are viable systems. This fact may be expressed in the manner of Chapter 9., given great perspicacity in choosing the structural representation. It is maintained that the viability of an organization or society, a culture of a civilisation as may be, is more generally and flexibly expressed from the dynamic point of view expounded in this present monograph. I hasten to add, in many situations we have encountered in our work, further even in our own endeavours, we have come across several exceptions. In any case, both approaches are precise, well documented, and our own is far from sacrosanct.

Fig.31.,Fig.32., Fig,33., Fig.34, in here.

CHAPTER 7. INTERKNITTING,

279. We have argued that &(Un(.....)) is conserved, at least in conscious states of mind. It gives rise to thought, often to language, so that actors interact.

280. We have also argued that sentient organisms, who are actors, are M-Individuated P-Individuals, having the properties of organizational closure and informational opennesss, further, that they evolve and must evolve as self organising systems. In this sense we distinguish between the evolution of a collection of (possibly) interacting actors and an organization, composed of actors who (must, not may), interact. On these grounds, an organization like a society, firm, or nation may evolve, (see, here, the Chapter 9. Note, on the work of Stafford Beer and his colleagues). We wish to show that viable organizations must, (not ony may), evolve.

281. The approach is as follows, in terms of "interknitting" the oriented clockwise and anticlockwise cycles of conceptual process and distinction making, with them, alternating in orientation, are concept applications and the application, to concepts, of productive and reproductive operations. The entire system is organizationallyb closed and informationally-open. Similarly, the &(Un(....))"-" and orthogonally directed, distinction crossing, cycles that are unfoldments penetrating a number of individual organisms or other units have this property. As shown, very crudely, in Fig.34., these also form an organizationally closed and informationally open system, complementary to the + oriented cycles, proper to these individuals, further that they are also evolutionary as self organising systems in their own right.

282. To complete this, admittedly outline, account we need only ask, on inspecting Fig.34, where is something equivalent, (in the unfoldment or" - " domain) to Con`, (in the +) domain. This is, perhaps, puzzling until we recall that the linking analogies are necessarily evolving by the generation of conflict and the resolution of conflict to produce analogy relations. From the resolution of these singularities, necessarily taking place in the indefinite iteration of a non linear dynamics enough variety is generated to furnish a satisfactory reply to this question.

283. It is not supposed that this is the only source of productive and reproductive operations in the "- "domain of unfoldments, in fact, such a state of affairs is very unlikely. The point being made is, simply, this one. It is a sufficient reply to guarantee that viable organizations must and do have an independent evolutionary mechanism, complementary to that of the subsystems which form their elements.

284. In practice, this is most readily seen, so far as memory goes, in the repetitions instigated by bards, repeated by youngsters in nursery rhymes, in long told tales, all of which are grossly imaged as being organizationally closed, in a societal closure, in Fig.34. But, of course, the reproduction of memory is, also, productive, as in the persistence as well as the development of folk myths, of cultures, of civilisations; one route being architectural, tangible but symbolic, the other, under the "-" tag of unfoldment, in the rites and rituals enacted within the Acropolis or at Delphi; there are myriads of others, not only in the Hellenic World but in Civilisations as far apart, geographically, as China, India, Mexico, Persia and those innumerable worlds before

history. They are readily accessible, irony again, since I have expressed doubts about our standard and stolidly temporal interpretation of history. The re-living, to which I subscribe more enthusiastically, goes on, even-today, even next door, with the Morris Dancers or the Commedia del Arte, progenitor of pantomime.

285. I give one exemplar of how this organizational closure is not only homeostatic, self stablisimg, but informationally open, productive and self organisiing. It comes from New Guinea where Roy Rappaport did most of the fieldwork but was substatially supported by both Gregory Bateson and Margaret Mead, previously refd. In a certain region, through which the Australian Government, with the best intentions, drove a high-road through the dense-forest to the coast.

286. In that land, there live a people called the Tsembaga. This culture, with a priesthood and antiquity of their own, is neccesarily divided into some 15 or 25 tribes, since subsistence depends upon the cultivation of "gardens" in the forest, where it is possible to maintain horticulture and also, in a double way, upon the existence but not dominance of wild boars. Their very life depends upon a ritual cycle, ornamented by myths or maybe half recalled facts. All this is "symbolic", which is well understood, although in somewhat different terms, by the priesthood, as also being essentially homeostatic, to maintain, under varying climatic and agricultural conditions, an appropriate balance between wild pigs and people and the territories cultivated as gardens.

287. The cycle begins with the planting of a Rumbim, a sort of overgrown carrot, and any family belongs to the tribe with whom it is planted, accompanied by massive ceremony. At this stage, some wild boars, (as later), remain and they, together with the ladies of the tribe who, traditionally, undertake most of the agricultural labour, use the boars to root around as agricultural implements. This regimen, depending upon the climate and fertility of the cleared forest land or garden, goes on for a number of years. Eventually, however, the herd size of boars increases, until it becomes evident that the ladies are feeding the boars by their labour, more than their gentlemen or the ladies, themselves.

288. In the meanwhile, the gentlemen have not been idle. They have travelled, at some hazard in the densely forested countryside, they have traded and formed allegiances with other tribes, often at a distance. They have obtained objects, like jeeps or sturdy trucks, of great value. But when, eventually, the ladies are manifestly working to feed their agricultural implements, (the pigs), they utter a feedback signal, in the form of a kind of moaning sound, pardon the expression but, having heard it, I can think of no better and the term is not intended in a pejorative manner. It is, however, one essential component in the ritual cycle, regarded as homeostatic or balance preserving. It leads, in various rather complicated stages, to the erection of a ritual fence, a fragile wooden structure, and to the slaughter of most of the pig herd. On the one hand, the pig meat serves as about the only source of high grade protein, with the amino acids tryptophan and tyrosine that are essential to humans, especially the human brain. But that need being satisfied, the rest of the meat is preserved by a process akin to the salting of fish. Journeying and trading is accelerated and those tribes who are allied to the tribe upon which we have focused our attention, by dint of friendly trading and the like, are ritually handed out portions of the preserved pig meat.

289. There are festivities and jollifications, chants and incantations galore. They go on whilst the rickety ritual fence rots away, until it is no longer a fence. That is followed by a ritual conflict, not a real conflict for people are seldom hurt. It is resolved, invariably, by the planting of a rumbim, the big carrot, but it has many resolutions for, let us recall, those with whom a family plants the rumbim are members of the tribe with whom they plant it.

290. That, of course, depends upon the fertility of the ground which is occupied by a tribe. So, although the ritual cycle has served its homeostatic purpose of maintaining a balance between people and pigs and territory, (a classical case of homeostasis, as social anthropologists are inclined to call it. Surely they did so when I first heard of it, in the very early 1960s at the Wenner Gren foundation in New York).

291. This ritual also serves as a source of variety, which renders the Tsembaga culture a civilisation, organizationally closed and informationally open and self organising. For the tribe to which you belong, with whom you plant this curious vegetable, the rumbim, has the fertile territory needed to sustain you. There is a tribal and territorial redistribution, restructuring, rejuvenation and 1 am very disinclined to believe that affections, emotions, symbols, recollections garnered by association or by trading expeditions, lack a significant, often determining, position in this process. I am no expert in anthropology, (but do have a moderately sensitive perception of peoples beliefs and dispositions). I am sure that, whilst a very tangible, climatically influenced, self organization is at work, there is also a symbolic, purely societal, self organization of as great, or of even greater importance.

292. I see a reflection of such a picture, a richly woven fabric of the concrete and the symbolic, acting, if needs be, on their own but, far more often, in concert, especially when it come to our own processions and parades and palaces and potentates. I see them in the corporate rituals which, like it or not, make a firm a firm or a factory, in that firm, a factory (see, here, the note on Beer et al). My only disagreement, not with Stafford Beer, far from it, but with a sprinkling of his dilutors and imitators, is that some of them seem to suppose that such rituals may be prescribed, like cough syrup, rather than allowed to grow.

293. As a Catholic, (in the broadest sense of that term, mixed with a certain disdain for partiality in respect of true faith), I SHOULD not, as a Cybernetist, (with assurance in his preachings and writings), I COULD not, in FACT, I simply DO not see an iota of difference between the dynamic, all pervasive, immutable modi operandi, exemplified in this book and those which are deemed to be biological, ecological, international, or intergalactic, or interuniversal in their domain of interpretation. My exposition may have been inadequate, even impoverished. Yet it is and remains my firm conviction that the underlying principles are those of genuine societal evolution, that if and only if we adhere to them, not by flag waving and such nonsense but by doing, may we make our own civilisations survive. If that much can be achieved, then, we, inhabitants of a universe so ordained will evolve, ourselves, into flora and fauna of unimaginable beauty.

CHAPTER 8. AN INTERMEDIATE SUMMARY.

294. I do NOT claim to have explained the often very elusive, often complex and consequently, most often neglected ideas that are listed below. On the other hand, I DO claim that, in concert with the groups severally cited, it has been possible to delineate the conditions surrounding their occurrence and to demonstrate their character, at least, in part. Chapters 9, 10, and 11, are, also, essential reading to butress the argument presented, placed where they are for ease of exposition, only.

295. In a few cases, such as a proper and formal distinction between a collection of people, or of people in aggregate, in a family, in a society, organization, division of such a thing or a culture, it has been possible to give a useful and believed-to-be original precise definition. The same comment applies, in lesser degree, to the matter of awareness and the awareness shared between participants, namely, consciousness. At very least, we have not avoided the issue (which is to avoid all real discussion of mind, thought, social organization and the like) and have contrived to surround the phenomenon (the fundamental reality of life), by those conditions that lead to consciousness, that lead to its disappearance and to its incessant fluctuation. To some slight extent, we have examined its quality and also its quantification, a more difficult matter, since it entails the particularities and niceties of meaning.

296. The contents of Table. 1. are set out as substantiated, as they are in referenced publications. Those of Table.2. are issues to be judged, in the light of this and other volumes in the series, by the reader.

297. One main intention of this book has been to delineate an "Interaction of Actors", or I.A., theory; to compare it and contrast it with the existing or updated forms of "Conversation Theory", of C.T. and to extend the protologic or protolanguage, Lp, in order to accommodate the gamut of them. One pointer is that whereas conversations can usually be said to have a detectable start and finish, interactions between actors do not allow the theoretician this luxury. But there is far more to it than that, for example the evolution, in I.A. theory, rather than the assumption, commonly made in C.T., of an iso-inter-family amongst the participants.

298. In particular, it has been neccessary to expose the ubiquity of conflict, to sustain distinction and unity rather than uniformity in a world governed by coherence; more poignantly, the resolution of conflict, mostly manifest as ambiguity, by the creation of analogy in a fundamentally dynamic world. In doing so, it proved essential to address the matter of analogical forms, not only the unambiguously ambiguous but also the ambiguously ambiguous. These resolutions led to forms that were, in crude chemical metaphor, tautomeric and resonant. As we now discover in the physical, chemical, and biological sciences that any aggregate, even the unambiguously ambiguous, may be fruitfully viewed within this framework and the significance of this finding is utterly fundamental, whether at the rough grain of discourse chosen or at much greater depth.

299. The fact is, if we neglected meaning, which I have no intention whatsoever of doing, it would be possible to erect a very prettified quantum mechanics of mind, and of thought, as tensors on its manifold. This approach is entirely legitimate in physics, say,

where particles or superstrings, quark-gluon -plasmas or whatever of the same KIND can be regarded as the SAME, that is, if unlike a few event based theorists, we include thought events amongst other elementary events. This, of course, is what thwarts any genuine endeavour to erect the quantum dynamics of mind and thought. For here, thank heaven, we do have to deal with the manifest differences induced by meaning and reflected, at the macrodynamical scale, of socio psycho-dynamics, by the difference between unity and uniformity, of conserved dynamic coherence and difference.

300. There are many other points raised in this book, concerning the ossature of both I.A. theory and C.T. They include, for example, the now definitive characterisation of a person, a mental organism, a culture or a nation or organization as a P-Individual, not as disembodied but M-Individuated or incarnated in any feasibly dynamic fabric.

301. The interaction between the P-Individual as one entity and the M-Individual as another, related, entity is of crucial importance . The reader may justly assert that this critical question has been merely skirted around, but so he or she may do of other questions. My excuse is that the book has a limited length, however other volumes are to follow on.

302. Even so, just as the first act of a musical play must have a finale which lays emphasis upon at least one important part of the story and serves to bring the audience back, anticipating what is to come after the interval, this monograph, must do the same. I have chosen to lay emphasis, in the first act finale, upon one point which, in a sense, epitomises many others, namely, this one.

303. It is the not-deliberately-hidden secret behind the work of Bateson, Laing, Mead, Anatol Rapaport and Roy Rapoport although, so far as I know, they did not state it with the rigour and precision it deserves and, in practice, requires. If an Lp mesh, relating the characterising and Omega-designated-but analogy-link-coupled meshes of any number of actor participants is but locally cyclic, then the participants may engage in transactions, using those mechanisms which have been discussed. They form a collection of participants, in some kind of proximity.

304. On the other hand, if any unfoldment of this linking Lp mesh has other-than-local cyclicity, the actors interact as a FAMILY, a SOCIETY, a NATION, an ORGANIZATION (see Fig.31. and Fig.32.) in which actors cooperate and work together, maybe FOR but not ONLY for, their wage packets. This is a phase change phenomenon, not unlike crystallisation. It is a phenomenon of the utmost significance in the participatory design of social support systems and, it is conjectured, of many other systems. In fact, I suspect that the subtle catalysis of this transformation lies, as the fundamental principle, at the roots of "therapy", of "social-and-industrial organization" and many other matters of immediate and pressing importance. It lies on a par with the conservation and increase of amity, of love in an-other-than trivial sense, which is why we may seek justification for the effort expended in performing this beneficially catalytic legerdemain.

305. The evolution of a society, for example, has been exemplified by but one culture, namely the Tsembaga of New Guinea. It should have been, to be strict about it, exemplified by many more, such as the Cargo Cultures or our own or those of the

Americas, the middle, and the far east. Further, their necessarily varied and various histories should have been brought into the picture, as should our own mixture of organizations, in a search for harmony in place of disparity. My only excuse for this neglect, if excuse it be, is an attempt to truncate this monograph volume as succinctly as possible.

CHAPTER 9, AN IMPORTANT NOTE ON BEER.S.et al, A VIABLE SYSTEM MODEL.

306. Stafford Beer, whom I met many years ago, prior to the 1958, N.P.L. symposia, is an old and valued friend and colleague. So, also, is Raoul Espejo, one of his main collaborators and innovative developers of the "viable system" model, in the U.K. (Beer.S,1979 and Beer.S,1981) amongst other publications.

307. It looks, often seems as though the "Viable System" model is poles apart from my own image of the social, organizational and national systems that have been amongst our cheif concerns in this monograph. It appears almost as though they were rivals, which they are not. On the contrary, these models, often actualities, are different perspectives taken upon the same thing, an organization as an organism. I do not intend to dwell upon the viable system model of Beer et al,(for it is clearly exposed in the referenced works). On the other hand, it is based upon an existing structure, an anatomical structure, if you like, and, of course, a structure which evolves. In contrast, the models and actualities which are set out in this monograph are physiological or immunological, as a comparable metaphor and the processes entailed build the anatomical constraints around these functional and living systems.

308. Personally I prefer this method, as being less reliant upon a perfection of anatomy. The viable system methodology may, however, appear more familiar to some managers, its subtelties emerging gradually, as it is applied.

309. On the other hand these methods both work to give viable systems, organizations that are organisms. Which one is better than the other, if either one or the other is, must depend upon context and the predelections of the practitioners involved. By token of this, the prescient theses of Robinson M. and Robb. Fenton, bear witness to the reality of discourse between organizations and societies, whichever one or other or both you prefer to employ. I DO maintain, however, that "viable system" theory and "C.T.,Lp, and I.A." theory stand out, it is no accident that they do so because they are foundationally Cybernetic in type, as competent and very general if not universal theories, against a background of badly considered, pretentious and often meaningless general theories, greatly publicised and advertised by empty rhetoric.

310. In no way is this, unusually acid, comment intended as a criticism of those, often elegant, theories which are more specifically addressed and of which there are many, take Braaten's "Dialogic", or Lefebreve's "Algebra of Conscience" or Matturana and Varela's "Autopoesis" as instances where the scope has been deliberately restricted, as Ashby deliberately restricted Axiomatic Cybernetics. As to Von Foerster's "Self Organization", that is a principle, a theory too, which encompasses a large postbag of the lot, general or specific.

311. So let us concentrate our gaze, once more, upon the general type of theory, in particular that of all viable systems. I can only end this inadequately brief chapter on the following anecdote, which is not apocryphal. I last met Stafford at our club, in London. Just before that, however, I came across him at one of his homes in Toronto, Canada. At that particular moment, when he was planning to show me some of his

devout murals, housed and painted in an upstairs room, he was relaxing, as is his wont, downstairs.

312. Physical relaxation, obviously, demands a sitting posture. He was sitting upon a Buckminster Fuller type octahedral tensegrity, all sticks and strings, the latter more conveniently replaced by elastic elements for the purposes of assembly and display. It was intended to demonstrate managerial articulation in, I believe, Montevideo.

313. In principle, the more you tension the thing, the more, due to its distributive properties, do you secure its rigidity. The practice, behind this valid principle, does depend upon the elastic. But, as Mike Ben Eli observed, many years past, a tensegrity, or tensionally integral structure, is an organizationally closed system, informationally open, viable system and an organism.

314. I believe in that statement, of course, and so does Stafford, much heavier than I. He sat harder and harder, I had my doubts about the elastic, not the principles, yet he had none. That shows courage, in minuscule form, but in your convictions which transcend mere erudition, even though they often connive, hand-in-hand. I know of many, more dramatic exemplifications of this precious quality, but, at this moment, they are not for general publication.

CHAPTER 10. A VERY SHORT ELUCIDATION OF THE MEANING OF CONCEPTUAL RESONANCE IN ACTORS, INTERACTIONS AND IN SOCIAL ORGANIZATION.

315. In Chapter 5., Section IX, (2)., I appealed to the reader that he or she should consult this truly ESSENTIAL Chapter. Its contents, if embedded in a lengthier work, might have been spelled out at that point but, also, they would have been likely to interrupt the flow of the argument, in a deliberately terse manuscript.

316. In writing this chapter, I shall probably be accused of purveying "Mental Chemistry" or some such heinous crime. Unless you accept the arguement metaphorically, the accusation would have some rectitude but, even if you do not, it contains a grain of truth. I am not too ashamed of that, for my atoms are not at all particulate, they are to be variously, without exception dynamically, interpreted. They are concepts, but there is no REAL base concept, no minimal thing apart from that chosen by, better still MADE in the interaction with some observer as a convenient straw-filled-homunculus. Neither a base entity, nor a highest entity, for the entire system is multiply and concurrently recursive.

317. However, the questions raised in Chapter 5. and in Chapter-6., with their topologically derived images, best shown in dynamic graphics and later on, interactive graphics (the former, an animation of 3.D. Euclidean projections, immitating reality), the latter in interactive animations, shown, interactively, upon a flat screen. That much is immediate, at this moment, but soon enough in should be enhanced by holographic projections of habitable and interactive virtual realities, (all of which are technically possible and realised, at least in prototype form, with rather minimal restrictions upon their tangible implementation).

318. Let me attempt an answer to these questions in terms of quantum chemistry, but please recognise that I am all too well alive to the fact that primitive, although useful pictures, like "electron clouds" represent not just little billiard ball electrons but the eigenvalues of the Schrodigger Wave Equation, or, for that matter, the non linear forms in which the "Soliton Impulse", a wave packet approximation to the information preseving impulse in the non-linear-domain, of the Sine/Cosine/wave is information preserving, in the linear domain . If you accept my reasoning, with respect to the inadequacies, for our purposes, of state spaces and phase spaces, then we must go a step further and, in that case, into perverse kinds of superstrings or, as an alternative, of quark and gluon plasmas, or further still. This world, even this one which is perceived as a minute part of conception, contains more, far more, than the mind can imagine, let alone think of.

319. Let us return, momentaily, to Fig.27. and the various Fig.28., all displayed as part of Chapter 5. Here, the partially explicated is exposed. Continuing, to scrutinise Fig.29. and ambiguous ambiguity the inadequacy becomes evident. For, after all, these structures, as well as stable collective and distributive structures MUST be of the SAME kind, if only because they all evolve, together.

320. Here, I recapitulate, in chemical terms, a comparable conundrum. Tautomerism was recognised around the turn of the century, if not before. It is exemplified by the

dynamic equilibrium shown, in classical formulation, by a dynamic equilibrium between molecular types (aceto-acetic-ester, is the classical exemplar).. It was, perhaps, because of this that Kekule's proposed structure, of oscillating double and single (covalent) carbon bonds for C6H6, the benzene ring and its curiously high stability, gained acceptance and has been of immense usefulness in the synthesis of many, but not all, aromatic compounds, that is those such as benzene, napthalene and anthracene, with the characteristic ring structure, (today,extended to any such structures of many carbon atoms). It was probably Kekule's insight which first caught up with the idea that his own, prescient and valuable, formulation lacked complete validity. There are some sketches, at least, which point to this conclusion. Instead of a mere tautomerism, there was a distribution, if you will tolerate the crude image, of electron clouds, rho-triple hydrogen p-bonded, or so called pi-bonded, to absorb the remaining six electrons which, it turns out in classical notation, are distributed over the orbitals of a pair or more of carbon atoms, lying on either side of a nearly linear 6 carbon molecule which is highly resilient to addition reactions but open to substitution reactions.

321. These properties, enhanced by modern but more obscure nomenclature, pervade chemistry. They pervade, for example, the alkene and akelyne groups, the ammonium, oxonium ions and radicals, in varying degree simple compounds like ethylene or methyl chloride, although in different ways. But, excepting by well attested and empirically confirmed metaphor, we are not speaking as chemists, but as Cybernetists, as Prof.Felgett calls us, rightly so. I have simply chosen chemistry as a middle ground, familiar to many. But I believe, although hesitate to assert, that these principles, of distribution and the like, are universal. When speaking of a resonant entity, we have changed our language, as de Zeeuw insists, in a very fundamental way. For example, malgre lui, the benzene molecule is a different kind of entity to the molecules I was taught about with balls and sticks for valencies, it MUST be and is, at very least, a resonance hybrid and so must the others. Today, of course, it is much more, though the hybrid construction remains of practical value, as depicted below, and so, of course, MUST the images evolve.

INSET HERE. Fig.35.

322. Captions. (a). Tautomerisim, aceto acetic ester in keto and in enol forms.(b). Benzene Kekule Resonance, (c)., electron clouds, (d),shorthand forms., aromatic benzene resonance. (e). Napthalene, (f)., Anthracene.. (g). Methylene-Dioxy-Amphetamine, an interesting double ring molecule, one ring resonance stabilised.

323. But, of course, we are not dealing with molecular resonance, or the stabilisation with which resonance endows the molecule. Rather, we are speaking of conceptual resonance, (alias, analogy), and the stability it gives to a conceptual structure. A Fortiori, this is the case for the fundamental analogies of agreement and agreement to disagree, (the similarity term) between participants, A and B, say, (their differences constituting the difference term), and the inherent generalisation being the resonance itself.

324. We should all have known this, early in the 1970s. In far too vague a manner, we sensed it as the rationale for the WHAT, HOW, and WHY Questions and Replies which, empircally, signified UNDERSTANDING (as in Fig.2.). In a sense, I think that all

of our group apprehended this essential fact. But I must take the blame, if blame there be, for an overemphasis upon empirics, to the detriment, perhaps, of a deeper philosophical and scientific examination of the processes that are involved.

325. These points are utterly crucial, at any rate to a proper comprehenssion of C.T./Lp,/ I.A., theories. All analogies are resonance based, the most fundamental being the analogy of agreement or agreement to disagree, generating concept sharing and distinction between participants, A and B. Such resonance phenomena also account for the resilience of an understanding, whether between participants housed within one brain, or between several people or communities or firms or societies.

326. It is possible to regard them as a very extended form of Petri-like synchronicity, that which occurs in discourse when the radiation, emitted into an Lp field by A, say, if A unfolds his/her mental repetoire under the focal thought created by "Un" is in harmony with that of B, when he/she unfolds a conceptual, mental, repetoire under "Un". It is not at all unlike, in fact it is very like, molecular resonance, once you notice, as Von Foerster and Glanville, amongst many others do, that there could be no A and B to interact in the absence of an observer, WITH whom they INTERACT, that is, a participant observer. For convenience and clarity, call this participant observer "C", and note that from the "C" point of view the conceptual orientation of A must be that, also, of B. It matters not whether this conceptual orientation is clockwise or anticlockwise, but to C they must be the same. Hence, resonance or local synchronicity of in-phase oscillations, radiating into an Lp field make sense. Conversely, as discussed in the next Chapter 11., specific kinds of action take place if unfoldments, themselves trains of thought, are of opposite orientation, both for A and for B.

327. This, in my view, is the most lucid way of distinguishing conversation and action. They are, of course, mingled and there are other ways of rendering the differentiation, for example, transactions at a distance, for "conversation", even communication and proximal motion, for "action". But all of these run into difficulties, or are liable to do so and I prefer the ontological commitment, forced upon us by prepositional operators and more fully exposed, below. I would be amongst the first to accept the accusation that these ideas are simple, but hard to grapple with, (Gerard might find them easy, I do not), for versed in mathematics and the social sciences and their praxis, they probably come to him with little effort apart from wielding a pencil stub over their written exposition. For my part, I do find these notions difficult and this FIRST volume in our joint series is MY responsibility, (hopefully not too deviant from our general theme), composing our joint series of volumes which have been written or are becoming.

328. In the next Chapter, that is Chapter 11., I do my best to make clear a conundrum which plagued Vygotsky and others. The conundrum, the riddle, for logicians the dilemma or the multilemma with inadequately defined antecedents, the classical connective "or" and a potentially indefinite number of "consequences", both number and value inadequately defined, may, I maintain, be resolved by the notion of a prepositional operator.

CHAPTER 11. PREPOSITIONAL OPERATORS.

329. I implored you, in Chapter 6..2. Section (iii), to examine Chapter 11., this one. It deals with prepositional operators, unlike prepositions, per se, which have a largely syntactic and at most impoverished, semantic interpretation. In contrast, I have coined the neologism of "prepositional operator" to designate a preposition like term, first suggested by Ms Lansky and her Father, when they visited my Institute, in Montreal, which carries a semantic and pragmatic and intention along with it .

330. All prepositions, for that matter all "prepositional operators" have, of course, a very sound and practical utility, notably in natural language, as it is understood in context. Thus, in language, all terms such as in/out, or above/below are direction indicators, when, explicitly or implicitly they are associated with verbs, in phrases such as "let us go in/let us go out" or stay"in/out", or phrases like "let us get above/below the milling crowd, perhaps by going to another cafe", or, in context, by leaping onto an airship or descending to a lower floor.

331. So, and this is not always recognised, prepositions have adverbial and adjectival qualifiers, as well, unless you are obsessively formal in your employment of language. However, if you are, then there is a purist tendency to regard prepositions as signposts, pointing nowhere in particular.

332. That is why I pondered upon that discussion in Montreal with Prof.Dr.Lansky and his Daughter, knowing it to be of interest . It was, however, only recently that I realised that it made repartee to the riddle, significant in I.A. theory, of the differences cleaving thought, language, and action, intentioned action. We knew that such an enigma existed; for example to slap you on the back, is surely an action, friendly or not, its friendship or otherwise determining the accidental, affectionate or malevolent intention which is linguistically involved. It is not an action at a distance, that is assured by its necessary proximity. On the other hand, if I place a Semtex bomb and radio detonantor beneath your motor car, explode it, whilst you are en route, from half a mile away, is that an action. It certainly contains the linguistic component of not liking you, or being hired to annihilate you, but it is an act at a distance, abhorred by many exponents of aether like theories.

333. All of thought, speech or language, emerge from the chasms of mentation, those inscrutable domains of intellect. Speech, language of any modality is disseminated in a field. The domain, the ontology of this field, is intellect and intellect beyond itself, so that action at a distance and not at a distance are intellectually identified, unlike the electromagnetic aether, where the billiard balls or bacskslaps, with which it is filled, must bang against one another, as on the ideal snooker table. Because of this its domain is indefinite and ineluctable, unfathomable.

334. Mainly due to this fact, 1 use the term "prepositional operator" to give a semantic, an ontology, and also an intention to actions. I may think, even speak", of killing you", or "vaunting you", yet, usually I do not. On the contrary I may kill you, or applaud you IN the town hall at a certain moment, and do so, or IN the theatre, and do so, more the pity. But that, in the unpleasant extreme, is ACTION. It is so, merely because the

preposition has become a prepositional operator, bearing its ontological commitment, with it. A very specific commitment, for it is not any town hall or any theatre where. the action takes place. Such concepts as these, benevolent or malicious, carry a very specific domain and codomain along with them. The prepositional operator is that which gives to concepts marked by the may of "Ap" the must of "&", that they ARE, not just MAY be applied to whatever domain and codomain is specified by the prepositional operator concerned.

335. At this stage, I find a little repetition helpful, for it props up an otherwise hard-to-grasp notion. In the hope that others will also find use for it, the recapitulation is included in the text.

336. Mind, the body of mentation, is represented by a repetoire of oriented processes, signed, alternately, as clockwise or anticlockwise in orientation. A conservation principle ordains that mind exists, in other words that at least some "+" processs, are marked Ap(Con) and thus applicable over the ensemble of any participant, whatsoever, and have the property of recursion, of existence, of eating their own tails rather than dissapearing into the void, and, if applied, creating distinctions as their carapaces. In order that this be so, then there must be an anticlockwise flux, of type "con", peculiar to a participant indexed Z, these "Cons" say, are of "anticlockwise" orientation, assuming that "clockwise" has been chosen as the orientatin, also +, of whatever is called a concept in the Z ensemble. A Con* is merely a designator, acting upon any or all Z concepts, to produce and incidentally to reproduce Z concepts, it may, by its nature, be called memory, in Von Foerster's sense of dynamic recomputation and it may give rise to novel, creative, entities; commonly so in dreams, less commonly, perhaps, in daydreams. However, as my first caveat, it is not the ONLY genesis of creativity. As my next caveat, which, think about it, helps to resolve Lewin's GENIDETITY invariance, it is not STORAGE but RECOMPUTATION which preserves identity.

337. A further conservation principle, marked "-", determines an orthogonal process, penetrating some distinctions and enlivening at least some of the concepts in any mental ensemble, marking them "Ap", so that they may be applied, a Petri-type Permissive-logic. Any Ap(Con) is able to exhibit its distinction, its product, and the train of "-" or "Un" operations will seek out further concepts in its neighbourhood, that is, in this case, concepts held together by an anticlockwise "+" force (since we opted to give the orientation "clockwise" to those Lp quantal entities with meaning). This conserved "-" force is known as directed thought, being directed from some origin or focal concept into its neighbourhoods, all of this being, (substantially) a repetition of the images and the words of Chapter 5. and of Chapter 6.

338. If one or more trains of "-" forces impinge upon a concept, then it is thought of from the point of view of the focal origin, a concept which, in this case, although an opposite choice is equally valid, we have opted to take as "clockwise" oriented and THIS is the important point, the orthogonal "-" train of thought,"Un", carries this orientation signature with it. Hence, no matter how many "Un-" unfoldments impinge upon a concept, it is enlivened, revealing its distinctive product in the intellectual domain of perception, by emitting conceptually quantised radiation into the Lp field. This is by no means a uniquely original statement, incidentally. I first heard it mooted by Fransisco Varela, in the context of somewhat different unfoldments of "categpry-theoretic" but, all

the same, "mesh-like" structures which he and Joe Goguen were constructing, in a meeting, at the Green Gulch Zen Buddist monastery, North of San Fransisco, a meeting about reality. No aether is needed, electromagnetic or not, only orthogonality, as in the electrical and magnetic components of an electromagnetic field and, here, represented by "+" and "-".

339. On the other hand I have posited, nay asserted, the existence of a prepositional operator mesh, in addition to the one or more meshes which characterise a participant, further one or more linking analogy meshes. We did so, in specifying an actor as a participant, an MIndividuated type of P-Individual, hence able to conserve if not evolve amity or love. Recall, please, that an analogy may be symmetric or invertive with respect to its unfoldments. To do so, we simply follow the tube like process, however contoted and twisted, until we have no further to go, we meet the impenetrabllle boundary of a different neighbourhood, until that, we enliven, make applicable, the concepts encountered so that they may display, upon application, their characteristic bounds and distinctions. How is it that, under this essential constraint or enlivenement, of amity conservation, (for it is both), how is it that we may distinguish thought and language of ANY kind or modality, from the actions of suicide, genocide, fraternity, building, or wanton destruction. This is a question, a very important one, over which I have pondered and agonised for very many years. Yet the reply is terribly simple, once you trouble to think and knit the superficially disparate bits-and-pieces together.

340. The reply is shown, crudely and imperfectly, in Fig.36.

INSERT HERE. Fig.36

341. It is that the MECHANISM of intention, its character being ineffable, is THIS. If you intend to think, then you do NOT unfold from a concept in the prepositional operator mesh, or meshes. Hence, you THINK by unfoldment, or unfoldments, which bear the same clockwise or anticlockwise signature, impinging upon and more or less highly enlivening a number of concepts, rendering them applicable as a result of that.

342. If, on the other hand, you intend to ACT, then you DO. If so, as shown in Fig.36., then some concepts, with "Ap" tags, are also given "&" tags and ARE applied, as actions, in the domain and codomain ordained by the prepositional operator, which, unlike a pure preposition, carries an ontology with it.

343. But how could all this come about, the joint impinging of "clockwise" and "anticlockwise" orientation signatured unfoldments, hence, the cancellation of orientation, physics calls it spin, and the result being an action. Well, (a). Because a linking analogy mesh preserves "+" and "-" it can, and from a prepositional operator mesh, it does, invert the signature of orientation, but some caution is needed, to make certain that your signs AND orientation signatures are BOTH properly assigned and, (b). If the prepositional operator mesh is, in itself, the category of difference terms ONLY in the topologically adjacent ANALOGICAL universe, the generalisation term pointing to the action operator, &, in this monograph.

344. The claim of this theory is that thought accompanies action, that whenever there is action there is thought, directed from some concept in the conceptual repertoire of an

an actor as represented in the evolving mesh of the P Indivuated part of an actor, namely an M Individuated P Individual.

345. Usually the thought precedes action, as in rational action. But the obvious occurence of misconceived action, accidental (I stub my toe) or reflex like action appears to refute the theory or part of it. I contend strongly and state that it does not, on grounds which have been spelled out carefully, namely:

346. The care taken in requiring a process rate in either the "+" oriented processes of mentation and the "-" oriented, orthogonal process of unfoldment, manifest as directed thought, and I question the Newtonian linear mapping of temporality as a general notion, however useful a notion it undoubtedly is.

347. On the possibly more familiar basis of (a), it is entirely possible that the rate of application of a concept (to form a distinction, manifest as a mental image or thought) is less than the the rate of application (given the specific domain and co-domain of a prepostional operator) of the same concept to do something. This could easily happen in "reflex action", like the eyelid blink to a puff of air or in "that was a thoughtless action" like being rude. However in such cases we do think of puffing air or rudeness after the event or, to take a more dramatic case, I suffer a crippling aneurism, unsuspected and unanticipated. That is a bodily act, as a matter of fact and that immobilises my M- Individuation, my P-Individual remaining, perhaps, but my actorhood lost. But the proposition applies to actors only. In the case of {b) we enter a barely explored universe, where temporal succession no longer has the neat and convenient succession of clocks and other chronometers. This much is needed, however, to explain, if only partly, the well attested "deja vu" experiences, the well attested "my entire life came back at once" experiences of those, myself included, in great danger on mountains or at the sea, where the vital action is taken before, after, above or below the hazard was thought of. Less well buttressed phenomena, like precognition in dreams (or their masterly interpretation by Freud) and post cognition may also be explicated by these enlargements of our common notions of temporality. Also, our ideas of what is "usual" like "thought before action" are in a good sense artifacts of a deeply entrenched conventional wisdom which has set up the causal and temporal framework to which we subscribe as a matter of indubitable convenience but which are not sacrosanct dogmas.

348. I have found it helpful and you may do so, to carry out pencil and paper exercises. You will be able, at least, to realise that the "&" operator and the "Ap" operator are different but have a lot in common, for example, their difference cleaving the intellectual world, whichis, and the outside world, solipsism apart, a creature of our own creation. Without it, the not void, we could not exist in the void. On the other hand, without us, there would be no void to engage in the endless debate with the not void.

349. I have tried, not altogether successfully, to articulate the notions of having a "void", a "not void, a "he," a "she" a and an "it", in Fig 36 and its many captions. However, this material is subtle, it is, to my mind, hard to tackle, come to grips with. Yet, once some familiarity is gained and some thinking undertaken, the obscurity diminish, even evaporate. It needs, in fact, little labour to apply it to situations of many kinds. In the hope of assisting this process, I have composed an Appendix, intended to augment the images of Fig.36., and to expand upon the captions which, though numerous, are brief.

CHAPTER I2 SOME NOTES, OF ACKNOWLEDGEMENT AND THANKS.

350. Primarily, I would like to aplogise for the omission of many immediate co-researchers, Gert Hulstein, Kurt Beks, Jules Herint, Haenk Slicht, Jaqueline de Jong, Jaques Meir, Helene Ripjer, Martha Vahl, Maryolyn, Rolf Pixley, Harrie van Haster, to mention a few of them. the Daniels John and Julian in particular, Gary Boyd, David Mitchell and others in Montreal, my friends and colleages at Old Dominion, such as Larry Richards and and the rest, many others in North America, above all Heinz von Foerster, Ross Ashby, Warren McCulloch, in South America, Humberto Matturana, Fransisco Varela and recalled but too numerous to list, in Mexico, in France, Italy, Portugal and Spain, not to mention the Scandinavian Countries, where Lars Loefgren, Graham Barnes, Ola and Bijorn Eric Dahlberg have contributied discussion and enouragement. The co-author-of the series, Gerard de Zeeuw has, needless to say, contributed and collaborated in the composition of this monograph.

351. Also, there are those in London, at the Architectural Association, before that at System Research, Brunel and the O.U. Brian Lewis, Ranulf Glanville, Bernard Scott, I. Mike Robinson, Laurie Thomas, Mike Ben Eli, Mike Elstob and a legion of others, scattered all over this globe.

352. I am sorry for many omissions ; also, I am sorry to have omitted or elided proper reference to strongly-influential work by Vygotsky, Luria, Bartlett, Kelly, Scandura, Wertheimer and a host of others, since it seemed as ridiculously pompous to select representative parts of their voluminous works as it would be to cite, in this context, particular bits of Aristotle, Archimedes, or Plato, for that matter, Abelard, Anslem, Lullius or Marx and only hope that these faults, if they be so judged, will be remedied in other volumes of this series. Often, it is virtually impossible to give proper reference, in a few cases because the publications are to be found only in scientific reports or are otherwise inaccessible, even more often because the authors have, to their credit, so many publications, in many editions or translations. Finally, since the authors, their utterances and their written works, live in my mind and have co-habited, so often, the chambers of intellect, are, as it were, such frequent and honoured guests, that it is difficult to place names and dates upon their published works.

353. To note them, familiar to some, less so, perhaps, to others, may be of assistance, like the syntactical form of prepositions, encountered in our discussion of prepositional operators and their meshes, as signposts to aeons of deliberation. It serves to remind me, at least, that nothing is entirely original and that the ideas presented come from deep wells of coexisting thought.

354. The explicit attempt to avoid formalism and symbolisim throughout this book, has, I hope, been helpful to some. But I have a sneaking suspicion that, to others, it may have been infuriating. If so, that is an unintended stylistic defect.

355. Defective or not, as you judge it, this style provides a useful reentry point . Much of the body of the manuscript has been concerned with analogy, notably its creation as a connective having both a Similarity AND a Difference. In language, such connective relations are said to be metaphors of more or less elaborate kinds. At the outset, it was maintained that our programme had the requirements of healthy growth and development, especially in what I am inclined to call the currently dominant information

environment. That is because and only because it has coherence, a type of Similarity, AND Difference.

356. Or, phrasing the matter otherwise, it is characterised by UNITY with the differentiation needed to avoid the trap of UNIFORMITY. This quality is, seen on a larger scale, as the essential ingredient, needed to foster healthy and ultimately useful innovation, particularly in the domain of social support systems. That subject, taking the designatory phrase in its widest sense, ramifies throughout the entire gamut of enterprises, engaging the efforts of mankind as a species. For everything we do, call it national, political, or scientific, or commercial, or artistic, or industrial or philosophical and the rest, is a systematisation of what is of concern to the species called mankind. For this peculiar eccentricity of mankind as a species maintains the spirit of mankind, the urge to preserve tradition yet, also, to explore, to evolve, to make life worth the living. So, if you take the last few paragraphs of Chapter 8. as the first act finale of this book, please regard this one as the finale of the first of an ongoing saga.

357. At this terminal point, I take the liberty of a mild disagreement with the printed words of Steven Hawkins, after all the protagonist of an other than specialist manner of exposition, the style adopted on that advice.

358. Towards the end of his latest book, Hawkins states something like this, "to discover the universal laws of (all) universes would be the greatest achievement of mankind, that it would be to discover the Mind of God". Yet, it seems to me, and quite conceivably seems to him, (since he has rightly noted that mankind is a sentient species, accorded freedom in choice and affect in demeanour, hence searching for understanding), it would be, also, the obliteration of mankind. For why is there sentience or understanding, unless there is eternal mystery, why does mankind accept the responsibility which goes with freedom of choice, of affect as other than epicine, or a "life" of exploration, created by the same God, and worth Living??.

359. Well, as a simple minded philosopher, a philosophical mechanic as I used to dub myself, ettling to and, overnight, willing to make artefacts that demonstrated my theoretical stance, I do NOT know. Yet, although it may sound odd, even contradictory, I DO know that the other-than-vicious circle of life goes on and IS worth living, phrased crudely, a multiple recursion which, upon impacting upon its varied selves, creates as well as recreates, well, life.

NEEDS APPENDIX RO FOLLOW THIS AND TABLE. 1.toTABLE.4. and

FIg.1.to Fig.36.for insertion.
Plate 1 and Plate.2., also for insertion.
© Gordon Pask.Oct.1992.
Latest Edit in April, 1993.

Table 1

Main CT and Lp Conclusions, for the most part previously supported by empirical evidence but not usually dependent upon it rather then upon participant observation.

1. The canonical form of conversation as the source of hard psycho-social-data and of rationally peripheral data is affirmed, in particular, an "understanding" of a concept, in the CT sense, is rigorously specified.

2. The canonical form of a P-Individual, M-Individual and a conversational participant has been established by empirical and historical evidence.

3. The existence of context dependant learning, creative, innovative and performance styles has been established. Their extreme forms are predictable of P-Individuals, however M-Individuated, and are often known as serialist, holist and versatile. On the other hand, whilst their discrimination is often locally useful, in context, it has been shown that any concept "understanding" relies, to a greater or lesser degree, on all of them.

4. The existence of idiosyncratic discovery and learning strategies, performance and planning strategies has been established, especially in the context of education, learning and complex decision making.

5. The fact that both are actively needed, in order to know has been definitely established. However, this neither negates nor degrades the manifest possibility or usefulness of determining these propensities.

6. The fact that conceptual fixity exists is very adequately demonstrated and further explained, in terms of normal attractors.

7. Conversely, various mechanisms of creativity and innovation has been explicated mostly in terms of plurality of strange attractors.

8. The fact that awareness, the shared awareness of consciousness depend specific, often explicable, forms of Petri-like information transfer has been empirically established, in fact demonstrated to the extent that many of its appearances and absence have been delineated.

9. Conversation, as a matter of agreement and agreement-to-disagree (modelled as a coherence and a distinction) is predicted and shown to be a process of concept sharing, perhaps its most important feature being the establishment of salient distinctions between participants involved in its communicative aspect, although significant, of lesser overall importance.

10. The fact that mentation, conceptualisation and creativity occur and MUST occur as a cyclic organizationally closed and informationally open process has been predicted and demonstrated, it has a dynamic coherence logic which is equivalent to a hermeneutic (in the strict sense of Taylor equivalent to Resher) truth and inextricably existence value hence its own ontology. Further *{the next five or six words are completely indistinct}* distinctions generated by the mental processes of conceptualisation, memory, and innovation a matter both predicted and sensibly demonstrated.

11. The fact that conversations MUST, not only may take place has been adequately demonstrated.

Table 2

Accomplishments of OEC/CICT/IA Theory

DEMONSTRATED

1. The character of actors and their interactions, actions, and so on.

2. Amity, its conservation and generation, and the character of Amity as a commodity which is real, in fact, positively essential.

3. Many forms of precisely specified, conflict and of conflict resolution.

4. A strict specification of society, in contrast to an arbitrary collection of people.

5. The distinction, generation and the coherence of shared concepts of a culture and its civilisation

6. Problem solving (externally defined/internally, defined, de Zeeuw) or (problematic situations/problems, Pask).

7. A participant character of all research and its dependencies on language types, such a s-languages, d-languages and metalanguages able to describe them.

8. The Need for, and definition of, a "void" and a "something" in order to explicate interaction.

9. The Reality of improvement and of quality as scientific properties, on some occasions mensurable.

ONGOING

1. The falsity of alleged schizophrenia (for example Harrie von Haster).

2. The participant doing *{indistinct}* of social support systems *{indistinct}* computing and computing machinary

3. Interdisciplinary interactions, as necessary features of social, rational and organizational transactions.

4. Learning to learn and to live on a conversational and learning to face death (Helana Ripjer gets terribly irritated if I call this "learning to die", understandably so, since it is reminiscent of "a short course in suicide", which is unintended).

5. Other than coercive social regulation by participatory and affective means (for example, Haenlk Slicht, Jaquwline de Jong, in music, Jaques Meir in group learning and program interaction, in preserving past programs and improving them).

6. Closely related Quality improvement, for instance, in management.

7. Mathematical logic of fundamental principles of learning science

8. Increasing or expanding quality of linguistic and diverse resolutions

9. The diversity of History, temporality, and infinities

Table 3

Main C.T./I.A./differences, given that Lp is dynamic

a.	Start and finish as inTz(s) and Tz(f) or assumed common to all z temporal index T(t)	No usual start and finish. Any temporal index t is *{indistinct}* minimal form t=THETA(<theta,,A,1, Theta,,A,2>,<Theta,,B,1,Theta,,B,2>...) and usually with coupling terms t=(LAMBDA(THETA(<Lambda, A<Theta,A,,1,Theta,,A,2>>,<Lam,B<,Theta,B1,,B 2>>...))) and so on.
b.	Kinematic Image	Kinetic Image
c.	Conz(T) evolves by Prog in Con*z acting on the Progs in Conz(T) whilst being applied.	Same, but Procs also grow by interaction with Interz through Con*z in z repetiore.
d.	Interz assumed fixed.	Interx evolves by interaction
e.	Z=A, B,... in similar type Iso-Inter-Family	Z=A,B,.. seldom in same Iso-Inter-Family, but converge by growth
f.	Mentation distinct from Thought, its orthogonal Unfoldment from focus.	Mentation distinct, similarity, from thought but, also, action if opposite orientation signatures meet
g.	Participant is M-Individual, P-Individual in an Lp field	Actor is Participant with propositional anti-mesh, linking by analogy mesh to characterising and ontology mesh.
h.	Conversations between class of participants	Interactions are like conversations but also with or between to societies.
i.	No NEED to invoke "void" as distinct from "something", but MAY do so.	Both "void" and "Something" ARE needed, if ONLY to specify a vector in a social system
j.	Cartesian phase space may be valid represenation.	Probably need to use coordinates of distinction products of mental process.
k.	NEED not, although may, use strict discrimination of society	MUST have a rigorous discrimination of society, here, given in terms of other-than-locally cyclic and interlocking dynamic meshes

Table 4

Summary of Main Principles

Conservations

(1) a. Conservation of I (meaningful information transfer).
     b. Conservation of AP, that is permissive application, given satisfaction of (Petri type), information transfer).
     c. Conservation of IM, or imperative application over ensemble of all Conz and all Con*z in canonical P individual, Z.
     d. Conservation principles are, amongst other things, one way
     e. Conservation of Parity
     f. Of distinction under *{indistinct}*
     g. From (a) and (c), conservation of consciousness in any, usually distributed, not localised system of Z indexed type.

(2) **Dualities**
     a. Duality, in an ideal situation, of CT and Lp
     b. Reminiscent of particle/wave duality of Conz(T)/Dz(T)

(3) **Complementarities** (see Loefgren L., for forms of linguistic complementarity)
     a. Of Procz(T)=<Prog(T), Interz>
     b. Of Conz(T)=<Con(T), Interz>
     c. Of <Conz(T), Dz(T)>
     d. Of <Conz, Con*z>
     e. Of Con*z=<Conz+, Conz->
     f. Of Z=A and of Z=B, and so on. All observers are, at least to some extent, participant observers with the main role of participant

(4) **Indeterminicies**
     a. Of foci of, thought or attention, from which to unfold.
     b. Truncation and selection of unfoldment, given its origin

(5) **Exclusion**
     Z=A is not Z=B, hence, no doppelgangers

(6) **Mathematical, logical and philosophical principles**
     a. Distinction
     b. Knot Theory and interpretation of self and other referential recursion (Kauffman, Hellerstein et all, refd)
     c. Action and Deontic Logics (Von Wright et al refd)
     d. Modal forms of logic (notably Gunther et al)
     e. Dynamics of Coherence truth and hermeneutic truth as the refinement of meaning (Rescher, Taylor, my own group amd myself)
     f. The Algebra of Consciousness(Lefebre et all, refd)
     g. Self Organization (von Foerster and others, Organizational Closure and Informational Openness, or structural openness, Maturana, Varela, Atkin, Gougen, Richrads, de Zeuw and othersw refd). The list should obviously include many authors not noted, especially of the older school, such as Cayley, Clifford, Dodson and Hamilton, see Appendix

The Figures
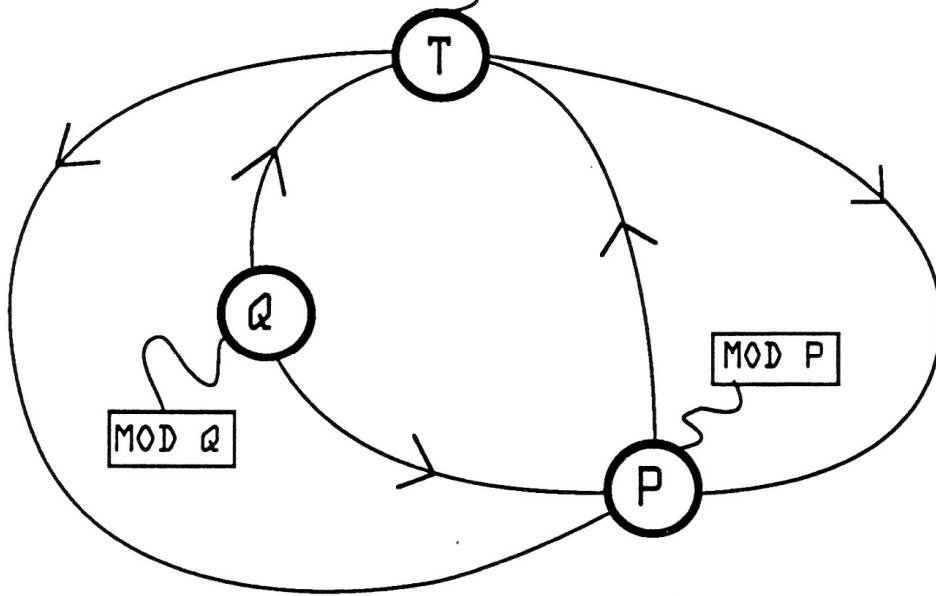
12a.   Collective Mesh
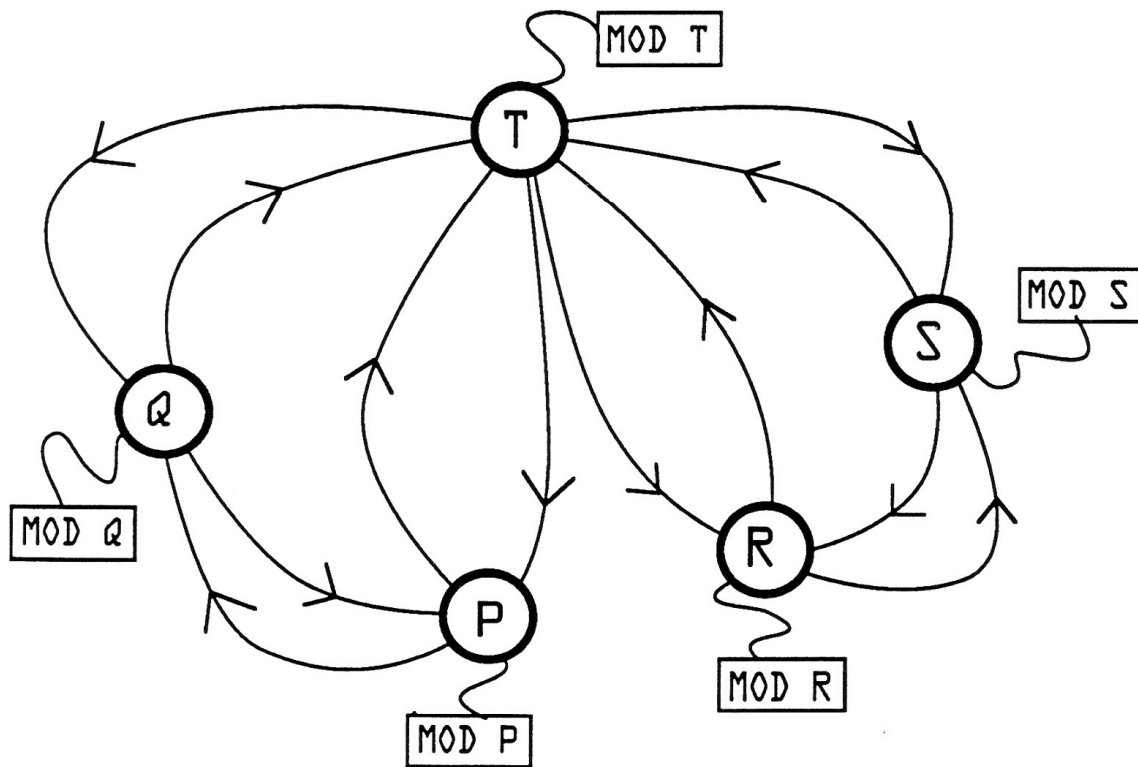
12b.   Distiributive Mesh

12c.
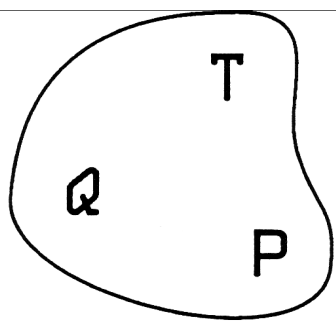
12d.
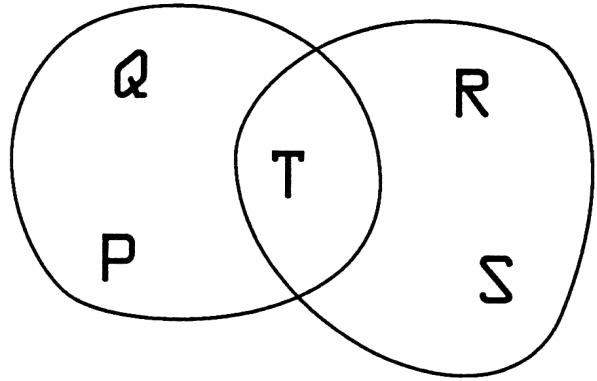
12e.
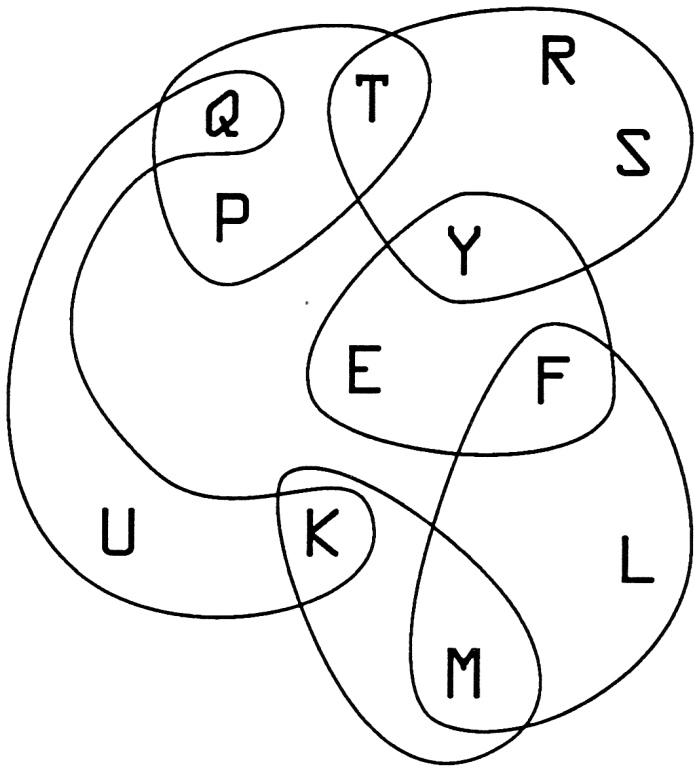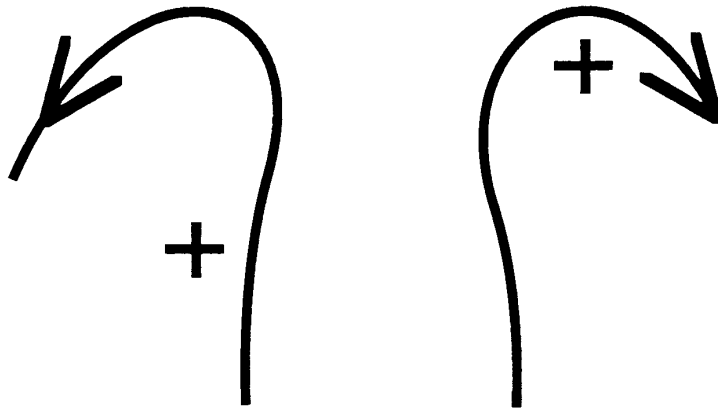
fig 13.
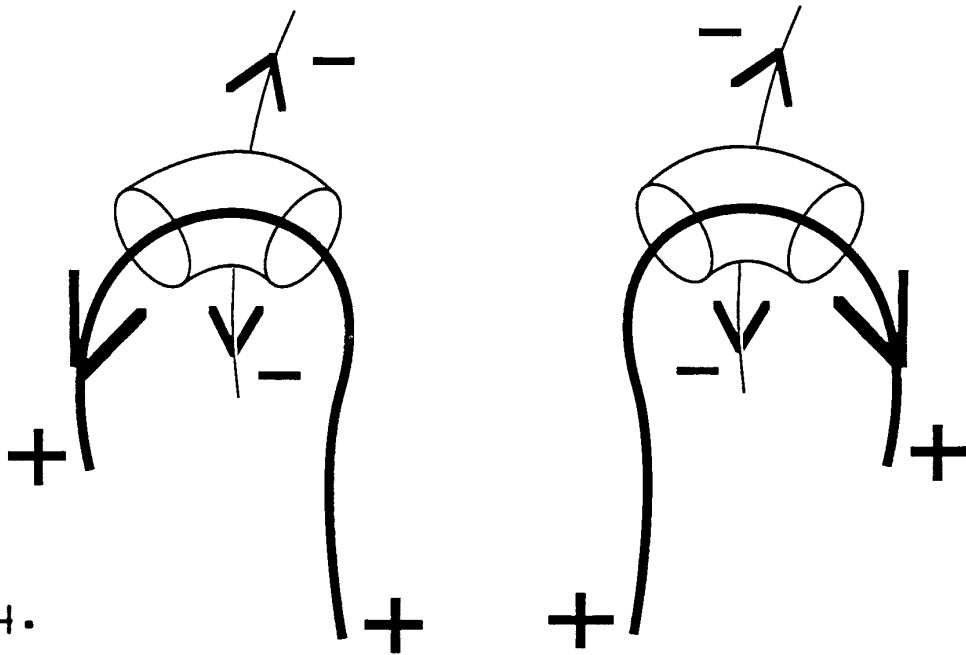
fig 14.

Fig 15a

Fig 15b.

Fig 16a.

Fig 16a.

Fig 17.

Fig 19a.

(a)

(b)

Fig 28.

(d)

Aceto-acetic-Ester

Keto form $CH_3-\underset{\underset{O}{\|}}{C}-CH_2COOC_2H_5$

Enol Form $CH_3-\underset{\underset{OH}{|}}{C}=\underset{\underset{H}{|}}{C}-C-OO-C_2H_5$

Benzene $\rightleftarrows$ Kepule 'Resonance' [O] source
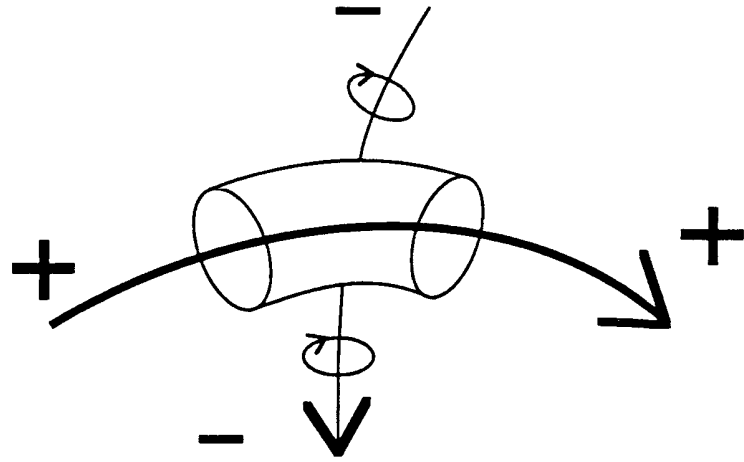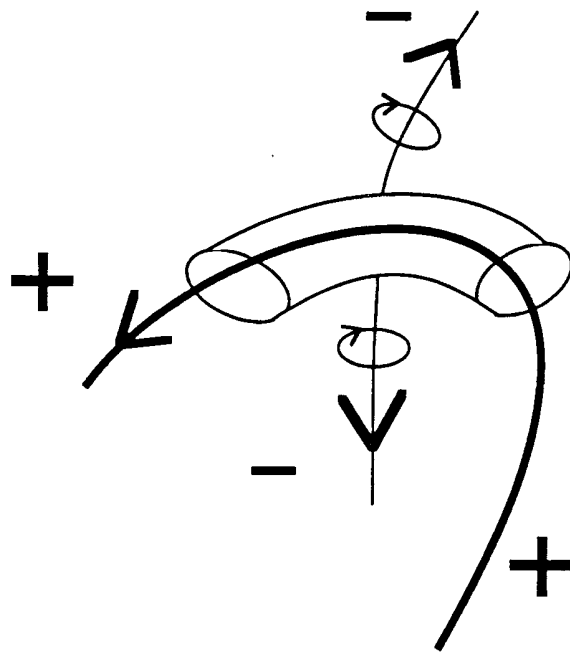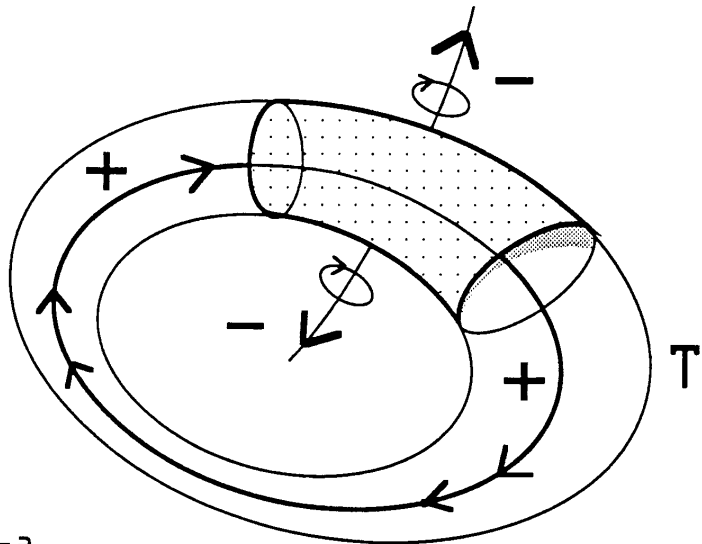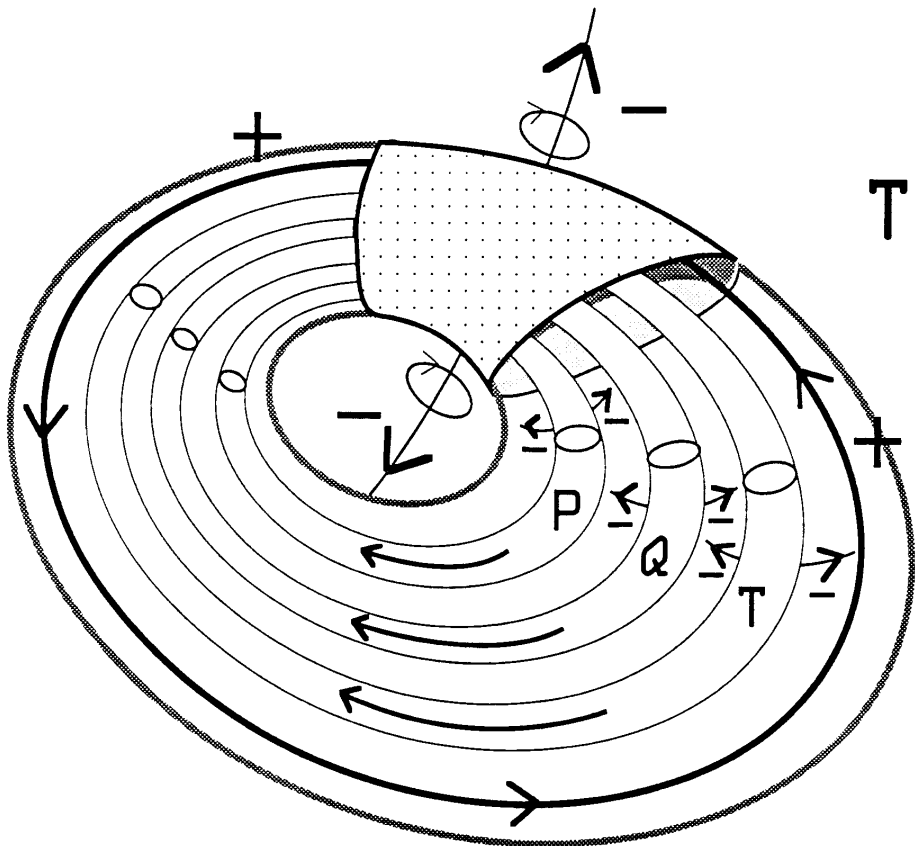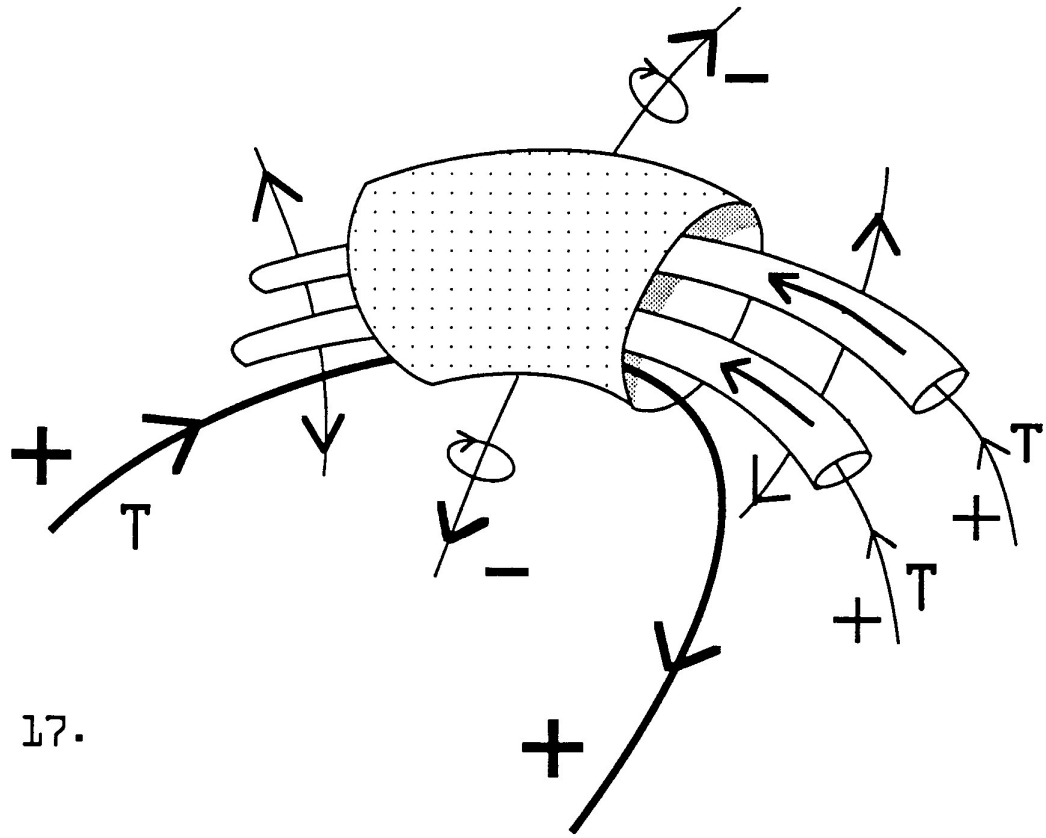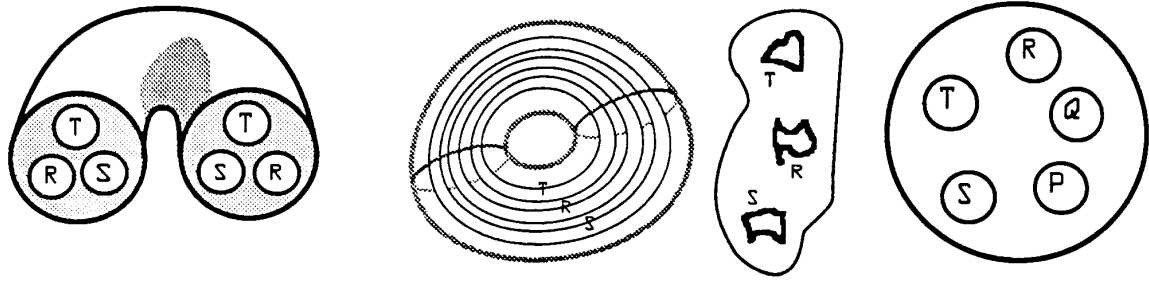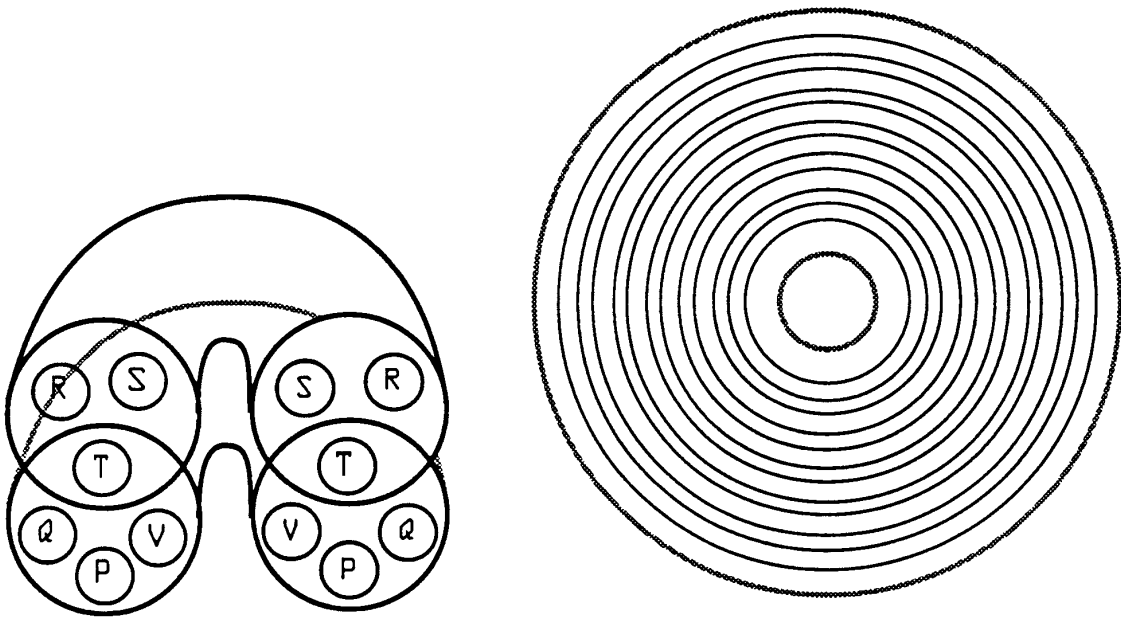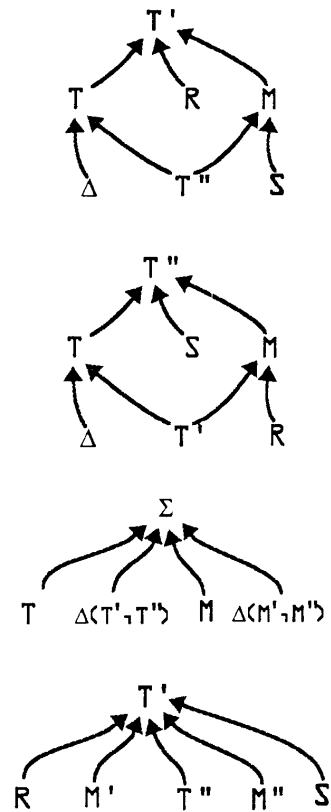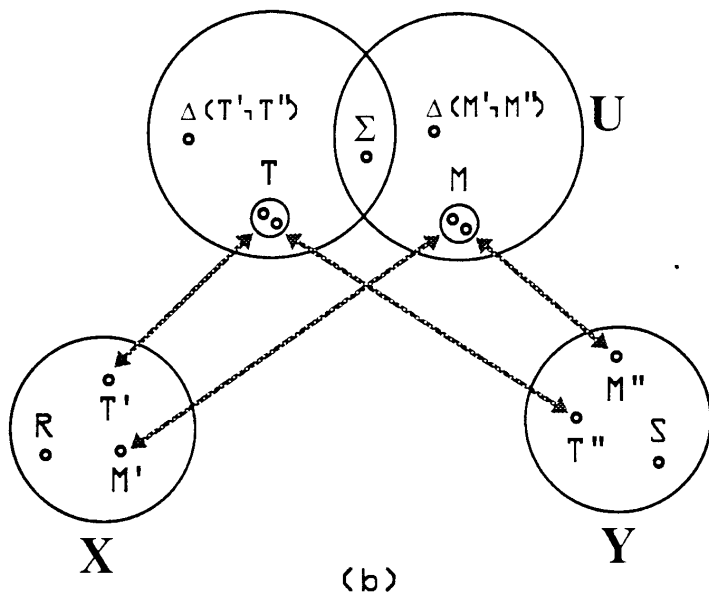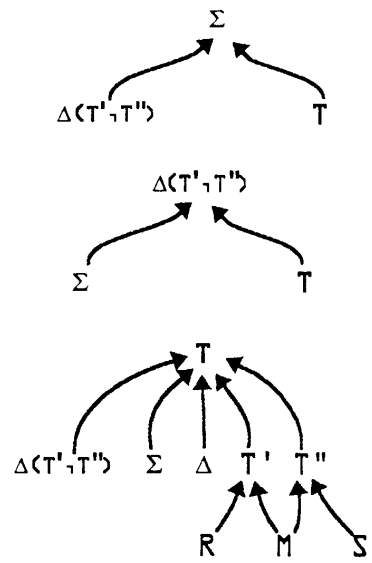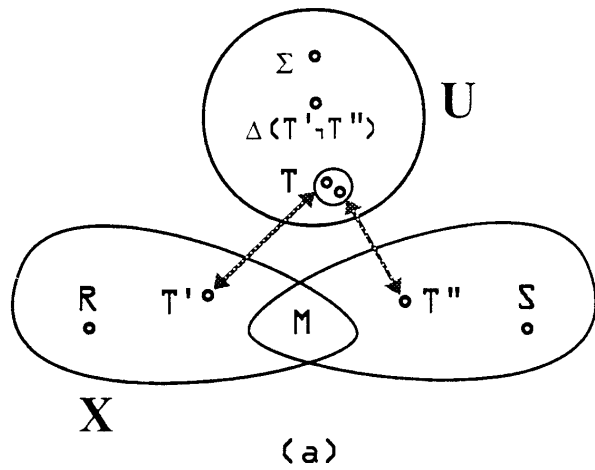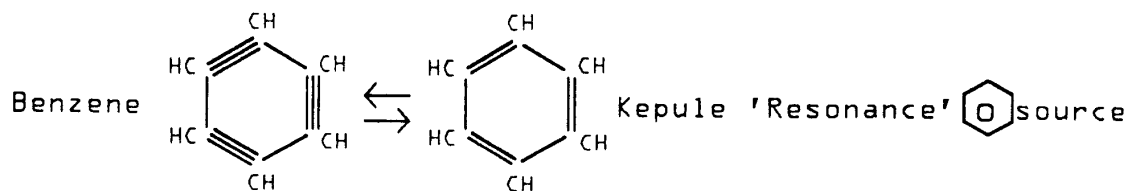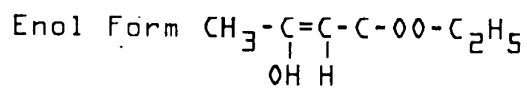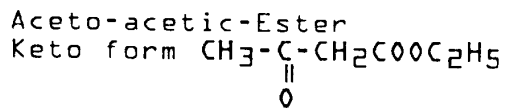
[hexagon] useful for Cyclohexane
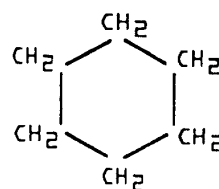
[O hexagon] Benzene stands for

electron 'clouds'

Napthalene [o α]

Anthracene [o o α]

Methylene Dioxy Amphetamine

$-CH_2-CH_2-\underset{\underset{CH_3}{|}}{\overset{\overset{NH_5}{|}}{CH}}$

Fig 35.

88

INDEX