

AN APPROACH TO STRUCTURAL
REGIONAL PLANNING FOR DEVELOPMENT

(With Particular Reference
to the
Northeast Mexican Region)

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To my Wife:

Adriana

To my Children:

Cecilia

Gustavo

DECLARATION OF AUTHORSHIP

I hereby declare that this thesis has been
composed by myself, and that the work is
my own.

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PART A

"A CRITICAL ASSESSMENT OF THE METHODS AND TECHNIQUES
CURRENTLY USED IN THE FIELD OF PLANNING AND A
COMPARATIVE EVALUATION OF ACADEMIC AND PRACTICAL PLANNING"

INTRODUCTION

The world can be roughly divided into rich and poor countries. Some of them are richer or poorer than others, some countries move up or down between or within categories as time goes by, but this gross sub-grouping still holds a certain validity for the purposes of this research.

Generally, the poor countries (i.e. 'Developing Countries' or UDCs) strive for their betterment by tending to imitate and ask for help from rich countries (i.e. 'Developed Countries' or DCs) which in turn, offer their economic and technical support by advising them - as demonstrated by the growing volume of research and publication on development produced in recent decades.

Unfortunately, the gap between UDCs and DCs widens rather than diminishes, thereby bringing seriously into question the applicability of the theories, techniques and recommendations which have been put forward. Many UDCs now also recognize that the majority of their technicians, having been trained in highly specialized countries, fall into the trap of uncritical mimicry with their frequent attempts to apply, without change, what they were taught while abroad.

Whereas the exact sciences can produce explanations and models of nature's laws which are valid and applicable the world over, when man, and the sciences concerned with his behaviour, are involved, too much must be assumed, too many variables eliminated, too many hypotheses established, while almost all qualitative (unquantifiable) factors have to be too strictly simplified, for any resulting model purporting to represent reality, to have more than very limited potential.

Regional Planning is a relatively new social science, originated within advanced societies and meant to solve some of their problems. Its methods and techniques are appropriate

to their social, political and administrative organization, culture, level of education, and so forth, which are far more advanced than, and altogether different from, those prevailing in the developing world.

The intention of the first part of this thesis is to review, as carefully and as objectively as possible, what has happened in the past in the field of development and planning, in order to test the following hypotheses:

First Hypothesis: "Most planning methods and techniques have been created to consider circumstances, problems and needs which are different from those of developing societies".

Second Hypothesis: "Academic planning, because it is based on rough assumptions, biased views of reality and gross simplifications, is not satisfactorily validated by the world of practical realities".

Third Hypothesis: "The uncritical transfer of planning methods and techniques appropriate to economic development by means of industrial growth, is unacceptable, being always dangerous and sometimes harmful in most, but not all, Developing Countries".

To substantiate these statements I have adopted a simple research method which consists of:

1. Selecting a large number of works of respected authors of planning,
2. Augmenting the list by bibliographic research (checking new references),
3. Searching some of the well known periodicals in the field,
4. Reading, selecting, classifying and checking cross references,
5. Sub-grouping all the information gathered for each of the three hypotheses put forward above.

The main reason for adopting this procedure is to avoid the uncritical acceptance of the overwhelming number of methods and techniques - some of them ill-founded - to which

students are normally exposed when being trained as planners in the developed world.

This approach stems not from any automatic rejection of what I have been taught, but rather from a desire to examine carefully how far it may or may not be valid and applicable to my native country.

CHAPTER I - CORROBORATION OF THE FIRST HYPOTHESIS

The first hypothesis presented in the introduction of this thesis stated:

"Most planning methods and techniques have been created to consider circumstances, problems and needs which are different from those in developing societies."

The intention of the first chapter is to test this hypothesis by comparing, in general terms, the development processes characteristic of industrialized and underdeveloped societies.

1.1. A Brief Account of the Development Process in Developed Countries.

Industrial and technological development (both so widely considered indispensable to modernization), had their origins in today's developed countries in their fortunately well-balanced nineteenth century agricultural and industrial revolutions.

The surplus of labour and capital from the primary sector was gradually transferred to the secondary and tertiary sectors concentrated in the cities.

Somehow, through cultural and health improvements, population growth was held under control, reinforcing even further the initial equilibrium.

Technology was not at the beginning sophisticated, thus allowing the unskilled countrymen to be integrated at the same time as becoming more educated. Technological advancement was geared towards industrial expansion without population pressures, simultaneously highly educated people responded to the needs for further technical competence.

This is, without doubt, what can be called a 'Balanced Process of Growth'. Moreover, another important factor added to this already favoured process was that, through colonialism, developed countries were able to expand beyond their own physical boundaries. Felipe II used to say imperiously 'the sun never sets on my domains' and he was right, the whole American continent with its enormous untouched natural resources belonged to him. The question of raw materials was solved for centuries. The same happened (though in a different context) to Britain with its extension through colonialism and later on through the so-called 'Commonwealth'.

This fortuitous, but unique and significant factor was the final propitious condition for the balanced process of growth of the West.

Industrialized societies were provided with both the key elements of success and raw materials at prices fixed unrealistically low for them. Colonies, again, were an open market for their products, in which manufacturers fixed their own prices and conditions. Their way was thus open for industrial development and mass production, applying new capital intensive techniques. High productivity, in terms both of manpower and machinery, have become corner-stones of the whole modern industrial process. Industrial development has been equated with 'modernization'. Primary activities are considered as a 'second class' activity by the quantitative fragmentary short-term economic analysis so often used in the market economy. It is far more profitable to invest and to develop one or more substantial manufacturing sectors with a high rate of growth, than to squander capital resources in other branches of economic activity with dubious potential returns.

1.2. A Brief Historical Account of the Development in Mexico.

Mexico has had a long history of human endeavour,

shown in her magnificent indigenous ruins, of which it is the anthropologist's and archeologist's task to provide consistent reconstruction. My concern is with the period from the Colonial Epoch onwards, and with the identification of the main characteristics of our process of growth in this era for the purpose of comparative analysis.

The colonial epoch, dating from 1519-1810, was the time in which the Spaniards injected their ideas and values into the newly formed Mexican 'bronze race'. The Catholic Church, closely linked to the Royal Crown, became an all-encompassing State-Church, but one which unwisely granted (without any foundation in Christian doctrine), divine right to the kings. As a consequence authoritarianism pervaded the whole structure. Natives were considered as citizens below second class without voice or vote. They were meant to obey and keep silence. Besides this damaging religious and political approach, Mexico also had to carry upon her weak shoulders the burden of a bad economic and social heritage from Spain, as Brandenburg has mentioned:

" The economic substance of Spain rested squarely on the doctrine of mercantilism, a philosophy that relegated New Spain to the subordinate position of supplier of silver, gold, and other commodities to the mother country and, at the same time, buyer of processed goods sent from Spain". (1)

A whole philosophical basis for economics (discussed in my previous thesis) was transplanted. Economic success was defined in terms of release and stimulation of greed and of personal indulgence. "Get-rich-quick", was the motto during the 'Gold-fever', a form of motivation which later on was utilised in other activities.

(1) Brandenburg, F. : "The Making of Modern Mexico", (Prentice-Hall, Inc. E.C., N.J.) USA, 1964.

" The fast-profit dreams of mining extended into agricultural production, encouraged by the virtually unlimited land supply and cheap labour. The abundant and servile native labour force that awaited the colonist was ready-made for Spanish-style feudalism". (1)

Simultaneously, a rigid social class system was formed, the 'gachupines' (immigrants from Spain) being at the top, followed by the mestizo (mixed-race descendants of Spanish immigrants and indigenes), who were rejected both by those above and those below them. In third place were the 'christianized' Indians, and at the bottom of the social ladder were the 'zambo', (mixed-race descendants of Indians and Negros).

Overall descriptions and criticisms of Spanish rule have been drawn up by many historians, going far beyond the scope of this thesis. From these, certain points emerge which are important for my purposes: (2)

1. Indian cultures were wiped out at once leaving a sense of total insecurity for those who survived the conquest.
2. A new language, religion, value system, culture and socioeconomic system were introduced and imposed.
3. Authoritarianism, censorship, centralism and personalism were incorporated, due to the Catholic Church's harmful intervention in State affairs.
4. There were unfounded claims of superiority for European vs indigenous values.
5. A psychopathic 'gold rush' was later on transformed into a psychopathic 'get-rich-overnight' quest in any economic activity in which such profits were involved.

(1) Brandenburg, F. "The Making ... op. cit.

(2) My free interpretation on Brandenburg's conclusions.

6. Mexico City was firmly established as the political, economic and social centre of New Spain.

Mexico became independent of Spain in 1810, paying thereafter the heavy price of more than 66 years of lawlessness, civil strife and insurrections. Complicity with the foreigner and ambivalence about values produced widespread corruption and American intervention in home affairs. Mexico found herself split into two incompatible Mexicos. The Europeanized Mexico, a by-product of three centuries of colonialism and the Indian Mexico, whose illiterate, exploited and mentally and physically underdeveloped people never understood what was happening, the only certainty being that something was wrong, something they were powerless to prevent.

It was not until 1876, when Porfirio Diaz assumed the presidency, that Mexico achieved any genuine political stability. His method of control has been described as 'Military Diaz-potism'. In an attempt to overcome problems remaining from the past, he colonized deliberately, giving extensive lands and resources to foreigners. The latifundio system was consequently strengthened, so effectively that by 1910, 800 haciendas covered 90% of the national land. While the peasantry remained poverty-stricken, the hacendados (the nouveau riche products of this 'Colonization' enjoyed a high bourgeois life style, carelessly squandering their vast wealth in the Capital City or abroad. Moreover, foreigners were allowed to dominate mining, utilities, industry and commerce. Mineral resources were heavily exploited - especially oil - by the Americans and British; industry was stimulated by the Americans, Germans controlled the hardware business and the Spanish took over food stores. The French monopolized large department stores while Canadians aided by Americans and Englishmen concentrated on electric power, trolley lines and water companies. This abject surrender to Europeans was the result of ideas underlying the education policy of Diaz. According to Brandenburg,

" To justify racial superiority (Europeans vs Indians),

Diaz's brain trust infected education and society at large with the doctrine of white supremacy. Indians, claimed the positivists, were inferior because nature willed it ! 'Salvation lay in transforming Mexico into a white man's country oriented by European values and customs.'" (1)

With this 'infected education' Diaz remained in power for 35 years (1876-1911) surrounding himself with a group of lawyers and economists equally infected by European doctrines calling themselves, with exclusive over confidence, the 'clientificos'. (Those who knew what was best for their own benefit in terms of economic power, prestige and social status).

Once Diaz had resigned the country fell again into a chaotic state of intrigue, revolution and guerilla activity. The United States reinforced her 'diplomatic' - extremely hypo-critically disguised interventionist - relations with the elite at the top of the ladder. Accounts beyond the scope of this thesis, can be found in historical research. (2) The list of the names of those who influenced Mexico in this revolutionary period (1911-1919) is a long one. The outcome was, however, that Mexico became more and more involved with the US. As a result, from 1920 to 1935 the major issues of American-Mexican relations were the payment of external debt, petroleum legislation and reparations for property damaged or destroyed in the civil war or confiscated under the name of agrarian reform. The most common motive was greed:

"If you have given me something I am allowed to use it as I wish without considering how this may affect you. If you change your mind, because of the principle of 'private ownership' and 'capital investment', I do not give it back to you. You have to pay dearly for it regardless of the amount of profit I have made out of

(1) Brandenburg, F. "The Making ... op cit.

(2) Gonzales-C.A.: "Mexico, 50 Anos de Revolucion" (Fondo de la Cultura Economica, Mex) Mexico, 1961.

your gift". Instances like Morrow's arrangements with Calles, in which the US Ambassador performed ... "one of the most constructive episodes in modern diplomatic history" (1) (as far as US interests are concerned), were, and still are, repeated frequently in our annals.

During and after all those years of internal struggle, agricultural production was extremely low, and needed to be augmented as soon as possible. To do this, Mexico engaged in gigantic irrigation schemes (2) which together with modern agricultural technology, help production to keep pace with the immediate needs of home consumption and export. Nobody can deny the value in terms of production of such efforts. It is, however, entirely open to question who were in fact the beneficiaries (3), since, at the same time an artificial state of affairs was being created. The process was based on the idea that the road to salvation was industrialization. The sooner this can be achieved the better the chances for economic growth and betterment. Calles further reinforced this faulty initial approach, concentrating maximum efforts on fostering economic growth through industrial development and commercial agriculture. He is recognized as the president who first propelled Mexico into large-scale modern economic activity. His 'new economic policy' prepared the ground for what has been called the Mexican 'take-off' into sustained economic growth (better known as the 'Mexican Miracle'). His successors (from Cardenas, Avila, Camacho, Miguel Aleman, Adolfo Ruiz Cortines, Adolfo Lopez Mateos, and to Gustavo Diaz Ordaz) continued more or less with the same approach though each of them having their own way for dealing with 'economic policies', one president emphasizing industrial infrastructure, the next, foreign investment, and so on. In spite of relative political, economic and social

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- (1) Nicholson, H. : "Dwight Morrow" (Harcourt, Brace, N.Y.) USA, 1935 (as quoted by Brandenburg)
- (2) See for instance : Barkin, D. and King, T. : Regional Economic Development: The River Basin Approach in Mexico" (Cambridge University Press, USA, publ. as well in G.B.) 1970 (pp. 236-248)
- (3) Barkin, D. : "Los Beneficiarios del Desarrollo Regional" (Sep Setentas, SEP, Mexico) 1972, (pp. 181-185)

stability and inspite of the general betterment that resulted from literacy campaigns, the establishment of certain labour rights, improvements in the educational system, agrarian reform, institutionalization of interest-group structure, and of the new roles played by Mexico on the international stage (amongst other major changes), both the old problems and many which had arisen since Diaz's epoch were still not solved. General economic backwardness prevailed, resulting from political authoritarianism and inequitable distribution of resources. The low per capita income overall was reflected in a low rate of savings. Illiteracy and bad housing were additional factors perpetuating agricultural inefficiency and rural poverty, as well as the urban slums, and worsening the existing imbalance between different regions. Most of these negative aspects are unfortunately still there and cause serious problems of social unrest at the present day.

1.3. Comparative Analysis of Both Processes

1. Today's developed industrialized countries have achieved their present status by processes which may be compared to natural stages of growth in an evolutionary sequence. Revolutions in agriculture, industry, social and cultural organization and public health have both fed on their own momentum and each provided, in turn, the indispensable conditions for the next step forward. Their appearance of being naturally organized has been enhanced by the extent to which these countries have exploited historic opportunities to milk the rest of the world of the raw materials for manufacture and profitable disposal to an unlimited market consisting of those same primary producers, a process from which developed countries continue to benefit today.

2. In the underdeveloped countries, (as far as Mexico and other ex-colonies are concerned) the set of 'revolutions' previously mentioned turned up at the wrong time creating grave disarrangements in the process. Mexico and other ex-

colonies are examples of underdeveloped countries where the historical circumstances in which development "revolutions" have taken place, far from enabling the inhabitants to build with the results of one advance upon another, have prevented each in turn from being used constructively. Nor have world conditions offered anything comparable to the markets for manufactured goods which have always been open to developed countries. Similarity to natural growth and evolutionary process has been entirely absent. Such countries experienced in colonial times the destruction or serious disruption of their original culture, religion, values and social organization, and for centuries afterwards remained subject to external control. Treatment of the people was - if not open - at least disguised slavery. In those conditions the agricultural revolution could not take place. Natural resources were taken out of the country at the will of the colonial power. Liberation, whether taken from or granted by their rulers, was followed directly by the industrial revolutions, which had no basis in modernized, agricultural production and lacked any such advantage as having some other country to exploit in the way that the ex-colonies had themselves been exploited. To the distortions due to colonial rule and its aftermath, and the historic accident of the lack of exploitable markets overseas, a third serious drawback was added by the mis-application of scarce economic resources, when these were squandered on gigantic imported projects. Any beneficial results from such projects have been far outweighed by the consequent debts and conditions of technological dependence and dangerous social disruption. Because of the structural interdependence between industrial development and urbanization, major discontinuities emerged between the cities and regions 'chosen' for economic growth and the rest. Centralization (left over from colonial times) was further reinforced. Cities became centers of attraction rather than points of diffusion of wealth. This may be regarded as the fourth misfortune in the process. Moreover, even the revolution in public health failed to fit in constructively with the rest of the changes. We shared medical advances with developed societies, reducing drastically both infant and

general mortality but because the type of social revolution which in other parts of the world accompanied these advances did not take place in Mexico, the birth rate remained constantly very high, (for instance, in 1975 the rate in Mexico was 42/1000 compared with a mere 16/1000 in Britain). Hence, population growth soared uncontrollably, yet further complicating each of the sources of stress and disorganization already present. There seems to have been no sequence at all. Growth was unnatural; it was (and still is) cancerous.

CONCLUSIONS

Whereas Rostow's well-known work (1) allows for the possibilities of comparing stages of economic growth, as between developed and developing countries, (and of emulation of the former by the latter), the foregoing comparative analysis suggests that it would be preferable to conclude that there are two different processes, each one a product of history, culture, fortuitous circumstances, environment and degrees of technological advancement utterly dissimilar in operation and effect. (2)

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- (1) Rostow, W.W. "The Stages of Economic Growth, A Non-Communist Manifesto" (Cambridge, C.U. Press) USA, 1962.
 - (2) Similar conclusions can be found in: Prebisch, R. "Change and Development: An Ecological Approach" (A.A. Knopf, New York) USA, 1971 (especially Chapter 8 pp. 231-243).

CHAPTER II - CORROBORATION OF THE SECOND HYPOTHESIS

The second hypothesis presented in the introduction of this thesis stated:

"Academic planning, because it is based on rough assumptions, biased views of reality and gross simplifications, is not satisfactorily validated by the world of practical realities".

2.1. Some Relevant Quotations About Methods and Techniques in Planning.

Following the research method originally mentioned, I have chosen and have freely underlined various relevant quotations which I thought would help me to trace the main traits forming the 'deep structure' (1) on which planning methods and techniques are based.

Due to the large number of references reviewed (more than two hundred) and the impossibility of including all of them in this thesis, I selected a more reasonable number of the most representative and these are here appended. (2)

2.2. An Evaluation

Pervasive among almost all the 'theoreticians' here analysed is a feeling of insecurity. This is clearly shown in their phraseology, examples of which are as follows: 'heroic assumptions are required'; 'assumptions departing from reality'; 'a wide range of error'; 'some degree of reliability'; 'weak and somewhat fragmentary estimations'; 'subjectivity is involved'; 'other equally important considerations are not included'; 'the impossibility of dealing with non-quantifiable factors'; 'Ceteris Paribus';

(1) Using Piaget's concept. See: Piaget, J. : "Structuralism" (Routledge and Kegan, Paul) G.B., 1971, p.98.

(2) See Appendix No. 1 "Some Relevant Quotations" (p.)

'effectiveness may be severely restricted'; 'however conceived each slant yields a very imperfect look'; 'too much remains to be done'; 'a highly simplified quantitative description of the real world'; 'static linear relationships which really do not exist'; 'utility much less than it appears at first sight'; 'particularly unsatisfactory'; 'production of partial one-sided solutions'; 'the most operational studies have produced only the most tentative results'; 'grave structural problems'; 'incapacity of setting up proper ways of measuring'; 'some topics remain a matter of judgement rather than scientific analysis'; 'traditionally narrow context'; 'the entire concept must be changed. The old, narrow, economic approach no longer can prevail'; 'environmental (physical), social, political, and other cultural factors must be considered'; 'a large amount of subjectivity'; 'simplifying assumptions exceedingly difficult to accept'; 'a still more restrictive set of assumptions'; 'a still more partial look at the world'; 'admittedly the conceptual shortcomings are many and serious'; 'ambiguity in concepts'; 'no clear cuts, no clear boundaries'; 'a lack of objectivity'; 'unwarranted assumptions based on the condition of a non-existing state of equilibrium'; 'extensive simplifying assumptions of linearity, homogeneity and continuity'.

It follows that the approach of these writers is admitted by themselves to be, to the 'Real World', defective, one-sided, narrow and incomplete, however good the scores they claim for their quantitative analyses.

This position can be further illustrated by a closer check on inconsistencies in the work of Issard. (1) His 'quadrology' attributes enormous importance to sophisticated mathematical models dealing with quantitative units

(1) By focusing my attention on Issard's inconsistencies, I am attempting to analyse the school of thought he represents, because to the author's knowledge, his influence is all pervasive not just in USA and to a less extent in Europe but unfortunately very much in Mexico and Latin America.

but the whole gigantic research displays fatal conceptual weaknesses, and deep structural inconsistencies, necessitating frequent resort to heroic assumptions. His apparent precision and scientific rigor rests upon gross oversimplifications. Equally serious, his apparent humble recognition of his limitations, is overtaken by his optimism about what can be done through his work ...

"... which, as it becomes increasingly concerned about the consistency of its internal logic, turns in upon itself, and grows more and more remote from reality." (1)

2.3. An Interpretation

If the Real World, or Milieu-Entier may be portrayed graphically as the working of the "Man-nature symbiotic system" (see fig.no.6, p.) in which qualitative and quantitative variables overlap, the weakness of reductionist methodology as a tool for grasping reality will be clear when we consider those limitations it necessarily imposes upon the scope of the milieu-entier actually analysed.

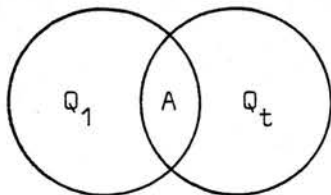
Number of variables:

(M-E)

$$/Q_1 / = \alpha$$

$$/Q_t / = \alpha$$

$$/A / = \ll \alpha$$



KEY

(M-E) = Milieu-Entier

Q_1 = all Qualitative factors existing in (M-E)

Q_t = all Quantitative factors existing in (M-E)

$A = Q_e \cup Q_t$ = all qualitative factors which can be quantified

FIG. NO.1 'Milieu-Entier' (M-E)

(1) Williams, J.H.: "An Economist's Confessions" (TAER, Vol.XLII, March, 1952, pp. 4)

The interactions that are taking place in this system are of Qualitative (Q_1) and Quantitative (Q_t) character. There is an overlap (A) consisting of all those qualitative factors which can be quantified. So, $A = (Q_1 \cup Q_t)$.

Neither Issard (1) nor Alonso (2), however, claim that their work can accommodate all three of the basic variables in FIG.1. Such a claim would in any case be unrealistic because the perception of the 'Milieu-Entier' is bound to be confined by our inability to comprehend the totality of interactions, so that Q_1 , A and Q_t are further (drastically) reduced to those of their aspects which constitute: The Milieu-Entier perceived, $(M-E)_p$.

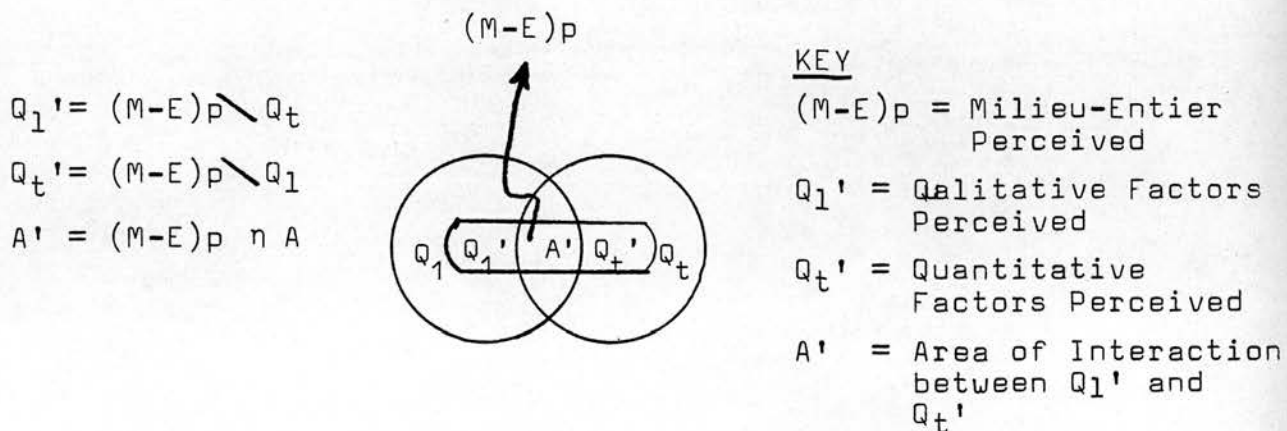


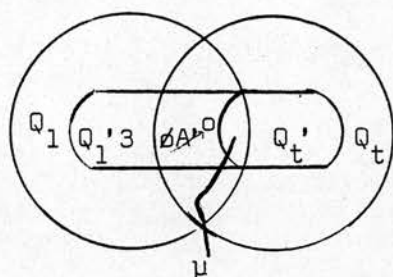
FIG. NO.2 'Milieu-Entier Perceived' $(M-E)_p$

From this it follows that $A' \ll A$, $Q_1' \ll Q_1$ and $Q_t' \ll Q_t$ and $(M-E)_p = Q_1' \cup A' \cup Q_t'$.

Moreover, the set of variables presented in $(M-E)_p = Q_1' \cup A' \cup Q_t'$ is far from being capable of analysis. Quantitative factors are not just difficult to quantify but such quantification is bound to be subjectively biased towards the analyst's values. The general tendency so far has been

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- (1) Issard, W. "General Theory" Social, Political, Economic & Regional Sciences No.8, MIT Press, USA, 1969, p.49
 - (2) Alonso, W. "Location Theory" in J.Friedman and W. Alonso (eds.), "Regional Development and Planning: A Reader", MIT Press, USA, 1964, p. 103.

to eliminate the unquantifiable qualitative factors Q_1' and to reduce to the minimum those which could be quantified.



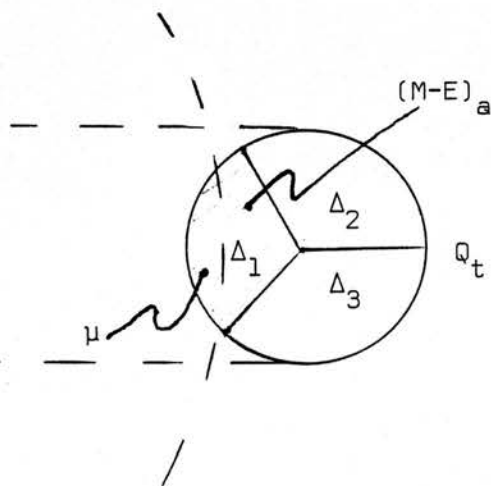
$(M-E)_c$ = Milieu-Entier
 Considered in which
 $(M-E)_p \quad Q_t = \emptyset$, and $(M-E)_c$
 $= (M-E)_p \quad Q_1 \cup \mu$ where $\mu = A'$
 and $|\mu|$ is very small ($\rightarrow 0$)

FIG. NO.3 'Milieu-Entier Considered' $(M-E)_c$

This $(M-E)_c \cong ((M-E)_p \setminus Q_1) \cup \mu$ can have a verbal statement using Issard's own words:

"These questions, like a host of others, of similar stamp, are subject to considerably less objective analysis". (1)

Furthermore, not all the quantitative factors (let alone the qualitative) can be considered, so 'hercic gross assumptions' (Δ_2) and 'citeris paribus' (Δ_3) further reduce the variables, as shown in the following diagram:



$(M-E)_a$ = Milieu-Entier Analyzed
 If $Q_t' = (M-E)_p \setminus Q_e \equiv \Delta_1 \cup \Delta_2 \cup \Delta_3$
 where Δ_1 = sub-set formed by all those quantitative variables to be considered Δ_2 = sub-set formed by all those variables eliminated through 'gross assumptions' Δ_3 = sub-set formed by all those variables eliminated through 'citeris Paribus' it follows that

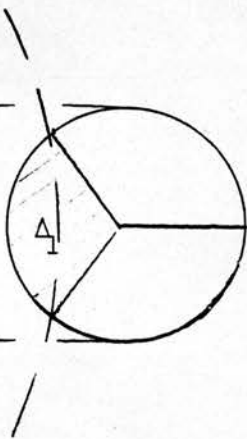
FIG. NO.4 'Milieu-Entier Analyzed' $(M-E)_a$

(1) Issard, W. "General Theory" ... op. cit.

From this it follows that the 'Milieu-Entier Actually Analyzed (M-E)a is further reduced $(M-E)a \ll (M-E)c \ll (M-E)p \ll (M-E)$.

This $(M-E)a \cong (\Delta_1 + \mu)$ can too have a verbal statement using Alonso's own words when dealing with his 'Location Theory':

"We have concentrated on transport costs (single parametric approach with 'n' pre-determined number of variables Δ_1 ,) because they vary in a patterned way over space, and only touched (\nearrow^0) on such things as labour costs and taxes which vary in no regular way ... (for doing so) ... the theory has little to say on some important topics which remain a matter of judgement rather than scientific analysis". (1)



In other words, with highly simplified and reduced quantitative techniques - basically concentrated in the field of mathematics and economics, - it is impossible to explain what is happening in any 'Milieu-Entier'. The so-called 'Reductionist Methodology', used in almost all fields of scientific endeavour, is based on a limited and biased approach to reality. Without adequate reference to the past, it is unable satisfactorily to interpret the present, and hence, however sophisticated as to its analytical roots, it is also useless for prediction.

2.4. Lessons from the World of Practical Realities as Compared with the Academic Planning.

Regional Planning has serious limitations as to method and technique, inspite of which planning has the reputation of being successful in some developed and developing countries.

(1) Alonso, W. "Location Theory" ... op. cit.

One way of assessing its effectiveness is by the measurement of 'performance level' (1) in the so-called 'Real World', by using a similar research method to that in the first chapter of the thesis. The end results are shown in Appendix No.2. (2)

CONCLUSIONS

There is an apparent gap between 'Academic Planning' and 'Applied Planning'. Academic Planning is widely recognized as being based upon a limited and constrained outlook on reality, whose gross assumptions, simplifications and elimination of variables, reduce its potential for solving complex problems. Applied Planning has not been shown to work satisfactorily in either developed and developing countries.

This state of affairs emphasises the need for considerable caution in selecting from among methods and techniques developed in Advanced Societies with a view to application in Developing Countries, and particularly when advising or training planners who will eventually practice in the Third World.

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- (1) Friedmann, J. "Intention and Reality: The American Planner Overseas" (JAIP, Vol.35, No.3) May 1969.
"The difficulties in the environment for planning in low income countries are often so great that American style of planning is rendered virtually useless" (p.188)
- (2) See Appendix No.2 "Lessons from the World of Practical Realities" (pp.)

CHAPTER III - CORROBORATION OF THE THIRD HYPOTHESIS

The third and last hypothesis to be tested in this research was stated as follows:

"The uncritical transfer of planning methods and techniques appropriate to economic development by means of industrial growth, is unacceptable, being always dangerous and sometimes harmful in most, but not all, Developing Countries".

In this very brief Chapter I will attempt to review the present worldwide concern about the unsatisfactory situation - as far as the environmental consequences of man's action on nature is concerned - manifested by a rapid rate of environmental degradation. The intention is clear: to reinforce my position against certain methodologies, theories and techniques currently used in planning which when transferred to the developing world, are dangerous.

Here again there is a two-sided problem stemming from my limited knowledge of ecology (1) and the swelling tide of published material. In the last ten years this has become more than any one person can read. (The Centre for Human Ecology of this University would appear to be an appropriate home for the further research so much needed in this field.)

The approach is to select freely some of the material which has been passed under review, and to synthesize its main components.

(1) I have been introduced into the 'A-B-C' of ecology through the following authors: Kormandy, E.J. "Concepts of Ecology" (Prentice Hall, New Jersey) USA, 1959 and "Readings in Ecology" (Prentice Hall, New Jersey) USA, 1965. Turk, A. (et.al.) "Ecology, Pollution & Environment" (W.B. Saunders, London) GB. 1972. Ricklefs, R.E. "Ecology" (Thomas Nelson & Sons Ltd. London) GB 1973. Mc Hale, J. "The Ecological Context" (Studio Vista Ltd. London) GB, 1971. Douglas, J.S. "Beginners Guide to Applied Ecology" (Pelham Books, Ltd. London) GB 1974.

3.1. Environmental Devastation in the Past

Ever since man started being able to 'dominate' nature and some of its creatures, his record has been that of a destroyer of soil and of ecological systems. Overgrazing, deforestation and overcropping long pre-dated the technological revolution as causes of environmental devastation. Our current physical world can show us the marks of such activity. According to Darling, F., the highlands of Scotland were degraded a century and a half ago by deforestation to fuel industry and then by the overgrazing of sheep. (1) In Mexico, the movement of cultures from the North to the South can be largely explained as self-destruction by societies successively devastating their habitats by cropping and soil depletion. (2) Even nowadays there are still some indigenous people in the south of Mexico who practise the so-called 'la quema' (the burning down of forest) in order to get some soil to cultivate. Their traditional agricultural methods reduce productive land to desert within a few years, after which they abandon it, and repeat the same procedure somewhere else. (3)

The history of mankind is full of similar stories, which led Southwick to state that ...

"There is little doubt that many environments throughout the world have been rendered barren and inhospitable by excessive pressures from the axes, plows and hoofed animals of man. The pioneer civilizations altered their own biotic and physical environments and displayed man's ability to trigger ecologic changes leading to his own downfall." (4)

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- (1) Darling, F.F. "West Highland Survey: An Essay in Human Ecology" (Oxford Univ. Press, New York) USA, 1935.
 - (2) Hardoy, J.E. "Urban Planning in Pre-Columbian America" (Allen & Unwin Ltd., London) GB. 1968.
 - (3) Bassols, B.A. "Geografia Economica de Mexico" (Ed. F. Trillas, S.A.) Mexico, 1970.
 - (4) Southwick, C.H. "Ecology and the Quality of Environment" (D. Van Nostrand, Co. London) GB. 1972, p.74.

The following conclusion by Nicholson, M. in his 'Environmental Revolution' makes the previous statement appear euphemistic when harshly declaring:

"Abuses, errors, crimes and distortion of growth have continually marked man's social evolution on earth, and nowhere are they more conspicuous than in his treatment of the earth itself and its living creatures. Man's obstinate stupidities, his character defects due to badly adjusted aggression, possessiveness and greed, and his passion for embracing myths ..., have gravely marred the great achievements inherent in his rapid self-induced promotion above the rest of the animals." (1)

In view of all this, it is clear that man's action on nature has been and still is the cause of large-scale environmental devastation. His anthropocentric view of the world leads him to treat 'nature' as something apart from himself and somehow below his 'divine status'.

Authors like McHarg, I.L. and Culbertson, J.M. have put the blame on the Judeo-Christian religion for the state of affairs. For the former has stated that the Biblical story of creation, in its insistence upon dominion and subjugation of nature, encourages the most exploitative and destructive instincts in man.

"Here can be found the sanction and injunction to conquer nature - The enemy, the threat to Jehovah" (2)

While the latter has even gone further when considering that ...

"The existing academic literature on the theory of economic development is not based on a scientific or ecological view of man. Rather it

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- (1) Nicholson, M. "The Environmental Revolution. A Guide for the New Masters of the Earth" (Hodder & Stoughton, London) GB. 1970, p. 280.
- (2) McHarg, I.L. "Design with Nature" (Natural History Press, Doubleday & Co. Inc., New York) USA, 1971 (2nd Ed.) p. 26.

derives from the myth of Judeo-Christian culture that the universe revolves about man and that the passage of time will raise him to an exalted position". (1)

But, with more knowledge and a deeper interpretation of the Bible, Derr, T.S., in his unique theological critique of the use and abuse of our birthright, has been able strongly to substantiate that ...

"Man is inconceivable apart from his body and its senses. This is surely the main stream of Christian thought, a fact newly appreciated in this century, long before it was discovered to have ecological relevance ... that he depends on nature for the essence of his being. Here, then, is the first statement about man, that he is not accidentally but essentially a natural, biological creature". (2)

Moreover, when a man is able to feel and to sense his undeniable interdependence with nature as a part of himself (within Christian thought) he will pray as Saint Francis of Assisi did: "Praised be the Lord by our mother 'The Earth' that sustaineth, that feedeth ... Praised be the Lord by our 'Sister the Water' element meetest for man". (3)

It seems to me quite unfair to criticize and to put the whole burden of man's separation from nature on the Judeo-Christian religion, for two main reasons: First, because mankind has been and still is responding to his innate drive towards the spiritual and metaphysical matters through a large variety of 'religions'. Non-Christian cultures, deeply rooted in other religious and

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- (1) Culbertson, J.M. "Economic Development: An Ecological Approach" (Alfred A. Knopf, New York) USA, 1971, p.4.
- (2) Derr, T.S. "Ecology and Human Liberation: A Theological Critique of the Use and Abuse of our Birthright" (a WSCF Book Vol.III, No.1, Geneva) Switzerland, 1973,p.9
- (3) Assisi, F. "Cantico del Sole" in Coughlan, P. (et.al.)(eds.) "A Christian's Prayer Book" (Geoffrey Chapman, London) CB. 1973.

philosophical approaches to life have done, and to a large extent still do, a lot of harm* to nature, altering and even destroying ecosystems. (1)

Second, Judeo-Christian thought has been badly distorted and misinterpreted. If it is accepted that Nature, as Christians believe, also the whole universe, is a product of God's love; if it is accepted too, that mankind is a newcomer in the earth's history springing out in the 'last minute' of the process of evolution; it follows that man is a product of God's love, symbiotically linked with Nature, to which he has to respond in love. Teilhard de Chardin has marvellously depicted this view of the 'world' in his work, especially in the 'Milieu Divin'. (2)

Considerations of this kind constitute no digression but are introduced here in direct response to one of the main recommendations of Ehrlich, Ehrlich and Holdren:

"5. Perhaps the major necessary ingredient that has been missing from the solution to the problems ... is a goal, a vision of the kind of Spaceship Earth that ought to be and the kind of crew that should man her. Society has always had its visionaries who talked of love, beauty, peace and plenty. But somehow the 'practical' men have always been there to praise smog as a sign of progress, to preach 'just' wars, and to restrict love while giving hate free rein. It must be one of the greatest

(*) 'Harmful' actions of man on nature is a term drawn from the U.N. Conference held in Stockholm, 1972.

(1) See for instance Turk, A. (et.al.) "Ecology, Pollution, Environment. (W.B. Saunders, Co.London)GB. 1972. Ehrlich, P.R. & Ehrlich, A.H. "Population, Resources, Environment: Issues in Human Ecology". (W.H. Freeman & Co. San Francisco) USA, 1972 (2nd Edition)

(2) de Chardin, T. "Le Milieu Divin" (Collins Fontana Books, London) GB. 1972.

ironies of the history of the human species that the only salvation for the 'practical' men now lies in what they think of as the dreams of idealists." (1)

Some such response was also called for by the Editors of the 'Ecologist' who, after quoting one of the Bishop of Kingston's ten commandments - 'You shall not take the name of the Lord thy God in vain by calling on His name but ignoring His natural Law' (2), stated:

"There must be a fusion between our religion and the rest of our culture, since there is no valid distinction between the Laws of God and Nature, and man must live by them no less than any other creature. Such a belief must be central to the philosophy of the stable society and must permeate all our thinking". (3)

3.2. Environmental Devastation in the Present

It is now acknowledged worldwide that misuse of technological advancement has accelerated the environmental devastation for which man is responsible. Technology is all-pervasive in man's activities. In the so-called 'Health Revolution' the improvement of medical technology upset population balances. Both infant mortality and general death rates were drastically reduced, while birth rates and life expectancy showed some marked increases, resulting in augmented rates of population growth. Mexico, for instance, illustrates this, both strikingly and pathetically.

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- (1) Ehrlich, P.R., Ehrlich, A.H. & Holdren, J.P. "Human Ecology: Problems and Solutions". (W.H. Freeman & Co San Francisco) USA, 1973.
- (2) Bishop of Kingston "Doom or Deliverance ?" Rutherford Lecture, 1971 (as quoted by:
- (3) The Ecologist (Eds.) "A Blueprint for Survival" in ('The Ecologist', Vol.2, No.1) GB, 1972. (pp.85-86)

Year	Infant Mortality Rate	General Mortality Rate	Birth Rate	Life Expect. (Years)	Rate of Pop. Growth	Pop. 15	No. Years to double pop. (years)
1931	137	25.9	43.8	33	1.6	39%	43
1940	122	23.2	44.3	37	1.7	41%	41
1950	100	17.9	45.2	48	2.8	42%	25
1960	74	11.5	46.0	58	3.1	44%	22
1970	63	9.0	45.0	63	3.4	47%	20

Source: Benitez-C.R. & Cabrera, A.G. "Proyecciones de la Poblacion de Mexico 1960-1980" (El Banco de Mexico, S.A., Mexico, D.F.) Mexico, 1966

*My own estimations assuming no change in the growth rate

TABLE NO.1 Mexico Population Data (1931-1970)

This population explosion (also present in different degrees in other countries) has created serious problems in the whole economic, ecological and social systems. (1)

The so-called 'Technological Revolution' has created too, grave problems of contamination, pollution and depletion of resources. This extensive field of research has been partially covered by the Steering Committee of the Study of Critical Environmental Problems, formed by approximately forty scientists, representing over a dozen disciplines including meteorology, atmospheric chemistry, oceanography, biology, ecology, geology, physics, several branches of engineering, economics, social sciences and law. SCEP concludes:

"In general, the expected losses from present impacts do not exceed our capacity to carry the burden; this leads us to the conclusion that an intractable crisis does now seem to exist. Our growth rate, however, is frightening. The impact of two, four or eight times the present ecological demand will certainly incur

(1) See for instance: "National Academy of Sciences: Rapid Population Growth: Consequences and Policy Implications" (John-Hopkins Press, Baltimore) USA, 1971
McHale, J. "The Future of the Future" (Braziller, N.Y.) USA, 1969.

greater losses in the environment ... the risk is very great that we shall overshoot in our environmental demands ... leading to cumulative collapse of our civilization. It seems obvious that before the end of the century we must accomplish basic changes in our relations with ourselves and with nature". (1)

Their study was primarily concerned with the effects of pollution on man through changes in climate, oceanecology, and in large terrestrial ecosystems. They recommended, apart from both the development of new methods for gathering and compiling global economic and statistical information, and the possibility of setting up international physical, chemical and ecological measurement standards, also

"... an immediate study of global monitoring to examine the scientific and political feasibility of integration of existing and planned monitoring programmes and to set out steps necessary to establish an optimal system". (2)

This standpoint is shared by the U.N. Conference on Human Environment (3) and by McKnight, Mastrand & Sinclair (4) who have stated:

"We see around us growing evidence of man-made harm in many regions of the earth; dangerous levels of pollution in water, air, earth and living human beings; major undesirable disturbances to the ecological balance of the biosphere; destruction and depletion of irreplaceable resources; and gross deficiencies harmful to the physical, mental and social health of man, in the man-made environment; particularly in the living and working environment"

Similarly Turk, A. (et. al.) have mentioned that ...

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- (1) Report of the Study of Critical Environmental Problems: "Man's Impact on the Global Environment" (The MIT Press, Cambridge, Mass.) USA, 1970 (PP. 1-2)
 - (2) Ibid ... (p.7)
 - (3) U.N. "Human Settlement: The Environmental Challenge" (The McMillan Press, Ltd., London) GB. 1974.
 - (4) McKnight, A.D. (et.al.) (eds.) "Environmental Pollution Control" (George Allen & Unwin Ltd., London)GB.1974 (p.306)

"... today man is drastically altering the ecosystems of the Earth and has within his power the ability to destroy many of them totally ... (He) can change the face of the earth in a matter of decades ... we can no longer look to evolution to catch up with the changes produced by man's technology." (1)

With a similar but wider conceptual approach, Detwyler, T.R. synthesized the content of more than fifty articles produced by the same number of specialists in many fields (basically the same as those covered by the SCEP report previously presented). He identified, after analysing man's impact on atmosphere and climate, on the waters, on the land and soils, through the spread of organisms, and the destruction of both vegetation and extinction of animals, some recent major 'trends' as well as some other 'common characteristics' of environmental alteration by man. Five major trends were noted in his 'summary and prospect' as follows:

- "1. Increasing variety of impacts. The numbers of ways that man affects the environment is proliferating.
2. Intensification of impacts. At any given place, the frequency and/or magnitude of a given kind of impact is probably increasing. We should expect more frequent and greater environmental catastrophes.
3. Geographical spreading of impacts. Environmental problems that were once locally confined have become regional problems, and likewise many national problems have assumed international even world-wide importance.
4. Increasing complexity and repercussions of impacts. Numerous indirect effects of man's activities have been cited.

(1) Turk, A. (et.al.) "Ecology, Pollution, Environment" (W.B. Saunders, Co., London) GB. 1972 (p.26).

5. Increasing per capita impact. Compounding the effects of greatly expanding populations is a general increase in per capita consumption." (1)

He recalled too, eight additional common features which were:

- "1. Cities are nodes of greatest environmental impact
The intensity of urban effects on climate and hydrology are noteworthy examples.
2. Many environmental changes are irreversible or persistent for very long periods ... in other words, man is trading future environmental quality, and future management options, for present expedience.
3. Man is simplifying and homogenizing the biological landscape ... Such biotic homogenization is partly countered locally, in disturbed habitats, by man's inadvertent creation of new hybrid organisms.
4. Some organisms have greater power than man to adapt by evolution to environmental changes.
5. Man's unique ability to adapt culturally to new environmental conditions, although great, may not be sufficient to compensate for new environmental demands on him as an organism.
6. War is an important influence on the environment ... Environment is not only affected directly by the waging of war but also indirectly by the production of war goods and further by the diversion of attention and resources from environmental problems.
7. Political control has been required to develop and maintain major environmental modifications ... inadvertent modifications should be subject to governmental control, because of their frequently far-reaching effects.

(1) Detwyler, T.R. "Man's Impact on Environment"
(McGraw-Hill Book Co. New York) USA, 1971. (pp.695-696).

8. The same few basic causes of environmental degradation underlie a wide spectrum of impacts, these being:
- 8.1. Ignorance (about environmental systems)
 - 8.2. Attitude (the idea that nature exists only to be used by man ... and also his overemphasis on economic values and lack of concern as long as consequences do not strike very close).
 - 8.3. Population Growth (It is axiomatic that an increase in the number of people increases the magnitude of man's environmental impact).
 - 8.4. Technological Development (An expanding technology largely accounts for numerous modern impacts ... Frequently, technological 'solutions' to man's problems have spawned new environmental repercussions).
 - 8.5. Synergism (As the variety and degree of environmental impacts mount, the resulting effects will often be greater than the sum of the independent effects). " (1)

These 'major trends' and 'common characteristics' are also partially presented by other authors in different terms. For instance, Helfrich, H.W. has epitomized the environmental crisis in the following terms:

"Our present dangerous position has not befallen us overnight. It has grown from two great forces that feed and reinforce each other: The first one, Unrestricted growth of man's numbers on a planet with finite capacity to provide for man's needs and absorb his garbage and the second one, unrestricted technology coupled with an attitude of exploitative dominance of his environment." (2)

(1) Ibid ... (p.697)

(2) Helfrich, H.W. Jr. (Ed.) "The Environmental Crisis: Man's Struggle to Live with Himself" (Yale Univ. Press Ltd. Yale) USA, 1970 (p.ix).

In another book still he feels the necessity of crying out about the imminent danger in which man has so blindly placed himself:

"Not everyone has as yet become convinced that there is an imminent danger of a world-wide environmental catastrophe. The warning of disastrous overpopulation and of vanishing natural resources are shrugged off with epithets such as 'doomsday prophets' ... We have not yet reached the point of no return, but the dire predictions are not far beyond the realm of probability if a sincere effort to secure our environment is delayed too long." (1)

The Ecologist's editors concluded that :

"By now it should be clear that the main problems of the environment do not arise from temporary and accidental malfunctions of existing economic and social systems. On the contrary, they are the warning signs of a profound incompatibility between deeply rooted beliefs in continuous growth and the dawning recognition of the earth as a space ship, limited in its resources and vulnerable to thoughtless mishandling". (2)

In a more direct confrontation with what has been called the 'Technological Civilisation' the conservationist attack in its present distorted phase, takes the form saying, for instance that:

"Many people have long suspected that governments, bankers, economists and business leaders were flattering themselves in claiming to understand and to be able to guide or control the evolution and performance of modern technological economies. That such suspicions were well founded has been demonstrated to all by recent events." (3)

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- (1) Helfrich, H.W. Jr. "Agenda for Survival: The Environmental Crisis 2 (Yale Univ. Press Ltd. Yale) USA, 1970 (pp.vii-viii)
- (2) Editors of the Ecologist: "A Blueprint for Survival" (A Penguin Special, Penguin Books Ltd. Middlesex, England) GB. 1973 (p.26)
- (3) Nicholson, M. "The Environmental Revolution"...op.cit.(p.282)

An even more drastic and gloomy picture has been depicted by Ehrlich, Ehrlich and Holdren, when forecasting the future state of affairs:

"Perhaps more likely than extinction is the possibility that man will survive only to endure an existence barely recognizable as human - malnourished, beset by chronic disease, physically and emotionally impoverished, surrounded by the devastation wrought by an industrial civilization that could not cope with the results of its own biological and social folly." (1)

'Technological Revolution' or the advancement of technology, has been the keystone of the entire modern world. Moreover, almost every established economic system is structurally linked to technology, mainly through industrial development (i.e. modern agriculture, processing, manufacturing). The 'Theory of Economic Development' used so far, preaches permanently and euphorically the use of technology as the 'only way out' of poverty, stagnation and backwardness. Unfortunately, environmental destruction has not been considered within the body of its theory, as Culbertson, J.M. has mentioned:

"The limitations of the environment, its fragility and the hazard of its destruction, are curiously missing from this theory. The existence of this blind spot in the theory of economic development adds to our understanding of its origins, its foundations". (2)

This viewpoint is basically the same as the one expressed by Johnson and Hardesty when saying:

"Today, economics and ecology rarely interact. Economics is a main stream concern, while ecology is peripheral and secondary ... Only a small number of people would accept the primacy of ecological criteria over the economic criteria, and our

(1) Ehrlich, P.R. ... "Human Ecology ... op.cit. (p. 278)

(2) Culbertson, J.M. "Economic ... op.cit. (p. 114)

society tends to see such people as taking ecology too far ... (Our) conclusion is that present economic trends are diametrically opposed to the requirements of ecosystem stability". (1)

Similarly Arvill, R., has mentioned that:

"Economic considerations are one half of the environmental equation - the other is ecological capacity. Any worthwhile national economic plan must invest a proportion of the resources available in the maintenance and enhancement of the environment - in effect, the real capital of the nation ... The unthinking acceptance of economic growth soley in terms of material goods threatens many environmental qualities and uses up fossil fuels and other resources on a vast and increasing scale". (2)

Professor E.H.P. Brown when talking about 'the smallness' of the contribution and economics have made in the last quarter of a century, to the solution of the most pressing problems of the times, mentions:

"checking the adverse effects on the environment and the quality of life of industrialism, population growth and urbanism". (3)

More explicitly, the Editors of the Ecologist have pointed out six ways in which economic growth affects the environment, these being:

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- (1) Johnson, W.A. and Hardesty, J. (Eds.) "Economic Growth vs. The Environment" (Wadsworth Publ.Co.Inc. Belmont, Cal.) USA, 1971. (p.1).
 - (2) Arvill, R. "Man and Environment: Crisis and The Strategy of Choice" (Penguin Books, Ltd.) GB. 1973 (p.307).
 - (3) Brown, E.H.P. Prof. "The Underdevelopment of Economics" as presented by Schumacher, E.F. "Small is Beautiful: A Study of Economics as if People Mattered" (Abacus Sphere Books, Ltd., London) GB. 1973, (p.39).

- "1. The introduction of technological devices (i.e. the growth of the technosphere affecting the ecosphere ...)
2. Industrial growth ... promotes population growth
3. ... (this phenomenon affects) and protracts unemployment ...
4. business enterprises ... tend to become self-perpetuating, which means that they require surpluses for further investment ...
5. the assessment of governmental success in terms of its ability to increase the standards of living as measured by per capita GNP., and finally, sustained economic growth". (1)

The combined effect of 'modern technology' and 'one-sided' (non-environmentally committed) planning is a new spectre depicted clearly by Fromm:

"It would seem that the one norm for planning that our technological society has developed is: One ought to do whatever it is technically possible to do ... In such a perspective technical feasibility becomes a source of all value formation". (2)

Muskie, E.S. has said in his introduction to Hamilton's book:

"Man is out of balance with his environment. Reaching only to critical environmental problems and then only on a limited basis, he has endangered himself and those who share this planet". (3)

Bandurski, B.L., has mentioned that the ecological crisis or breakdown has happened because ...

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- (1) The Ecologist (Eds.) "A Blueprint ... op.cit. (pp.27-28).
 - (2) Fromm, E. "The Crisis of Psychoanalysis" (Penguin Books, Middlesex, England) GB. 1973, (p.89).
 - (3) Muskie, E.S. 'Introduction' to Hamilton, M. (Ed.) "This Little Planet" (Scribner, N.Y.) USA, 1971 (p.).

"Only lately have humans begun to realize the global misery we have wrought by being more proficient at analysis - taking things apart - than we are at putting things together as we see logical connections". (1)

3.3. A Brief Epitome of the State of Affairs

Further information on this subject (2) may be said to abound, but at this stage a summary is clearly called for.

In my view, there is no doubt that the current situation exhibits systematic weaknesses in society and dangers for the future of man. Such faults are mainly due to the feeble, unsatisfactory and blind approach of man to nature. 'Modern' societies or more specifically, highly industrialized 'developed' countries, have relied heavily on the application of technological innovation - through industrial development - with little or no concern about its impact on both mankind and in the biosphere. One of the main failures has been the use of 'the reductionist scientific methodology' (which I have treated in Chapter III, section 3.3.3.) as applied to natural sciences (e.g. biology and ecology) which deal with real, complex and highly dynamic systems.

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- (1) Bandurski, B.L. "Ecology and Economics - Partners for Productivity" in 'The Annals of the American Academy of Political and Social Science', April 13-14, 1973 (p.77)
- (2) See for instance: Pawley, W.H. "In the Year 2,070" in Ceres, Vol.4 No.4) July-August 1971.
 Dasman, R.F. (et.al.) "Ecological Principles for Economic Development" (J. Wiley & Sons, Ltd. England) GB. 1973.
 Dumont, R. "A World Gone Mad" in Ceres, Vol.6 No.6., November-December 1973.
 Ehrlich, P.R. & Harriman, R.L. "How to be a Survivor" (Pan/Ballantine Books, N.Y.) USA, 1971.
 Armstrong, T.R. (Ed.) "Why Do We Still Have an Ecological Crisis?" (Prentice-Hall, Inc., N.J.) USA, 1972.
 Onitiri, H.M.A. "One World, Several Ways" in Ceres, Vol.15, No.4, July-August, 1972.
 Murdoch, W.W. (Ed.) "Environment: Resources, Pollution and Society" (Sinauer Ass. Inc. Stanford) USA., 1971.
 Perin, C. "With Man in Mind: An Interdisciplinary Prospectus for Environmental Design" (MIT Press, Camb. Mass.) USA. 1972.

Moreover, one of the striking features of modern life is a deep and widespread faith in the efficacy of science and the usefulness of technological progress, inspite of the partial failure of technology to control its own harmful effects on the ecosphere. The small body of reference here presented is backed by a vast amount of research carried out by their authors into the effects of recent technological mistakes on the environment.

It is my belief that the current ecological disruption in many parts of the world is a consequence of both the very nature of modern technology and the restricted range of values used by man in his approach to his activities (i.e. materialistic values), ignoring the effects on the biosphere as a whole. The set of values which govern most current economic systems are geared towards maximization of material gains in the short-term, whereas nature requires a different set of values which aims at minimization of long-term liabilities.

No wonder that a new cry is now being heard all over the whole world, a plea to halt - for the new generations sake - so-called 'developmentism'. The term 'de-development' used by Ehrlich, Ehrlich and Holdren, which means "bringing our economic system (especially patterns of consumption) into line with the realities of ecology and the global resource situation", (1) is differently introduced by Myrdal who speaks of "the need for radical domestic reforms" (2); by Professor Blackstone who argues that the basic causes of the environmental crisis are mistaken values and attitudes, and that the resolution of the crisis ... "Will require a transvaluation of values" (3); by Professor Rescher who says ... "we must

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- (1) Ehrlich, P.R., Ehrlich, A.H. & Holdren, J.R. "Human Ecology ... op.cit. (p. 279).
 - (2) Myrdal, G. "Against the Stream - Critical Essays on Economics" (McMillan Press, Ltd.) GB. 1972, see Chapter 6 (pp. 101-132).
 - (3) Blackstone, W.T. (Ed.) "Philosophy and Environmental Crisis" (Univ. of Georgia Press, Georgia) USA, 1974, (p.3)

de-escalate both our expectations and the technological race" (1); by Culbertson, who, after rejecting the so-called theory of economic development calls for controlling the "... Living standards in order to avoid disaster by permitting modern society to meet nature's criteria for survival" (2); by Detwyler, T.R. who states that "... we must strive to restructure economic systems to 'reduce' production and consumption as much as possible" (3); and by Mesarovic M., and Pestel, E., who recommend a "... "new kind of education; an education geared to the twenty-first century rather than the twentieth or nineteenth centuries ... (in which) ... one has to begin to consider the 'outer limits', the limits that man cannot transgress without destroying himself and the biosphere" (4).

3.4. An Ecological Interpretation

As already mentioned, most economic systems are based largely on industrial development, which in turn makes use of science and technological advancement. Technology has become itself one of the main spheres (i.e. 'technosphere') forming part of the trinity of spheres within the realm of man, in the Man-Nature symbiotic dynamic holistic system (see Fig.No.6, page). This 'technosphere' is in permanent interaction with nature within the biosphere. The fundamental distinction between the two spheres is the creation of different types of ecosystems. The ecosphere is formed by milliards of 'natural ecosystems' (or ecological niches) interacting directly or indirectly amongst themselves; whereas the technosphere creates 'Human ecosystems' :

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- (1) Rescher, N. "The Environmental Crisis and the Quality of Life" in Blackstone, W.T. (Ed.) "Philosophy ... op.cit. (p.7).
 - (2) Culbertson, J.M. "Economic Development ... op.cit. (p.297).
 - (3) Detwyler, T.R. "Man's Impact ... op. cit. (p. 698).
 - (4) Mesarovic, M. & Pestel E. "Mankind at the Turning Point" (Hutchinson of London) GB.1975, (p.148).

(or man-made ecosystems), which interact with the immediate environment. This duality is depicted schematically in the following diagram:

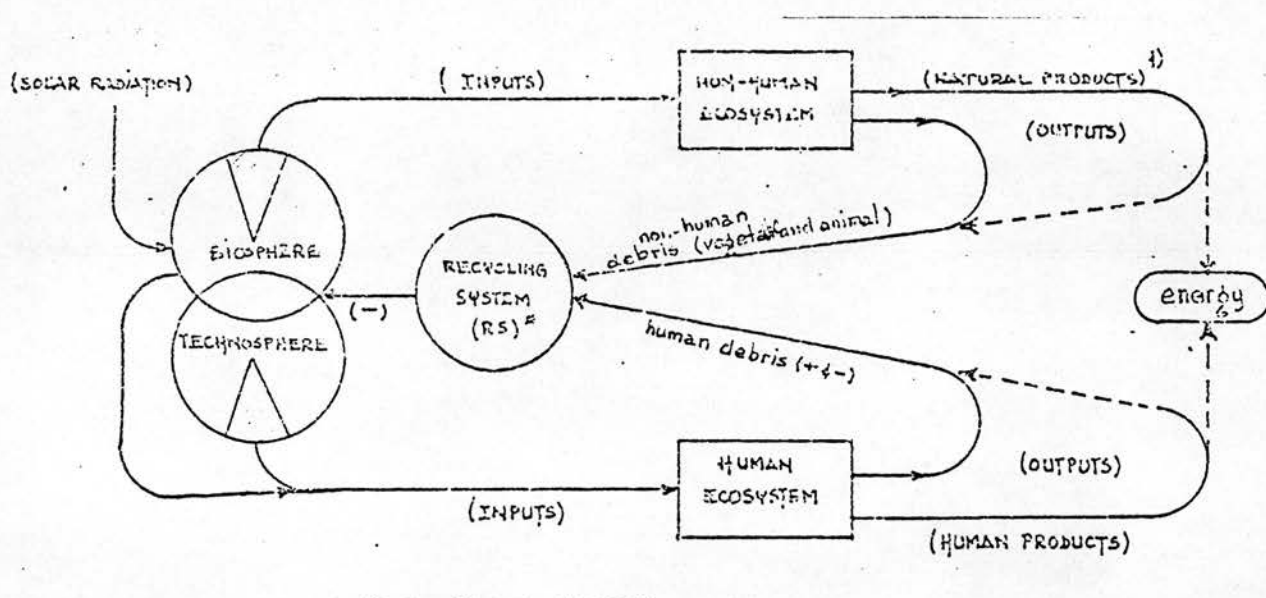


FIGURE NO.5 "The Dual System Biosphere-Technosphere and Their Symbiotic Interactions Through Human and Non-Human Ecosystems"

(*) The 'Recycling System' is formed by both decomposers (bacteria and fungi) and the processes of decay and dissolution.

Even though the actions of the technosphere are carried out within the biosphere, it can be considered as a kind of semi-autonomous sphere containing elements which do not belong to the first sphere (i.e. human attitudes, values and judgements).

It is known that a 'Non-human ecosystem' (1) takes its inputs (e.g. moisture, nutrients, etc...) from the biosphere.

(1) By 'Non-human ecosystem' I mean 'An ecosystem which responds to the natural laws without human interference.'

Solar radiation being the only external output. Its output can be subgrouped into natural products (1) (e.g. plants, animals, etc...) and non-human debris (vegetable and animal). This debris may carry a negative symbol as far as their pollutive potential (2) is concerned. Fortunately, all non-human ecosystems have as part of their system what may be named as the 'Recycling System' (RS) formed by all those micro-organisms and processes of decay and dissolution. The main task of this system being to dissolve the non-human debris and to reduce it to its most elementary form for being recycled into the biosphere. This process is not in permanent static balance but is characterized by dynamic stability. Non-human ecosystems are 'stable systems' in which their homeostatic mechanism functions constantly in order to correct slight imbalance before they become out of control.

The source of problems appears to be in the 'Human ecosystems' (3) (or man-made ecosystems) created by the technosphere. According to Nicholson ... "physically and chemically the resemblances between these two (kind of ecosystems) are obvious, and they can be studied, measured and evaluated in much the same way". (4) An artificial ecosystem also obtains its inputs (e.g. raw materials, water, fossil fuels, biological products etc...) from the ecosphere. Its outputs can be likewise divided into two broad groups - human products and human debris.

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- (1) By 'natural product' I mean 'product from nature without the human intervention in the process of its formation'.
 - (2) By 'pollutive potential' I mean 'the possibility of carrying elements that contaminate nature' - By 'contaminate I mean, 'impure, nocive or poisonous element which interfere and affect the non-human ecosystems.'
 - (3) By 'Human ecosystem' I mean, 'An ecosystem which takes its inputs from the biosphere, and which do not necessarily respond to the natural laws but rather to the complex channels and treatments created by man and expressed mainly (not only) through modern science and technological advancement'.
 - (4) Nicholson, M. "The Environmental ... op.cit. (p.283).

Unfortunately, from what I have learned through the review in the preceding sections of this chapter, the 'Recycling System' (RS) has been affected by the poor, incomplete and consequently limited ways of treating human debris, by-products mainly of industrial development. As a consequence the output of this system still carries within itself potentially harmful effects - into both, the ecosphere and the Recycling System in-built in every non-human ecosystem. Moreover, human ecosystems leak lethal poisons and irritants which threaten the existence of both man and nature. So, by its very nature a human-ecosystem generated by the technosphere is an unstable system, in which the homeostatic mechanism is working partially or not at all, introducing 'noise', or disturbances into the non-human ecosystems.

Perhaps the best way of concluding this section is with the following quotation:

"Technological inventiveness in itself is not the disturbing factor ... the mischief comes from its use, first in mis-raising environmental fears, then in creating protective measures which wreck vital relationships of man to environment". (1)

3.5. The Lesson to be Learned by Developing Countries Striving for 'Economic Development' Mainly Through the Process of Industrialization.

Even though my main concern is Mexico, I recognize that the lesson to be learned is not limited exclusively to that country. On the contrary, Mexico is one of many 'developing countries' which are striving for 'Economic Development' mainly through the process of industrialization. (2)

(1) Glikson, A. "The Ecological Basis of Planning" (Martinus Nijhoff, The Hague, Neth.) 1962, (p.10)

(2) After this chapter was finished, I came across the last book of Barbara Ward published this year (1976) "The Home of Man" (Penguin Books, England) GB. in which she deals with this subject in a masterly way with which I entirely agree.

Industrial growth is one of the main goals in almost all programmes of development (produced by governmental and for private planning agencies) in the 'UDCs'.

Modern sciences and technological advancements as applied through industrial development have engendered an environmental crisis in developed countries. They are faced now with the problem of reversing the tendencies by the process of "de-development". But, to what extent have the ecological costs of introducing modern technology affected the developing countries ?

For what has been recorded of the Conference on the Ecological Failures in International Development, I can quote Farrar's words:

"The introduction of new kinds of technology from alien environments into that of a less developed country, together with the complex of factors involved in the usual change that follows such introduction, can cause certain definite dysfunctions in the normal man-environment relationships ... The introduction of technology into underdeveloped countries has produced widespread, serious disruptions". (1)

It is all too obvious that the faulty ecological approach to nature has been uncritically transplanted into our 'developing economies'. What is even more worrying is that modern technologies which were designed to meet the requirements of different environments (i.e. temperate zone ecosystems) are being imposed on our usually tropical environments.

This fact has unforeseen side-effects which make the introduction of new alien technologies even more perilous.

(1) Farrar, M.T. & Milton, J.P. (Eds.) "The Careless Technology: Ecology and International Development" (Redwood Press, Ltd., Wiltshire, England) GB., 1971 (p.51).

Hughes and Hunter have concluded that:

"...Perhaps it would be useful ... to start talking about a new category of diseases ... the 'diseases of development' and would consist of those pathological conditions which are based on the usually unanticipated consequences of the implementation of developmental schemes". (1)

Lastly, Sir F.F. Darling has made a humble recognition of the mistakes made in the past by saying:

"The so called UDCs ... have a perfervid belief in our technology. And were we to try to explain that we were not quite sure of our cleverness, that we have made some deplorable mistakes, it would be interpreted as one more example of the west wanting to deny the benefits of technology to the rest of the world. We in the West are in a dilemma and some of us know it". (2)

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- (1) Hughes, C.C. & Hunter, J.M. "The Impact of Technological Introduction in Underdeveloped Countries" in Farrar, M.T. and Milton, J.P. (Eds.) "The Careless ... op.cit. (p.93).
- (2) Darling, F.F. "Wilderness and Plenty" (Ballantine Books, Ltd., London) GB., 1971 (p.).

CONCLUSIONS

Man's actions have affected nature since he started exploiting it systematically for his survival. But in the last century such effects became increasingly dangerous and notoriously harmful even threatening man's own existence.

Modern wealthy societies rely heavily on industrial development, the key to economic growth. Unfortunately, economics and ecology rarely interact satisfactorily, and the pattern of development proposed by Developed Countries to Underdeveloped ones, usually follows the same formula of striving for economic growth by means of industrial development.

Industrial growth depends basically on technology. The use and abuse of technology without ecological concern has had readily demonstrable negative effects on nature.

Planning methods and techniques, especially economic and regional, geared towards economic growth by means of industrial development using advanced technology, tend to reinforce the above mentioned peril, so as to be potentially dangerous if uncritically transferred.

GENERAL CONCLUSIONS OF PART A

The three main hypotheses put forward in the introduction of this thesis, seem to be adequately substantiated:

1. The historical process in Developed Countries took the form of a sequence of complementary revolutions (i.e. agricultural, technological, industrial, medical, etc...) generating a semblance of balanced organic growth; whereas in most Underdeveloped Countries the revolutions have been non-sequential, competitive and conflicting. Growth became unbalanced and unhealthy. The former pattern was unique and unlikely to be repeated. Any attempt at emulation (following the unilinear interpretation of history) is almost certain to create more problems than it cures.
2. Those planning methods and techniques which are geared to economic growth by industrial development have been shown to rely upon simplifications, assumptions and exclusions of parameters, to such an extent as to set them apart from the real world in its complexity. Moreover, applied planning, when measured by 'level of performance', has had little success, especially in Developing Societies.
3. The current environmental crisis suggests forcibly that economic growth by means of technological development seriously harmed the environment in both DCs and UDCs.

PART B

"THEORETICAL REFORMULATION"

INTRODUCTION

The conclusions reached in PART A cast serious doubts upon the usefulness and validity of planning, its theories, methods and techniques. Nonetheless, to look ahead into the future is part of the human nature. It is better to have plans than nothing at all, as Geddes and Glikson suggested.

Planning, notwithstanding its limited success so far, if properly revalidated, could in future be very useful. For the purposes only of the present research, such a revalidation will be attempted. This lays no claim to universal applicability.

Five stages are required in this revalidation:

1. Analysis of key concepts, including 'Cooperation for Survival and 'Dynamic Equilibrium'.
2. Interpretation of the "Man-Nature System", and comparative analysis of related concepts and common elements in the work of Geddes, Rowse, Schumacher, Bandurski, Culbertson, Glikson, Mackaye, Mumford, MacHarg and Fromm, as the basis of the next stage of theorizing.
3. Analysis of General Systems Theory, Urban Dynamics, Cybernetics and Structuralism, and assessment of the usefulness of each in relation to the complexities of planning.
4. Redefinition, as functions of planning, of those methods and techniques best suited for implementation of the concepts presented.
5. Conclusive redefinition of Regional Planning in the context of a new, structuralist formula.

CHAPTER IV RESTATEMENT OF THE VALIDITY OF PLANNING THEORY

"All planning, whether with or without the use of computers, depends on norms and values that underlie the planning. Planning itself is one of the most progressive steps the human race has taken. But it can be a curse if it is 'blind' planning, in which man abdicates his own decisions, value judgement and responsibility. If it is alive, responsive 'open' planning in which the human ends are in full awareness and guiding the planning process it will be a blessing". (1)

The process of critical analysis has been performed, in an attempt to show that something is wrong in the whole system. Nonetheless, it would be a grave mistake to overemphasize what is faulty without making clear suggestions as to changes needed for the generation of the new kind of planning, that referred to by Fromm as responsive 'open planning'. This I intend to apply in my specific case study, though without the intention - as I have already mentioned - of claiming for it 'universality', since even though poverty, uncertainty and instability are characteristics common to all underdeveloped societies, the differences in both qualitative and quantitative terms from Milieu-Entier to Milieu-Entier are so great that every culture should be treated as unique.

The complex web of interactions making up the content of a general term, for example, 'poverty' are such that the 'causes', 'characteristics' and 'degree' of this phenomenon make it entirely different from country to country. Moreover, the problem of poverty at intra-national level may be tackled differently according to the specific conditions (human, natural and economic resources) existing in each specific area. Obviously the common cry will always be, 'eliminate poverty'

(1) Fromm, E. "The Revolution of Hope: Towards a Humanized Technology" (Harper & Row, N.Y.) USA, 1968 (p.57).

but the 'how', is a matter of marked varieties.

In the following sections I will review and re-state some areas of economy and planning which still, I think, can be used in the reformulation of a Planning Theory which will perhaps offer an alternative path towards a more integrative approach to the problems which I have to face in dealing with the Mexical reality.

4.1. Cooperation for Survival (1) and Dynamic Equilibrium

Having concluded that the philosophical foundations on which the whole economic and planning theory is based, are ill-conceived, it follows that alternative philosophical positions must be suggested. Fundamentally, the exploitative character of planning theory must be changed if some hope is to be held out for the future. Those responsible for economic, social and political systems are, however, reluctant to accept the appropriate radical structural transformations. Cooperation for the sake of survival (2) is opposed to confrontation for the sake of ones own advantage. If exploitation is all pervasive, cooperation must be all pervasive too, as a counterbalancing force in the following interrelationships - man to man, man to society, society to man, and man to nature. A kind of 'dynamic equilibrium' must be sought.

The philosophical concept of an appeal for a more human approach towards economics and planning has profound repercussions in what I will re-state as the 'Man-Nature Symbiotic Dynamic System' later on in this section.

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- (1) Rowse, E.A.A. "Africa's Place in the Economics of World Catastrophe or Opportunity" in Gardiner, A.K.A., et.al. "Africa and the World" (Oxford Univ. Press, England) GB. 1970, (pp. 155-156)
- (2) 'Survival' has become in the past two decades the cry and main goal of all of those concerned with the current world crisis and its possible outcome (i.e. chaos and self-destruction), if we are unable to modify the present trends. It is a responsible human reply towards future generations.

First it calls for the rejection of the notion of 'intrinsic harmony of interests' (1) in the economic thinking based on utilitarianism, which was accepted in the past because it helped to sustain the status quo, without much concern about the violent struggle of interests occasioned by the practices of mercantilist society. Secondly, it demands the control through the proper channels, of the still existing but disguised 'laissez-faire' activities which pervade the whole socio-economic-political system. Third, it means the amendment of the concept of 'free competition' which is the basis for 'free trade doctrine'. It is clear from the current international trade situation that 'free competition' has become synonymous with 'free legal exploitation'. Fourth, it urges the rejection of the goal of 'stable equilibrium', which is unattainable in the world of social and ecological realities. Fifth, it requires consideration of the whole societal, economic and physical systems in which the so-called 'non-economic' factors (2) have been considered irrelevant. This necessarily implies a move beyond the quantitative analysis and the acceptance of unquantifiable events as relevant parameters which are operating in the whole system. Sixth, it demands that misleading short-sighted and dangerous policies intended to produce 'sustained economic growth' be discarded as 'scientifically unfounded' (3) and ecologically unacceptable (4).

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- (1) Further explanations can be found in Myrdal, G. "Economic Theory and Under-developed Regions" (G. Duckworth and Co. Ltd., London) GB. 1975. (See specially, Chapter 10, pp. 135-146).
- (2) Some of the fostered 'non-economic factors' put forward by different authors are : health, welfare, freedom, education, aesthetic, moral, political, community development, family planning, culture and so on ... Broadly speaking all these factors are related with attitudes, institutions and organizations.
- (3) Culbertson, J.M. after prefacing his book by saying that ... "the attempt to explain economic development is a losing game mainly because it is a state of mind or a delusion" ... (p.vii) he concluded that ... "the theory of economic development rests on foundations that are basically anti-scientific" (p. 294).
- (4) Johnson, W.A. and Hardesty, J., in their book

(continued ...)

Basically, it can be said that non-human ecosystems are in a state of dynamic equilibrium with their environment, while any economic system (or human ecosystem) which is dependent on 'rapid and sustained economic growth' is fundamentally in a state of disequilibrium. In the words of Detwyler,

"The myth of continued economic growth must be supplanted by an environmental ethic." (1)

Cooperation for survival, is the alternative that seeks the re-establishment of the dynamic equilibrium between man and nature. In other words it is in balancing the two antagonistic forces, cooperation and competition, that a sustainable balance with the environment can be achieved. The catch-words of 'progress', 'economic growth' and 'modernization' (as currently used), must be replaced by the concepts of 'survival', 'dynamic equilibrium' and 'environmental ethic'.

4.2. Man-Nature Symbiotic Dynamic Holistic System (M-NS DH) - System Re-Stated. (2)

Before moving into the field of the concepts such as Geotechnics, Meta-economics and 'Ecospheric Dynamics', I

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- (4) (Continued from previous page) ...'Economic Growth vs. The Environment', present enough arguments against economic growth substracted from the main work of well-known economists, from which, linked with other sources and facts, I can safely assume the ecological unacceptability of such a principle.
- (1) Detwyler, T.R. "Man's Impact on ... op.cit. (p.699)
- (2) Even though I am aware that 'a systems map of the universe' can be produced (as Checkland did); and that there are theories about the existence of other universes; my approach is to see the biosphere system (in our small 'spaceship') as the environment which provides a sufficient totality for the analysis. In this view the 'openness' of the three sub-systems in consideration (i.e. 'man', 'nature' and 'ecosphere') are, in ultimate terms, operating in a closed system of which the only external input are the solar radiation and laws that govern our solar system.



consider it indispensable to re-state what has been called the 'man-nature' system (1). The following highly schematic figure intends to show visually what I will explain immediately afterwards.

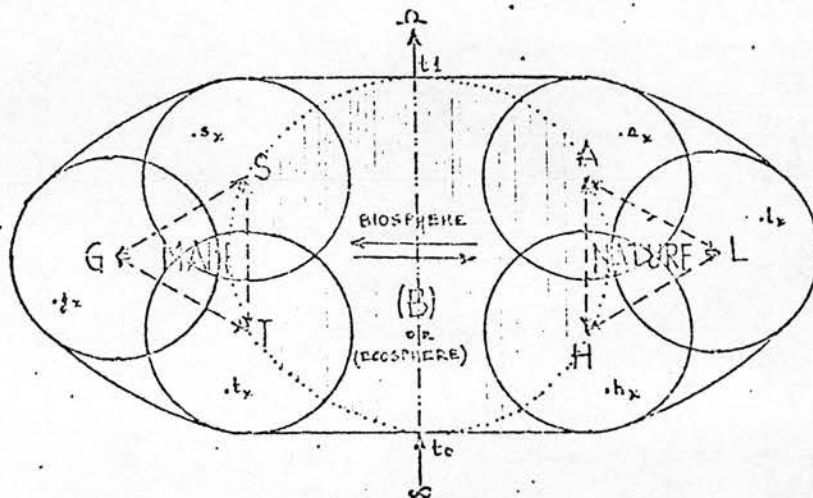


FIG. NO.6 'Man-Nature Symbiotic Dynamic Holistic System'
(M-NS DH) - System

This system takes the form of a triad, consisting of

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- (1) See for instance, Chadwick, G. "A Systems View of Planning" (Pergamon Press, Oxford) GB. 1971 (p.19).
 - (2) 'Symbiotic' in this case does not have its figurative connotation of helpful interdependence but rather its biological meaning of 'association of dissimilar entities for their mutual advantage' and, I would add, "for their mutual survival" (since man cannot exist without nature, and nature cannot resist indefinitely the careless treatment of man).
 - (3) By 'Dynamic System' I understand that kind of adaptive system in which ... 'feedback operates to keep the state of the system changing through a sequence of un-repeated states usually termed the 'trajectory' or 'line of behaviour'. See for instance, Forrester, J.W. "Principles of Systems" (Wright - Allen Press, Inc. Cambridge, Mass.) USA, 1968 (p.2.1)
 - (4) By 'Holistic System' I understand what Ozbekhan has defined in his "Planning for Human Action" as: 'That system in which its parts are interconnected by means of their position in the system. The formation of the whole is, consequently, not additional to the aggregation of parts, but something of an entirely different order': Ozbekhan, H. "Planning for Human Action" in Weiss, D.H. (Ed.) "Hierarchically Organized Systems in Theory and Practice" (Hafner Pub.Co. N.Y.) USA, 1971 (p.204).

a set of three sub-systems of equal importance, the open (1) sub-systems of 'man', 'nature' and 'ecosphere'. Similarly, the first two open sub-systems are each composed of a triad of semi-independent spheres which in addition to being in permanent interaction in all directions, have their own specific characteristics (2).

The open sub-system 'man' (3), on the one hand, is represented by the:

Gnos⁽⁴⁾sphere (G) or the sphere of knowledge, which covers the total human adventure into the process of thinking through intuition, perception and rationalization, the

Socio⁽⁵⁾-sphere (S) or the sphere of societal formation, from the simplest gregarious forms (clan, tribe, etc.) to the highly complex intra and international types of organization, and by the

Techno⁽⁶⁾-sphere (T) or the sphere of science and technology which has developed from the first use of tools, to its

- (1) By 'Open Sub-System' I understand that system which interacts in positive and negative form across its boundaries with its immediate environment. In other words that it is bound to affect or be affected by factors external to itself.
- (2) This state of 'semi-independency' can be represented mathematically (with the use of set theory)
- if $G = \text{Gnos-sphere}$; $S = \text{Socio-sphere}$ and $T = \text{Techno-sphere}$; then
- $G \cap S \cap T \neq \emptyset$, such that, $(G \cap S \setminus T \neq \emptyset)$ $(G \cap T \setminus S \neq \emptyset)$;
 $S \cap T \setminus G \neq \emptyset$.
- The 'semi-independency' status can be represented, therefore, by the following:
- $g_x \in G \setminus (S \cup T)$; $s_x \in S \setminus (G \cup T)$ and $t_x \in T \setminus (G \cup S)$.
- (The same mathematical logic and representation can be used for the other two open sub-systems 'nature' and 'ecosphere').
- (3) This sub-system has been divided into a different triad by both McHale, J. (Technological, Psychosocial and Biophysical Sub-Systems : See "The Ecological Context" (Studio Vista, Ltd. London) GB. 1971,) and by ... Milsum, J.H. : Technosphere, Biosphere and Sociosphere (in Spectrum, IEEE, Vol.5, No.6) 1968.
- (4) 'Gnos' from the Greek (ΓΝΩΣΙΣ = Gnosis) = Knowledge
- (5) 'Socio' from the Latin (Societat)= Society
- (6) 'Techno' from the Greek (ΤΕΧΝΗ = Techni) = Art of doing something or technology.

present status of a 'semi-independent ecosystem' (1), characterized by fast growth, unexpected effects on nature, and resistance to being harnessed to the objective of survival for mankind.

g_x , s_x and t_x (see FIGURE NO.6, Page No.52) represent the independent characteristics of the Gnos-Socio-and-Techno-spheres respectively. (See Footnote No.1 below).

The open sub-system 'nature' on the other hand, is depicted by the:

(2)

Litho-sphere (L) or the sphere of earth, which covers not only the soils in the outer crust but also the inner rock formation which is transformed into parent material, and from parent material into soil, the

(3)

Hydro-sphere (H) or the sphere of waters which refers to all waters existing on and in the earth (oceans, lakes, rivers and so on, and underground water), and by the

(4)

Atmosphere (A) or the sphere of air which is the gaseous envelope surrounding us, being in direct contact with the stratosphere.

As in the case of the sub-system 'man', the trinity of spheres which form 'nature' have both certain independent characteristics represented by l_x , h_x and a_x (or symbolically by $l_x \in L$ (HUA); $a_x \in A$ (LUH) and $h_x \in H$ (LUA) see footnote , page).

(1) See for instance Nicholson, M. : "The Environmental ...op.cit. (He stated: "recent ecological studies, ... have opened for treating and analysing the technosphere itself as a kind of semi-autonomous ecological system". (Page 283).

(2) 'Lithos' from the Greek (ΛΙΘΟΣ = Lithos) = stone

(3) 'Hydro' from the Greek (ΥΔΡΟ = idor) = water

(4) 'Atmos' from the Greek (ΑΤΜΟΣ = atmos) = steam ether, air

The centre of the diagram (the hatched circle) represents the third open sub-system in which all the interrelations, interactions and interfaces between man and man, and man and nature take place. I have called this sub-system the 'eco-sphere' (E) or the sphere of the ecosystems these being both 'non-human ecosystems' (2) (or natural ecosystems) and 'human-ecosystems' (3) (or man made ecosystems), (see Chapter III, section 3.4.). All those human activities which have effects on nature take place within the eco-sphere.

Lastly, although represented in the diagram as static and bi-dimensional, the myriads of interactions are seen to be dynamic when their interdependence with both time and space factors is recognized. In other words, every single interaction is distinctive and unique due to the fact that dynamic and stochastic processes are in constant movement (i.e. bio-physical and bio-psychosocial evolution) while they are unfolding through time. This is to say that one set of main parameters and collateral variables at a fixed moment of history (t_0) is such that it will certainly be different (though not in its totality) from any presented at a later time (i.e. t_1).

Our approach to this constant movement cannot but be heuristic. Nonetheless, simultaneously certain very general patterns of behaviour can be explained from the analysis of both past and present and by projecting it (with a lot of constraints and reservations) into the future.

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- (1) From the Greek words (ΟΙΚΟΣ = ikos) = house, habitat
 - (2) By 'non-human ecosystem' I mean: 'Ecosystem which responds to natural laws without human interference'.
 - (3) By 'human ecosystem' I mean: 'Ecosystem which takes its inputs from the ecosphere, and which does not necessarily respond to the natural laws but rather to the complex channels and treatments created by man and mainly, but not exclusively, expressed through modern science and technical advance'.

There is a certain structure, but as I have mentioned in Chapter VI, section 6.1. this structure is subject to a permanent process of transformation, the understanding of which demands a much more flexible, complete and integrative approach than it is now commonly accorded.

4.3. Geddes Concept of 'Geotechnics' (1)

Among the ideas of Geddes, to some of which later reference will also be made, those of Folk, Work and Place are the three fundamentals primarily requiring identification and re-interpretation. In his book 'Life: Outlines of Biology' ... he defined the basic forms of life as: "Organism, Function and Environment, in their everlasting mutual influences" (2). Afterwards, he re-interpreted LePlay's 'biosocial' approach which emphasized the interconnection between environment and organism, and tried to show how cities result from interaction among occupations, forms of social organization and the physical environment.

For him, it became 'Folk', 'Work' and 'Place' which constituted the living synthesis of social, occupational and spatial realities. Among these three factors there exists triadic relationships, which do not operate in one direction but in mutual actions and reactions. Moreover, he demanded the unification of this 'trinity' into a living whole. He stated:

"Place studied without Work or Folk is a matter of atlases and maps. Folk without Place or Work are dead - hence anthropological collections contain too much of mere skulls and weapons. So too for Economics, the study of Work, when apart from

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- (1) For Geddes, P., 'Geotechnics' is an applied science which shows what ought to be, or the science of making the earth more habitable. See: Glikson, A. "Regional Planning and Development" (Leiden, A.W.S. The Hage,) Netherlands, 1955 (p.73).
- (2) Geddes, P. & Thompson, J.A. "Life: Outlines of Biology" (New York) USA, 1931, as quoted by: Glikson, A. "Regional Planning ... op.cit. (p. 73).

definite Place and definite Folk comes down to mere abstractions" (1).

4.4. A First Comparative Analysis

1. The sub-system 'man' as represented by the triad gnosphere, sociosphere and technosphere deepens the meaning of 'Folk'.
2. The sub-system 'nature' as represented by the triad lithosphere, hydrosphere and atmosphere expands the meaning of 'Place'.
3. The sub-system 'ecosphere' as represented by the combination of 'non-human ecosystems' and 'human -ecosystems' extends the meaning of 'Work'.
4. The fundamental concept of 'dynamic system' corresponds to his "triad" of relationships, which operates not in one direction but in mutual actions and reactions.
5. His demand for the unification of his "triad" into a living whole is further reinforced by 'symbiotic dynamic holistic system', as already described.
6. The main difference between his approach and mine, is that his key objective is planning for habitability, whereas I wish to assert the necessity of planning for survival. His approach - valid for his time and his situation - town and civic planning geared mainly towards the improvement of conditions in the cities - does not apply directly to Mexican conditions, in which the exceedingly undesirable phenomenon of rapid urban growth, with its concomitant economic, social and environmental side-effects, cries out for a different approach.

(1) Geddes, P. (Ed.) "Cities in Evolution" (Lund H., London) GB, 1949, first published in 1915, as quoted by Glikson A. "Regional Planning ... op.cit. (p.73). (He himself was a biologist, geologist, sociologist, geographer and planner, apart from his interest in economics, statistics and pedagogy (especially the problem of University education). He analyzed them as mutually complementary sciences and treated them - as Rowse still does - as essentially complementary and interrelated).

4.5. The Future of Planning or The Discovery of the Gunpowder in 1970.

The note of warning sounded by Geddes as early as 1915, about the dangers of isolated academic analytical study of his "triad", was expressed in practice by Professor E.A.A. Rowse who, in 1934, made multidisciplinary association the basis for staffing his School. (1) Unfortunately, the academic world chose, in contrast, to create isolated specializations, and confined specialists to their respective small worlds, each generating their own 'technical jargon' and becoming progressively less capable of communication with other fields of science dealing with the interrelationship of man with nature. Such specialization produces a restricted vision of reality, in which complex systems are fragmented, and the pieces judged separately, and inconsistently. Problems are therefore liable to be wrongly diagnosed and inappropriate remedies prescribed.

To take a medical analogy, a patient suffering simultaneously from various physiological and psychological disorders requires first a 'general diagnosis' and afterwards the combined action of different 'specialists' who in mutual agreement decide on a prescription which has no side-effects in the other areas under treatment. Otherwise, what seems to be the right diagnosis and even the right prescription, to cure, for instance, heart disease, could become lethal if a previous skin sensitivity test is not performed.

Unhappily, something very like this has taken place in economics, sociology and planning in its different branches. It is sad to learn that it is precisely in Great Britain, where Geddes and Rowse put their ideas forward fifty years ago, that the planning activity became so methodologically narrow and fragmented that it has been recognized by the

(1) See Appendix No.3 (pp. 288-), in which I deal with the subject in more detail.

Center of Environmental Studies (1) (concerned with 'urban planning'), as ... "totally inadequate to meet the complexities of the future" (2), because "it is quite clear as a series of systems, the city itself is incredibly complicated", and they found the "planners in the old sense as ill-equipped to switch their activities from urban design to the problems of the proper application of national resources". Moreover, in their conclusions they stated that:

"Above all, in meeting the new complexities of the situation the need is for new mixes of disciplines.

It has already become quite clear in the last decade that planning is an inter-disciplinary activity and the so-called 'planner' is one of a team" (3).

They went on by proposing Hall's three-fold educational solution to the problem of supplying the 'new planner' (4) who conforms to future demands, that is :

"First, a generalist course as a preliminary which will not be confined to the traditional aspects

- (1) The Members of the Study Group on Developing Patterns of Urbanization which were involved in the production of the book in question are: Cowan, P., Donnison, D., Foster, Ch., Hall, P., Jones, E., McLoughlin, B., Senior, D., Willmott, P. and Wilson, A. (For them the 'departmentalism' of planning in practice today is a reflection of the fairly simple way in which planning issues were seen in the past (:). Departmentalism could be an enormous constraint upon planning in the future).
- (2) A similar conclusion is presented by Bruton, M.J. (Ed.) "The Spirit and Purpose of Planning" (Hutchinson & Co. Ltd. London) GB, 1974, who proposes 'Corporate Planning' as the way of dealing with the complexity of the inter-relationships between the various forms of planning (i.e. physical, social, economic) at local level.
- (3) Cowan, P. (Ed.) "The Future of Planning" (Heinemann Books, Ltd., London) GB. 1973 (p.).
- (4) It has been reported by Goist, P.D. in his historical bibliography, "Patrick Geddes and the City" (AIP Journal Jan. 1974.) that... "Though eminently qualified for a position in any of the leading Scottish universities his applications were blocked because of his insistence in breaking across the established disciplinary lines in his work. As a result, he could not obtain any of the several positions he sought. However, J. Martin White created a chair in botany for him at Dundee !" (p. 36)

but rather will cut across the usual boundaries of the social sciences. (Second,) a specialist technical course, (and) beyond this again there should be an advance course of training on co-ordination and strategic planning ... This of course, makes nonsense of professionalism as it is today. Rather it makes for a further generalization in education"... (1)

The future of planning, they concluded calls, amongst other things, for:

"A greater concern with the 'quality of life; an appreciation of the complexity of the problems involved and of the techniques by which these problems can be solved; a new kind of planner, broader in outlook and conviction than ever before ..." (2)

Urban planning in Great Britain is turning back to the theories existing in the very origins of 'planning' as it should be. It is a pity to think of the time and effort wasted and the total ignorance (of these theories), demonstrated by those who now are putting 'fresh ideas' forward for the creation of the 'new planner' who hopefully will meet the needs of the future.

4.6. Meta-Economics, Ecospheric Dynamics and Economic Development Ecologically Approached.

In the field of economics as well, new and more holistic theories are emerging into the social sciences arena, the endeavour of which is to re-integrate what was - without much justification - split into parts, productive of narrow, individual specializations.

(1) Cowan, P. (Ed.) "The Future ... op.cit. (p.).

(2) Ibid.

Schumacher's concept of 'meta-economics', Bandurski's term of 'ecospheric-dynamics' and Culbertson's ecological approach to 'economic development' clearly show the necessity of returning with a humble attitude to the 'old wise gurus' (1) mentioned in the previous section.

"According to Schumacher ... "As economics deals with man in his environment, we may expect that meta-economics consists of two parts - one dealing with man and the other dealing with the environment. In other words, we may expect that economics must derive its aims and objectives from a study of man, and that it must derive at least a large part of its methodology from a study of nature" ... "The study of economics (as currently constituted) is too narrow and too fragmentary to lead to valid insights unless complemented and completed by a study of meta-economics" (2).

'Ecospheric-Dynamics' as put forward by Bandurski intends to fuse two realms of investigation - 'ecology and economics' - this main point is stressed in the following terms:

"The necessity of bringing mankind's laws into line with natural laws is stressed as an initial step by planning for viable and rewarding life styles. Human values such as 'stability' (physiological, psychological and sociological homeostasis (*)), 'diversity of opportunity', and 'freedom of choice' are shown to be guaranteed by going along with

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- (1) 'Guru' means master, teacher, learned man; who possesses both 'wisdom and knowledge' and follows a 'path' to perfection.
- (2) Schumacher, E.F. "Small is ... op.cit. (p.38)
- (*) Homeostasis has been defined as a 'force enabling an individual to maintain physical or psychological stability despite conflicts in the external environment'.

rather than controverting our ecosystem's naturally antientropic tendencies" (1).

Lastly, when 'economic development' is ecologically approached by Culbertson it leads to the following theses:

1. A scientific approach to the subject supports the pessimistic view that modern civilization faces a fall for want of the control systems required to meet nature's term for survival.
2. The existing academic literature on the theory of economic development is not based on an ecological view of man ... this theory is the doctrine of progress.
3. What is required to preserve civilization is the adoption of societal control systems to limit population, preserve the environment and maintain or increase economic efficiency. Such actions will not happen automatically with the passage of time but will require a radical departure from past policies and from the predominant current view of man's relation to nature. (2)

The foregoing may be summed up in the words of McHarg as follows:

"Economic determinism is an imperfect evaluation of the biophysical world is only one of the consequences of our inheritance. An even more serious deficiency is the attitude towards nature and man which developed from the same source and of which our economic model is only one manifestation" (3).

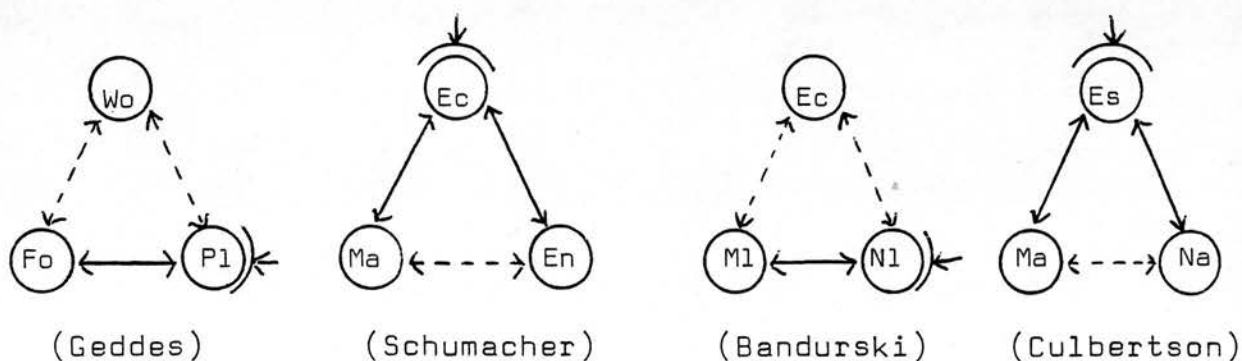
-
- (1) Bandurski, B.L. "Ecology and Economics - Patterns for Productivity" in 'The Annals of the American Academy' (p.75).
 - (2) Culbertson, J.M. "Economic Development ...op.cit. (p.4.)
 - (3) McHarg, I. "Design with Nature" ... op.cit. (p.25).

4.7. A Second Comparative Analysis

A second comparative analysis between Geddes and Schumacher, Bandurski and Culbertson's concepts and approaches, is required for the theoretical reformulations I wish to propose. Geddes "triad" of 'work', 'folk' and 'place' finds parallels in the work of the other authors as follows:

'Geothecnics'	'Meta-Economics'	'Ecospheric Dynamics'	'Economic Development Ecologically Approached'
(Geddes)	(Schumacher)	(Bandurski)	(Culbertson & McHarg)
Folk (Fo)	Man (Ma)	Mankind (M1)	Man (Ma)
Work (Wo)	Economics (Ec)	Economy (Ec)	Economic System (Es)
Place (Pl)	Environment (En)	Natural Laws (N1)	Nature (Na)

Schematically this comparison can be portrayed as follows:

KEY

(\longleftrightarrow) = Interrelationships strongly emphasised

($\leftarrow\text{---}\rightarrow$) = Interrelationships mentioned but not further treated

(\curvearrowright) = From the point of view of ...

FIGURE NO.7 "Schematic Representation of Geddes, Schumacher Bandurski and Culbertson's "Triads".

4.8. The Ecological Approach to Regional Planning

Once again, in working out my own approach to Regional Planning, it became clear that, to a considerable extent, the 'new ecological awareness' had already been clearly stated among the earlier authors by Arthur Glikson, Benton MacKaye, Lewis Mumford and more recently by Ian L. McHarg, as already quoted (p.).

4.8.1. Arthur Glikson's 'Ecological Basis of Planning'

Glikson's fundamental concept of planning is based on the careful checking of man's relationship to his environment. He stated that:

"By observing and interpreting the evolution of man's relationship to environment we gain important clues to the profound significance of cultural evolution for the human constitution. In environmental change, cultural facts are converted into biotic realities, while biological conditions mould human culture in their turn; human and environmental evolution become interacting processes of change, constituting a whole life-system. To comprehend the system, we must study alternately its human and environmental components, consider both biological and cultural aspects of evolution and note their interconnections whenever they appear" (1).

His Regional Planning was concerned with the cultivation of 'habitability'. He defined 'habitable' as ... "any natural or artificial space which provides man with suitable external conditions for his continued existence". (2) 'Habitability' thus necessitates a sort of 'arrangement' between these two sets of factors: "The natural and the

(1) Glikson, A. "The Ecological Basis of Planning" (Martinus Nijhoff, The Hague) Netherlands, 1972, (p.2).

(2) Glikson, A. "Regional Planning"... op.cit. (p.8).

human". Regional Planning for him, should aim towards ... "the establishment of a state of balance through regulation of the relationship between human and environmental factors" ... (1)

Glikson saw in the modern sciences of sociology, ecology and regional planning the fundamental fields of study which could collaborate in the same effort:

"The reconstruction of mutuality in biotic and social relationships in general, and in the relationship between man and his environment in particular, as the common objective" (2).

Like Geddes and Rowse, Glikson is here clearly opposed to single factor analysis, mechanistic oversimplifications and the unbalanced activities which have produced the so-called 'environmental crisis', calling forth in turn the 'new awareness'.

Having this open attitude towards man-nature inter-relationships, he could not but be conscious of the need for training a new generation of planners (as Lewis Mumford remarked in introducing Glikson's book).

"... who would think habitually in terms of organic complexity, and who would realize that man himself, in order to survive would have to re-insert himself into 'nature's life cycles and into a greater scale of time' - a tendency decisively opposed to disintegration as everyday events reveal it." (3)

4.8.2. Benton MacKaye's 'New Exploration'

Benton MacKaye, similarly, approached Regional Planning seeing not only 'parts' and 'specific details' of the regional setting but rather the completeness of the phenomena involved.

(1) Glikson, A. "Regional Planning"... op.cit. (p.9).

(2) Glikson, A. "Regional Planning"... op.cit. (p.20).

(3) Glikson, A. "The Ecological"... op.cit. (see:Introduction).

He tried to grasp as many of the factors included as possible in order to unite them into organic wholes. For him indigenous environment is ...

"... essentially a symphonious environment; and nothing else. It is the source and support of all true living ... is the basic natural resource of civilization as a "spiritual form", all other natural resources (the soils, the ores, the waters the forests) are basic of civilization as "material fact" ". (1)

He was deeply concerned with 'time' and the necessity of looking at Regional Problems in terms of long periods (what is nowadays called 'long-term planning'). His idea was that looking at the same problem extended further into the future, would provide both new insights and a more responsible attitude towards the preservation of biological and social life, and the adaptation and even the subordination of man's laws to natural principles. His definition of regional planning in general was:

"... the visualizing within a region of coordinated action for the purposes of general human living..." (2)

The long-range thinking changed his attitude towards the 'Metropolitan World'. He saw the control of nature by 'metropolitan man' as a dangerous illusion. He said:

"This metropolitan invasion is, in the nature of an interruption, but whether it will amount actually to this or to a permanent undoing depends on what we are going to do about it." (3)

(1) MacKaye, B. "The New Exploration" A Philosophy of Regional Planning (Univ. of Ills. Press, Ills) USA, 1962 (First published, New York,) USA, 1928, (p.144).

(2) Op.cit. (p.153).

(3) MacKaye, B. "The New Exploration ... op.cit. (p.165).

4.8.3. Lewis Mumford's View of the City

Lewis Mumford basically shared the position of Patrick Geddes who had taught him biology when young. He mentioned that:

"I had come under the influence of Patrick Geddes who brought into sociology and civic design the fundamental ecological concepts that Darwin, and Geddes' own teacher Huxley, had developed. Huxley's study of physiogeography of the Thames Basin was an early and masterly example of unified thinking about the entire environment". (1)

His close personal friendship with Glikson was based on 'common bonds of interest and outlook'. He was the means through which Glikson got to know not only the work of Patrick Geddes, but also Benton MacKaye, and others.

For him the work and vision of Geddes, Glikson and MacKaye appeared likely to be of importance in future. Their work will eventually be recognized as ...

"... far more essential to the renovation and further development of the modern world than the grandiose schemes "for creating vast megapolitan complexes", (2), of, for instance, Le Corbusier, Dexiades, Kenzo Tange, F. Lloyd Wright and B. Fuller. Glikson, he noted, had already seen the megapolitan complexes, in which megastuctures, transport networks, and computerized, remote control culture replace existing cities as obsolete " in terms of viable biological and social criteria.

(1) Mumford, L. "Lewis Mumford on Arthur Glikson" in J. of RTPI, Vol.58, No.2) February 1972 (p.70).

(2) Glikson, A. "The Ecological ... op.cit. (p.14).

His personal position is clearly stated in the following statement:

",,, social factors are primary, and the organization of a city, its industries and its markets, its lines of communication and traffic, must be subservient to its social needs". (1)

4.8.4. Ian L. McHarg's 'Design with Nature'

"Design with Nature" is considered by Mumford to be one of the few works of significance and worth comparable to those of Patrick Geddes, Benton MacKaye, Arthur Glikson and their associates. In his introduction to the work of McHarg, Mumford asserts,

"Here are the foundations for a civilization that will replace the polluted, bulldozed, machine-dominated, dehumanized, explosion-threatened world that is even now disintegrating and disappearing before our eyes. In presenting us with a vision of organic exuberance and human delight, which ecology and ecological design promise to open for us, McHarg revives the hope for a better world". (2)

The fundamental approach of McHarg is that his emphasis is not on either design or nature separately, but upon the preposition with, which implies 'human co-operation and biological partnership'. (3) His whole

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- (1) Mumford, L. "What is a City?" (Architectural Record, LXXX11, Nov. 1937 as reprinted in Haudlin, O and Burchard, J (Eds.) "The Historian and the City" (Harvard Univ. Press) USA, 1963 (p.226).
- (2) Mumford, L. 'Introduction' to Ian L. McHarg. "Design With Nature ... op.cit. (p.viii).
- (3) This concept has served as the key 'dynamo' for ecological awareness. See for instance amongst others: Ingmire, T.J. & Patri, T. "An Early Warning System for Regional Planning" (A.I.P., Vol.37, No.6) Nov. 1971. Holling, C.S. & Goldberg, M.A. "Ecology and Planning" (A.I.P., Vol.37, No.3) July 1971. Nelson, T., Hakim, B. & Cott, L. "Ecological Systems as Models for Human Environment" (Ekistics Vol. 35, No. 208) March 1973.

(Continued ...)

approach is based on ecological symbiosis, in which man responds with an open mind towards the alternative paths for action consonant with the conditions imposed by nature. His ecological model applied to human processes is based on the criteria that they are subject, as any other ecological system to: 'Negentropy' (the increase in levels of order); 'Apperception' (capacity to transmute energy into information and thence to meaning); 'Symbiosis' (the cooperative arrangement that permits increase in levels of order and requires apperception); 'Fitness and Fitting' (the selection of a fit environment and the adaptation of that environment, and the organism, to accomplish a better fitting); and 'Health and Pathology' (the evidence of creative fitting requires negentropy, apperception and symbiosis).

Further, in his approach to the problem of education, he demonstrates opposition to fissiparous tendencies in science:

"It is in education that the greatest benefits (of the ecological view) lie. Here 'separatism' rules, yet 'integration' is the quest. This ecology offers: the science of the relations of organism and the environment, integrative of sciences, humanities and the arts - a context for studies of man and the environment". (1)(2)

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- (3) (Continued from previous page)
 Southworth, M.S. "Environmental Quality in Cities and Regions" (T.P.R., Vol. 44, No. 3) July, 1973.
 Waller, R.A. "Environmental Quality, Its Measurement and Control" in (Regional Studies, Vol.4, No.2) 1970.
 Hufschmidt, M.M. "Environmental Quality, as a Policy and Planning Objective" (A.I.P., Vol.37, No.3) July 1971.
- (1) McHarg, I.L. "Design with ... op.cit. (p. 197)
- (2) Southwick, C.H. has summarized his conception of Ecology in the following terms: "Ecology, in fact, is the great synthesis, the theme around which all disciplines concerned with man and the living world must be oriented. Our various scientific and educational disciplines become far more meaningful when they are related to the theme of man's relations to himself and his environment" see "Ecology and the Quality of ... op.cit. (p.60).

And finally in the quest for 'survival' (the fundamental issue to be treated in section 4.1 below) he states:

"The ecological view offers an invaluable insight. It shows the way for the man who would be the enzyme (*) of the biosphere - its steward, enhancing the creative fit of man-environment, realizing man's design with nature" (1).

4.9. A Third Comparative Analysis

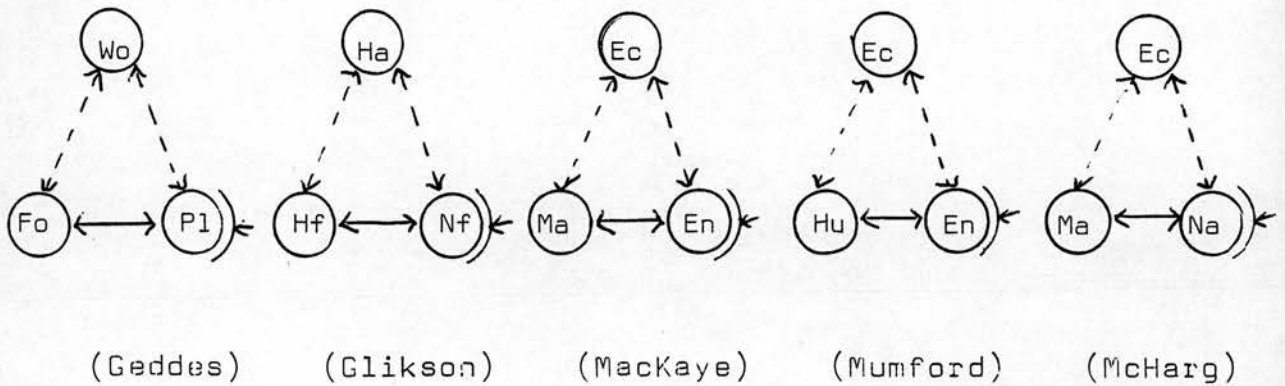
A third comparative analysis between the Geddes "triad" and Glikson, MacKaye, Mumford and McHarg's ecological approach to planning, may assist understanding of my suggested basis for a reformulation. As in previous comparative analyses, the triad has certain similarities with those of the other authors.

'Geothecnics'	'Ecological Basis of'	'New Exploration'	View of the City	Design With Nature
(Geddes)	(Glikson)	(MacKaye)	(Mumford)	(McHarg)
Folk (Fo)	Human Factors (Hf)	Man (Ma)	Human (Hu)	Man (Ma)
Work (Wo)	Human Actions (Ha)	Economy (Ec)	Economy (Ec)	Economy (Ec)
Place (Pl)	Natural Factors (Nf)	Environment (En)	Environment (En)	Nature (Na)

(*) 'enzyme' means, 'Organic substances produced by living cells, which act as catalysts in chemical changes (without itself being used up in the reaction)'. See, Abercrombie, M. et.al. "A Dictionary of Biology" (Penguin Books, Middlesex, England) GB, 1975, 6th Ed. (p.99).

(1) McHarg, I.L. "Design with ... op.cit. (p. 197).

Similarly, a schematic description can be depicted as follows:



KEY

- (\longleftrightarrow) = Interrelationships strongly emphasised
 (\dashrightarrow) = Interrelationships mentioned but not further treated
 (\curvearrowright) = From the point of view ...

FIGURE NO.8 'Schematic Representation of Geddes, Glikson, MacKaye, Mumford and McHarg's 'Triads'.'

4.10. Erich Fromm's 'Humanistic Planning' and His Concept of 'System Men'.

In our current world of over-specialization or 'scientific fissiparism', (1), fragmentation, compartmentalization of knowledge and departmentalism (specifically in the field of planning (2) as recognized by the Centre for Environmental Studies), (3), it was to be

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- (1) I have borrowed this expression from Prof. E.A.A. Rouse, 'fission' means, splitting off, breaking up into parts in biology, it means 'Reproduction by splitting into two or more equal parts (multiple fission)'.
- (2) Concretely, The Centre for Housing, Building and Planning, Dept. of Econ. and Soc. Aff. of the U.N. has reported the following forms of planning: 'Transport', 'Public Utilities', 'Housing', 'Town and Country', 'Employment', 'Economic', 'Social', 'Regional', and recently 'Environmental' Planning in ('Human Settlements' Vol. IV, No. 2) April 1974. See as well, White, B "The Literature and Study of Urban and Regional Planning" (Routledge St. Lit. G. London) GB., 1974.
- (3) Cowan, P. (Ed.) "The Future of ... op.cit.

expected that the reaction to Fromm as a planner, and his concept of 'system men' would be dismissive. What could a psychoanalyst be expected to know about planning? How could he make judgements and teach a field of knowledge outside his own speciality, and beyond his technical competence?

It is worth noting at this point, using Alonso's own words, that ...

"Indeed, many of the most significant advances (in sciences) are made outside the 'conventional academic (inner) circles', and that the 'academic establishment' is lagging in its recognition of these issues" (1).

Both the upholders of specialism, and those in agreement with Alonso continue to hold to their opinions, which do clearly conflict. The development of ideas as a basis for planning may illustrate some arguments against specialism. It was, for instance, necessary for Mumford to introduce Glikson to his colleagues (i.e. a 'closed circle of urbanists') so that they could hear his ecological approach to planning. Nobody paid too much attention to Malthus theories of population until things became self evident and then the 'new prophets' started to cry out about the dangers of uncontrolled population growth. Few people thought about the necessity of multi and intradisciplinary education put forward in different ways by both Geddes (Botanist 1874) and Rowse (Civil Engineer 1927), until the last decades in which some people like Jantsch, E. (2), are looking for the 'new' kind of University, once over-specialization has proven to be seriously constrained when faced with complexity.

(1) Alonso, W. "Beyond the Interdisciplinary Approach to Planning" (The 2nd International Symposium on Regional Development, Sept. 17-19, 1968, Tokyo) Japan. (p.15).

(2) Jantsch, E. "Inter and Transdisciplinary ... op.cit.

Another strong reason for listening to Fromm is the low 'performance level' (1) (indeed the frequent failure) (2) of current economic and physical planning and the similar difficulties of social planning in which man (3) is studied more closely. Moreover, 'planning' as a discipline makes use of bits and pieces of other disciplines, mainly the social sciences (4).

Fromm's criticism of 'planning' is that ...

"... it presently serves the aims of production, technology, and corporate organization rather than the growth and development of man. Caught in the conflicting values of humanism and the demands of an industrialized society, our planning has been based on the erroneous assumption of a pre-established harmony between the two." (5)

The truth is that there exists a permanent conflict between the two, which can be solved only with the establishment of a system of values, based on our knowledge of man's nature. For him ... 'the basis of this value system lies in the idea that it is possible to determine what is good and what is bad for man.' He has made a deep study of the main great humanistic religions such as Taoism, Buddhism, Judaism, Christianity and Islam, and has reached the following conclusion:

"Good and bad do not mean what man desires or does not desire, nor simply what is good or bad for his

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- (1) Friedmann, J. "The Future of Comprehensive ...op.cit.
 - (2) See Chapter IV (Sections 4.1., 4.2., and 4.3.) of this thesis.
 - (3) Ozbekhan, H. "Planning and Human Action ... op.cit.
 - (4) Famelis, N. "A Quantitative Technique for Analysing Spatial Development Possibilities and Policy Implications for Urban and Regional Planning" (M.Sc. Thesis, DUDRP, Univ. of Edin., Scotland) GB. 1970.
 - (5) Fromm, E. "Humanistic Planning" in (Journal of the AIP, Vol. 38, No.2) March 1972, (p.67).

material well-being; it means what is conducive to the full growth of the total man, of all his capacities and potentialities, what is good for the attainment of his optimal human maturity" (1).

His approach to man is, "the link between the concepts used in systems analysis and those used in psychoanalysis. For him 'Man is a system' ...

"Like an ecological or political system, the system of the body or of the cell, or a system of society or an organization. In analyzing the system, 'men', we understand that we are dealing with a system of forces, and not with mechanical structure of behaviour particles. Like any system, the system, 'man', has great coherence within itself and shows great resistance to change; furthermore, the change of one item that is allegedly 'the cause' of another undesirable item will not produce any change in the system as a whole" (2).

His main thesis has thus been clearly stated: First, man, not technique, must become the ultimate source of values. In other words, optimal human development and not maximal production must be the criterion for all planning (3). Secondly, he has stated convincingly what is good for man, namely whatever conduces to human maturity. Third, man needs to be considered as a system, specifically a system of forces. From this he concludes that,

"the system 'man' must become an 'integral' part of the system 'society'. In other words, the science of man must become 'one' of the planning sciences" (4).

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- (1) Fromm, E. "Humanistic ... op.cit. (p.69)
- (2) Fromm, E. "The Crisis of Psychoanalysis" (Holt, Rinehart and Winston, Inc. N.Y.) USA, 1970. Reprinted (Pelican Books, England) GB. 1973 (p.90).
- (3) Ozbekhan, H. has stated that 'quality of life' should be the yard-stick for measuring the planning activity performance: see for instance: "The Triumph of Technology" ... op.cit.
- (4) Fromm, E. "Humanistic Planning" ... op.cit. (p.92).

And, as a corollary, the 'optimal function' of this system means for man:

"the optimal development of all his faculties, minimal friction and waste of energy within man, between man and man, and between man and his environment" (1).

4.11. A Fourth Comparative Analysis

As in the previous analyses, once again Geddes fundamental 'triad' seems clearly reinforced by Fromm's corollary. The obvious main emphasis, though, in the latter is upon 'man' (seen as a system). As a psychoanalyst, Fromm has been able to 'see' the human consequences of planning activity, which he considers as 'valueless' (as that term is currently used).

Even though Fromm does not mention directly the implications of both 'work' (i.e. economics) and 'place' (i.e. ecology), he refers to them indirectly when stating the optimal function of the system 'man' in his relation with himself and with his environment. An exploitative and degrading economic system compounded by careless mismanagement of the ecological balance, denies human beings the natural fulfilment of full growth to optimal maturity.

This may be depicted schematically as follows:

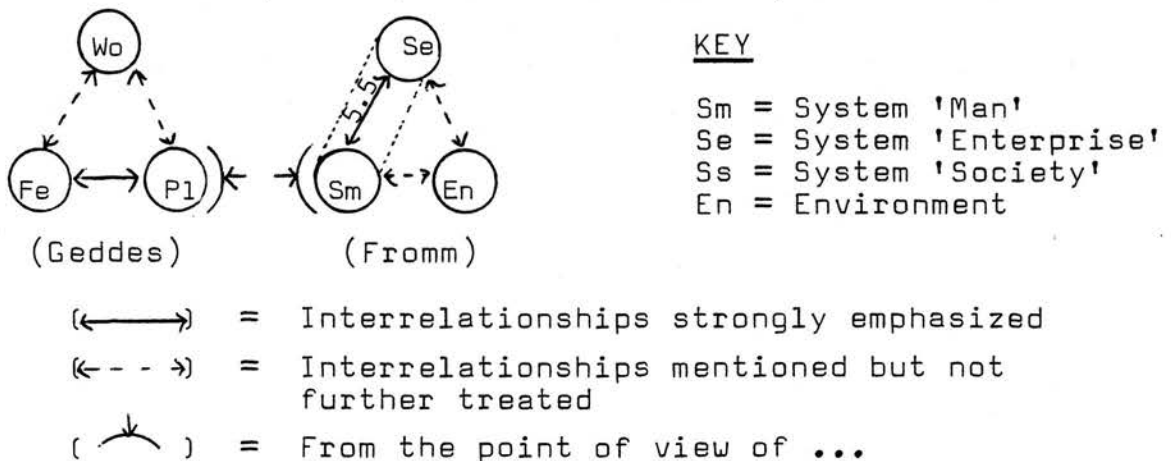


FIGURE NO.9 'Schematic Representation of Geddes and Fromm's "Triads".'

(1) Fromm, E. "Humanistic Planning" ... op.cit. (p.94).

A Summary Review

On the basis of this methodological analysis, the core idea of the foregoing chapter may now be briefly restated. Society in the grip of the current environmental crisis, in addition to suffering as the result of the poor performance level of 'planning' (in all or any of its specialized forms), cries out for a new approach based on radical structural changes, the main objective of which is cooperation for survival.

Fissiparous tendencies in both science and society have harmed the modern world, by, for instance, creating a "Tower of Babel" syndrome in academic language, and distorting reality by treating aspects of complex phenomena separately, rather than in the light of the relations of each one to the whole. (1)

The reformulated 'Man-Nature Symbiotic Dynamic System' (M-NS DH) - System, is not a new discovery. The 'old wise gurus' such as Geddes, Rouse, Glikson and MacKaye said the same things in different terms. It should, therefore, be possible, if one goes back to them with an open mind, to utilize their insights, taking advantage of some new tools in the management of situations directly experienced in planning work today.

This interpretation is, moreover, reinforced by Mumford, McHarg, and more recently, Schumacher, Bandurski, Culbertson and Fromm.

The new awakening of planning and its urge for the creation of the new type of planner who can face 'the

(1) Famelis, N. "Critical Evaluation of the Development and Use of Models of the Urban Structure in Spatial Analysis and Planning" (Ph.D. Thesis in preparation, DUDRP, University of Edinburgh, Scotland) GB. 1976. See as well: Ackoff, R.L. "Science in The Systems Age" (Operations Research, Vol.21) M/J 1973.

future in all its complexity', has sad to say, come about mainly because of the state of crisis. The teachings of Rowse, Geddes, and their associates were so far in advance of their time, that it has taken almost a half of a century, as well as the inputs of systems theory, cybernetics, ecology, structuralism, etc., to enable planners to realize that planning requires the serious consideration of human and natural phenomena, no longer piecemeal, but as a whole.

A synthesis of the three comparative analyses produced (see sections 4.4., 4.7., and 4.9.) compared with the Man-Nature Symbiotic Dynamic Holistic System (M-NS DH) system, may be represented as follows:

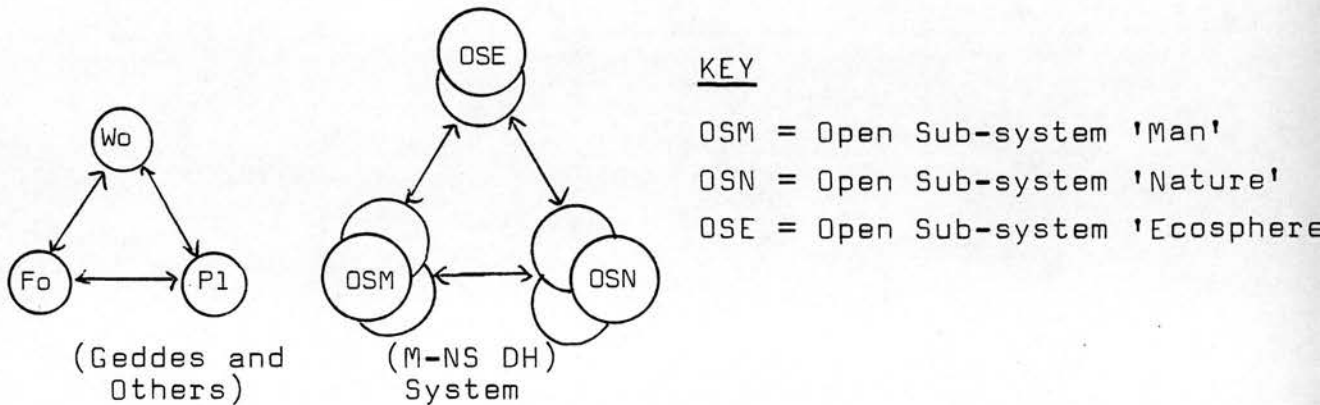


FIGURE NO.10 'Schematic Representation of Geddes and Others Triads as Compared with (M- NS DH) System'

What Geddes called 'folk' and the others call 'man', 'mankind laws', 'human factors', and 'system man', re-appears as the 'open sub-system man' formed by a triad of semi-independent spheres (Gnosphere, Sociosphere and Technosphere). These have to be studied in their systemic dynamic interrelationships, interactions and interfaces.

What Geddes called 'work' and the others call 'economics', 'economy', 'human actions', and 'system enterprise',

re-appears as the 'open sub-system ecosphere', formed by non-human and human ecosystems. In the 'ecosphere' all the actions of man and reactions of nature to man positive and negative feedback loops take place and 'work' and 'economy' are expanded beyond their limited accepted definitions.

What Geddes called 'place' and the others call 'environment', 'natural laws', 'nature' and 'natural factors'; re-appear as 'open sub-system nature' formed by a triad of semi-independent spheres (Lithosphere, Atmosphere and Hydrosphere), and constitute the fundamental trinity upon which depend both the sub-systems, man and ecosphere.

CHAPTER NO.V 'GENERAL SYSTEMS THEORY, URBAN DYNAMICS,
CYBERNETICS AND STRUCTURALISM IN PLANNING'

The (M-NS DH) System reviewed in the previous chapter opens up a field of investigation extending far beyond the limited scope of this research. Parts of it can however provide a framework for procedures which should be considered in the search for a kind of planning appropriate to Mexican reality.

6.1. General Systems Theory (1)

The systems approach to planning has been adversely affected by the compartmentalization of planning. For instance, the well-known works of Chadwick (2) and

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- (1) 'Systemness' has pervaded all realms of knowledge. Every single discipline and specialization makes its own interpretation, definition and use of 'the concept system'. There are different attitudes towards 'system' and its wide application. Some authors such as Bertalanffy, Boulding, Rubin-Smith, Zadek, Optner, Emery, Ackoff, Mesarovic, etc... have set up the foundations of the theory, furthered its development and found some areas of its application, whereas other authors like Hillier and Leamen, Faludi, Silvester, McDougall, Gouldner, Christabis, etc... have criticised very heavily the 'systemic' approach to social sciences.
(See for instance amongst others):
Bertalanffy, L. von "General Systems Theory"
(George Braziller Inc. N.Y.) USA, 1973 (3rd. Ed.)
Boulding, K.E. "General Systems Theory: The Skeleton of Science" in (Management Science, Vol.2, No.3) 1956.
Rubin, S. "On Systems Theory" (Collage Paper, N.Y.) USA. 1973.
Zadik, L.A. "Systems Theory" (McGraw-Hill, N.Y.) USA. 1969.
Optner, S.L. "Systems Analysis" (Penguin Books, England) GB. 1973.
Ackoff, R.L. "Towards a System of Systems Concepts" (Management Science, Vol.17, No.11) 1971
Mesarovic, M.D (Ed.) "Views on General Systems Theory" (Systems Symposium, N.Y.) USA. 1964.
- (2) Chadwick, G. "A Systems View of Planning: Towards a Theory of the Urban and Regional Planning Process" (Pergamon Pub.Co., New York) USA. 1971.

McLoughlin (1) are concerned with physical or spatial planning and with the urban system considered as an ecosystem, but they lack proper emphasis on social processes, the need for which was clearly stated by Webber;

"The decisions about the spatial distribution of physical objects are taken within the social, economic and political structure, and control lies within this structure". (2)

Any attempt to create 'a fully rational theory of planning' ignoring this fact, is, according to Etzioni ... "likely to be rejected, ignored, or radically altered by the political decision-makers..." (3)

The so-called 'Regional Sciences' originated by Isard (4) with the original aims of "improving the spatial and regional frameworks of the social sciences disciplines and emphasizing the basic interactions of political, social and economic forces..." (5) are another example of 'being at odds with reality'. In spite of Isard's recognition of the importance of the cultural environment he and his collaborators mention questions of social goals, political processes and individual preferences, only briefly, and use unwarranted assumptions in quantifying related observations, with the result that these matters are poorly treated.

The complexity of the 'urban condition in its regional context' has led to the use of the ecological analogue,

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- (1) McLoughlin, J.B. "Urban and Regional Planning" (A System Approach, London) GB. 1970.
 - (2) Webber, M. "Planning is for People - Not Things" (Alean Conference, London) GB. 1968 (p.35)
 - (3) Etzioni, A. "The Active Society" (The Free Press, N.Y.) USA. 1968. in Chadwick, G. "A Systems ...op.cit. (p. 341).
 - (4) Isard, W. (et.al.) "Methods of Regional Analysis...op.cit.
 - (5) Isard, W. (et.al.) "General Theory...op.cit. (see introduction).

which in turn is treated as an ecosystem (1). Here the main failure to grasp reality is that in spite of defining the metropolis as a 'dynamic open system', it is treated by Rodwin, for instance, as a closed system, for the sake of simplicity:

"... if there is to be a more refined evaluation the boundaries of the urban development regions will have to be carefully defined" (2).

Even though Friedmann and Alonso (3), Ashby (4), Heyman (5) (amongst many others) have tried to 'integrate' physical planning with social phenomena through the wider approach of systems analysis (considering cities as 'open systems', sui generis); they have lost contact with reality by assuming the constancy of certain factors endogenous to their system city.

The use of the ecological analogy in describing urban systems, has led Abel (6) and others to claim that

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- (1) Stoddart, D.R. "Organism and Ecosystem as Geographical Models in (Models in Geography, Ed. Arnold, London) GB. 1967.
 George, C.J. & McKinley, D. "Urban Ecology: In Search of an Asphalt Rose" (McGraw-Hill Books Ltd. New York) USA, 1974.
 Dorney, R.S. "Role of Ecologists as Consultants in Urban Planning and Design" (in Human Ecology) Vol.1 1973.
 USB of SF & W "Man and Nature in the City" (US Bureau of S.F & W. Washington, D.C.) USA, 1969.
 Bray, J.R. "Notes Towards an Ecological Theory" in (Ecology, No.39) 1958.
- (2) Rodwin, L.I. "Nations and Cities" (Houghton Mifflin, England) G.B. 1970 (p.29).
- (3) Friedmann, J. & Alonso, W. "Regional Development and Planning" (The MIT Press, Camb.Mass.) USA. 1964.
- (4) Ashby W.R. "General System Theory A New Discipline" (General Systems, No.3) 1958.
- (5) Heyman, M. "The End of Classic City Planning" in (Landscape, No.15) 1966.
- (6) Abel, C. "Evolutionary Planning" (Architectural Design, Vol.12, No.68) 1968.

cities, like 'non-human ecosystems' have inbuilt homeostatic mechanisms and are therefore self-organising systems. The obvious step forward from this unwarranted inference is taken by Banham (et.al.) (1), who suggested 'a radical experiment with selected areas of 'non-plan' in order to test hypotheses of self-organization'.

Other authors such as Stewart (2) and Wilson (3) have introduced laws from the fields of physics and thermodynamics (i.e. gravity and entropy respectively) into the field of urban and regional planning, and shown little concern for the complexity of the whole human and natural phenomenon. (4)

5.2. Urban Dynamics (5)

The work of Forrester (6), who as recently as 1969, started applying his industrial dynamic techniques to the 'grave and complex crisis' of urban problems in America, is of special significance in the field of urban dynamics. Employing a computer-model of the system of an urban area, Forrester attempted to simulate the behaviour of an urban system.

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- (1) Banham, R. (et.al.) "Non-Plan: An Experiment in Freedom" (New Society, No.13) 1969.
 - (2) Stewart, J. "Empirical Mathematical Rules Concerning the Distribution and Equilibrium of Population" in (Geog. Review, Vol.37) 1947.
 - (3) Wilson, A.G. "Entropy in Urban and Regional Modelling" (Pion Ltd., London) GB. 1970.
 - (4) Gouldner, A.E. "The Coming Crisis of Western Sociology" (Basic, N.Y.) USA. 1970.
 - (5) Forrester, J.W. "Urban Dynamics" (The MIT Press, Camb. Mass.) USA. 1969.
 - (6) Forrester, J.W. "Industrial Dynamics" (The MIT Press, Camb. Mass.) USA. 1961.

Undoubtedly his main contribution is the shift from simple systems approaches (which apart from their proved incapacity to solve complex systems, tend to be linear and to involve only single feedback loops), to complex systems (which are non-linear and involve multiple feedback loops). His model is, in his own words, preliminary ... "it suggests a method of attack. It is not presented as a set of final answers to guide urban policy-making". (1)

However, three fundamental weaknesses can be detected in his approach. First, when establishing the boundaries of the urban system, even though he suggests that an urban area is in a limitless environment, he states that,

"The area communicates with the environment but does not alter it. People from the outside come into the area and leave it without affecting the outside", so, (for him) ... "The specific system boundary is most easily defined in terms of interacting components that are to be included within the system." (2)

In other words, the 'open-ness' of the system is after all, in another sense, 'enclosed'. But it has frequently been shown that the area (i.e. city, metropolis or megalopolis) affects and indeed alters directly and indirectly its immediate environment. In a direct sense, pollution is one of the most discussed side-effects of urban conglomerations. Indirectly, too, the urban area can alter the outside system (i.e. environment) whenever one central urban system polarizes power, economic activity, and so on, consequently restricting the growth of a balanced system of cities in a region or nation. The urban area studied according to this

(1) Forrester, J.W. "Urban ... op.cit. (p.11)

(2) Ibid. (p.15)

model does not fit reality because no regional consequences are considered in relation to its process of growth, maturity and decay. Moreover, the three fundamental subsystems; business, housing and population only partially explain the urban phenomenon.

The second weakness can be detected in one of his conclusions:

"The urban systems can be controlled from within (and) are not the victims of outside circumstances but of their own internal practices" (1).

This statement is in clear contrast with the reality because cities are bound to be subject to policies and decisions taken at regional and national level, (and even sometimes at international level) leaving small room for the inner control to operate effectively (2). Another important aspect of the real nature of UDCs is the liability for any uncontrolled inflow of people to generate a state of crisis within the city.

A third major weakness in Forrester's approach may be detected in his effort at quantification. Due to the fact that every aspect to be considered had to be expressed in mathematical language to feed the computer for the simulation, a lot of the qualitative aspects existing in a real city situation were left out of the analysis.

The impressive output of the computer represents merely what the original assumptions taken a priori

(1) Forrester, J.W. "Urban ... op,cit. (p.19)

(2) See for instance: Friedmann, J. "The Urban Field" (J. of AIP, Vol.31, No.4) USA. 1965.

want the model to reveal. They reflect a restricted quantified world with an absence of relevant qualitative insights. Hence, the output generated could be called 'the idealistic non-qualitative city' and may be thought of as necessarily distant from possible applications to reality (1). This accords with the view of Brookbanks, Coursey and Lee who conclude that ...

"There has not yet been a realistic attempt to apply system dynamics to urban planning problems; Forrester's 'Urban Dynamics' model although a technical tour-de-force which demonstrates the power of the methodology, has serious deficiencies as a description of the urban system." (2)

Nonetheless, here in Great Britain, the 'Urban Dynamic Approach' of Forrester is having a strong impact as is shown by the list of some of the research carried out during the last two years:

Constable, D. "A Study of Urban Dynamic Simulation Models ..." (Town Planning Dept., Polytechnic of the South Bank and Dept. of Geography, Univ. of Reading).

Chadwick, G.F. et.al. "System Dynamics Modelling in Urban and Regional Planning" (Dept. of Town and Country Planning, Univ. of Newcastle upon Tyne).

Wagle, B.V. et.al. "A Dynamic Simulation Model for Regional Economic Development" (IBM Scientific Centre, U.K., Dept. of Town and Country Planning, Univ. of Newcastle upon Tyne).

Lewis, P.J.P. et.al. "A Comprehensive Urban Simulation Model" (Centre for Urban and Regional Research, Univ. of Manchester).

Bennett, R.J. "Dynamic Simulation and Control of Regional and Urban Systems" (Dept. of Geography, Univ. of London).

- (1) A similar weakness is detected by Commoner, B. "Alternative ... op.cit., when analysing the approach of the Club of Rome and their well known work the "Limits to Growth". Both, Forrester and Meadows' studies are based on methods designed originally for analysing the dynamics of industry.
- (2) Brookbanks, E., Coursey, R. & Lee, C. "A Dynamic Approach to Complex Systems" (Buitt Environment) June 1973 (p.358).

The same narrow minded and single discipline approach using 'systems analysis' is found in other fields (1) (such as economics and social sciences, geography, etc...) (2).

Perhaps the best way of closing this section is by quoting Hillier and Leaman who state:

"Those who advocate the 'system approach' in environment studies on grounds that this theory is successful in biology, have obviously not heard that neither the organicism of system theory nor the finite information models of cybernetics prevails in theoretical biology". (3)

5.3. Cybernetics (4)

It is not surprising to find that 'Cybernetics' is normally mixed up with 'General Systems Theory'. In fact the two are often considered as synonymous. Hence, confusion results when theoretical concepts are taken from both fields and introduced into 'planning theory' without adequate understanding of what they really mean in their own context.

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- (1) Christakis, A.N. "The Limits of Systems Analysis in Economic and Social Development Planning" in (Proceedings of the Jerusalem Conference on Inf. Technology) August, 1971.
 - (2) For a review of the literature see, for instance: McLoughlin, J.B. & Webster, J.N. "Cybernetic and General-System Approaches to Urban and Regional Research" (Environment and Planning, Vol.2) 1970.
 - (3) Hillier, B. & Leaman, A. "Structure, System, Transformation: Sciences of Organization and Sciences of the Artificial" in (Transactions of the Bartlett Society, Vol.9) 1972-1973 (p.)
 - (4) Wiener, N. "Cybernetics" (The MIT Press, Camb. Mass.) USA. 1948.

Even though cybernetics was conceived in the same nexus of ideas as systems theory, its perspective was different from the beginning. According to Wiener, cybernetics is the science of ... "control and communication in the animal and the machine" (1) which can offer a new interdisciplinary approach for tackling problems presented in different sciences. From this definition, it can be seen that the key of cybernetics is: 'control' and 'communication'. But the main concern of this relatively new field of knowledge is with the mechanic of systems (i.e. machines, organisms as and also of relatively finite and sociotechnical systems and productive processes). As a science it deals with the problem of stable states in dynamic systems. Its two fundamental concepts of 'negative feedback' (self-regulation mechanism of dynamic systems in a variable environment) and that of 'information' (order and regulation in the systems) are by their very definition constrained to mechanical functions (2).

Moreover, even though Wiener and Bertalanffy established the difference between their particular approaches, both agree, as Hillier and Leaman have mentioned, that ...

"... a system model which dealt only with the direct interaction of elements could never explain systems above the level of the single biological organism ... (and that)... the mechanistic interpretation of a feedback cycle as an information system cannot adequately characterise human societies. In a sense, each has refuted (the other), at least so far as application to social phenomena are concerned. Both agreed that life at the human and social level is too bound up with 'symbolic systems'

(1) Wiener, N. "Cybernetics ... op.cit.

(2) See for instance : Porter, A. "Cybernetics Simplified" (English Universities Press, London) GB. 1969.

to be capable of description in terms of either model" (1).

What is striking is to find Forrester (as presented in the previous section), Chadwick and McLaughlin (amongst many others)(2), failing to heed, even the clear warning put forward by the originators of both models from the start.

5.4. Structuralism

Structuralism as scientific methodology which has pervaded fields of knowledge such as biology, mathematics, linguistics, and so on ...

"has only recently begun to be explored in environmental sciences, but, as elsewhere, its first outcome is reformulation at a theoretical level" (3).

Hillier and Leaman's research strategy which is based on opposing variable subjects to variable environments and searching for systematic patterns in the relationship - structure is ignored on both sides - may be redefined in terms of the language speech distinction. Moreover, their approach to urban modelling

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- (1) Hillier, B. & Leaman, A. "Structure, System ... op.cit. (p.47).
- (2) Hilhorst, J.G.M. "Regional Planning: A Systems Approach" (Rotterdam Univ. Press) Netherlands)1971.
 Silvester, M.S. "The Contribution of the Systems Approach to Planning" (Socio-Economic Pl.Sc. Vol.7 No.1) 1973.
 de Vries, E. "Bringing Systems Analysis into the Rural World" (Ceres. Vol.4, No.1) 1971.
 Catanese, A.J. & Steiss, A.W. "Systemic Planning: Theory and Application" (Heath Exington Books, Lex.Mass.) USA. 1970.
 Chadwick, G. "A Systems View ... op.cit.
 McLoughlin, J.B. "Urban and Regional Planning: A Systems Approach" (Faber & Faber, Ltd., London) GB. Reprinted 1970.
- (3) Hillier, B. & Leaman, A. "Structure, System...op.cit. (p.70).

goes beyond the work of March (1) (who gives an account of the generation of space by society) by making a theory which they have called 'socio-spatial morphology' ... and

"(it) aims initially to account for certain generic forms of space as expression of social processes". (2)

They compare the concept of an internally generated 'structural stability' to that of 'homeostasis' used in systems theory. They emphasised that ...

"... our theoretical approach to urban systemness is still in early stages of development and is given here only to illustrate the possibility of transformational approaches". (3)

It is too early to make any significant evaluation on the potentialities of this completely novel approach to urban modelling because, as they have stated: "It is still in (its) early stages of development"; nonetheless one can say that it is a kind of 'structuralism as applied to urban planning'.

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- (1) March, L. & Martin, L. (Eds.) "Urban Space and Structure" (Camb. Mass.) USA. 1972 (as quoted by 1.).
- (2) Hillier, B. & Leaman, A. "Structure, System ... op.cit. (p.71)
- (3) Hillier, B. & Leaman, A. "Structure, System ... op.cit. (p.72).

CONCLUSIONS

From what has been briefly analysed in the areas of General Systems Theory, Urban Dynamics, Cybernetics and Structuralism as used in planning, the following traits can be noted:

1. Common to all of them is their 'compartmentalist approach' (i.e. urban planning, regional economic planning, social planning, and so on, separately).
2. Common to all of them is their 'incompatibility with reality' (i.e. they tackle specific isolated areas of the whole human and natural phenomenon).
3. Common to all of them is their superficial 'conceptual transplantation', creating problems of confusion and misuse.
4. Common to all of them is their search for a more comprehensive approach to the dilemma emerging from complexity.
5. General Systems Theory, Urban Dynamics and Cybernetics deal with the mechanics of the systems; the models of physical, social, economical or cultural phenomena generated through them are constructed from the 'outside' of the system and treated in the same way as any 'physical system'.
6. Structuralism - if redefined and used in its wider context - seems to be a promising area for further research.

CHAPTER VI 'STRUCTURAL PLANNING THEORY: A FIRST
APPROACH TO REFORMULATION THROUGH
STRUCTURALISM.'

At this stage an apparent contradiction in this thesis is becoming clear, on the one hand my approach to the so-called 'man-environment paradigm' (1) has been redefined in terms of 'systems' (i.e. (M-NS DH)- system formed by a set of three sub-systems (2)) whereas the conclusions of the preceding chapter (3) rested on the view that not only General Systems Theory, but also Urban Dynamics and Cybernetics, grasped only partially the total human and natural phenomenon. What then is the basis of such 'systemress'?

A way of solving this dilemma is through the use of Structuralism as a analytical methodology, its general definitions and conceptualizations. This approach differs from that of Hillier and Leaman from the very beginning of the reformulation at least on two fundamental issues:

First, they used both de Saussure's structuralism as applied to linguistics (4), and Thom's structuralism as applied in biology (5), whereas my approach is based on Piaget's structuralism (6) which safely can be considered as a 'General Theory of Structures' in so far

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- (1) Hillier, B. & Leaman, A. "The Man-Environment...op.cit.
 - (2) See Chapter VI, Section 6.2.
 - (3) See Section 7.5.
 - (4) de Saussure, F. "Course in General Linguistics" (McGraw-Hill, N.Y.) USA. 1966.
 - (5) Thom, R. "Structuralism and Biology" in Waddington, C. (Ed.) "Towards a Theoretical Biology 4" (Edinburgh University, Scotland) GB. 1968.

as he attempts to synthesise the core definitions and concepts currently used in mathematics, linguistics, psychology, biology and philosophy (amongst other disciplines).

Secondly, their theoretical approach is straightforwardly focussed towards urban 'systemness' - through what they have called 'socio-spatial morphology', whereas mine is to reformulate a planning theory which will enable me to deal with the complexity of the man-nature phenomenon as portrayed in Figure No.10, P.77

6.1. 'The Fundamental Concepts and Definitions of Structuralism'

According to Piaget there are at least two aspects that are common to all varieties of structuralism:

"First, an ideal (perhaps a hope) of intrinsic intelligibility supported by the postulate that structures are self-sufficient and that, to grasp them, we do not have to make reference to all sorts of extraneous elements ... (and) second, certain insights ... that structures in general have, despite their diversity, certain common and perhaps necessary properties".

6.1.1. Definition of Structure

"A structure is a system of transformations". In as much as it is a system and not a mere collection of elements and their properties, these transformations involve laws: the structure is preserved or enriched by the interplay of its transformation laws, which never yield results external to the system nor employ elements that are external to it." (1)

(1) Piaget, J. "Structuralism ... op.cit. (p.5).

For him, the concept of structure is comprised in a triad of key ideas: the idea of 'wholeness', the idea of 'transformation' and the idea of 'self-regulation'.

6.1.2. The Concept of 'Wholeness'

The idea of 'wholeness' implies a fundamental distinction between structure and aggregates, the former being wholes, the latter composites formed of elements that are independent of the complexes into which they enter. This is not to deny that structures have elements, but ...

"the elements of a structure are subordinate to laws, and it is in terms of these laws that the structure qua (i.e. as a) whole or system is defined. Moreover, the laws governing a structure's composition are not reducible to cumulative one-by-one association of its elements: they confer on the whole as such overall properties distinct from the properties of its elements." (1)

For this very reason a 'whole' is not the same as a simple juxtaposition of previously available elements, but is the outcome of viewing the whole as prior to its elements or contemporaneous with their 'contact'.

This concept has led Piaget to the formulation of what he calls 'operational structuralism' which goes over and beyond the schemes of 'atomist association' (2) on the one hand and 'emergent totalities'

(1) Piaget, J. "Structuralism ... op.cit. (p.6)

(2) Comte, A., proposed to explain men in terms of humanity not humanity in terms of men. Durkheim thought of the social whole as emerging from the union of individuals following the atomist analogy.

- (1) on the other. 'Operational structuralism' ...
 "adopts from the start a rational perspective, according to which it is neither the elements nor a whole that comes about in a manner one knows not how, but the 'relations' among elements that count".

This brings about a fundamental problem: do structures call for 'formation' or is only some sort of eternal 'preformation' compatible with them? The second characteristic of structures, namely, their being systems of transformations rather than of static forms, is the starting point for an approach to this problem.

6.1.3. The Concept of 'Transformations'

Piaget suggests that the laws of composition which form structured wholes, must by their very nature be 'structuring'. He explains this in the following terms:

"It is the constant duality, or bipolarity, of always being simultaneously 'structuring' and 'structured' that accounts for the success of the notion of law or rule employed by structuralists". (2)

This is to say that a structure without transformations falls into static form, whereas a structure with transformations becomes dynamic within the boundary of its formation laws.

"Certainly - Piaget asserts - the elements of a structure must be differentiated from the transformation laws which apply to them.

- (1) Gestalt theory is based on the belief that immediate wholes can be detected in primary perception following the electromagnetic field analogy (see for instance: Kohler, W. "Gestalt Psychology" (Livrerright, N.Y.) USA. 1947 (republished 1970)
 Kofka, K. "Principles of Gestalt Psychology" (Routledge & K. Paul, London) GB. 1935.
- (2) Piaget, J. "Structuralism ... op.cit. (p.10).

Because it is the former which undergo transformation or change, it is easy to think of the latter as immutable" (1).

'Transformation' is the key concept which makes structuralist theory the theory of difference and variety. This can be perceived more clearly by looking at Darwin's theory of evolution (2) which too is based on the idea of historically irreversible transformations within time.

6.1.4. The Concept of 'Self-Regulation'

The idea of 'self-regulation' as one of the basic properties of structures, entailed 'self-maintenance and closure'. This implies that the transformations inherent in a structure never lead beyond the system but always engender elements that belong to it and preserve its laws; it is in this sense that structure is 'closed'. A structure can be considered as a sub-structure of a larger one; but in being treated as such it does not lose its own boundaries, its laws are not altered but conserved.

"These properties of conservation along with stability of boundaries despite the construction of indefinitely many new elements presuppose that structures are self-regulating" (3).

'Self-regulation' may be achieved by various procedures or processes, and these can be ranked in order of increasing complexity. This is perhaps one of the most difficult areas to deal with for the very fact that every single discipline has its own way of system-formation.

(1) Piaget, J. "Structuralism ... op.cit. (p.11).

(2) Darwin, Ch. "The Origin of Species" (Pelican Books London) GB. 1968 (originally published by Murray in 1859).

(3) Piaget, J. "Structuralism ... op.cit. (p.14).

In the case of mathematics, 'self-regulation' is performed by the application of a clearly defined set of explicit rules which means that errors are excluded before they are made. For instance, if we all accept the laws of 'subtraction', when performing a subtractive operation we must be able to detect the presence of erroneous results by checking the laws established.

The serious problem appears to be in those structures presented in other fields of social sciences like linguistics, sociology, psychology, etc., which are not 'strictly logical or mathematical'. Their transformations which unfold in time are not...

"...in the strict sense "operations" because they are not entirely reversible (from the mathematical point of view). Transformation laws of this kind depend upon the interplay of anticipation and correction (feedback concept). (1)

6.1.5. The Concept of 'Global Structuralism' and The Justification for its Use in Planning.

There are at least two types of structuralism in the social sciences: the 'Global' and the 'Analytic'. The former speaks of 'emergence' (2) whereas the latter speaks of 'laws of composition'.

"Global structuralism" holds to systems of observable relations and interactions, which are regarded as sufficient unto themselves (i.e. surface structures); whereas 'analytic

(1) Piaget, J. "Structuralism ... op.cit. (p.15).

(2) By 'emergence' it is understood, 'come to the surface from concealment, or become known'.

structuralism' is that which seeks to explain such empirical systems by postulating 'deep structures' from which the former are in some manner derivable." (1)

As a first approach to reformulation of the planning theory using the methodology of structuralism, I cannot but take the first step at a theoretical level. This is to say, to depict through reflective abstraction a structure, the one on the surface, which later on, will serve as the general framework for further analyses trying to penetrate into the details of the transformational interactions, (i.e. the likely existence of a 'deep structure' in the planning theory) in terms of gradual approximation, until operational structural planning can be properly defined.

The two most important of Piaget's conclusions supply the right justification for the use of structuralism - in its Global conception - in the field of planning:

First "the study of structure(s) cannot be exclusive and that it does not suppress, especially in the human sciences and in biology, other dimensions of investigation. Quite the contrary, it tends to integrate them ..."

Second...

"the search for structures cannot but result in inter-disciplinary coordinations" (2).

6.2. Structural Planning Theory

If one can find a structure in planning theory then one can make an attempt at conceptual reformulation. 'Planning' has been defined in too many ways

(1) Piaget, J. "Structuralism... op.cit. (p.97).

(2) Piaget, J. "Structuralism ... op.cit. (p.137).

according to the kind of planning activity involved so that it has acquired increasingly diverse meanings.(1) Nonetheless, there are certain aspects that one discovers as common to almost all forms of 'planning', these being:

First, planning is a 'rational process' which implies a high level of abstraction.

Second, planning is a 'future oriented activity' insofar as it intends to bring about certain changes according to certain pre-established goals and objectives.

Third, planning is a 'decision process' which implies the selection of pre-visualized alternatives as the outcome of action.

Thus, 'planning' can be defined on the basis of these three fundamental aspects which are: ... 'The rational future-oriented decision process'.(2)

Without any of these three key ideas planning does not exist. From the point of view of my reformulation 'a process' somehow denotes the presence of a structure (as defined by Piaget, i.e. 'a system of transformations').

A process is by definition 'a whole series of continuous actions'. It implies, therefore, 'wholeness' as long as the whole series of continuous actions are defined. This is to say that even though 'planning' contains elements (i.e. stages) these are subordinated to the laws of the process. For instance, viable alternative changes cannot be produced previous to the analysis of the object under study through the information available.

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- (1) See for instance, 'GEO-ABSTRACTS' in which planning is subdivided into various headings ranging from National planning and ending up with community planning.
- (2) This definition became similar to that presented by Ozbekhan, H. "Towards a General Theory of Planning" in (OECD "Perspectives of Planning" Paris) France, 1969 (p.151).

A 'process' as previously defined infers, too, 'transformations' as long as its laws stimulate the bipolarity of always being simultaneously structuring and structured. Continuous actions are by nature dynamic. Dynamicity amongst stages of a process is (the same) as a system of transformations. The 'planning process' concept is unmutable, - what undergoes transformations or changes are both the object on which planning acts and the stages or the elements contained on it.

Lastly, the kind of planning here reformulated presents too, characteristics of 'self-regulation' i.e. self-maintenance and closure. For the former it is clear that the transformation laws presented in planning are regulated, like those relating to linguistics, sociology, psychology, and so on, not by strictly logical and mathematical operations as is the case in physics, cybernetics, etc., but rather by the interplay of anticipation and correction, in other words, by the use of feedback systems. For the latter, the meaning of being "closed" is that planning cannot exist without the three fundamental aspects of being rational, future-oriented and a decision process. The planning process is 'closed' therefore, as long as any of its stages can be considered as structured and forming part of a larger structure. It must be clear that every single stage of the planning process does not lose its own boundaries but still responds to the general laws governing the whole process.

It is my belief that this analysis (as a first approximation) does explain the existence of a structure in planning theory, and so may be properly referred to as, 'Structural Planning Theory'. Apparently, it does not make too many changes, but if followed carefully it raises a tremendous potential for overcoming

a lot of the shortcomings and pitfalls presented in previous chapters. Perhaps one of the fundamental contributions is that 'systemness' in planning must be based on the recognition of an operational structure on which systems can operate. This is directly contrary to the posture of Chadwick, McLaughlin, Catanese and Steiss, (1) (amongst others) who, following mainly the school of 'General Systems Theory' 'Operational Research' and 'Cybernetics' have tried to make 'systems analysis' the 'skeleton of planning'. In other words their approach is that of discovering a certain structure through the analysis of 'systems' whereas mine is to consider systems as being characteristic of dynamic structures.

6.3. 'The Structure of the Planning Process'

I have defined in the foregoing section 'planning' as a process, and I have set up what may be the structure of the planning theory. It is, therefore, essential to uncover the structure of the planning process. For doing so, I reviewed, selected, classified and analysed what has been understood as the

(1) Catanese, A.J. & Steiss, A.W. "Systemic Planning: Theory and Application" (Heath Lexington Books, Lexington, Mass.) USA. 1970; whom accepted that "...The limitations of systems analysis are stressed advisedly, based on sad experience and observation ... Systems analysis in the wrong hands can be like a dangerous weapon in the hands of a child" (p.12).

planning process by different authors (1) and then detected what appears to be the fundamental structure and the most likely elements (i.e. stages) which such a process should include.

Perhaps, before going any further it is worthwhile to restate that my intention is neither to build up 'a general theory of structured planning' nor a 'general planning process' which should have universal validity, but rather to discover what can be applied in my own Mexican reality after detecting a lot of faults, incongruences and shortcomings in the planning theory as currently taught and used.

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- (1) (Amongst others, see for instance:) Hall, P. "Theory and Practice of Regional Planning" (Clark, D. & B. Ltd.) GB. 1970.
 Rowse, E.A.A. "Africa's Place in the Economics of World Catastrophe or Opportunity" in Gardiner, A.K.A. (et.al.) "Africa and the World" (Oxford Univ. Press, London) GB. 1970.
 Amos, F.J.C. "The Development of the Planning Process" (RTPI Journal, Vol.57, No.7) 1971.
 Bigwood, R.T. "Aspects in a Integrated Planning Process" (Discussion Paper, PRU, Edinburgh) GB. 1972
 Falude, A.K. "Planning Theory" (Pergamon Press, Ltd. London) GB. "Teaching the Planning Process" in (RTPI Journal) March 1972.
 Le Breton, P.P. & Henning, D.A. "Planning Theory" (Prentice Hall, N.J.) USA. 1961.
 Mauch, S.P. "A Hierarchical Model of the Planning Process" in (Town Pl. Review, Vol.44. No.2) 1973.
 Perks, W.T. "Basic Components of the Planning Process" in (Journal of the TPI of Canada, Vol.11, No.2) 1972.
 Sarly, R.M. "The Planning Process" (P.M. Research Unit, WP-2, School of Env. Studies, V L, London) GB. 1972.
 Chadwick, G.F. "A Systems View ... op.cit.
 McLoughlin, J.B. "Urban and ... op.cit.
 Catanese, A.J. & Steiss, A.W. "Systems Planning ... op.cit.
 Emery, J.C. "Organizational Planning and Control Systems" (McMillan Co. N.Y.) USA. 1959.
 Ackoff, R.L. "A Concept of Corporate Planning" (John Wiley & Sons Inc., N.Y.) USA. 1970.

The basic structure of the planning process can be delineated as follows:

- Stage One: 'Information Subprocess' (1) (INS)
 (Getting Information, Evaluation, Selection, Classification and Problem Finding from the 'Milieu-Entier' (i.e. real world).
- Stage Two: 'Evaluation Subprocess' (1) (EVS)
 (Evaluation through different methods and techniques of the outcome of the other subprocesses. It must have an inbuilt 'Do Research' Subprocess).
- Stage Three: 'Goal Setting Subprocess' (1) (GSS)
 (Establishment, Evaluation and compromising incompatibilities amongst Criteria, Values, Objectives and Goals).
- Stage Four: 'Modelling of Reality Subprocess'(1) (MRS)
 (Model design, Simulation, Evaluation Validation and Application).
- Stage Five: 'Alternatives Generation Subprocess (1)(AGS)
 (Alternative Generation Evaluation and Selection).
- Stage Six: 'Plans Generation Subprocess' (1) (PGS)
 (Plans Generation, Evaluation and Selection).
- Stage Seven: 'Decision Making Subprocess' (1) (DHS)
 (Plans Evaluation and Selection by Decision Makers, (i.e. politicians)).
- Stage Eight: 'Implementation Subprocess' (1) (IMS)
 (Accomplishment of the plan selected in the Milieu-Entier)
- Stage Nine: 'Control Subprocess' (1) (COS)
 (Performance Evaluation and control of immediate action).

(1) Each stage is in itself a process being formed by and considered as a 'subprocess' of a larger one. But in being treated as a 'subprocess' they do not lose either their own boundaries and internal laws or their fundamental role within the general structure with which they interact permanently through the feedback dynamic mechanism.

TABLE NO.2 'The Basic Structure of the Planning Process as Formed by a Set of Nine Subprocesses'

The transformation laws in both structures, the planning 'process' and the nine stages or 'subprocesses' which form it, do not respond to laws of operational systems (i.e. mathematics), but depend rather upon the interplay of anticipation and correction (trial and error). This is because planning as here defined is related by definition with time. Once a 'plan' is implemented it is not entirely reversible. It may, however, require to be altered, changed, modified or even cancelled according to the information that can be gathered as to its impact on both man and environment, because the outcome of the whole planning process is not a perfect operation which can exclude errors a priori.

As compared with both 'General Theory of Planning' of Ozbekhan and 'Systemic Planning'(1) of Catanese and Steiss, this structural approach enjoys two fundamental advantages. Ozbekhan avoids the issue of 'power' in his theory even after recognizing that ...

"It is one of the central problems that confront us ... 'power' (is not just a political issue) but it is personal, social, institutional, situational - it is ecological ... 'Power' is at the heart of every argument with which planning is concerned" (2).

While Catanese and Steiss interpret the 'systemness' in planning in a cybernetic mechanical way. They represent the feedback system as indirectional (clockwise between 'input', 'conversion mechanism' and 'output') following the engineering paradigm.

Firstly, as regards power, this structural approach includes in its stage no.6, the 'decision

(1) Catanese, A.J. & Steiss, A.W. "Systemic Planning ... op.cit. (p.13).

(2) Ozbekhan, H. "Towards a General ... op.cit. (pp. 153-154).

making subprocess'. This represents de facto the presence of 'power' within the planning process. Planning without decision making (1) becomes an academic conjectural exercise. Decision making without planning becomes a dangerous pragmatic action bound to deal mainly with matters of immediate power, ignoring the long-term repercussions. The dichotomy between 'theoretism' and 'pragmatism' must be somehow settled within the planning process.

Secondly, the structural approach goes beyond the unidirectional feedback engineering paradigm brought about by Catanese and Steiss. The so-called 'conversion mechanism' should be formed, if properly understood, not as a 'black box' in the systems jargon but rather by a set of at least seven sub-processes (i.e. goal setting modelling of reality, alternatives generation, and so on ... see, Table No.2, p.102) which are bound to feed back to the 'inputs' (i.e. information subprocess) before any 'output' is actually implemented. (This is further explained in the next section).

(1) 'Decision Making' here implies, not the kind of 'decision' that the planners have to take when confronted with the 'binary decision point' within the planning process; but rather, the kind of decision that is introduced from 'outside' to 'inside' the process. It can be taken by a representative or group of representatives of any of the forms of 'power' mentioned by Ozbekhan, the political being the most prominent in the Mexican context.

6.4. The 'Systemness' in The Structure of the Planning Process.

Following the biological analogy used by Boulding, it may be said that structuralism not general systems theory detects and formulates the skeleton of science on which ... "to hang the flesh and blood of particular disciplines" (1). Moreover, the analogy can be expanded beyond flesh and blood to the 'digestive', 'respiratory', and 'nervous' systems which are inbuilt in the body but at the same time are in permanent interaction with themselves and the surrounding environment.

The apparent contradiction, stated at the beginning of the chapter, between the redefinition of the "man-environment paradigm" in terms of systems, and the shortcomings of existing systems theory, can be resolved in terms of the foregoing reformulation. "Systemness" can be explained, and used, if the structure of the planning process is seen to consist of the nine sub-processes related to one another in the way already described.

The fundamental components of a mechanistic system are simply represented in the following figure:

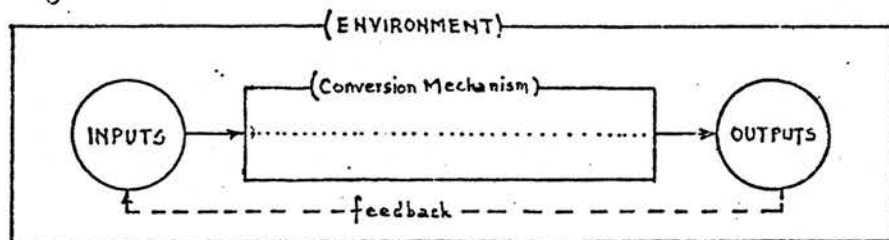


FIGURE NO.11 'The Fundamental Components of a Mechanical System'
(After Catanese & Steiss: "Systemic Planning" ... op.cit. (p.5)

(1) Boulding, K.E. "General Systems Theory - The Skeleton of Science" (Management Science, Vol.2, No.3, April 1956) (p.208).

Here there is a one-way feedback from inputs to (→) Conversion Mechanism, from Conversion Mechanism to (→) output and from output back to (→ inputs). The information circulates 'clockwise'. This is not the kind of system which planning has to face. When both human behaviour and ecological factors get interwoven the system becomes much more complex. It is what I have called the (M-NS DH)-system.

If planning is meant to tackle such a system it must be a multidimensional activity embracing social, economic, psychological, anthropological, political, physical and technological factors. The task of structural planning comprises in a comprehensive way what is happening in man, nature and ecosphere as subsystems and the interrelations, interactions and interfaces amongst them.

Then, the fundamental components of the system even though remaining essentially the same relate to each other differently and the 'Conversion Mechanism' instead of being a 'black box' becomes an 'internal self-organizing mechanism' formed by seven subprocesses containing a series of feedback loops within themselves, amongst themselves and with the inputs and outputs outside the conversion mechanism. It can be portrayed as follows:

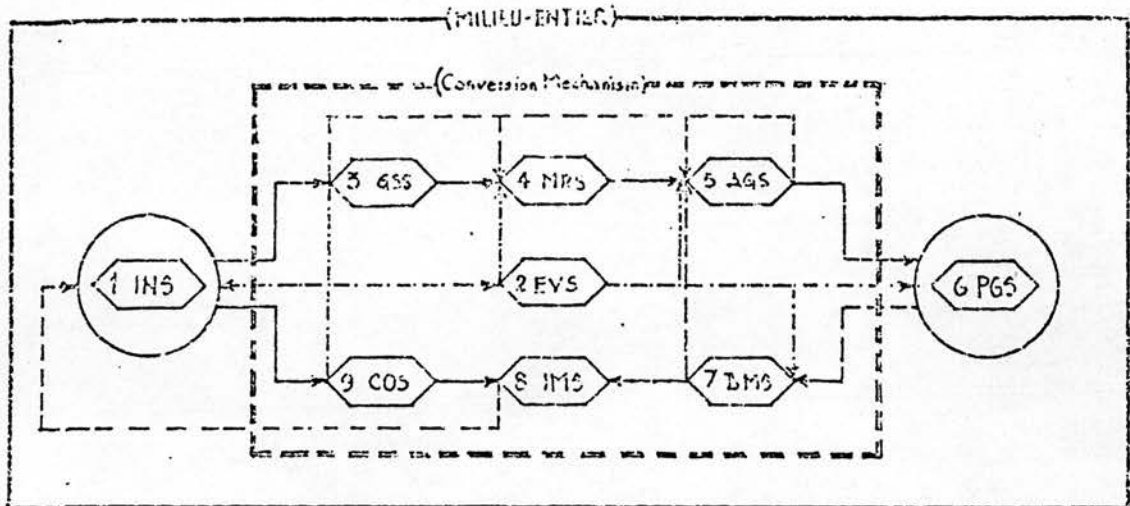


FIGURE NO.12 'The Fundamental Components and Interactions of the Structure of the Planning Process Considered as an Inventive System'. (1)

KEY (Read Figure together with Table No.2, p. 102)

It is now apparent how every single subprocess is connected with the others in permanent feedback, the role of evaluation being prominent, since it is involved in each one of the other subprocesses (with the exception of the 'implementation subprocess (IMS)').

Each subprocess can be seen now as a subsystem generating certain transformations.

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- (1) An 'Inventive System' - according to Jantsh, E. - is that 'which changes its internal organization in accordance with its own intention to change the environment by inventing (internally generating) information', (see: "Forecasting and Systems Approach: A Frame of Reference" (Management Science, Vol.19, No.12) USA, 1973 (p. 1359)).

6.5. The Structure of the Planning Process as Formed by a Set of Nine Subprocesses

Once the subprocesses are recognized and organized within the planning process, the next stage is to see how they are most likely to function internally. Of primary importance too, in this analysis, is the discovery of the main interconnections amongst them, i.e., the manner in which they operate externally, in order to adjust the 'inner' to the 'outer' structure.

The Figure No.13, page 119, shows the synthesis of what can be considered as the first attempt at comprehensive' (1) or 'integrated' (2) structural

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- (1) 'Comprehensive' must not be confused with what has been called 'comprehensive planning', which according to Friedmann, J. 'has turned out to be a colossal failure'. He invented a new term, namely 'urban policy analysis' the validity of which is restricted to urban planning in the regional context (see: 'The Future of Comprehensive Urban Planning' (Public Admin. Review, Vol.31, No.3) M/J 1971. In spite of this and many other sharp critical views, the popularity of 'comprehensive planning' seems to continue largely undiminished. For instance, as recently as 1974 the United Nations published (in cooperation with the McMillan Co. London), a book based on the outcome of the first UN Conference on the Human Environment, held in Stockholm in 1972, the name of which is: "Human Settlements: The Environmental Challenge" Chapter 3 named 'A Comprehensive Approach' deals with Comprehensive Urban Approach, ignoring totally Friedmann and others criticisms and warnings. 'Comprehensive' means for me: "Approaching the (M-NS DH) - system as whole".
- (2) 'Integrated' must not be confused too, with what Boudeville, J.R. named 'integrated' regional development; (based on economic analysis) or what Fromm named 'Integrated Planning' crying out for the system 'man' to be integrated into the system 'enterprise-government-society'. 'Integrated' means for me: "Sustained as a structured whole by formation of the three subsystems into the (M-NS DH) system".


systemic analysis of the planning process. It is liable to require further correction if it intends to be dynamic but it is my belief that it contains the major elements essential to a coherent structure. (The following verbal presentation must be read simultaneously with Figure No.13, page 119).

6.5.1. Information Subprocess (INS)

This subprocess is formed basically by two further subprocesses: The 'Get Information' and the 'Do Research'. The first one when operating properly uses 'n' sources of information which provides the 'rough information' taken from the 'Milieu-Entier'. Such rough information has to pass through 'selection', 'classification' and 'analysis' sub-subprocesses, according to the specific purposes. If after evaluation the information reveals 'no problem' the first positive feedback loop is generated (i.e. the creation of an information bank). If after evaluation there is a problem, and the information is not either good and/or enough, the second subsystem is activated: "Do Research", which using a certain set of survey methods and techniques goes to the 'Milieu-Entier' (i.e. real world) to provide new (!) sources of information. The whole previous sub-subprocesses are performed creating a second positive feedback mechanism until the analysed information responds through evaluation to that which is set up as 'good and enough' information. Permanent inflows of information are required if the intention is to maintain 'openness' to future unpredictable changes ($t_0, t_1, t_2 \dots t_n$).

6.5.2. Evaluation Subprocess (EVS)

As has been mentioned earlier, this subprocess is in permanent interaction with all the others. The contact is established in what are symbolised as 'binary decision

points' (). Perhaps this subprocess is the 'Achilles' tendon' of the whole planning activity. Because apart from having to 'evaluate' every single subprocess with different characteristics and outcomes (through a 'set of evaluation methods and techniques') it has still to face two further problems: First, the 'do research' if the problem cannot be properly evaluated, to produce a new one, to test it and to apply it, and secondly, it is the main entry for 'subjectivity', 'cultural factors' and 'technical bias'.

The whole process may become a 'mockery of planning' if evaluation is distorted. Moreover, it may be that the planning process is 'technically' performed but if the initial assumptions on which the evaluation is based are ill-founded, the outcome with all its scientific pretention is bound to be ineffective and dangerous when implemented.

6.5.3. Goal-Setting Subprocess (GSS)

It is in this subprocess that the 'desired changes extended into the future' (as seen and perceived in the present) have to be organized. Hierarchically, social norms and natural laws (man-nature factors) must be integrated at this stage before anything else. Any attempt at future change which does not compromise these two sets of mutually dependent requirements is bound to be harmful to man and for nature. (Heavy emphasis was placed on this in the first part of this thesis.) From this 'normative-ecological' system of values, long-range 'structured objectives' can be generated and established in a form of far reaching 'general policies'. Such general policies, are the frame (i.e. substructure) of reference from which medium and short-term 'socio-ecological goals' may be derived. These are the goals which have to be adjusted through the so-called 'goals

achievement matrix', the outcome is evaluated and if there is incompatibility another internal feedback loop is generated going back to the higher level of 'normative-ecological-values', passing through the structure objectives and back to the goal achievement matrix until the strategic socio-ecological goals are made to fit with the policy objectives.

From this emerges the set of 'operational goals' (or medium-and-short-term set of 'operational targets') which are one of the main inputs in the alternative generation subprocess (AGS).

6.5.4. Modelling of Reality Subprocess (MRS)

A model is in general an ideal representation of reality. It is a tool by which one strives to represent the structure contained within and hidden behind complexity. Structure implies a certain kind of order, which must be sought deliberately and therefore the permanent interaction between (MRS) and the information subprocess (INS) is essential. But because of both 'selectiveness' of information and 'dynamicacy' of reality, the model cannot be a perfect one-to-one representation of reality (i.e. isomorphic), at best it can be an approximation to what is happening in the Milieu-Entier, so, the model of reality cannot be 'homomorphic'.

The very fact that we are dealing with subprocesses which contain both human and non-human events means that the planning process has to deal simultaneously with internal and external self-organizing behaviour systems. The former systems are 'adaptive' and 'inventive', the latter, 'purposive', 'heuristic' and 'purposeful'. (1)

(1) According to Jantsch an 'adaptive' system adapts itself to changes in the environment through changes in their internal organization by using pre-programmed information; whereas 'inventive' (or human action) systems change their internal organizations in accordance with their intentions to change the

From this one can understand that the (M-NS DH)-system which I have proposed as one way of looking at the Milieu-Entier is far too rich and too complex to be correctly modelled without a proper iterative approach which responds to trial and error approximation.

The iterative approach here proposed is the following:

First, from the 'information subprocess' (INS) the detected problem is carried over to the process in question (MRS).

Secondly, an initial model is constructed (M₀). This requires a high level of abstraction and intuition which can be accomplished only by hard work and observation.

Third, once the initial model is completed its simulation is required. Information that has passed the whole subprocess explained in 6.5.1. is used for this simulation. Simulation leads to the discovery of the internal inconsistencies of the model after testing and comparing against what has been considered as a

(1) (Continued from previous page)

environment by inventing (internally generating) information. As far as the external self-organizing behavior systems are concerned; a 'purposive' system pursues prescribed strategic goals or multi-goal patterns, but selects the corresponding operational targets, a 'heuristic' system selects its goals or multigoal patterns flexibly within the framework of a prescribed overall policy and finally, a 'purposeful' system formulates and selects policies in the light of the long-range outcome of its own and its environment's potential dynamics.
(See: Jantsch, E. "Forecasting and Systems Approach" ... op.cit.)

'significant representation of reality', this further leads to a model reformulation (M_1) which in turn has a feedback with the information subprocess (INS). Model simulation may be expected to have several revisions - model reformulations - until a model is considered through the evaluation subprocess (EVS) as worthwhile for validation ($M_2, M_3, \dots M_n$).

Fourth, the final model (i.e. M_n) is chosen as the one to be used. 'Final' does not necessarily imply either that it is completed or that it becomes 'closed' to further revisions. It must remain open to new inputs from both refined information and new methods and techniques of testing and evaluating.

In the synthesis the model should be formed by a set of representative variables (qualitative and quantitative) from the triad of subsystems defined as 'open sub-system man', (OSM) 'open sub-system nature (OSN) and 'open sub-system ecosphere', (OSE) and by the triad of subsystems of their interrelations: ('OSM-OSN') subsystem, ('OSM-OSE') subsystem and (OSN-OSE) subsystem.

Every single subsystem above mentioned is in itself highly complex and requires different and specific methods and techniques for testing and evaluating it. The $f(x,y)$ n symbol means: 'set of representative variables (quantitative (x) and qualitative (y)) which can delineate the open subsystem 'n'.

What I have depicted here is a very general initial model (i.e. fundamental structure) to which 'systemness' can be attached and in a way explained. This is indeed what should be called a large-scale or macro-model, and it is immediately apparent that any reasonable approach must be 'inter' and 'trans-disciplinary' (1), because of

(1) This is further discussed in Appendix No.3 (p.266-99).

the incapacity of single, multi and pluri-disciplinary approaches to face such complexity and variety with a reasonable degree of both flexibility and objectivity.

6.5.5. Alternatives Generation Subprocess (AGS)

It is in this subprocess that the output of the previous four subprocesses come together in order to generate (or produce) alternative changes which seem to suit the pre-visualized future state.

On the one hand, one has the set of operational goals (or 'operational targets') as the input provided by the 'goal setting subprocess' (GSS); and on the other one has the 'final model' (M_n) as the input supplied by the 'modelling of reality subprocess' (MRS). In order to generate alternatives, certain hypotheses have to be formulated on the basis of the available information (obtained from the 'information subprocess (INS)'), and forecasting methods and techniques have to be used in order to project current trends so as to foresee the possible future states. Alternatives generated through this process have to be evaluated, this being the point of contact with the 'evaluation subprocess (EVS)'.

If the alternatives do not correspond to the operational targets and/or distort the final model (M_n), then one is faced with the problem of checking - in a feedback process the incompatibilities amongst the operational targets assumed, the hypotheses made, the forecasting methods and techniques used and the evaluation criteria applied when examining the first alternatives obtained in the subprocess in question. Once incongruences are disentangled the output of this subprocess is a 'set of selected operational alternatives' which pass as an input to the next subprocess.

6.5.6. Plans Generation Subprocess (PGS)

It is in this subprocess that a 'set of selected operational plans' are generated, based on the inputs from both the 'alternatives generation subprocess (AGS)' and the 'information subprocess (INS)' and the evaluation - much in the same way as in the previous subprocess - of the output. At this point it is worthwhile to note that up to this subprocess the decision-making involved as to whether to pass to the next stage, or to feedback into previous subprocesses (or even to expand further the action in one specific subprocess) is mainly taken by 'technicians' (i.e. planners). Here the so-called 'planning methods and techniques' are used for the production of the above mentioned set of 'operational plans'.

6.5.7. Decision Making Subprocess (DMS)

As has been stated earlier (Section 6.3.) it is in this subprocess that the two worlds, the 'technical' and the 'political' have to come to terms with each other.(1) The technician's set of values and criteria are not always in harmony with those of the politician. The search for 'power' (in its wider meaning) can indeed affect either or both of them, and very likely in different directions. The ideal situation would be that in which both would look towards the same essential objective, i.e. 'survival of mankind in profound harmony with nature'.

(1) See for instance: Davies, M.R. & Lewis, V.A. "Models of Political Systems" (Pall Mall Press, London) GB. 1971. McDougall, G. has stated that "Planning Theory must begin by recognising the political nature of the planning act. Any attempt to "depoliticise" planning to create a neutral "scientifically" based planning rests on a fallacy". (See, "The Systems Approach to Planning: A Critique" Socio-Economic Planning Science. Vol.7, Pergamon Press, GB. 1973 (p.89)).

Further main inputs in this subprocess are the 'constraints' imposed by the Milieu-Entier (obtained through the information subprocess (INS)) as far as resources (human, natural, economical, and so on) are concerned. The main task of this subprocess is optimization.

'Optimization' here means more than the 'finding of optimum solutions to management problems' as viewed in the field of operational research; it implies the optimum solution for the full development of man with the maximum care of the ecosphere and with the minimum waste of human and non-human energy. Once again the evaluation process (EVS) has a role to play in relation to the 'problem finding binary decision point'. If optimization can for any reason not be attained, then a series of feedback loops occurs, going backwards to different previous subprocesses until the main source of the problem can be detected and corrected. Then the planning process is performed in the way hitherto explained.

The enormous difference between the mechanistic approach to systemness and the one here developed, in which the so-called 'conversion mechanism' is in permanent interaction with the 'inputs' (Information Subprocess (INS)) and the 'outputs' (Plans Generation Subprocess (PGS)), should be borne in mind.

6.5.8. Implementation Subprocess (IMS)

Once an optimum plan is selected it is carefully programmed for its implementation, being still in contact with the information subprocess (INS) through which details and short term operational targets have to be reconciled with the resource availability. Few plans reach this stage, and still there is room for asserting that during programming, several major revisions

may alter, though not substantially, what was considered the optimum plan. When approaching planning as an open structured process, the last solution has no reason to be considered 'final' or 'complete' as a static structure, but is rather an approximation to reality in which the parameters, variables, and relationships are in a permanent process of transformation.

6.5.9. Control Subprocess (COS)

Any action which makes changes in the Milieu-Entier engenders new information, which can be acquired immediately through the information subprocess (INS). A series of transformations starts taking place and unfolds in time. When implementation begins the 'time' dimension is introduced in the planning process. The information used before implementation is marked by (t_c), whereas the information utilised after implementation is labelled as (t_i) where (i) stand for any (1.2. 3...i) time interval in which verification of the direction in which changes are taking place needs to be disclosed

'Control' is not here considered as a subprocess in the narrow mechanistic conceptualization used in both systems theory and cybernetics, (because neither of them can deal with invertive, heuristic and purposeful systems in which human behaviour is involved). It is used rather as a wider concept. Both the so-called 'error detector' and the 'controller' should be responding to the 'normative-ecological system of values' set up as the basis of the 'Goal Setting Subprocess (GSS)'. In other words, any action (i.e. implementation) on the Milieu-Entier which affects negatively any of the man, nature and ecosphere subsystems should be detected, controlled and removed. If some problems are discovered after implementation (t_i), the whole planning process

is bound to be reviewed from its very early stages, forming in this way a kind of circular process evolving spirally through the time scale.

This is perhaps one of the weakest areas in the whole process. If few plans have been implemented (as compared, let us say, with numbers of plans generated) still fewer have been designed which have contained a proper and operative control system. The most common practice seems to be that of the 'linear planning approach' in which implementation is the 'climax', and which later on will confer a 'lesson from experience' from which one can learn how to both improve the 'pros' and avoid the 'cons'. It is true that human learning is based on trial and error because of the uncertainties of the future but it is true as well, that control if properly understood and used within the planning process, can help to reduce to the minimum waste of resources and energy.

~~The synthesis of this section is depicted in Figure No. 43, the key is:~~

~~Subprocess (or planning stage) which contains within itself one or more subprocesses and for one or more subsystems.
 Binary decision point (yes or no). This is the point of contact between any subprocess and the evaluation subprocess, the outcome has two alternatives either it goes to the next stage or goes back to other internal and/or external subprocesses.
 Certain information about the different elements which are forming the subprocess. They formed the organized (rational) sequence the climax of which are both evaluation and for contact with the next stage.
 Flow of information in one direction
 Flow of information in both directions (feed back loop)
 Flow of information between 'evaluation subprocess (EVS) and the others.
 t_0 = Initiation of the whole planning process
 t_i = Information generated after the implementation subprocess (IMS) has been accomplished.
 P.F.? = Problem finding.~~

CHAPTER VII 'STRUCTURAL REGIONAL PLANNING FOR DEVELOPMENT'

In the previous chapter an attempt was made to reformulate the planning theory by disclosing and explaining its basic structure. It fulfils a major part of the first half of this research task the intention of which is to cover both the theoretical and the practical areas of planning endeavour. In this chapter I will strive to adapt such a general theoretical reformulation to the specific field of regional planning. In doing so, I am not going to fall into the same error - namely disciplinary compartmentalization - which I am trying to counteract, for the obvious reason that 'regional planning' if properly understood is by its very nature 'open' and 'inter-disciplinary'.

Before going any further it is essential to define as clearly as possible the meanings of 'region', 'development', 'developmentism', 'basic human needs', 'psychological pollution', 'standards of living' and 'level of content', and then synthesize them in the new concept of 'structural regional planning'.

7.1. The Meaning of 'Region'

'Region' has been defined in many different ways according mainly to the discipline involved (geography, economy, etc...), the factors considered (social, physical, political, ecological, etc...) and the purposes for its designation. Any attempt at general definition is bound to be an impractical academic exercise with little or no use in the world of practical realities. Perhaps all the definitions I have come across can be divided into two broad subgroups: Those which belong to the 'academic realm' and those which belong to the 'practical world'. An example of the

former is Glikson who states...

"The Region is the primal spatial framework, the economic and ecological compartment for the maintenance of mutual assistance among different communities, and for the preservation of characteristic natural cycles ... (its) boundaries are defined by topographical, agricultural, social, economic or traditional factors". (1)

Carrillo-Arronte, a representative of the latter category, has defined a Region as the ...

"Geoeconomic space made out of one or more contiguous states with a greater degree of (natural, social and economic) similarity or homogeneity among themselves than with their neighbouring states". (2)

The enormous difference among these two representative quotations is the political factor. The 'academic region' hardly corresponds to the 'political' one. The so-called 'administrative boundaries', (namely borough, county, state and so on) established long before Regional Planning emerged in the field of social sciences impose serious limitations upon the former.. It is not too risky to assert that administrative boundaries were constituted as a response to political (i.e. power) factors rather than any other ecological or social considerations. Large bureaucratic organizations with vested interests have been built upon these illogical divisions. Power is involved in any single recognized division and a short-sighted approach towards coordination is its natural outcome. There is no rational explanation for the existence of the 'administrative boundaries' other than power. One of the major handicaps of

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- (1) Glikson, A. "The Regional Approach to Planning" in "Regional Planning and Development" (A.W. Sijthooff's Uitgeversmaatschappij, N.V.) Netherlands 1955. (p.23).
- (2) Carrillo-A, R. "An Empirical Test on Interregional Planning" (Rotterdam Univ.Press) Netherlands, 1970 (p.66).

Regional Planning is that it is trying to operate, to explain and to justify its role in relation to irreversible illogical political sub-divisions. The two worlds seem far apart from each other.

The 'theoretical' region considers the completeness of phenomena, and somehow intends to unite different factors into organic wholes, considering geographic, economic, ecological and social events as the key for its definition. The 'administrative' region on the other hand has been determined 'a priori', Politico-administrative divisions impose critical limitations to rational regionalization.

The Mexican case is a prototype of this painful regional incongruency. A large amount of academic research in the past decades has produced the most diverse gamut of regions (1). Moreover, in the last three years (after the submission of my previous thesis) still 'new' regions were generated by different institutions.(2) They all were meant to follow certain recognized techniques to determine 'coherent regions' (namely 'natural', 'homogeneous', 'nodal', 'functional' and 'formal') (3). Nonetheless, the regionalization

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- (1) See especially Chapter I, Section 1.2. of my M.Sc. Thesis: "A Quantitative Methodology for Guiding Planning Policies for Improving Agricultural Production in Mexico" (Edinburgh University, Nov. 1973) (pp.22-37).
- (2) See for instance: Banamex, "Exámende la Economía Regional" (Regionalización Banamex) In (Exámen de la Sit. de Mex Vol.60, No. 594) 1975. SP-ONU. "Estrategia de Desarrollo Regional para México" (Doc. Preliminar) Mexico. 1975.
- (3) See for instance: Hall, P. "Theory and Practice ... op.cit.
 Glasson, J. "An Introduction to Regional Planning" (Hutchinson Ed. London) GB. 1974.
 Friedmann, J. & Alonso, W. "Regional Development and Planning" (MIT Press, Cambridge, Mass.)USA, 1964.
 Nols, E. "Nature, Dimension and Content of the Region" (I H & Pl. Bruxelles) Belgium, 1969.

put forward by the administration of the former president of Mexico Luis Echeverria A. as early as 31st March 1975 (see Figure No.14, p. 124) did not correspond to any of the previous regionalizations mentioned. (2)

What is clear is that such regional division was a product of the rigidity of the Mexican political-institutional structure which undoubtedly is the paramount criterion for any planning. Natural regions are split into two or more parts according to divisions made a long time ago. This imposes limitations and acute problems for dealing with the idea of social and biological integration in an specific geo-ecological set-up. This problem will be discussed in more detail in Part C of the thesis.

For this theoretical reformulation one has to find a way of bringing these two different worlds together ... 'Theoretical Regionalization' overlooking the limitations raised by the political-institutional structure is bound to remain a mere academic exercise. 'Practical regionalization' disregarding the openness of its illogical boundaries and the relations with the immediate neighbourhood is bound to carry on with the same meagre results as at present.

(1) (Continued from previous page)

Lankford, P.M. "Regionalization Theory and Alternative Algorithms" (Geographic Analysis) No.2, 1969.
 Vance, R.B. "Region" (IE of SS, Vol.13 McMillan-The Free Press, 1968).
 Boudeville, J.R. "Planning Methods for Integrated Regional Development" (Ekistics, Vol.32, No.192) 1971.
 Brown, L.A. & Holmes, J. "The Delimitation of Functional and Nodel Regions" (J R.S. Vol.11, No.1) 1971.
 Friedmann, J. "The Concept of Planning Regions" (UN/DESA, W.P. No.12) 1958.

(2) Comisión Nacional de Desarrollo Regional: "Desarrollo Regional" (Secretaría de la Presidencia, México) Abril de 1980. (p.21.).

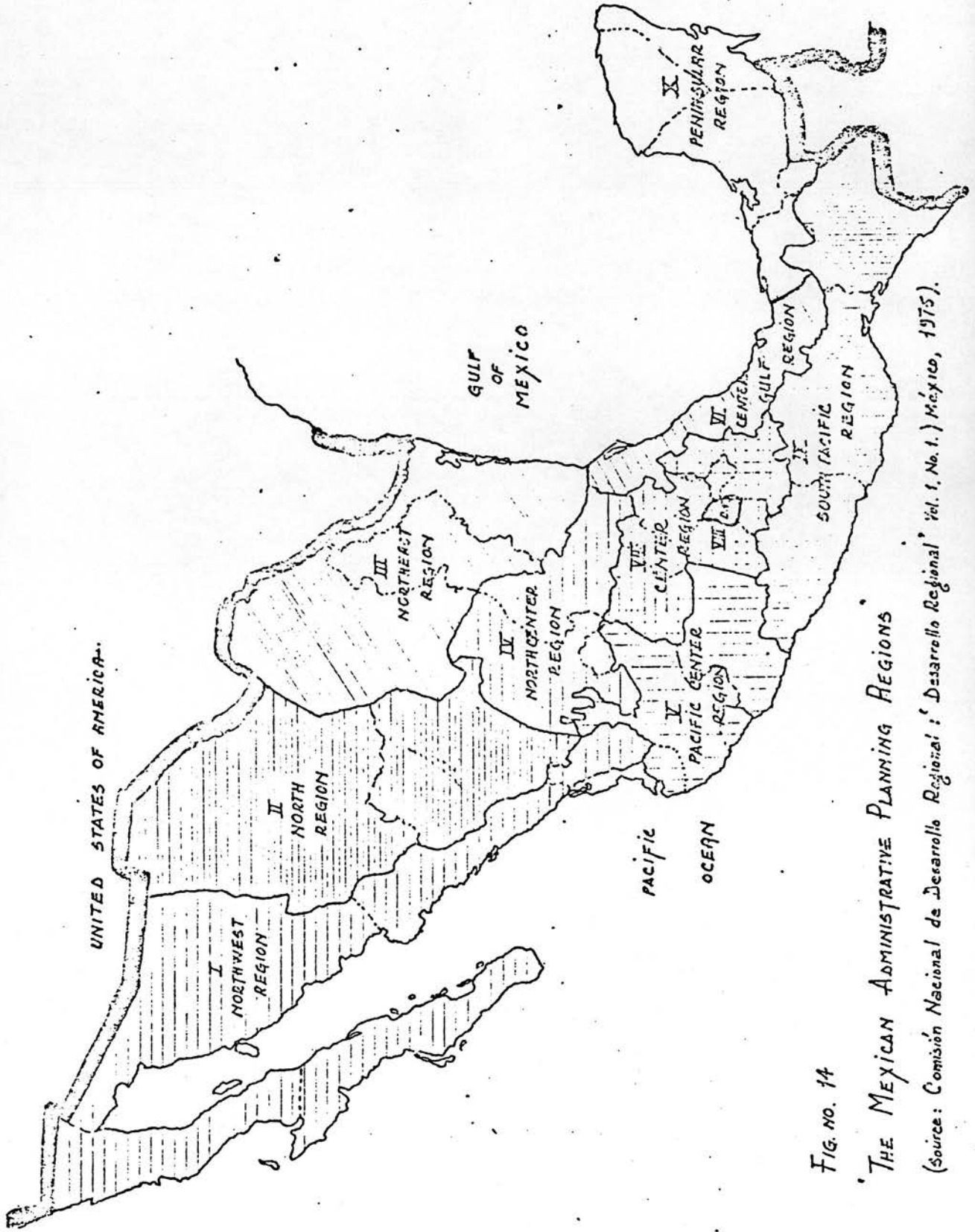


FIG. NO. 14

THE MEXICAN ADMINISTRATIVE PLANNING REGIONS

(Source: Comisión Nacional de Desarrollo Regional: 'Desarrollo Regional' Vol. 1, No. 1.) México, 1975).

A 'Region' on this basis will be that which accepting the political-institutional constraints imposed a priori, will attempt coherency and openness. In most cases coordination will be required not only between but also within regions. Coordination beyond vested political interests is the first condition 'sine-qua-non' for regions to operate as entities. Planned and coordinated regions should address themselves (within their recognized limitations) to the re-establishment of biosocial dynamic stability.

7.2. The Meaning of 'Development'

The word 'Development', like 'Region', has been defined in so many different ways that I will concentrate on some of the main trends of its meaning, and then draw out what can be considered a valid definition for this research.

It is now obvious that development means something much more complex than the narrowly unilinear economic development concept (1), measurable mainly by indicators such as GNP (2). Moreover, the World Bank experience in development has been recognized by its president as 'incomplete' when declaring that, in seven years "... I have learnt that the development process is much more

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- (1) See for instance: Rodney, W. "How Europe Underdeveloped Africa". (Bogle L'Ouverture, Pub. London) GB. 1972.
 Silb, L. "Shattered Assumptions", in (Ceres Vol.6 No.1) J/F. 1973.
 Pearson, L.B. "The Crisis of Development" (Pall Mall Press, London) GB. 1970; Vermeulen, A. & Sanders, C. "A Study in Development" (Rotterdam Univ. Press, Rott.) Netherlands, 1970; Seers, D. "The Meaning of Development" in (Int. Dev. Review) Dec. 1969; and "Development in a Divided World" (Penguin Books) 1971.
- (2) Sundt-Mortensen, M. "Forget About GNP" (Ceres, Vol.4 No.1) 1971. ILO "Time for Transition- Mid-Term Review of the Second UN Dev. Decade" (ILO) Geneva, 1975.
 Myrdal, G. "Against the Stream-Critical Essays on Economics" (McMillan Press, Ltd. London) GB. 1972.

complex than I thought it was" (1).

No wonder then, that Bagai has said: "It is now being recognized that 'development' means a total transformation of society which cannot be brought about by the application of single element economics - pulled out of the total context" (2), nor even that Francis Blanchard has concluded:

"It is now an accepted fact that the very pace and pattern of ... development over the past quarter of a century have generated social, economic and ecological imbalances" (3).

According to Seers, 'Development' is inevitably a normative term the universally accepted aim of which must be, 'the realization of the potential of human personality' (4). Barbara Ward has conceived sound development as that which put emphasis on ... "decentralization of ... industrial development (towards) integrated centres in which technology, the balance of population, the growth of the distribution of income, begin to counter the fatalities" (5). For the ESCAP the current 'development' in developed societies is sick and should be urgently and radically reoriented.

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- (1) McNamara, R. "New Plans for Aid and Food" in (Europa, Vol. II, No. 6) The Times, March 1975.
- (2) Bagai, M. "GNP-ism" in (Ceres, Vol. 5, No. 4) 1972 (p. 23).
- (3) Blanchard, F. "Time for Transition: A Mid-Term Review of the Second United Nations Development Decade" (ILO Report prepared for the meeting) in (Society for International Development: "International Development Strategy" Vol. XII, No. 3, May-June 1975, p. 1).
- (4) Seers, D. "The Meaning of Development" in (International Development Review, Dec. 1969. (p. 2).
- (5) Ward, B. "The Urban Process in Developing Countries: The Problem Stated" in (Franklin, G. "Summary and Report: Overseas School" Town and Country Planning, Summer School, 6-18 Sept. 1974 (p. 56).

The message is:

"Existing approaches to development planning have shown themselves no match for the acute problems facing the region. On some (developing) countries, a staggering proportion of the population, involving hundreds of millions of people, is at the margin of subsistence"(1).

Goulet has defined 'Development' as follows:

"Development is the entire gamut of changes by which any social system ... moves away from a condition of life widely perceived as unsatisfactory towards an alternative condition held to be 'humanly better' ... (therefore) it embraces political, cultural as well as economic and social processes. It is both a cluster of societal goals and a congeries of processes by which such goals are pursued"(2).

Dom Helder Camara prefers to speak about 'liberation' instead of development because for him the term or the expression 'development' has been distorted. He has said:

"In speaking about development you are often talking about economic growth that is to the advantage of privileged groups and is achieved at great cost to thousands and even millions of people over the world"(3).

For Myrdal 'Development' means ...

"... the movement upward of the whole social

- (1) United Nations Economic and Social Commission for Asia and the Pacific (ESCAP): "Fundamental Changes in Development Strategies" in (Society for International Development, Vol. XII, No. 2 (p. 3).
- (2) Goulet, D. "Technology, Development and Values" in (Ceres, Vol. 6, No. 3) M/J 1973 (p. 3).
- (3) Camara, D.M. "Liberation instead of Development" in (Cooperation Canada, No. 20, CIDA) May/June 1975 (p. 4).

system. In other words, not only production, distribution of the produce, and modes of production are involved, but also levels of living, institutions, attitudes and policies. Among all the factors in this social system there are causal interrelations ... the coefficients of which are largely unknown or not available in precise form ... for this reason alone, the possibility of working out an 'index' of development in this sense is not within sight"(1).

From what has been quoted and in general from what has been reviewed in this area during the last three years (2), it has been possible to detect, in spite of the diversity of definitions, certain common characteristics:

1. Development implies 'demographic change', 'improvement', 'structure' and 'systemness'.
2. Development has been defined by DCs in a narrow and biased sense.
3. Development is much more complex than was thought in the past.
4. Development must be redefined in terms of the wholeness of the man and nature phenomenon.

On these bases the definition of development, valid for this research is the following:

"Development is the change towards 'improvement' -within the constraints set by the Milieu-Entier - of the Man-Nature Symbiotic Dynamic and Holistic System". In other words, it implies advancement, movement upwards, betterment and transformation within certain

(1) Myrdal, G. "Against ... op.cit. (p.190).

(2) The problem of development is a main concern of the majority of works referred to in this thesis as a whole. Definitions quoted directly in this section seem to me representative.

boundaries laid down not just by the immediate physical and social environment but also by anthropological, cultural and psychological environment. The appropriate system for dealing with is not merely social (as Myrdal suggests) but rather the much more comprehensive (M-NSDH) -system, as defined in this thesis. In this, 'Man' and 'Society' become a subsystem. In addition 'Nature' and 'Ecosphere' also become subsystems.

If 'development' requires to deal with complexity, it is imperative to see the wholeness of the phenomenon. The danger of getting lost in the middle of the 'jungle', and dispersed by the variety of subjects involved can be overcome only by discovering the fundamental structures and working with them on interdisciplinary bases. The complexity and the magnitude of the task goes far beyond the capacity of a single brain (whether or not 'specialist' or 'generalist'). I will refer to this subject further in the next chapter.

My definition closely resembles that of Dr. Akef, who, after a careful survey of the current meaning of 'development', presented a revised definition in the following terms:

"Development must mean change and advancement in a socially 'desired direction' - must originate from the ground up ... It should imply the enabling of people to use minimum resources to satisfy their expanding essential needs through a congruous set of relations between people and their social and physical environment ... It is therefore implied that economic elements, social elements and ecological elements should be considered as inseparable in the process of development" (1).

(1) Akef, Q.M.A. "A Prototype System for the Control of Land Use and Settlements in the Planned Development of Bangladesh" (Unpublished Ph.D. Thesis) (Dept. of Urban Design and Regional Planning, Fac. of Social Sciences, Univ. of Edinburgh, Scotland) GB.1975 (p.294).

7.3. 'Developmentism' or the Negative of 'Sound Development'.

Development, as here redefined, is opposed by its very nature to what has been called 'developmentism', (1) which means the refusal to accept that major changes are necessary in order to accelerate the present pace of development, and the belief that social disparities will gradually be smoothed out by the dynamics of development itself. The program of developmentism is 'develop according to the instructions' (given by DCs) and the desired alterations will happen automatically. A fundamental condition is the use of technology as the paramount component of economic development without much concern about either the subordination of the human factor, or its side-effects on the environment.

Development, if understood properly as a process, demands the qualities noted in our analysis of structures, these being wholeness, capacity for transformation and self-regulation. If current forms of development have failed (2), structural (i.e. major) radical alterations appear to be unavoidable (3).

The negative effects of the 'Developmentism' - for instance in Mexico - have been disclosed by Carrillo-Arronte, in the following declaration:

"The so-called 'developmentism' has had negative effects in the Mexican society. It keeps the majority of Mexicans in poverty, it accentuates the difference between social classes, it wastes and misuses human and natural resources and leads to foreign dependency" (4).

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- (1) Pebrisch, R. "Change and Development - Latin America's Great Task" (Praeger Publ., N.Y.) USA. 1971 (p.19).
 - (2) ILO: "Economic and Social Survey of Asia and the Pacific, 1974" as presented in "Survey of International Development" (SID, Vol. XII, No. 3) M/J. 1975 (p.1).
 - (3) See for instance: Bernstein, H. (Ed.) "Underdevelopment & Development" (Penguin Books, Ltd., England) GB. 1973.
 - (4) Carrillo, C.A. "El Desarrollismo en Mexico" (Excelsior) Mexico, 4/11/74 (p.17).

7.4. The Basic Human Needs and Their Ecological Implications.

The new definition of development implies basic (i.e. structural) changes in the value system attached to it (1). If the sustained 'rate of growth of production - consumption' is neither possible nor desirable, a new value system must be established and affixed to the definition. (2)

The concept of basic human needs appears to me to be the key to the new value system of development. Ehrlich (et.al.) when redefining development have called for ...

"... new standards of values ... that will permit access to the basic human needs of adequate food, shelter, clothing, education and medical care for all human beings ... (this means) careful attention to the quality of life within environmental limitations" (3).

Dr. Akef also refers to them in his definition of development ...

"... minimum resources to satisfy people's expanding essential needs through a congruous relation between people and their social and physical environment"(4).

Dr. Stavenhagen has also alluded to the necessity of going back to basic human needs, after stating that ..

"The economic growth based on both 'personal

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- (1) See for instance: Hunter, R.E. (et.al.) "Three-Dimensional Change" in (Ceres, Vol.6, No.1) 1973. Myrdal, G. "Gloomy Optimist" in Opinion in (Ceres Vol.5, No.6) N/D 1972.
- (2) Meadows, D.H. (et.al.) "The Limits ... op.cit. (p.191), and Masarovic, M. & Pistel, E. "Mankind at the Turning Point" (the 2nd Report of the Club of Rome) (Hutchinson of London) GB. 1975 (p.147).
- (3) Ehrlich, P.R. (et.al.) "Human Ecology ... op.cit. (p.272).
- (4) Akef, Q.M.A. "A Prototype System ... op.cit. (297).

profitability' within the free forces of a market economy and on the capital accumulation in few private hands do not conduce to the fulfilment of the basic human needs of the majority of the world population ... these being physiological, social and cultural (like food, clothing shelter, education, work, leisure, freedom and participation)" (1).

Barbara Ward and Rene Dubos have defined the minimum basic biological needs as:

"Food, shelter, health, and social organization"(2).

Finally, Dr. Hale and H. Dickenson - as recently as the current year (1976) have defined basic human requirements in the following terms:

"There are two basic requirements before all others which must be satisfied before life for a human being could possibly be considered to have a measurable quality. These two requirements are adequate shelter and adequate food and water"(3).

These requirements are discussed in the context of human settlements, in which people can provide themselves not only with them but also with ...

"... opportunities for creative work and adequate social organization in a balanced ecological arrangement" (4).

A serious problem emerges when one is faced with the questions ... Which are the 'minimum resources'

- (1) Stavenhagen, R. "Hacia Nuevas Metas de Desarrollo" (Excelsior, 29/VII/75) Mexico (p.13).
- (2) Ward, B. & Dubos, R. "Only one Earth... op.cit.(p.78).
- (3) Hale, L.J. & Dickinson, H. "Ecological Basis for Human Settlement" in "Human Settlements. A Commonwealth Approach" (Habitat, UN.Conf. on Human Settlements, Vancouver) Canada, 1976. (p. 9).
- (4) Ibid... (p. 9).

needed to satisfy essential needs ? What is the meaning of 'adequate' ? Where is the yardstick for measuring such a general term as 'adequate' ? What is the 'minimum level' accepted as to fulfill the basic requirements ?

There are not unquestionable criteria. There are not general rules to be applied with universal validity. The minimum levels accepted must be generated by each society responding in full understanding with its Milieu-Entier. Nonetheless, as a rule of thumb, one can detect not so much the accuracy of the limits established but rather the efficiency of actions performed by making the following query ... first, Is all the population properly fed ? (1) Secondly, Are all the people who are able to work employed ? (2) Third, Are all the people sharing the benefits of the wealth created? (3) Fourth, Are the environmental limitations considered before any action is carried out by which nature will be affected ?

If one or more of these key questions are answered negatively, it means that certain basic human needs and their implications for the environment are either not considered, or are improperly incorporated in the program, or are not implemented in spite of their recognition. The seriousness of the problem here introduced goes beyond the mere nomination of human needs as formulated in the United Nations declaration of human rights ... As a

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- (1) In my M.Sc. thesis I worked in detail with this area. Food and water are the paramount biological needs, shelter and clothing come second.
 - (2) Work is the paramount social need and condition-sine-qua non-social structures can be preserved.
 - (3) Wealth distribution through the proper mechanisms is one of the possible solutions to poverty.
 - (4) Environmental concern is one of the main features of the 60s. It is discussed in this thesis in Chapter V.

matter of fact a large number of countries have amongst their main national objectives those of self-sufficiency in food production, jobs generation, income distribution and environmental protection, but their reality somehow departs in major or minor degrees from these objectives. What therefore is going wrong ?

I believe that there are another two significant factors which are hardly mentioned in planning: 'Psychological pollution' and the consequent creation of artificial needs.

7.5. 'Psychological Pollution' or
The Creation of Artificial Needs.

The necessity of using this term derives from a check of some of the main sources on 'pollution' (1), all of which were found to concentrate on physical surroundings (i.e. air, soil, water) without considering the psychological environment, as comprehended by the concept of the Milieu-Entier. The current economic system based on mass production has felt the urge to increase and even further accelerate the growth of mass consumption. In doing so, it has stimulated the uprise of two of the more harmful twin professions: Advertisement and Industrial Design.

The main task of the former is the creation of artificial needs. As Papanek has noted:

"Advertising design is (to) persuade people to buy things they don't need, with money they don't have, in order to impress others who don't care, and is probably the phoniest field in existence today" (2).

(1) Some of the terms used are; thermal, nuclear, environmental, chemical, etc... pollution (see Chapter V of this thesis).
(2) Papanek, V. "Design for the Real World. Human Ecology and Social Change" (Paladin, Granada Publishing Ltd. London) GB. 1974 (p. xxi).

Whereas the principal duty of the latter is to design new things, and then to ...

"... elaborate plans to make and sell these 'gadgets' to millions of people. Today, industrial design has put murder on a mass-production basis. By designing criminally unsafe automobiles ... by creating whole new species of permanent garbage to clutter up the landscape, and by choosing materials and processes that pollute ... designers have become a dangerous breed" (1).

In the previous section I dealt with basic human needs. Here one is confronted with artificial human needs. The pressure of the psychological pollution is undoubtedly such that most of the basic needs have been utterly distorted. Certain artificial needs have become involved in socio-pathological trends and society will fight for them as if they were basic. (2) Capitalist societies and mixed-economies based on such faulty needs are psychologically ill (3) and in them, people will be unable to make free choices unless a process of re-education and advertisement control is undertaken as part of the planning task.

One can continue repeating that 'we must change our attitudes and approach to life' (4), that major

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- (1) Papanek, V. "Design for the ... op.cit. (p. xxi).
 - (2) I have still fresh in my memory an interview held in early 1972 during the coal miner's strike in the U.K. in which the wife of one of the miners said to the BBC interviewer: "We need to fight for better payment, you know we haven't even got a colour T.V." (!)
 - (3) Fromm, E. "The Sane Society" (Holt, Reinhart & Wiston, Ltd., N.Y.) USA. 1974.
 - (4) Ehrlich, P.R. & Ehrlich A.H. "Population, Resources, Environment" (Freeman & Co. Sn.Fco.) USA, 1972.

'structural reforms are required' (1), that the 'current crisis is due to the pattern of development followed' (2), and still our words will not make a significant impact on the masses that have been 'brain-washed' and transformed into automatic irrational mass consumers. One can keep working towards producing 'sound plans for development' but inoperatively in a society which is ...

"persuaded, advertised, propagandized, and victimized into (irrational consumerism), throwing away mentality and considering all consumer goods and indeed, most human values, to be disposable" (3).

No wonder Papanek has named this as the 'Kleenex Culture' heading towards 'phylogeneicide'.

This kind of pollution presents another two disastrous consequences; frustration and alienation. Frustration is the outcome of unsatisfied needs. We know that we are in a world of inequality. Even the wealthiest rich countries (i.e. developed) such as the United States, the Lorenz Curve is somehow skewed. The 'poor are getting poorer' and the 'pets of the rich are getting fatter' (4). Advertisement is by nature indiscriminate - non selective - it creates artificial needs

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- (1) Hunter, R.E. (et.al.) "Three Dimensional Change"...op.cit
 (2) Masarovic, M. & Prestel, E. "Mankind at the Turning Point" (The 2nd. Report to the Club of Rome) (Hutchinson of London) GB. 1975 (see especially Chapter II, 'Epilogue').
 (3) Papanek, V. "Design for ... op.cit. (p. xxi)
 (4) It is a painful human experience to see in this society (Great Britain) 'Supermarkets' packed with tons (600,000 in 1974) packed with different brands of food for pets (£300-400 million worth expended annually) when human beings are dying from starvation. Fears, R. "Pet Foods and Human Nutrition" (New Scientist, Vol.69, No.992) GB. 1976.

in all people (poor and rich alike) through the powerful tool of the mass media (1). There are vast populations who, sharing the 'aspirations', 'desires' and 'needs' afforded by the middle class upwards, cannot fulfil them. This frustration becomes pathetic in UDCs which, following the same pattern of generation of artificial needs, find themselves with a much more restricted potential market, due to the concentration of wealth in the hands of a small privileged group.

Alienation, which is the second consequence of psychological pollution, can be explained as the loss of human identity. The alienated man has been clearly depicted by Fromm in the following terms:

(a man...) "who co-operates smoothly and in large numbers; who wants to consume more and more; and whose tastes are standardised and can easily be influenced and anticipated", "who feels free and independent, not subject to any authority or principle or conscience- yet willing to be commanded, to do what is expected of him, to fit into the social machine without friction; who can be guided without force, led without leaders, prompted without aim - except the one to make good, to be on the move, to function, to go ahead"(2).

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- (1) See for instance: McLuhan, M. "The Gutenberg Galaxy" (Routledge & Kegan, P. N.Y.) USA. 1962.
 McLuhan, M. & Fiore, Q. "The Medium is the Message" (Penguin Books, London) GB. 1971.
- (2) Fromm, E. "The Art of Loving" ... op.cit. (Unwin Books, London) GB. 13th impression, 1974. (p.63).

7.6. The Three Main Negative Feedback Loops of the 'Standards of Living'

Perhaps the major difficulty of any society is to define and stick to determined 'standards of living'. 'Minimum standards' are periodically established, and a few years (even a few months) later they often are discharged and new 'thresholds' are negotiated, just to reproduce the same circle. Human greed (1) stimulated by the system in which psychological pollution plays the principal role is the cause of this 'never-ending' push upwards of minimum levels (2).

The way in which this system operates can be portrayed using our synthesis of trinities (see Chapter IV, A Summary Review, page 75) operating dynamically through time. 'Increase' or 'improvement' will be symbolized by a positive sign (+) whereas 'decrease' or 'deterioration' will be symbolized by a negative one (-).

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- (1) Katz, R. 'The Politics of Doomsday' in (Ceres, Vol.6, No.1) J/F 1974 (He has said, "What is needed is the reduction of both rate of increase of human numbers and 'human greed'").
- (2) This phenomenon, in which a change does not call forth countervailing changes but, instead, supporting changes, which move the system in the same direction as the first change but much further, has been named the 'Circular and Cumulative Causation' by Myrdal. He applied the concept in a different context. Myrdal, G. "Economic Theory and ... op.cit. (pp. 16-17).

Change' will be symbolized by the greek letter (δ) and 'tendency' by an arrow (\rightarrow).

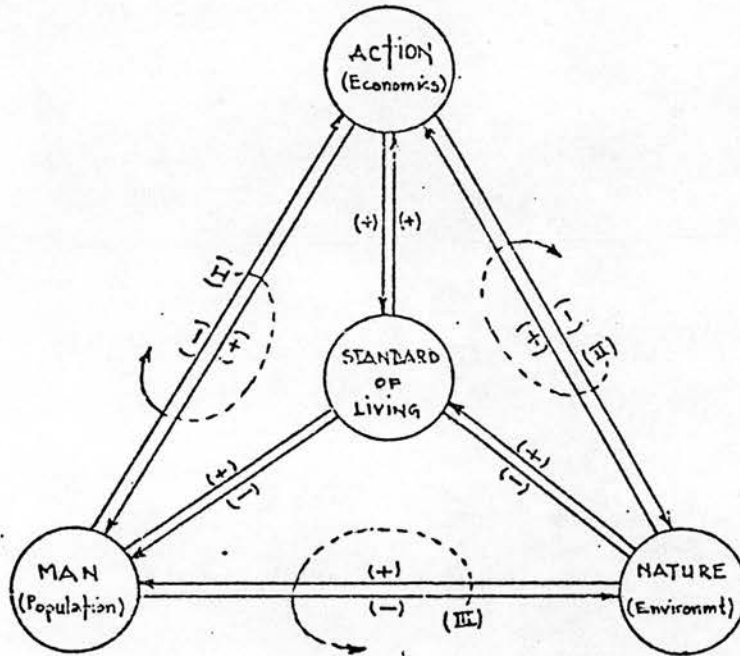


FIGURE NO.15 The Three Main Negative Feedback Loops through the 'Standards of Living'

The first loop, (I) occurs when a change in economic efficiency (δE) leads to an increase (+) in real output and to improvement in the standards of living (+SL). But this improvement leads to a population change (δM) increasing its number (+ pop.) and creating pressures, demands and deterioration in the economic system (-ES). So, $\delta E \rightarrow (+SL) \rightarrow (+ Pop.) \rightarrow (-ES) \rightarrow 1$.

The second loop, (II) occurs when a change in the environmental conditions (δEC) leads to an improvement in the standard of living (+SL). This improvement has favourable effects in the economic system (+ES) (through improving health, education, etc...) which, unfortunately tends to demand and consume more and more, depleting

natural resources and deteriorating the environment (-E_n). So, $\delta EC \rightarrow (+SL) \rightarrow (+ES) \rightarrow (-E_n)$ 2.

The third loop, (III) occurs when a change in the environmental conditions (δEC) leads to an improvement in the standards of living (+SL); commonly, however, this increase leads to a population growth (+Pop) which has negative effects in the environment (-En). So, $\delta EC \rightarrow (+SL) \rightarrow (+Pop) \rightarrow (-En)$ 3.

Obviously in reality the three negative feedback loops operate simultaneously and are interwoven. Here the role played by the increase or improvement of the 'standards of living' is stressed. By combining (1), (2) and (3) one arrives at the following expression: $(\delta EL) \rightarrow (+Pop) \rightarrow (-ES); \rightarrow (+ES) \rightarrow (-En); \rightarrow (+Pop) \rightarrow (-En)$ therefore, $(\delta EL) \rightarrow (+Pop) \rightarrow (-ES) \rightarrow (-En)$ 4.

In other words, an increase in the 'Standard of Living' has side-effects on both population growth and demands for more consumer goods, which in turn affect negatively both the economic system and the environment and eventually the biosphere.

The counter-balancing spiral tendency can be explained using Professor Rowse's concept of the 'Level of Content' (1). This is, briefly stated, to reduce the societal needs to the minimum satisfying the real basic human needs. If (SN) societal needs (BN) basic need + (AN) artificial needs; the idea is to reduce AN to the minimum until SN gets closed to BN.

$$SN \cong (BN) + (AN)^0 \quad \underline{SN \cong BN} \quad 5.$$

(1) This concept originated by Professor E.A.A. Rowse, was transmitted to me personally by him during his stay in Edinburgh (1971-1974).

This implies the following important change:

By reducing the standards of living to the 'minimum level of content' the pressure on the economic system is abated to the minimum. This in turn abridges the heavy burden impinged on the environment by both the unjustifiable use and abuse of natural resources and the pollutative action of the mass production-consumption society. It is implied that population should be reduced to its minimum number as well.

This is indeed the exact opposite of the current approach. It is definitely against present trends but it is, at the same time, in consonance with the new awakening brought about by the current state of world crisis (1). It is, in fact, part of the hope for and pressure towards radical reforms (2), constituting nothing less than a new approach to development, of which the ultimate objective is survival.

7.7. Synthesis: "Structural Regional Planning for Development"

Structural Regional Planning must be, by definition (for the purposes of this research) "a rational future-oriented decision process of which the main task is: To disclose an existing structure in a given politico-administrative region; to plan changes towards improvement in the man-nature symbiotic dynamic and holistic system; and to reduce the standards of living to the minimum level of content". This definition implies the following stipulations:

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- (1) See Chapter No.V, especially Sections 5.2., 5.3., 5.5., conclusions and postscript.
- (2) See for instance:
 Camara, D.H. "Address to the Congress on Youth & Development" in (Ceres, Vol.4, No.1) J/F 1971.
 Pronk, J.P. "Inequality at Home is the Same as Inequality Abroad - The Result of Economic Structure" in (Ceres, Vol.6, No.1) J/F 1974.
 Prebisch, R. "Structural Changes and the Rate of Development" in 'Change and Development... op.cit.
 Myrdal, G. "Against ... op.cit. (see Chapter 6: "The Need for Radical Domestic Reform".
 Katz R. "The Politics of Doomsday"...op.cit.

1. It must consider the structure disclosed in its 'wholeness'.
2. It must be 'open' and 'interdisciplinary'.
3. It must accept the limitations imposed a priori by the illogical politico-administrative divisions which still allow for a certain degree of freedom when dealing with subregionalization.
4. It must attempt coordination with neighbouring regions.
5. It must follow the nine subprocesses of the structural planning process.
6. It must aim towards the re-establishment of the bio-social dynamic equilibrium in the light of both ecological considerations and basic human needs.
7. It must attempt to reduce artificial needs to their lowest point by the establishment of the minimum level of content according to the characteristics of the Milieu-Entier in which it is applied. This is to say to reduce mass production and consumption as much as possible for the sake of survival.

No individual regional planner, could be expected, having reached this stage, to confront single-handed the requirements for dealing with the complex interrelations and interactions of the M-NS DH system. As emphasized throughout this thesis, the interdisciplinary basis is essential in practice, as in theory. 'Structural Regional Planning for Development' as here defined demands the formation of a 'Group' or a 'Team' in which the so-called 'regional planner' as a generalist plays an important role, as important as any other member of the group.

The Composite Mind Theory (see Appendix No.5, pp. 303-309 , including figures nos. 16-25), was the result of more than two years work with Professor

E.A.A. Rowse (the main contributor and exponent of the theory) and Mrs. I. Young, psychoanalyst, currently Student Counsellor at this University.

This theory is the basis of the Composite Mind Group required for an interdisciplinary approach in terms of the M NS DH System. Key elements of the theory are:

- a) Most attempts at forming and properly operating interdisciplinary groups, have failed because of human components such as aggression, jealousy, competition and so forth. The effects of these components on the working of the interdisciplinary groups have yet to be considered.
- b) The theoretical intention of the Composite Mind, in Rowse's own words, is to ... "Organize the continuum of knowledge and experience in a structure composed of individual, related brains, each specialized in one or more fields, to achieve as an ultimate objective optimum mastery over the environment, in the service of the survival and further evolution of mankind." (1)
- c) Interdisciplinary, multidisciplinary, metadisciplinary are but catchwords which have been rejected even by some of their proponents. Human behaviour has not been properly managed, thus creating major disruptions, within and among groups.
- d) Composite Mind Theory is based on the belief that the phenomenon of synapses, performed at micro-scale (i.e. single brain), can be reproduced at macro-scale (i.e. various brains), so as to augment synergically their capacity. (2)

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- (1) Rowse, E.A.A. "Comprehensive Environmental Development as Applied to Africa" in Wolstenholme, G. & O'Connor, M. (eds.): "Man and Africa" (J. & A. Churchill Ltd. London) GB. 1965 (p.346).
 - (2) Professor Rowse's hope was that "... eventually what may be termed multi-brain intellection will be recognized as an important field in psychology". (Rowse, E.A.A. "Comprehensive Environmental ... op.cit. (p.359).

e) For this theory to work for a group these conditions are necessary:

- e.1. The same far reaching long-term goals (i.e. survival of mankind, ecological concern, earthship perspective, etc...)
- e.2. The same philosophy as far as the Composite Mind is concerned.
- e.3. The same 'language' as far as the capacity to communicate ideas, technical jargon, knowledge and culture is concerned.
- e.4. A long painful period of adaptation to, and experience of, human interactions before tackling a problem together. The intention of this period being to minimize within the group the effects of natural personal dislike, misunderstanding, and so forth, so as to reduce friction and waste of human potential.
- e.5. Individual fulfilment within the rules of the group.
- e.6. Mutual respect, cooperation and intellectual honesty, being the essential agglutinating factors so as to avoid or reduce unnecessary aggression.

CONCLUSIONS

1. Structuralism (based on Piaget's work) as analytical methodology with its general theory, concepts and definitions, has shown real potential for being used in planning. (1)
2. The fundamental concepts and definitions, such as 'structure', 'wholeness', 'transformation', 'self-regulation', 'global-structuralism' and 'deep structure', as adapted to the planning field, reveal that the study of structures has been successfully performed in other areas of the human sciences and cannot but result in recognition of the need for interdisciplinary coordination.
3. The basic structure of planning detected through the methodology is formed by a triad of concepts, these being:
 Planning as a 'rational process' (with its own logistic)
 Planning as a 'future oriented activity' and
 Planning as a 'decision process'.
4. Hence, Structural Planning can be defined as:
 "The rational future oriented decision process", in which the concepts of wholeness, capacity for transformation and self-regulation are satisfactorily integrated.
5. Based on this definition, the planning process comes to mean a structure formed by a system of relations and interactions composed of a set of nine sub-processes.

(1) Hillier, B & Leaman, A. have stated that ...
 "Structuralism has only recently begun to be explored in environmental sciences, but, as elsewhere, its first outcome is reformulation at a theoretical level." (See: "Structure, System... op.cit. (p.70).

6. 'Systemness' (or the quality of being modeled as a system) consequently appears in the structure of the planning process as a whole, and of each of the nine subprocesses. The final outcome was a 'Macro-model of the Structural Planning Process' (See Figure No.13, page 119).
7. This theoretical reformulation constitutes the general framework in which the concept of 'Structural Regional Planning for Development' has been generated, using additional concepts and definitions such as 'region', 'development', 'developmentism', 'basic human needs' and 'psychological pollution'.
8. The Composite Mind Group (see Appendix No.3, pp. 266-295), is proposed as one way of approaching the resulting variety and complexity, too great for any single brain, on an interdisciplinary basis, by forming a team whose main characteristic is, however, to go beyond the traditional concept of 'interdisciplinarity'.
9. It is my belief that Structural Regional Planning offers a useful theoretical and methodological avenue, if properly understood and applied, for solving some of the major problems with which I will have to deal, when doing the case-study on México.

PART C

"CASE STUDY: AN ATTEMPTED APPLICATION TO THE
NORTHEAST MEXICAN REGION"

INTRODUCTION AND BRIEF JUSTIFICATION
OF THE CHOICE OF REGION

Having satisfactorily completed the academic requirements of the thesis (a critical assessment and theoretical reformulation), I am now concerned with the application of the theory and methodology. PART C (the case study), is the pragmatical part of the thesis, being an attempt to apply the theoretical findings to my own country. But Mexico is exceedingly large and complex (approximately two million square kilometers or 4.8 times the size of Scotland), hence the necessity of selecting a region of more manageable size.

Fortunately, as presented in Chapter VII, Section 7.1. (page 124); Mexico was divided on the 31st March 1975 into ten 'Administrative Planning Regions' which correspond more or less to sets of parameters.

To decide upon the most appropriate region, representative of Mexico as a whole, I applied the methodology of structuralism to determine the main parameters (i.e. deep structure) of the Mexican Problematique and then selected the region which best represented it at the reduced scale.

The Northeast Region emerged as the most suitable, This includes three states: Coahuila, Nuevo Leon and Tamaulipas, with a total area of 295,955 square kilometers, (15% of Mexico's territory or the equivalent of 71% of the total area of Scotland).

Historically each state has been treated as a closed system, their interactions and interdependence being ignored. A regional inter-state approach used here tends to create an 'open system' in which the previous limitations are no longer insurmountable. Moreover, natural regions - divided by state boundaries are studied and analysed as units requiring coordination of government planning institutions.

CHAPTER VIII THE STRUCTURE OF THE MEXICAN PROBLEMATIQUE*

8.1. Introduction

During the period in which this research was carried out I was twice in Mexico, each time for six months, from June to December of 1974 and 1975. In this way, in spite of being out of the country for quite a long time, I was able to maintain contact with its reality.

During 1974 I was accepted as research fellow in the 'Departamento de Ing. Termica, Fluidos y Control del Instituto Tecnologico de Monterrey (ITESM)'. This was the time during which the Structural Planning Process was produced (see Section 6.5 and Figure No.13) (1). Simultaneously I had the opportunity to work, part-time, for the 'Departamento de Planificacion del Estado de Nuevo Leon' (2), a State Governmental body through which I had the experience of being in contact with the 'real world' confronted every day by the so-called 'technicians' when dealing with the immediate and urgent problems which should have been solved 'the day before yesterday' (3).

* The untranslatable French expression "problematique" is currently used in planning to agglutinate problems with their interactions, unexpected configurations, and their totally obscure interconnections" (see for instance, Ozbekhan H. "Planning and ...op.cit. (pp. 200,210 & 211).

- (1) Here special acknowledgement must be paid to: Ing. Juan A. González-Aréchiga, Director, who apart from accepting me in his Department, gave me engineering insights into the problem, and to both Lic. Leonel Zúñiga and Dr. José de J. Rodríguez who helped me very much to understand and use algorithms and computation symbology.
- (2) Currently under the Direction of Arg. Urb. Carlos A. Martínez-Serna.
- (3) A commonly used Mexican expression which implies that one has to work under tremendous pressure to produce 'reasonable alternatives' - curative solutions - for a problem which has got out of control. This is the pragmatic world in brutal confrontation with the academic one.

During 1975 I was engaged in a more formal way with the professional 'real world' when working for the COPRODE-NL (1) as 'technical secretary' (title granted by them).

During this time I became involved with the problems of the State of Nuevo Leon, and after realizing the insurmountable limitations of the single-closed-statal approach, a study was carried out considering the whole Northeast Region (including the States of Coahuila, Nuevo Leon and Tamaulipas), some part of which is here exhibited. (2)

8.2. The Structure of the Mexican Problematique

I have dealt with this area in my previous thesis. Nonetheless, new evidence and a deeper knowledge may justify a further concise presentation. The French word 'problematique', and its English equivalent, problematic, have the meaning of agglutination of problems into a vast problem, a 'whole one', is similar to the meaning of 'syndrome', as currently used in psychology (i.e. a symptom-complex). It is misleading to talk about population, or poverty or food production, or whatever as the problem. All of them are parts of the problematique. It is in the interrelationships, interactions and interfaces, among the parameters, in their cumulative causation and unexpected conformation that one encounters the phenomenon of 'wholeness' or globalization. 'Wholeness' in this sense implies a high degree of complexity which is not increased or decreased according to the size of the problematique under study.

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- (1) COPRODE-NL (An Acronym for: Comitè Promotor del Desarrollo Socio-Economico del Estado de Nuevo Leon).
- (2) Béjar, L. "Estratedía de Desarrollo Urbano y Regional a Mediano y Largo Plazo para el Estado de Nuevo León Dentro del Contexto de la Región Noreste" (Coprode, N.L.) Monterrey, 1975. (Preliminary Working Paper).

Moreover, whether the Mexican Problematic is reviewed in its world wide context, or at national, regional and local level, its complexity does not vary, since its basic structure is the same at all the different 'scales'. As far as this research is concerned the 'Regional Scale' chosen does not change in essence the intricate structure exhibited at national level, for the clear reason that sound regional planning must be open to the dynamics of the whole nation (and indeed to the whole world).

Here my problem is how to disclose the structure of the problematic and represent, within severe limitations, its complexity. If I was going to strive for quantification I should have used the words of Levins, when making a model for population biology:

"The naive, brute force approach would be to set up a mathematical model which is a faithful, one-to-one reflection of this complexity. This would require using perhaps 100 simultaneous partial differential equations with time lags, measuring hundreds of parameters, solving the equations to get numerical predictions, and then measuring these predictions against nature. However ...

- (a) there are too many parameters to measure; some are still only vaguely defined; many would require a lifetime each for their measurement.
- (b) The equations are insoluble analytically and exceed the capacity of even good computers.
- (c) Even if soluble, the result expressed in the form of quotients of sums of products of parameters would have no meaning for us.

Clearly we have to simplify the models in a way that preserves the essential features of the problem."⁽¹⁾

(1) Levins, R. "The Strategy of Model Building in Population Biology" in Dawson, P.S. & King, C.E. (eds.): 'Readings in Population Biology' (Prentice Hall, Inc. N.J.) USA. 1971. (p.421).

But when dealing with the (M-NS DH) - system, and its manifestation through the Mexican 'Milieu-Entier', qualitative factors play a fundamental role in their interaction with quantitative ones. So, it seems to me that one legitimate simplification is to determine the structure of the Mexican Problematic, and to define, as in the case of the structural planning process, the main elements which make up that particular structure.

There are several alternative strategies for detecting a structure through the use of models. One is to sacrifice generality to realism and precision (i.e. reduce the parameters to those relevant to the short-term behaviour of the system). Another one is to sacrifice realism to generality and precision (i.e. set up quite general equations from which precise results may be obtained, although the results are clearly unrealistic). Still another one, the one used here, is to sacrifice precision to realism and generality. Since I am concerned with both qualitative and quantitative factors and their interrelations, interactions and interfaces; I can, at the first approach, resort to a very flexible graphical model which shows a flow diagram representing the dynamic behaviour of the main parameters of the Mexican open system. Figure No.26 (page 166) is the first result of such an approach which is subject to further revision and readjustment, nonetheless, at this stage it depicts what I have considered - after several corrections - a representative model of the Mexican Problematique. Every single factor included is important to the whole system. Each of them implies an immense number of qualitative and quantitative variables, which are working (positively and/or negatively), in both directions internally and externally. Some of the principal interconnections amongst the factors are also delineated. The set of nine inner (hatched) circles, ~~are~~ what can be considered as the primary elements constituting the fundamental structure of the problematique.

8.2.1. Power (Public and Private Decision Making)

It has been already suggested in different parts of this thesis that power is the centre of any action in Mexico. We are in a so-called 'mixed economy' which implies, in theory, the division of power into two different clearly cut categories: public sector (i.e. government) and private sector (i.e. business, industry, commerce, and so on). In the last few decades a new 'hybrid' is expanding rapidly the 'para-statal' (public-private) organizations, through which the government intends to interfere in the free market economy. The real power, nonetheless, is heavily concentrated in the political arena (1), at the centre of which is, without doubt, the president, who in turn imposes on the whole system (for a period of six years), his own personal style of governing. (2)

The whole country rises to a pitch of excitement and commotions occur when the new candidate to the presidency nominated by the party (PRI) (3) that has held the power for the previous 40 years, is 'destapado' (or disclosed) by the current president. Everybody knows from that moment onwards who will be the next president of Mexico. Moreover, the key posts in the top echelon of government are immediately reshuffled to suit the man who is taking power. (4) It is clear that such a system is an 'oligarchy' with a mask of 'democracy'. The climax has been reached in the present elections (4 July 1976) in which the new president of Mexico got almost the

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- (1) The 'Mexican Political System' has been the object of large amounts of research. It may be sufficient to mention the work of the best Mexican political scientist: Dn. Daniel Cosío-Villegas, "El Sistema Político Mexicano. Las Posibilidades de Cambio" (El. Joaquín Mortiz, S.A., México D.F.) México, 1973.
- (2) Cosío-Villegas, D. "El Estilo Personal de Gobernar" (Ed. J. Mortiz, S.A.) México, 1974.
- (3) Partido Revolucionario Institucional (PRI).
- (4) See Sections 1.3.1. and 1.3.2. of my previous thesis.

total percentage of votes, meeting with no real opposition from the other parties and pseudo-parties. (1)

The 'democracy game' is of such importance to the party (PRI) that Lopez-Portillo's political campaign cost the nation (according to his own team's estimations) 10 million pesos daily, or the enormous sum of 2.5 billion pesos (2). This is to say in a comparative analysis that one year's political campaign is worth roughly, in economic terms, the investment in the whole river basin commissions (Papaloapan 1947-1975; Grijalva 1953-1975; Tepalcatepec & Balsas (1947-1975) and Fuerte (1952-1975) which have been established with the main objective of regional development.

One of the serious handicaps resulting from this democratic system - at sui generis (3)- is that short and medium term plans have to be designed, approved and implemented within the president's term. There is small scope for long term plans. Even if they are produced, they have to be completely reviewed to make them appear 'sound' to the new president. Two more well known weaknesses are attached to this political system: bureaucracy

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- (1) 'Partido Acción Nacional' (PAN) did not present a candidate; 'Partido Auténtico de la Revolución Mexicana' (PARM) and 'Partido Popular Socialista' (PPS) postulated the PRI's candidate as theirs; and 'Partido Comunista Mexicano' (PCM), a weak mockery of a 'party' presented an insignificant challenge. See: Ayala, A.A. & Marti, F. "El PRI de Carne y Hueso" (Contenido Dic. 1975) Mexico, 1975.
- (2) Dupont, W. "A procissao Elcitoral" in ('Veja', No. 404) Brasil, Junho, 1976. (This amount in U.S. Dollars is 80,000/day and 20 million. In Sterling pounds it is approximately £44,500/day and £11.2 million respectively).
- (3) See for example: Hansen, R.D. "La Politica del Desarrollo Mexicano" (Ed. Siglo XXI, S.A.) Mexico 1971. See chapter 5: "El PRI y la Politica Mexicana: La Cosa Nostra" (pp.129-173).

bureaucracy (1) and corruption (2).

A myth is generated around the new president, and his words, thoughts, and wishes pervade the entire system.* The so-called 'Plan Basico de Gobierno 1976-1982' (3) which was the product of months of work of thousands of 'technicians' in different areas (4), and was meant to be the 'blueprint' for the new president after its approval by the majority of the main representatives of the party in a general assembly, was never endorsed because when the 'hundred main points' were being put to the general assembly, it was cancelled abruptly when the name of the 'new candidate' was disclosed (5) - following Echeverria's instructions - by the less democratic representative, the worker's leader Fidel Velazquez. (6)

From that moment onwards the Plan Basico has become another 'plan' which is there, in the history of the Mexican political process with little or no impact on the new plans to be formulated to respond to Jose Lopez Portillo's own style of governing.

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- (1) Pichardo, P.I. "10 Años de Planificación y Admón. Pública en México" (IAP, Mex.) México, 1972.
 - (2) 'Conexión' - Conacyt reported from January to August 1976, at least three cases of fraud, corruption and trickery amongst government ex-officials.
 - (3) PRI: "Cien Puntos: Plan Básico de Gobierno 1976-1982" (Com.Nal.Ed.del PRI) México, 1975.
 - (4) The participation of more than '60,000 Mexicans' in the production of it was reported (see previous ref.).
 - (5) Moreno-Sanchez, M. "Los Cien Puntos Del Plan Basico" ('Siempre'), Mexico, Nov. 1975.
 - (6) All the mass media (radio, T.V., newspapers) reported this fact the 22nd of September 1975.

* López Portillo 'ideology' was profusely published during the whole year of his political campaign. His every single move was followed and reported by hundreds of journalists (national and international) 'order', 'organization', 'coordination', 'logic', 'efficiency', and 'planning' are words he likes to use.

The private sector has also its own share in the power, but it is intertwined and heavily affected by any governmental action and policy. (1) It has a lot of significant side weight in the whole social process. The same can be said about the parastata organizations (about 500). The former president, Luis Echeverria, felt it was necessary to justify the existence of these and their way of operating, by saying that their task was not mainly 'economic' but social (2), thus recognizing, by implication, that they had not been operating to the best of their productive capacity.

8.2.2. The Population Dilemma (*)

I have discussed this problem at length in my previous thesis. Nonetheless, a few remarks can be made here. Firstly, significant change has yet to be detected in the pattern of growth. (3) Secondly, there are slight reductions in the natural growth in urban areas (4), negatively counterbalanced, however, by the high rate of both natural and migrational increase of urban squatters (5), on the fringes. Thirdly, no reduction is noticed in the

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- (1) See for instance: Vernon, R. "The Dilemma of Mexico's Development" (Harvard Univ. Press, Cambridge, Mass.) USA. 1963.
- (2) He stated: "Their standards cannot always be identified with the size of financial gains. Their objectives and targets are not only mercantile; they pursue societal targets as well ..." 5th State to the Nation", 1975, in "Comercio Exterior de México" (BCO., Nal. de Comercio Ext. S.A. Vol.21, No.10) México, Oct. 1975.
- (3) Morelos, J.B. "La Evolución del Problema Demográfico" in Wionczek, M.S. (et.al.) "Disyuntivas Sociales; Presente y Futuro de la Sociedad Mexicana II" (Sep Setentas No.5), Mex. 1971.
- (4) Urquidi, V. (et.al) "La Explosión Humana" (Testimonios Fondo de la Cultura Ec.) Mexico, 1974.
- (5) de la Rosa, M. "Netzahualcoyotl: Un Fenómeno" (Testimonios Fondo de la Cultura Ec.) México, 1974.
- (*) It is expected that population will grow from 62 to 75 million during the López Portillo administration (1976-1982).

natural growth in rural areas, which in turn is creating pressures in both rural and urban areas. Lastly, the new 'law of population' put forward by Echeverria's administration (1) - even though it means a tremendous step forwards towards population control - does not treat openly the fundamental issue of birth control. Rather it suggests very generally the advantages of small families. This is not only a matter of simple mathematics, it is a matter of fact. We will be at least 70 million by the end of this decade, and very likely nearly double (around 130 million) by the year 2000, no more than one generation later.

Obviously this will have repercussions in all directions (as shown in Figure 26) - internal migration, urbanization, squatting, housing, education, land tenure, unemployment, food production and availability, income distribution and capital formation being the most directly affected. (2)

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- (1) Editorial: "El Proyecto de la Ley General de Población" in (Comercio Exterior Vol. XXIII, No. 10) Mexico, 1973.
- (2) There is an immense amount of information on each area here named. See for instance the following selection of representative references:
 Balan, J. "Urbanización, Migraciones Internas y Desarrollo Regional" (Demografía y Economía, Vol. VII, No. 2), México, D.F.
 Wionczek, M.S. (et.al.) "La Sociedad Mexicana: Presente y Futuro", op.cit. presents a selection of 15 essays covering the enlisted areas of the Mexican problematique. The other authors like Sergio Reyes, Salomón Eckstein, Bela Balassa, Javier Alejo, Eduardo Navarrek, David Barkin, Carlos Tello, José Morelos, Luis Unikel, Juan Ramírez, Pedro Arroyo, Pablo Latapí, Rodrigo Medellín and Ricardo Carrillo, A are very well known for their works.
 Urquidi, V.L. (et.al.) "El Perfil de México en 1980" op.cit... (3 volumes), presents too, a selection of more than 20 essays dealing with a similar topic. The joint authors are as well very well known for their publications.

8.2.3. Food Production and Agricultural Development

This was also thoroughly treated in my previous thesis. Unfortunately, still, in 1975, no significant change has taken place. (1) Food is still unevenly distributed while its production has advanced at a lower rate (1.7%) than that of the growth of population (3.5%) in 1973. Of necessity, staples such as 'maize' (corn) and 'frijol' (beans) had to be imported from different countries, even, to my surprise, from Africa. (2) Agriculture is in a state of crisis. (3)

8.2.4. Land Tenure

This part of the problematique continues largely unsolved in spite of the years of the so-called 'land reform' (4). The population explosion, combined with bad distribution of land (5), new-latifundism (6),

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- (1) Sánchez, D. "Balance Negativo en Materia Agrícola" (El Porvenir, Monterrey, N.L.) Dic, 1975.
- (2) This was one fact that struck me when arriving in Mexico for a second time during June 1975.
- (3) Mejido, M. "La Agricultura en Crisis" (Testimonios del Fondo de la Cultura Econ.) Mexico, 1974.
Freebairn, D.K. "The Dichotomy of Prosperity and Poverty in Mexican Agriculture" in ('Land Economics', Vol. XLV, No.1), February 1966.
- (4) Wecktein, R.S. "Evaluating Mexican Land Reform" in (E D & C Ch. Vol.18, No.3), 1970.
Dovring, F. "Land Reform and Productivity in Mexico" in (Land Ec. Vol.46, No.3), 1970.
Duran, M.A. "El Agrarismo Mexicano" (Ed. Sidlo XXI, S.A.) Mexico, 1972.
- (5) Carr, R. "Mexican Agrarian Reform 1910-1960" in Jones, E.L. & Woolf, S.J. (eds.) "Agrarian Change and Economic Development" (Methuen & Co. Ltd., London) GB. 1969.
Eckstein, S. "El Ejido Colectivo en México" (Fondo de la Cultura Económica) México, 1966.
- (6) Barra, G.F., Secretariat of the Agrarian Reform, informed that there are at least 120,000 hectares of land in five states which can be affected by the Agrarian Law. See 'Conexión' - Conacyt publication, Vol.II, No.48. August, 1976, de la Cerda, A.J. denounced too, that 856 landowners monopolized 12.5 million hectares of the best land in the whole nation, (42% of the total arable land). See, 'Conexión', - Conacyt publications, Vol.II, No.33, Jan. 1976.

uneven distribution of resources (1), the use of advanced technologies (2) and the atomization of the ejido (3) have been major causes of rural-urban migration on a massive scale, the slowing down of production, and of social unrest in some parts of the countryside. (4)

8.2.5. Unemployment and Underemployment

Linked directly with the problems of population explosion, land tenure, social unrest, and technology, and indirectly with the problems of nutrition, education and finances; this problem has been recognized as one of the most urgent and pressing problems of Mexico for the years to come. (5) It has been noted earlier in this

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- (1) Griffin, K. "The Political Economy of Agrarian Change" (The McMillan Press, London) GB. 1974.
 - (2) Poleman, T.T. & Freebairn, D.K. "Food, Population and Employment: The Impact of the Green Revolution" (Praeger Publishers, N.T.) USA., 1973 (See: Income Disparities, The Case of Mexico).
 - (3) The Agrarian reform (1915) created the ejido, the land-holding village that is sometimes farmed collectively but more usually, and increasingly, farmed individually by ejidatarios.
 - (4) González, S.R. & Guhérrez, D. "Invasiones" in ('Conexión' - Conacyt, Vol.II, No.41) May, 1976.
 - (5) Echeverría, A.L. has stated: "Job generation has become the paramount problem of our era ... Neither political nor economical organization will be able to prevail without offering through employment the possibility of creative work to its people" in 'Fifth State to the Nation' ... op.cit.
 Urquidi, V.L. "Empleo y Explosión Demográfica" in (Demografía y Economía, Vol.VIII, No.2) 1974 (His estimation is 7 million new jobs have to be generated from 1970-1980).
 Trejo-Reyes, S. "El Desempleo en México" in ('Línea' No.15) México, M/J, 1975.
 Boon, G.K. "La Absorción Futura de Fuerza de Trabajo en México" in (Demografía y Economía, Vol.IX, No.1), México, 1975.
 Tijesina, G.E. "Política de Empleo en México" in (Ciencia y Tecnología, No.3) México, J/A, 1975.
 PRI in his "Hundred Points of the Plan Básico de Gobierno 1976-1982" has stated the necessity of generating at least 4.5 million new jobs (point No.13).

thesis that one of the fundamental basic human needs is the right to a creative job. The current economic system, too much concentrated on production, productivity and wealth generation, has taken 'unemployment' as one more variable to be considered within the system. Unfortunately, in a fairly young population (20 years on average) growing at the rate of 3.5% per annum, this approach is extremely dangerous. The so-called 'urban guerilla movement', and social unrest is growing at the same speed as unemployment. (1)

The kidnapping (2) of prominent and wealthy personalities and/or their families has become part of the news. Some of the victims are killed, even after the payment of a significant ransom.

8.2.6. Poverty and Income Distribution

Closely linked to the problem of under and unemployment is that of poverty and income distribution. (3)

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- (1) The current new elected president of Mexico, José López-Portillo has said: "If we do not generate jobs, we will have violence in the country"- see ('Conexión'- Conacyt, Vol.II, No.43), México, June 1976
- (2) From January to August 1976, the same above mentioned source of information reported: Two 'kidnappings' and a failed one, one 'gun fight', two 'acts of open violence', one 'private property invasion' and an 'aggression' within the University of Mexico campus.
- (3) Navarrete, I. "La Distribución del Ingreso y el Desarrollo Económico de México" (IIE, ENE) México, 1960
 Puente-Leyva, J. "Distribución del Ingreso en un Area Urbana" (Siglo XXI Ed.) México, 1969.
 García-Rocha, A. "La Distribución del Ingreso en México" (Demografía y Economía VIII, No.2) México, 1974
 Padilla-Aragon, E. "México, Desarrollo con Pobreza" (Siglo XXI, Ed.) México, 1974.

Wealth is concentrated in few hands (1) and it seems that it will continue so, if both unemployment and income distribution are not properly tackled. It has been estimated that half of the Mexican population is 'poor' (2) inspite of the misleading figures of GNP, NNP, and the like.

8.2.7. Technology

Perhaps one of the main failures associated with the policies based upon the uncritical use of models, has been the use of highly sophisticated capital-intensive technology. The 'GNP-ism' race in search of economic growth involved the use of inappropriate technology imported from DCs, principally the U.S.A. (3) This has created grave problems of labour displacement and wastage of manpower. As recently as the current decade certain governmental measures have attempted to control the uncritical inflow of technology. (4) The creation of the 'Center of Appropriate Technology for the Third World' (5) in the current year shows the new government awareness of its importance.

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- (1) Aguila, F.H.A. & Carmona, A. "México: Riqueza y Miseria" (Ed. Nuestro Tiempo) México, 1970.
 - (2) Ibid.
 - (3) Escobedo, G. "The Response of the Mexican Economy to Policy Action" (Fed.R.Bank of St.Lewis), USA., 1973.
 - (4) Echeverría, A.L. "The Registration of Transfer of Technology and the Use of Exploitation of Patents and Trademarks" in ('Comercio Exterior', Vol.XVII, No. 10) México, 1971.
Wionczek, M.S. "Where Patents go Through Customs" in (Ceres, Vol.6, No.2) 1973.
 - (5) The former president of Mexico, Luis Echeverría, has created the 'Center for the Third World' of which a part is the Centre of Appropriate Technology. Mr. Harold Dickinson and Mr. George McRobie were invited (together with 30 other advisors of the world) to help with its establishment. This was during June, 1976.

8.2.8. Finances

The formation of capital in Mexico has been very difficult due mainly to the negative effects of poverty, unemployment, low income per capita, and wealth concentration. (1) The alternative solution has been the inflow of foreign capital borrowings through both the public sector (from 263.1 million dollars in 1970 to 2,469 in 1975, increased 9.4 times) (2); and the private sector (from 61.1 million dollars in 1970 to 483.3 in 1975, increased 7.9 times) and by increasing direct foreign investment (from 200.7 to 363.3 million dollars in the same period, 81% increased).

This factor has created grave problems of indebtedness, the main result of which is economic dependency (3) and inflation (4). Again, it can be said that this problem arose as a result of the idea that economic growth would bring automatic development.

8.2.9. Trade and Balance of Goods and Services

The Mexican balance of trade has been negative for the last 25 years, with a continuous tendency towards

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- (1) Aguilar, M.A. & Carmona, A. "México ...op.cit.
- (2) See: Editorial, "The External Sector of the Mexican Economy in 1975" in (Comercio Exterior de Mexico, Vol.22, No.4), Mexico, April 1976.
- (3) In 1974 the debt service represented 32.4% of the country's income of foreign exchange. According to the Eximbank the international indebtedness limit is reached when its debt service represents 15-20%.
- (4) CEESP: "La Inflacion in México" (CEESP, Vol.1, No.3) Mexico, Oct. 1974.
Bazdresch, C. "¿ Se Puede Manejar la Inflación?" in ('Plural') México, September, 1974.

deterioration. (1) The costs of importation are greater than the incomes due to exportation. The international market demands a lot of sacrifices. The rules of the game - as Helder Camara stated (2) - are set up in the major decision centers of the world. We have fallen into the trap of importing capital, technology and services as against the exportation of a few manufactured goods and primary raw materials.

8.2.10. Education

Mexican education is in a state of crisis (3) inspite of the so-called 'eleven year plan of primary education (4) established by the administration of President Adolfo Lopez Mateos (1958-1964), and carried through the following administration of President Gustavo Diaz Ordoz (1964-1970). In spite of the enormous effort made in the last 18 years the average school attendance is 3.5 years (5) as compared with 9 years in any developed country.

This problem becomes seriously aggravated by the inadequacy of education in Mexico to meet the countryside's needs, its uneven distribution in the regions (6) and its concentration (at higher levels) in a few big cities.(7)

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- (1) Since 1950 the imports of goods surpassed the exports of goods, widening the deficit 'Trade Balance' from nearly zero in 1950 to the enormous amount of 3.58 billion dollars in 1975. This tendency has been followed by the Balance of Goods and Services dropping to 3.64 billion dollars.
- (2) Camara, D.H. "Liberation instead of ...op.cit. (p.4).
- (3) Benveniste, G. "Bureaucracy and National Planning" (Praeger, Pub. N.Y.) USA., 1970.
- (4) This idea was originated by Manuel Germán Parra (early January 1959) as reported by Benveniste.
- (5) Latapí, P. "Las Necesidades del Sistema Educativo Nacional" in Wionczek, M.S. "La Sociedad ... op.cit.
- (6) Fuentes, M.O. "Enseñanza Primaria y Desigualdad Regional" in (Desarrollo Educativo, EDUPLAN) Mexico M/A 1974.
- (7) Carrillo, A.R. "La Estrategia del Desarrollo Regional de México" in Wionczek, M.S. "La Sociedad ...op.cit.

The former president Echevarria stated:

"The country cannot passively accept an education structure that impoverishes the provinces, promotes centralization, and congests the big cities". (1)

8.2.11. Other Significant Parameters

The combined effect high population growth in a neglected countryside, in which the system of land tenure has left millions of landless peasants, impoverished, unemployed and underfed, (2) with the use of inappropriate technology which has reduced even further the availability of jobs and has at the same time disrupted the pattern of village life, has been to create rural-urban migration on a massive scale. (3) Cities, especially big cities, are growing as fast as six to seven per cent per annum (4), while lacking both essential infrastructure and capital to provide it.

Overconcentration of population, industry and services in a few cities (5), has created the 'macrocephalia'

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- (1) Echeverría, A.L. "Fifth State ...op.cit. (p.35). He reported that in 1975 alone 30 billion pesos were allocated in this area.
 - (2) Zubirán, S. (et.al.) "La Desnutrición del Mexicano" (Test. Fondo de la Cult.Ec.) México, 1974. Ramírez, H.J. (et.al.) "Aspectos Socioeconómicos de la Alimentación en Mexico" in Wionczek, "La Sociedad ... op.cit.
 - (3) de Montañón, Luz, M.V. "Exodo a la Ciudad" in ('Conexión' - Conacyt, Vol.II, No.47) México, August 1976. (She mentioned that between 1950-1970 approximately 4.5 million peasants have emigrated to the cities.
 - (4) Unikel, L. (et.al.) "El Desarrollo Urbano de México" in (Ciencia y Desarrollo, No.3), Mexico, 1975.
 - (5) 66% of the national industrial value was produced by two big cities - Mexico City and Monterrey, N.L.

phenomenon, (1) linked with critical regional imbalances and all forms of pollution (2). Not only population, but also industry and services are concentrated, as are all other forms of 'power' (such as finances, banking, education, etc.) in the big cities, augmenting their attractiveness (i.e. centripetal force) for those who have nothing.

8.2.12. Synthesis and A Flow Diagram

The flow diagram of the 'structure' of the Mexican Problematique was made up of simple elements, and will continue to be subject to further corrections. The fundamental parameters considered which have to be tackled simultaneously and coordinately, if real structural reforms are wanted, are: Decision Making, Population, Food Production, Land Tenure, Under and Unemployment, Poverty and Income Distribution, Technology, Finances, Trade and Education. All these are generating rural-urban migration, rapid urban growth, centralization, regional imbalances and pollution. The manifestation of these is in increasing social unrest.

8.3. The Systemness^(*) Within the Structure

Once the fundamental structure has been detected and considered as representative of the Mexican reality, elements within it may be discerned. Mexico in this way can be seen as a substructure of a larger structure with which it is interacting at all times. It is, as any other country of the world - subject to big powers fluctuations. Inflation, Recession, Energetics and so on,

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- (1) Unikel, L. "Urbanización y Urbanismo: Situación y Perspectivas" in Wionczek, M.S. (et.al.): "La Sociedad ... op.cit.
- (2) Jiménez, C.J. "Temática de Problemas de Mejoramiento del Ambiente" (SMA, SSA) Mexico, 1973.
Suárez, L. "La Contaminación" (Testimonios del fondo de la C.E.) México, 1974.
- (*) Systemness is a word used in the technical jargon: See for instance: Hillier, B. & Leaman, A. "Structure, System ... op.cit. (p.48). They coin the words "Urban Systemness" (p.72).

have had an impact on the internal working of the Mexican Structure.

Everything is so intertwined and interrelated that a single action or statement made before the world community can have unpredictable 'quantitative' repercussions on the whole system and even on its structure. A typical example is the Mexican vote in the U.N.O. for considering 'Zionism as a kind of racism' (1). The reaction of international Judaism was exceptionally strong against Mexico, calling on its members for an immediate boycott especially in her most vulnerable area, tourism, which in 1974 accounted for 24.7% of the net income of foreign exchange (2). The impact was so damaging that the Minister of Foreign Affairs (Dn. Emilio O. Rabasa) had to travel immediately to Israel to retract 'publicly' Mexico's previous statement. (3) After his visit and declarations (4) the boycott was called off and part of the nightmare was over. Nonetheless, in 1975 the income of foreign exchange due to tourism showed a marked drop.

Another typical example of Mexico's vulnerability to external conditions is the effect upon her of the recession in the industrial countries. International demand has suffered a marked decline in both volume and price of goods, affecting exports and incomes of foreign exchange. The country is also feeling the effects of a marked outflow of foreign exchange because of the imports of

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- (1) U.N.O./Keesings: "General Assembly of Nov.10th,1975".
 - (2) BNCE,S.A. "The External Sector of the Mexican Economy" (Comercio Exterior, Vol.21, No.4) 1975.
 - (3) Velázquez,P. "Aventura y Escarmiento" (El Porvenir, 9th December 1975, Monterrey, N.L.) Mexico.
 - (4) Dn Emilio O. Rabasa resigned a few months later (see 'Excelsior' 30 & 31 Dec.) 1975.

petroleum by-products, grains and farm commodities. (1)
In spite of the effort to maintain the free money exchange
at the fixed rate of 12.5 pesos to one U.S. dollar,
devaluation is now a fact. (2)

8.4. The Reduction of Scale from 'National' to 'Regional'.

The main parameters detected in the Mexican
Problematique are pervasive at all levels (i.e. national,
regional, local). Nonetheless, due to the natural geo-
graphic, social, political and economic characteristics
of each region, those parameters will play different
roles according to such variations.

For these very reasons it is essential for the case
study to analyse as deeply as possible the behaviour of
the system at regional scale and to formulate policies
which, apart from tackling simultaneously the main para-
meters, do respond to the national objectives.

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- (1) BNCE,S.A. "Commentary on the ... op.cit.
- (2) While writing this thesis a new but not unexpected
problem developed: The devaluation of the Mexican
peso in the International Monetary Market. On the
1st of September, 1976, the president announced
that after 22 years of a fixed rate of exchange as
compared with the U.S. dollar (12.5 to 1) the peso
had to float. By the end of September 1976, this
rate was 19.9 to 1, meaning a devaluation of 60%
in one month.

CHAPTER IX THE STATE OF NUEVO LEON AND ITS PLACE
AT NATIONAL AND REGIONAL LEVEL.

9.1. Introduction

As I have already mentioned in the introduction to the previous chapter, I worked for six months on the 'Committee for the Promotion of Socioeconomic Development of the State of Nuevo Leon (COPRODE-NL)' which was established by Presidential decree on the 31st of December, 1973. By the end of 1975 all the states had a similar Committee, headed by the State Governor, composed of resident federal officials, state and municipal authorities.

The original idea is that ...

"Federal, statal and municipal governments' representatives, and representatives of the population's active sectors, undertake - in open, democratic dialogue - the tasks of co-ordination and programming the socioeconomic development of their state" (1), ... Being in permanent coordination with the 'National Regional Development Commission". (2)

Unfortunately, like any other new governmental organization, the 'COPRODES' had to face the problem of being the 'newcomer' and serious difficulties occurred in some of the states when coordination was attempted amongst federal officials and state and municipal authorities (i.e. intra-public sector), even more over the creation of democratic dialogue with the representatives

(1) Diario Oficial: "Decreto por el que se Crea el Comité Promotor del Desarrollo Socioeconómico del Estado de Nuevo León". (Gobierno de México, pub. of) México, 3/1/74 and 27/1/75, (p.4).

(2) Diario Oficial: "Decreto por el que se crea la Comisión Nacional de Desarrollo Regional" (Gobierno de Mexico, pub. of.) México, 28 de Enero de 1975, (p.6).

of the 'population's active sectors' (i.e. private sector). (1) Obviously, the effectiveness of every single COPRODE depends fundamentally on its Coordinator's political status, and his ability to deal tactfully with the proper coordination.

Due to the fact that each state has its own COPRODE the general tendency has been to consider the statal limits as boundaries of an area to be dealt with as a closed system. This is no surprise because ever since the division of Mexico into a 'federation of free and sovereign states', almost every Governor is concerned fundamentally with the development of his own territory. Moreover, much earlier than the creation of the COPRODES, most of the state governments established their own planning offices concerned mainly with their own 'tiny world'. Their struggle has been, essentially, to get maximum investment from the federal government for an attack on the most compelling and immediate of the local problems. There has not been much attention to spare for what happens in neighbouring states.

The obvious course for dealing with the state as a closed system was to sub-divide the state into a set of sub-regions (as shown in Figure No.27), and deal with them separately.

9.2. The Information Sub-process (INS)

The first stage was to 'get information' from the

(1) We - COPRODE-NL, encountered obstacles to the formation of an 'inter-government' and 'interdisciplinary working team'. In other words, the possibility of a CoMi-Group (as presented in Chapter X in this thesis) was unattainable. This fact does not necessarily mean that such a theory is unrealistic or invalid; it shows, rather, the difficulty of its application in the political arena where the search for power is more compelling than the willingness to plan.

different sources available (1), make a selection, classification, analysis, and evaluation. Here a first weighty set of constraints was imposed on the research; time, (2) personnel, (3) and resources. (4) Even though some of the areas under study needed more detailed information, the 'do research' subprocess (see Figure No.13, p. 119) was not performed due to the constraints mentioned. Nonetheless, certain characteristics were clearly detected, and synthesized in a first rough model of the State's reality.

9.3. Modelling of Reality Subprocess

1. The State of Nuevo Leon occupies a prominent position in Mexico's socioeconomic development when compared with the other states, (5) being only surpassed by the Federal District. The common way of representing it, which is quite misleading, is shown in Figure No.28.

2. When the State of Nuevo Leon is analysed internally, disaggregated into its smallest units (i.e. municipalities), the panorama changes completely. This

-
- (1) The list of sources of information was of at least 200 different quotations, some of which are presented as footnotes throughout this chapter.
 - (2) The so-called 'Medium and Long Term Plan for the Development of the State' had to be carried out within 8 months.
 - (3) The full time personnel assigned were four people, the part time personnel were 10 people who had their own jobs.
 - (4) There was no financial resources for any extra survey even if required.
 - (5) This is heavily substantiated by 16 different sources of information which are included in the selected bibliography previously noted.

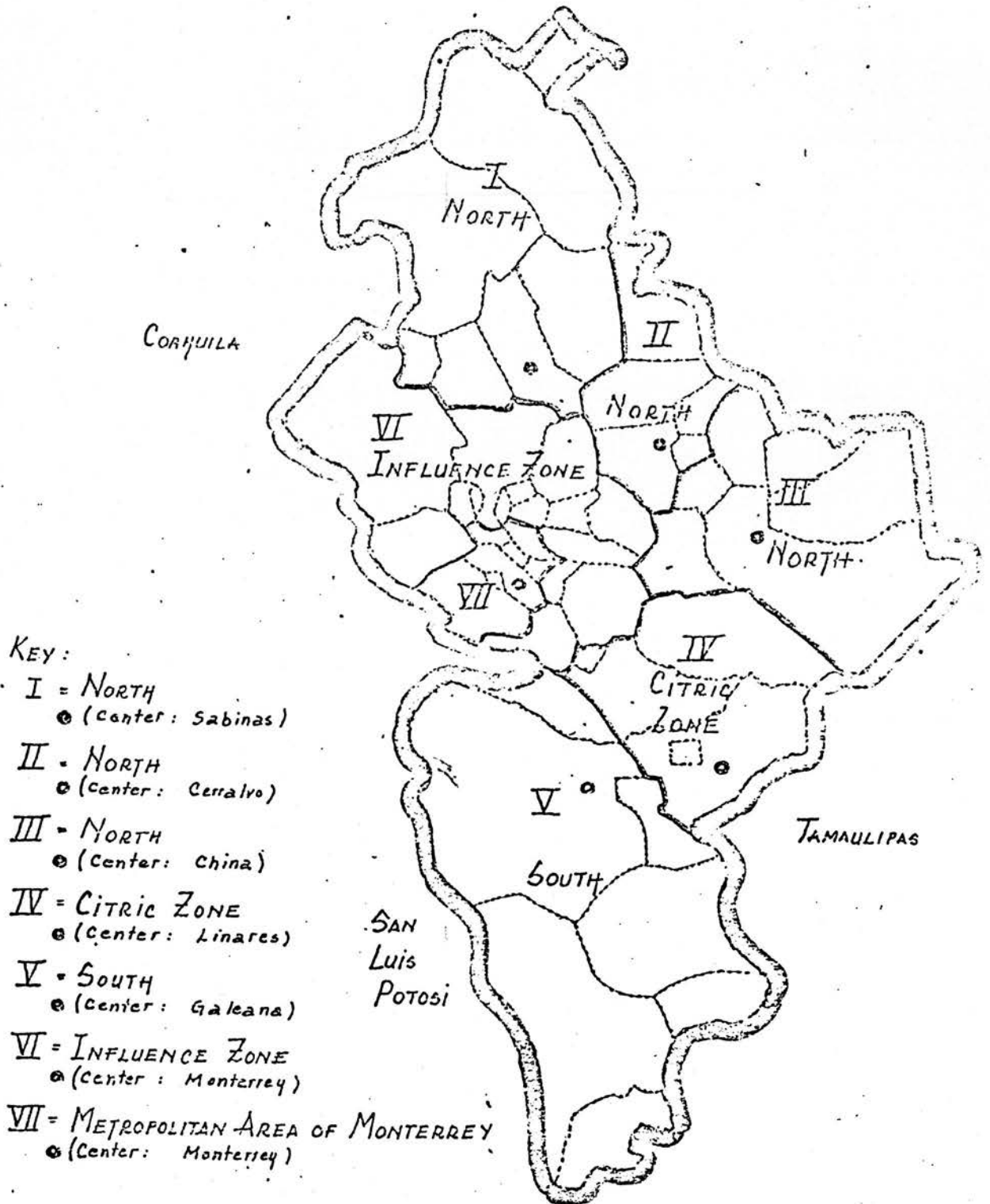


FIG. NO. 27 'SUB-REGIONALIZATION OF THE STATE OF NUEVO LEON'

Source: Dirección Gral. de Estadística y Procesamiento de Datos del Estado.

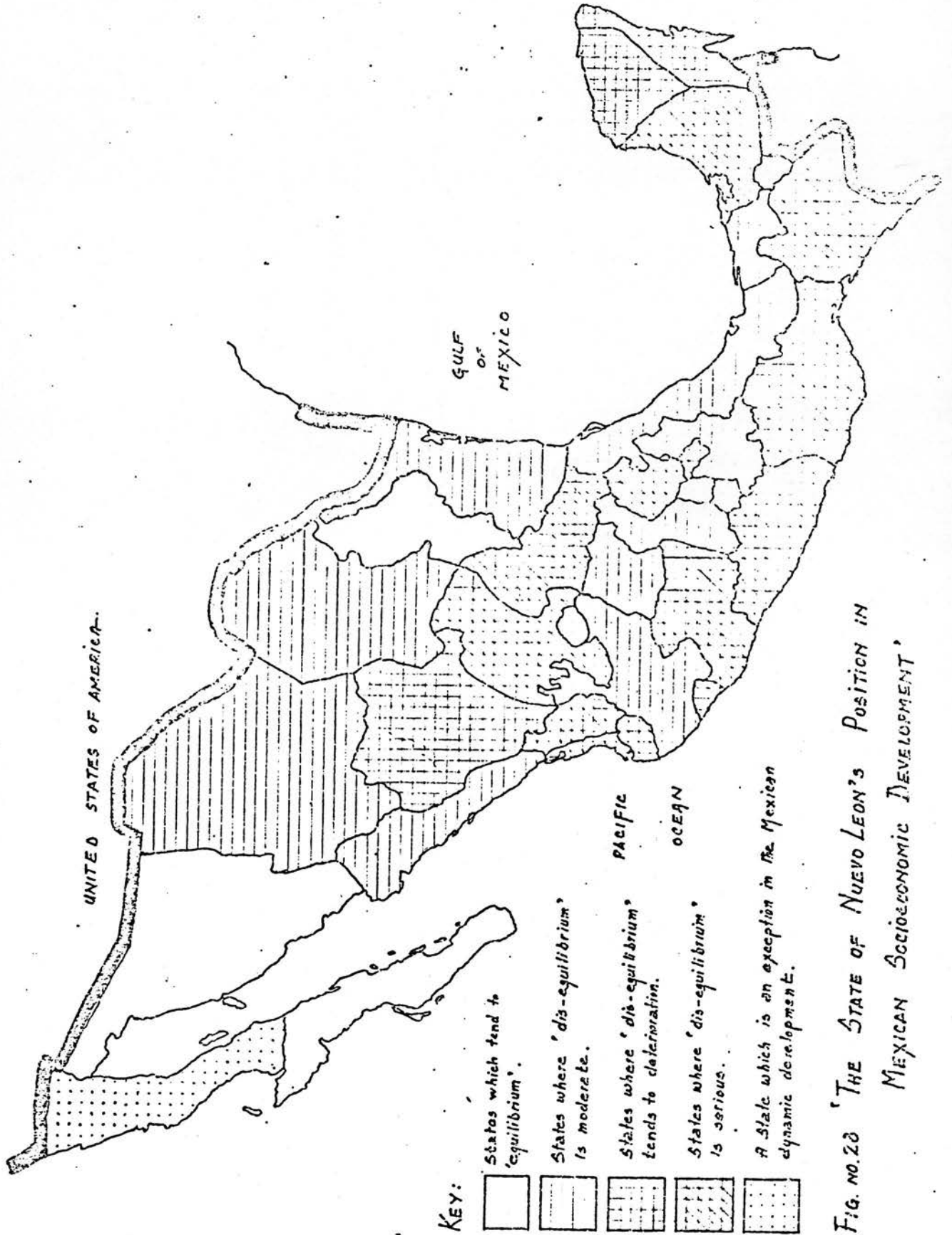


FIG. NO. 23 'THE STATE OF NUEVO LEON'S POSITION IN MEXICAN SOCIOECONOMIC DEVELOPMENT'

can be demonstrated using the regional income per capita 'differential index' (1) which was in 1970, 1.3 for U.K., 6.2 for Mexico, and 11.8 for Nuevo Leon. (2) In other words, this means that the 'average income per capita' in the wealthiest sub-region was almost 12 times higher than the 'average income per capita' in the poorest sub-region. No wonder that Garza-Ulloa, N. has stated that ...

"Nuevo Leon is the state with the greatest socioeconomic imbalance in the whole country"(3)

3. Moreover, when the socioeconomic development is spatially analyzed, it becomes clearer that its benefits are almost totally concentrated in the municipalities forming the Metropolitan Area of Monterrey (MAM) and in the so-called 'Influence Sub-region', (ISR) as shown in the next Figure and Figure No.29-B.

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- (1) The regional income per capita 'differential index' is the quotient of the highest regional income per capita over the lowest. A country with a differential index equal to 1.0 would imply the existence of perfect regional balance.
- (2) My own estimates
- (3) Garza, U.R. "El Desequilibrio Regional en el Estado de Nuevo León 1950-1970" (Sec. de Fomento Económico y Obras, Gob. del Estado de Nuevo León) Monterrey, México, (undated), (p.17).

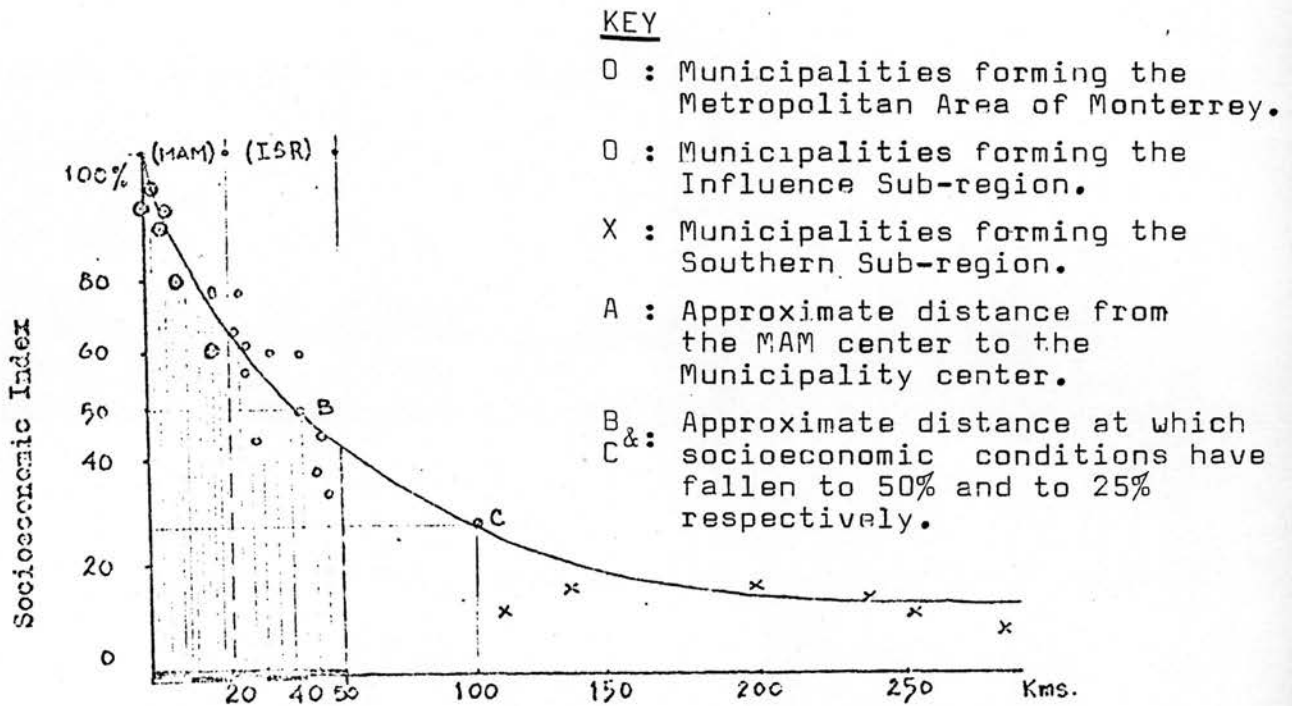


FIGURE NO. 29 "The Spatial Concentration of the Socioeconomic Development in the State of Nuevo Leon"

4. Perhaps the most striking factor within the 'socioeconomic index' (1) is that of nutritional differences between the richest and the poorest municipalities. When in Garza Garcia, practically 100% of the families consumed milk, meat and eggs at least four days a week, in Mier y Noriega just 2.6% of families (the wealthiest ones) had the resources for doing so in 1970.

5. Income Distribution is another symptomatic characteristic of critical importance. 78.5% of the economically active population in the state (only 29% of the total population) received incomes smaller than 1,500.00 Mexican pesos, considered as the lowest income, while only 3.5% received more than 5,000.00

(1) This index was formed by the following factors: 'Education' (three variables), 'Housing' (five factors) and 'Nutrition' (one variable) as social factors; and 'Economic Activity' (one variable) and 'Income per capita' (one variable) as economic factors. As presented by Garza, U.R., *op.cit.*... (p.54).

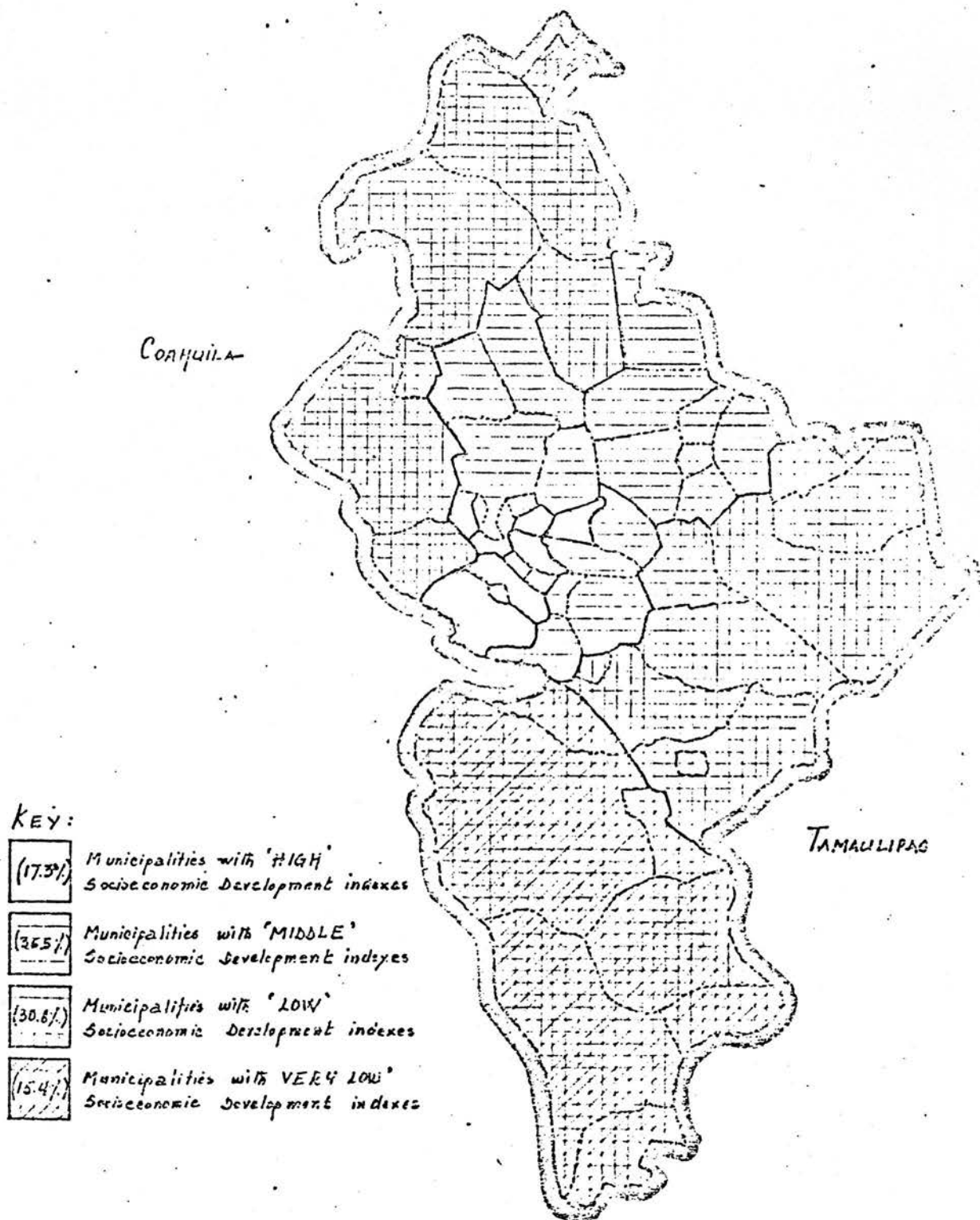


FIG. NO. 29-B 'THE SPATIAL CONCENTRATION OF THE SOCIOECONOMIC DEVELOPMENT IN THE STATE OF NUEVO LEON'

Mexican pesos. Graphically it can be depicted as follows:

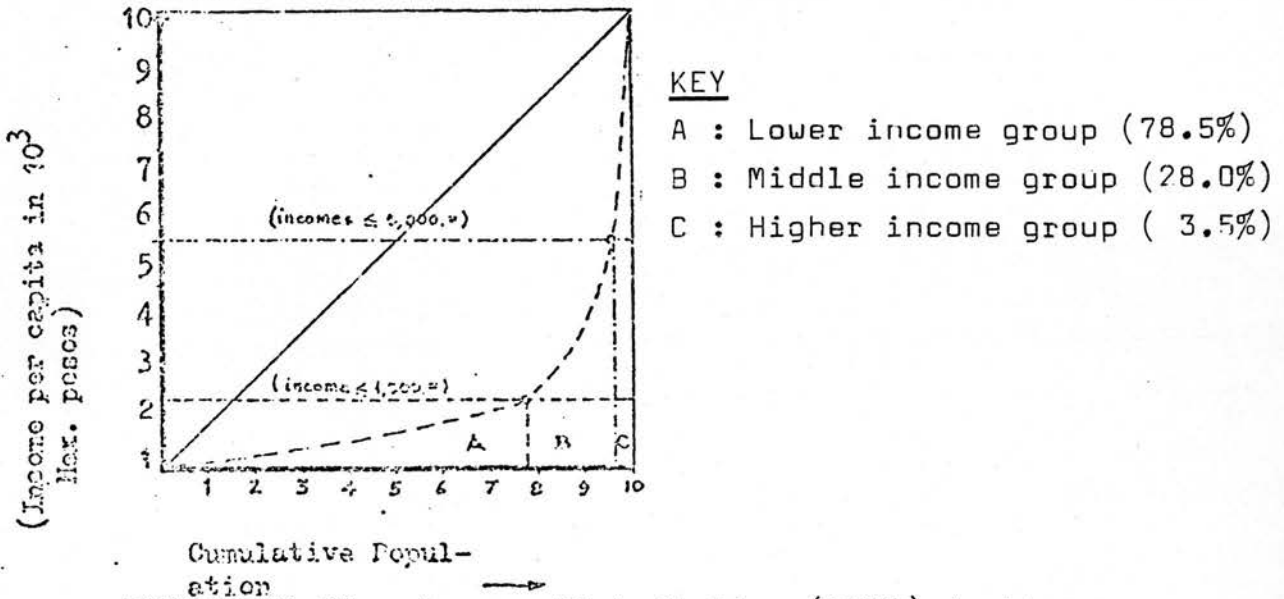


FIGURE NO.30 Income Distribution (1970) in the State of Nuevo Leon.

6. An analysis of the dynamics of this phenomenon of concentration suggests that the situation is tending towards deterioration rather than improvement. In 1950 the capital city concentrated 70% of the 'Statal Wealth', by 1960 this concentration rose to 80%, and by the end of 1970 it came to 80.2%.

7. The Metropolitan Area of Monterrey is growing rapidly. Between 1950 and 1960, population rose at an annual average rate of 7.3% as people from both other states and the same state poured into the area, (1). Between 1960 and 1970 the rate was lower, but still impressive at 5.3% annually. The current rate reported by the State Governor was an estimated 6%. In other words it is expected that the city's population (1.64 million inhabitants) will have doubled (3.5 million inhabitants)

- (1) Cortes-Melo, G. "Desarrollo Geográfico Poblacional 1940-1960-1970 del Area Metropolitana de Monterrey" (Litoxerografía Baca Osorio, Monterrey, N.L.) Mexico (undated) (p.1).
 Vaughan, D.R. & Feindt, W. "Initial Settlement and Intra-city Movement of Migrants in Monterrey, Mexico" in (AIP Journal), November 1973.
 Madrigal, H.R. "El Comportamiento Demografico del Medio Urbano - El Caso del Area Metropolitanaz de Monterrey" (CIE/UANL Monterrey, N.L.) Mexico, 1974.

in a mere 12 years. (1)

8. By the end of 1975 the capital city concentrated 73% of the total population of the state, this figure being equal to 85% of the total urban population. Moreover, 90% of the total non-selective rural-urban immigrants flocked into the city, creating serious problems of urban infrastructure, education, health, unemployment and urban sprawl. (2)

9. According to the 'Dirección de Planificación' of the State, the population of the Metropolitan Area of Monterrey was divided into three main socioeconomic categories; upper class (10%), middle class (31%) and lower class (59%). (3) This situation has deteriorated in the last few years during which the 'lower class' has been notably enlarged (75%) (4) by the non-selective immigration mentioned earlier. It is striking to see the way in which the shanty areas (or so-called 'misery belt') are expanding almost out of control. Social unrest is growing significantly. During February 1976 the Governor of the State had to intervene after five

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- (1) "El Desarrollo Urbano y Regional de Nuevo León" (Editorial in Boletín Bimestral de la Secretaría de Fomento Económico y Obras, Gob. del Estado de Nuevo León, Vol.I, No.2, Nov.1974, Monterrey, N.L. Mexico) (p.4).
- (2) DGE & PDU/GENL: "Diagnóstico Socioeconómico del Estado de Nuevo León" (GENL publication) Monterrey, 1972.
- (3) Cortes-Melo, G. "Desarrollo Geográfico ... op.cit. (p.6).
- (4) Estimation made using different sources of information.

members of the illegal land holding group named 'Tierra y Libertad' were killed, (and another four wounded) by the armed police (1). Since then, violence, confrontation, and public manifestations within the Metropolitan area, are increasing dangerously.

10. The horizontal expansion of the Metropolitan Area can be depicted by the number of municipalities swallowed up by its urban sprawl. By 1940, two municipalities had been added to that of the single Metropolitan Area of 1920. In 1960 this was made up of 4 municipalities, in 1970, 5 and in 1975, 7. (2) It is expected that, by the turn of the century, at least 20 municipalities (3) with a population of approximately 5 million, will be included in the Metropolitan Area.

11. In 1970 the industrial sector generated 56.6% of the state value-added total, which 97.6% was contributed by the Metropolitan Area (4), the latter figure having risen since 1965, when it was 96.9% (5). (See Figure No.31).

12. In 1970 the Metropolitan Area had 1.25 million inhabitants. The second largest city in the State was Linares with 24,000 inhabitants. This means that the capital city was more than 51 times bigger than the second rank city in the state. Mexico City, the 'macrocephalic' center of the nation was - in the same year -

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- (1) 'El Porvenir' 19th to 22nd Feb.1975. See as well 'Conexión'-Conacyt, Vol.II, No.38) Mexico, 1976.
- (2) Dirección General de Estadística: "Diagnóstico... op.cit.
- (3) Dirección de Planificación del Estado: "Desarrollo... op.cit. (p.4).
- (4) DGEYPD/GENL: "Plan de Desarrollo Socio-Económico Para el Estado de Nuevo León" (GENL,Monterrey) Mexico, 1974, (p.3).
- (5) DGE/SIC: "VIII y IX Censos Industriales" (SIC,Mexico) Mexico, 1965 & 1970.

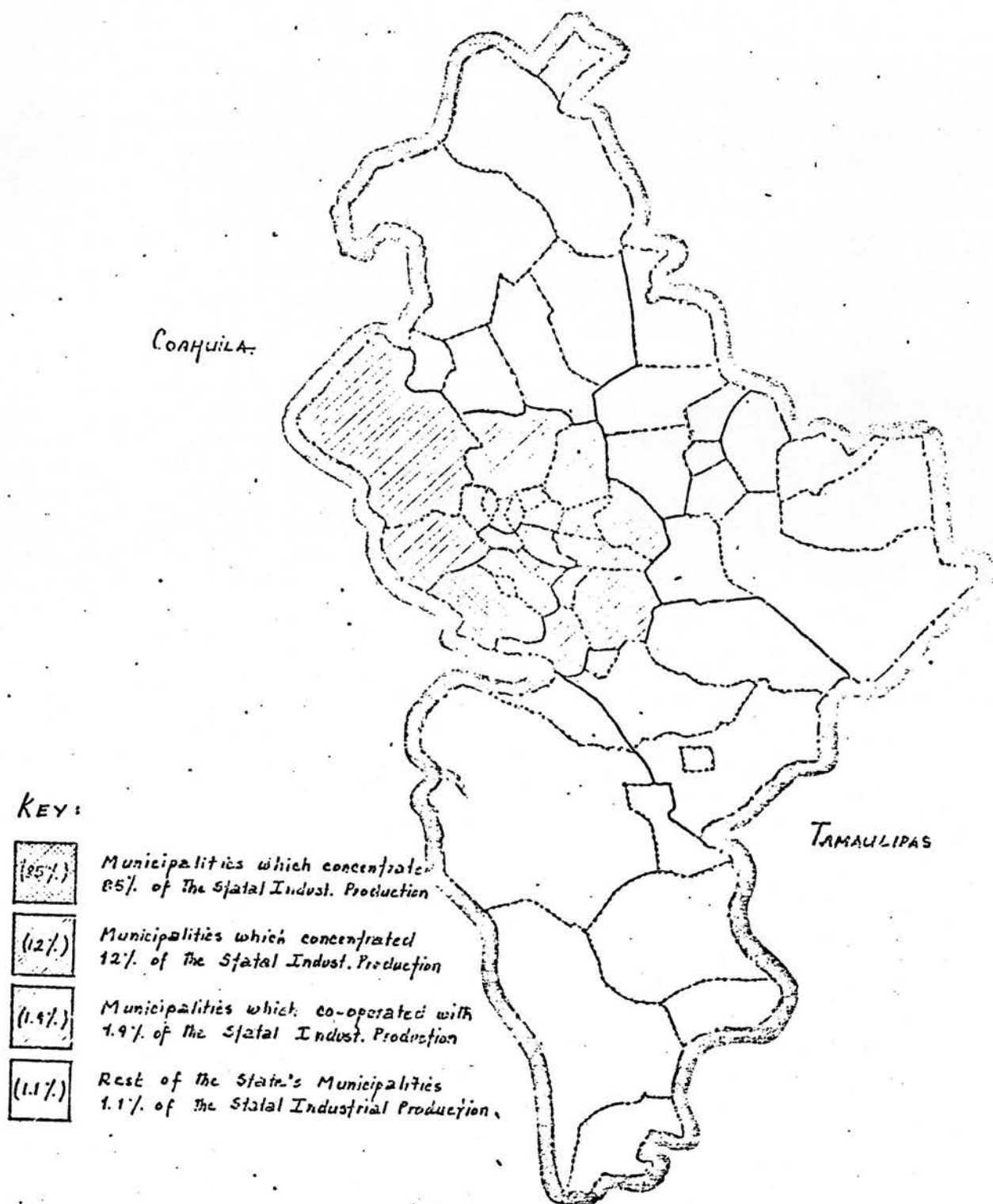


FIG. NO. 31 "INDUSTRIAL CONCENTRATION IN THE STATE OF NUEVO LEON 1970."

Source: Dirección General de Est. SIC. "IX Censos Industriales" México, 1972.

5.4 times bigger than the second rank city in the nation (1). By the year 1975 this overconcentration grew still worse. The Metropolitan Area had 1.640 million inhabitants whereas Linares has 28,900, the relation being 56.8 times! (2) From this is clear that one of the most serious problems of the State is that it does not have a system of intermediate cities with enough weight to counterbalance the attraction of the big city. This urban hypertrophy (3) is beyond any possibility of remedy if tackled at state level. (4)

13. In 1970, the spatial dissemination of the rest of the state population (27%) was amongst 4,095 localities. (5) This fact hindered the expansion of both health and educational services to the population in the countryside, widely scattered all over the area in small - and sometimes - hardly accessible communities. (6)

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- (1) Unikel, L. (et, al) "El Desarrollo Urbano de México" (Ciencia y Desarrollo No.3. Jul/Ago 1975, México) (p.70).
- (2) Estimation made based on direct information provided by the Dirección General de Estadística, N.L.
- (3) Béjar, L./COPRODE-NL. "Perspectivas y Problemas de la Ciudad, La Concentración y Sus Implicaciones" (Working Paper prepared for the 'Novena Comisión Nacional del Plan Básico de Gobierno 1976-1982' COPRODE-NL. Monterrey, N.L.) Mexico, 1975 (reduced circulation).
- (4) This is one of the main conclusions to which I arrived and one of the main reasons for looking at the problem beyond state level, (i.e. the Interstatal Regional approach).
- (5) DGE & PD: "Diagnosis Socioeconómica del Estado de Nuevo León" (Reporte interno de la Dirección General de Fomento Económico y Obras, Gobierno del Estado de Nuevo León, 1972, no publicado) (p.33).
- (6) CONAZA (National Commission for Arid Zones) has been working in the last three years in the poorest statal sub-region named 'Zona Sur'.

14. Due to the demographic characteristics of the state (more than 50% of its population is less than 20 years of age), (1) the pressures in both employment and education are remarkably high. It has been calculated that for satisfactory levels of employment it is necessary to generate an average of 25,000 jobs per year during 1970-1975 (2), while the State has expended more than 82% of its budget in 1974 in keeping pace with the demands of education (3).

9.4. The Goals-Setting Subprocess

The national goals have been, during Echeverria's administration: a) A high rate of economic growth; b) the reduction of external dependency; c) equitable income distribution; d) job generation, especially in rural areas, and e) the strengthening of regional development. (4) These goals have been echoed at state level where the main objectives have been set out similarly. (5) Nevertheless, the problem of overconcentration in the Metropolitan Area is so pressing that decentralization has been adopted as one of the paramount state objectives, (6)(7) along with the others above mentioned.

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- (1) DGE/SIC: "IX Censo General de Poblacion 1970" (DGE/SIC) Mexico, 1972.
 - (2) DGE/GENL: "Plan de Desarrollo ...op.cit.
 - (3) COPRODE-NL: "Programa de Inversiones Públicas Federales en el Estado de Nuevo León". (COPRODE-NL, Monterrey, N.L.) Reporte Preliminar, Mexico, 1974 (p.7).
 - (4) CNDR/SP: "Presentacion" in ('Desarrollo Regional', CNDR/SP, Vol.I, No.1), México, 1975.
 - (5) COPRODE-NL: "Programa de Inversiones... op.cit.
 - (6) SFEYO/GENL: "Descentralización" in ('Boletín Informativo SFEYO', Vol.I, No.1, Monterrey, N.L.) Mexico, 1974.
 - (7) SFEYO/GENL: "Programa de Descentralización Industrial" in ('Boletín Informativo SFEYO', Vol.I, No.4, Monterrey, N.L.) Mexico, 1975.

9.5. Governmental Action

In spite of the clear awareness of all these facts, expressed in endless lists of congresses, seminars, working meetings and political addresses, the situation has not improved at all, but continues to deteriorate markedly. Data relating to Municipal, State and Federal expenditure in recent years, reveals the nature and extent of this deterioration. There is also some evidence of awareness of its causes, however ineffective.

1. In 1974, public investment was concentrated in the Metropolitan Area of Monterrey as follows: Municipal 88.4%, State 81.4% and Federal 65%. (1) These figures meant an average concentration of 57.2 times with respect to the rest of the State. (2) In other words, when in the Metropolitan Area more than a half million pesos/km² was invested, this figure was for the rest of the State on average nearly 10,000 pesos/km².

2. Moreover, the combined state investment programmes for the year 1975 (3) and 1976 (4) have designated approximately a thousand million pesos for the capital city, when the aggregated state investment programme for the six next most important cities was only ten million (5) pesos, or 1%.

3. The state government has been trying to correct the obviously grave problem of overconcentration in the last three years. (6) Figure No.32 shows the inadequacy of the measures taken so far. Five out of six industrial

(1) Figures produced by COPRODE-NL.

(2) Estimation made based on the above tables.

(3) SFEO/GENL: "Plan General de Desarrollo Urbano Programa 1975" (SFEO, Boletín Bimestral, Vol.1, No.5, Monterrey, N.L.) México, June 1975.

(4) Garza, G.E. "Programa de Obras Para 1976" as presented by ('El Porvenir', 10/X/75) Mexico, 1975.

(5) Estimation based on information provided by the municipal presidents during November 1975.

(6) SFEO/GENL: "Quarterly Report of the Secretary Activities" (Boletines No.1 to No.5) 1974-1975.

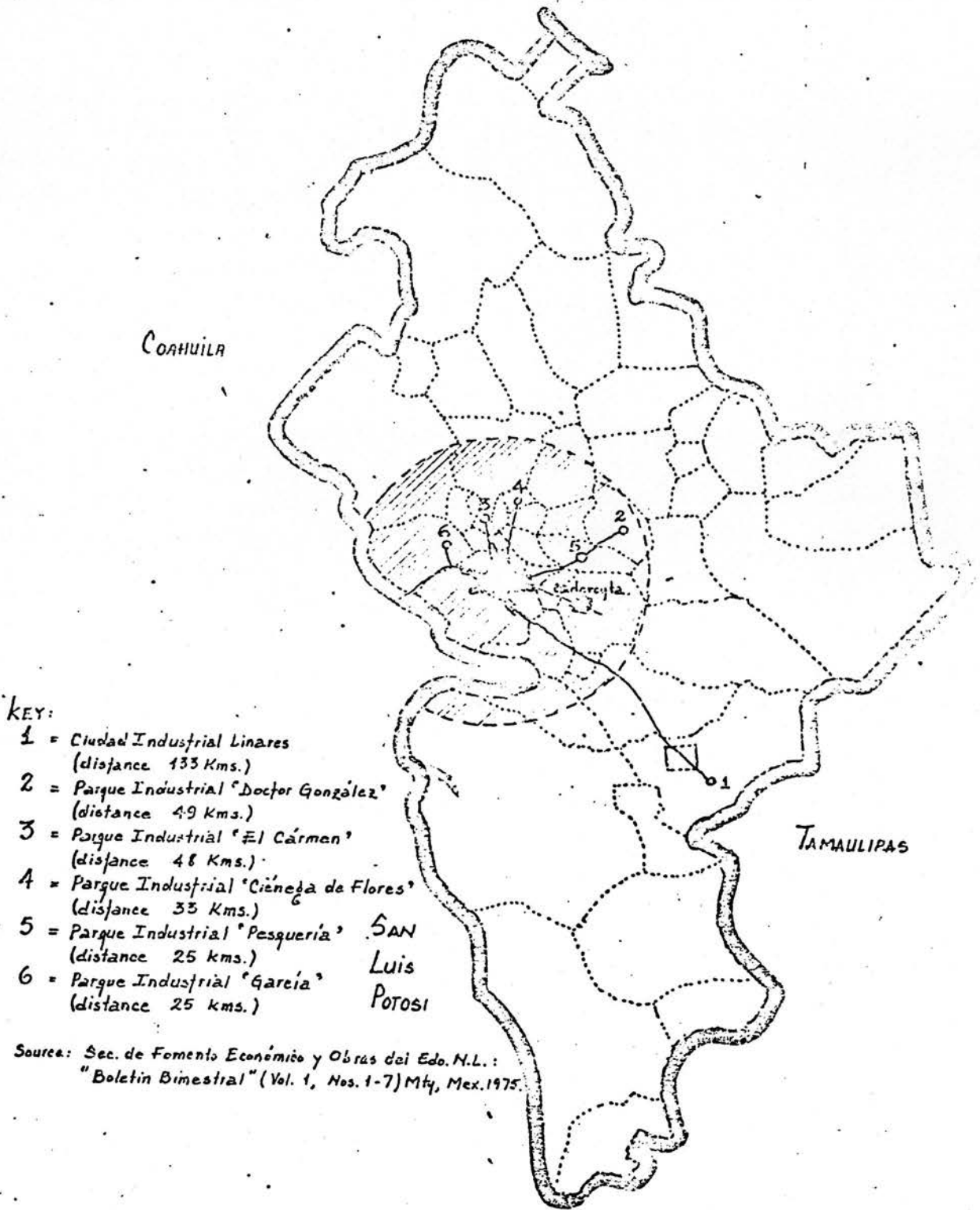


FIG. NO. 32 'GEOGRAPHICAL LOCATION OF THE 'INDUSTRIAL CITIES' AND 'INDUSTRIAL ESTATES' IN THE STATE OF NUEVO LEON'

estates are within a radius of no more than 50 kms. from the center of the capital city. Immediate consequences have been shortages of water (1), and energy (2) closely followed by industrial pollution (3).

4. The inadequacy of the state government's decentralization programme and measures become more obvious, as depicted in the next two Figures, 33 and 33-B, when spatially analysed, using the socioeconomic index.

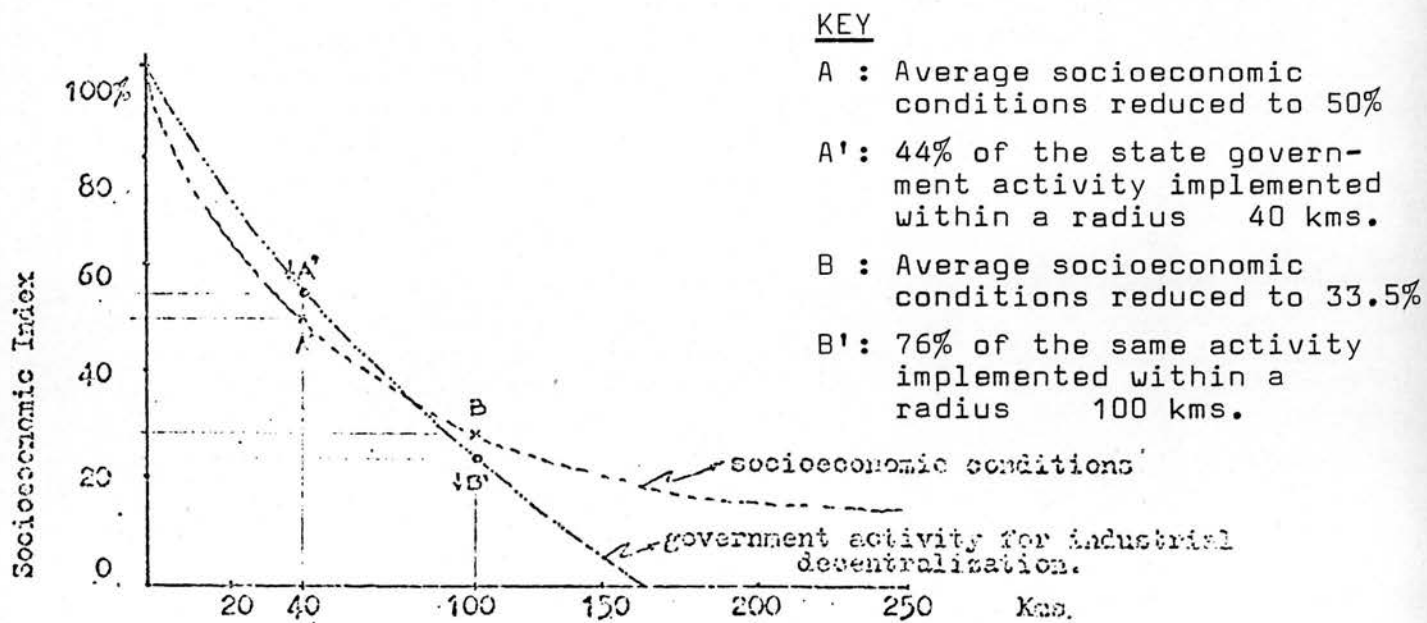
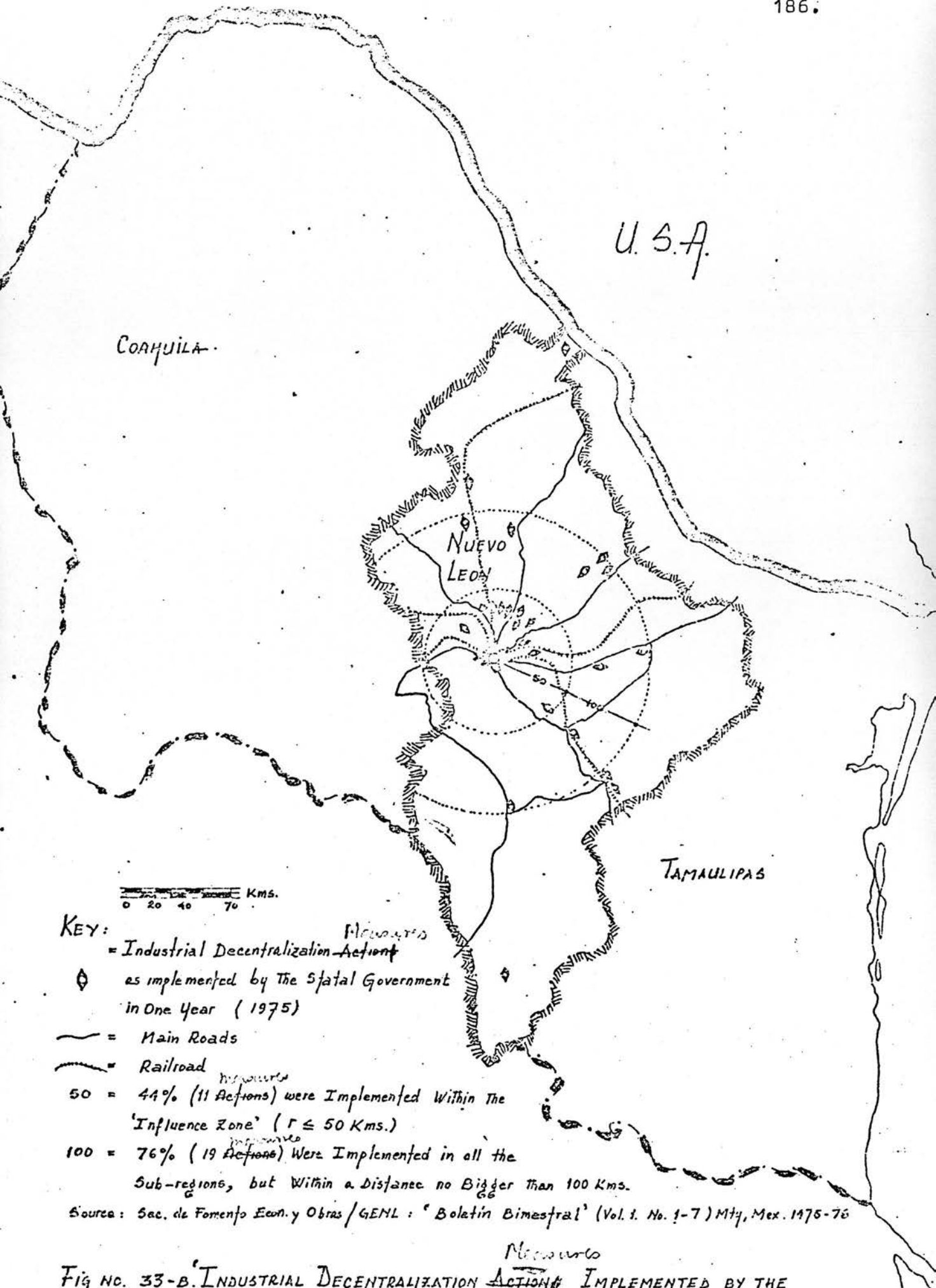


FIGURE NO.33 Socioeconomic Conditions (1970) vs. State Government Activity (1975) for Industrial Decentralization.

9.6. Evaluation Subprocess

The next stage of the Structural Planning Process is to make an evaluation of the 'level of performance' of the policies implemented vis-a-vis the goals adopted

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- (1) SRH/Dependencia N.L. "El Abastecimiento de Agua Potable para Monterrey" (Working paper) Monterrey, 1972.
 - (2) Servin, L.L.C. "Los Energéticos en Nuevo León" in (SFEO/GENL Boletín, Vol. I, No. 4) Monterrey, 1975.
 - (3) UANL/SSA - Subsecretaría de Mejoramiento del Ambiente: "Contaminación". (UANL/SSA Monterrey, N.L.) Mexico, 1974.



KEY:

◆ = Industrial Decentralization Actions
 as implemented by the State Government
 in One Year (1975)

— = Main Roads
 — = Railroad

50 = 44% (11 Actions) were Implemented Within the
 'Influence Zone' ($r \leq 50$ Kms.)

100 = 76% (19 Actions) were Implemented in all the
 Sub-regions, but Within a Distance no Bigger than 100 Kms.

Source: Sec. de Fomento Econ. y Obras / GEML : 'Boletín Bimestral' (Vol. 1. No. 1-7) Mtg, Mex. 1975-76

Fig. No. 33-B. INDUSTRIAL DECENTRALIZATION ACTIONS IMPLEMENTED BY THE STATE GOVERNMENT OF NUEVO LEON IN THE YEAR 1975

and set to be achieved. In preceding sections a very rough model of the state reality has been depicted using the information subprocess, (including behaviour of the model through time), while the goal-setting subprocess has provided the frame of reference to which to refer when making an evaluation. Lastly, the review of government measures has provided certain components for judging implementation so far.

In spite of the efforts made so far, incompatibility persists as between reality and those goals which have been adopted. This evaluation is based on an assessment of the implementation of the program, and its effects:

a) Concentration, overcentralization and urban hypertrophy have been encouraged rather than counterbalanced by the so-called 'Industrial Towns and Estates', the effects of which in the long run are likely to be more harmful than expected. Urban sprawl (i.e. horizontal uncontrolled growth) will tend to expand towards the industrial cities. This in turn will increase land speculation, (1) demands on urban infrastructure, and the difficulties of implementing real planning action (2), especially in a Metropolis enlarging at the rate of 6% per annum.

b) If concentration intensifies further - as is expected - this necessarily implies worsening of regional imbalances, and this in turn will augment pressures in the big city. Further weakening of the small surrounding cities, is a parallel effect, tending to reduce their already limited capacity for development.

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- (1) An effort has been made as recently as 1975, to institute the legal procedures to deal with this problem:
Zorrilla, M.P. "Ley de Urbanismo y Planificación para el Estado" in (Periódico Oficial, GENL, Monterrey, N.L.) 1st February, 1975.
- (2) Similarly, two more recent presidential actions have been taken in this line:
Torres, A.F. "Urban Development Legislation" in ('Comercio Exterior', Vol.22, No.4) México, April 1976.
Echeverría, A.L. "Ley General de Asentamientos Humanos" in ('Conexión - Conacyt, Vol.II, No.43), Mexico, June 1976.

c) In the Metropolitan Area of Monterrey, being the second most important city in the country, all forms of power have, in effect, been centralized. Decentralization programmes in so far as these are mainly concerned with industrial development (1), are an illusion and a delusion. Industry, does not create favourable conditions for urban growth in itself. A real program for decentralization must first take account of the many existing forms of power held by the private sector, public administration, financial institutions, the banking system, workers organizations, etc., because it is the relationships between these which characterize the power-structure already discernible in the alternative places proposed for development.

d) Uneven income distribution, unemployment, especially in rural areas and misery belts around the capital city, and regional imbalances have not changed positively inspite of being nominated as the main objectives for governmental development policies in the State.

(1) Echeverría, A.L. "Fideicomiso para el Estudio y Fomento de Conjuntos, Parques y Ciudades Industriales" (Diario Oficial, 23 Dic.1970), México 1970.

CONCLUSIONS

1. The so-called 'Mexican Problematique' has special features within the state of Nuevo Leon which make it distinctive.
2. These are acute problems of overconcentration, overcentralization and urban hypertrophy. Being the second wealthiest state in the nation it exhibits, at the same time, the widest variations within the region.
3. Industrial growth has been the key to economic growth in the State, but it has been, at the same time, concentrated almost totally in the municipalities forming the Metropolitan Area, creating serious problems of urban sprawl, excessive demands for and upon infrastructure, energy supplies and services, and, consequently of pollution.
4. 'Overconcentration' in the capital city is not by any means solely the result of industrial concentration, but stems also from concentration of political, economic, administrative, financial, and 'intelligence' powers. The result of this is the concentration of population, resources and opportunities.
5. The most apparent consequence of this phenomenon is the lack of a system of internal cities. There are no intermediate size cities counterbalancing significantly the centripetal force of the Metropolitan area of Monterrey.
6. There is no possible way out of this dilemma if the State continues to be treated as a closed system. A new kind of inter-state and inter-regional outlook must open the state system towards a more comprehensive and extensive approach.
7. The very poor level of performance of governmental activity - inspite of the good intentions - reinforces

all that has been said about planning and development so far.

8. By presidential decree, the State of Nuevo Leon, with the neighbouring states of Coahuila and Tamaulipas, now forms part of the Region No.III: "Northeast". (1) This division was made with the idea of facilitating the 'economic, social, state and regional planning' (see Figure No.14, page 124).

The attempt in the next chapter to develop a new approach to the problems of the State in its regional context, is, therefore, not only clearly called for by the theoretical and practical difficulties already described, but is historically most opportune.

(1) CNDR/SP: "Regionalización del País" in 'Desarrollo Regional' ... op.cit. (pp.20-21).

CHAPTER X STRUCTURAL REGIONAL PLANNING: A PRELIMINARY
APPROACH TO THE NORTH EAST MEXICAN REGION

10.1. Introduction

It would be a serious mistake if I were to say that the present case study proves the validity of structural Regional Planning as redefined previously. This is not the case, for the following reasons:

First, as I have already mentioned, grave limitations were imposed on the research because of the lack time, personnel and resources.

Secondly, I have alluded also to the critical restrictions existing when coordination is attempted amongst representatives of different government bodies (i.e. municipal, state and federal). Moreover, it proved impossible to form a proper inter-disciplinary and inter-government 'working group' on the lines of the Composite Mind theory for work on the case study.

Thirdly, due to factors beyond our control no contact was made with the governors of the neighbouring states.

This preliminary approach, however, showed how things should be done if time, personnel and resources were available, and has therefore a validity of its own.

The problem of intra-state coordination is not necessarily insurmountable. It depends fundamentally on the right person, the right moment and the proper attitude. The Governors of Yucatan, Campeche, Tabasco, Chiapas, and Quintana Roo held a work meeting in Cozumel in early February this year, attended by President Luis Echeverria.(1)

(1) BNCESA: "Economic and Social Conditions in México" Regional Economy - in ('Comercio Exterior' Vol.22, No.4) México, April 1976.

The discussion centered on the socioeconomic integration of the South East, including the Peninsula, and part of the South Pacific regions. Each Governor made a brief summary of his state's major problems, after which all five agreed on the urgency of creating the necessary infrastructure on which to base the region's economic and social development.

This recent fact indicates that Mexico's decision-makers are becoming more aware of the potentialities of a more integrative and open approach to their own 'local problems'. The federal government - for the first time in Mexican political history - is changing its attitude towards inter-state governors' meetings, as declared by the former Secretary of the Presidency. (1)

10.2. The Theoretical Inter-state and Interdisciplinary Approach to a Region

Figure No.34 portrays a suggestion for a valid way of tackling the problem of inter-state and interdisciplinary coordination. It could be applied when dealing with a region like the North East, or with two or more regions, as in the case above mentioned.

1. The 'Milieu-Entier' is permanently feeding the 'Information Subprocess', which in turn provides the data required by each of the 'Working Groups' formed according to the specific regional characteristics. Information is also given to both the 'Decision-Making Group', which is formed by representatives of Federal, State and Municipal Governments of the various states involved, and to the 'Other Related Group' (i.e. technical advisers from different national and international organizations).

(1) Cervantes del R.H. "Fin a Suspincias Sobre Reuniones de Gobernadores" in ('Novedades') México, 1/4/75.

KEY :

- WG₁ = Working Group 1 (i.e. Agriculture)
- WG₂ = Working Group 2 (i.e. Urban Devt)
- WG₃ = Working Group 3 (i.e. Industry)
- WG_n = Working Group n (i.e. Tourism)
- DMG = Decision Making Group (i.e. Govt.)
- ORG = Other Related Group (i.e. Private S.)
- INS = Information Sub-Process
- IMS = Implementation Sub-Process
- R₁ = Representative Group no. 1
- R_n = Representative Group no. n
- RDM = Representative Decisn. Making G.
- ROR = Representative Other Related G.
- PF = Problem Finding
- GC = General Concensus
- = Flow of Information
- = Flow of Information from the Working Group to its Representative
- ←--- = Feedback to INS if either there is a Problem and/or there is no General Concensus.
- = Point of decision in both Working Groups and Round Table.

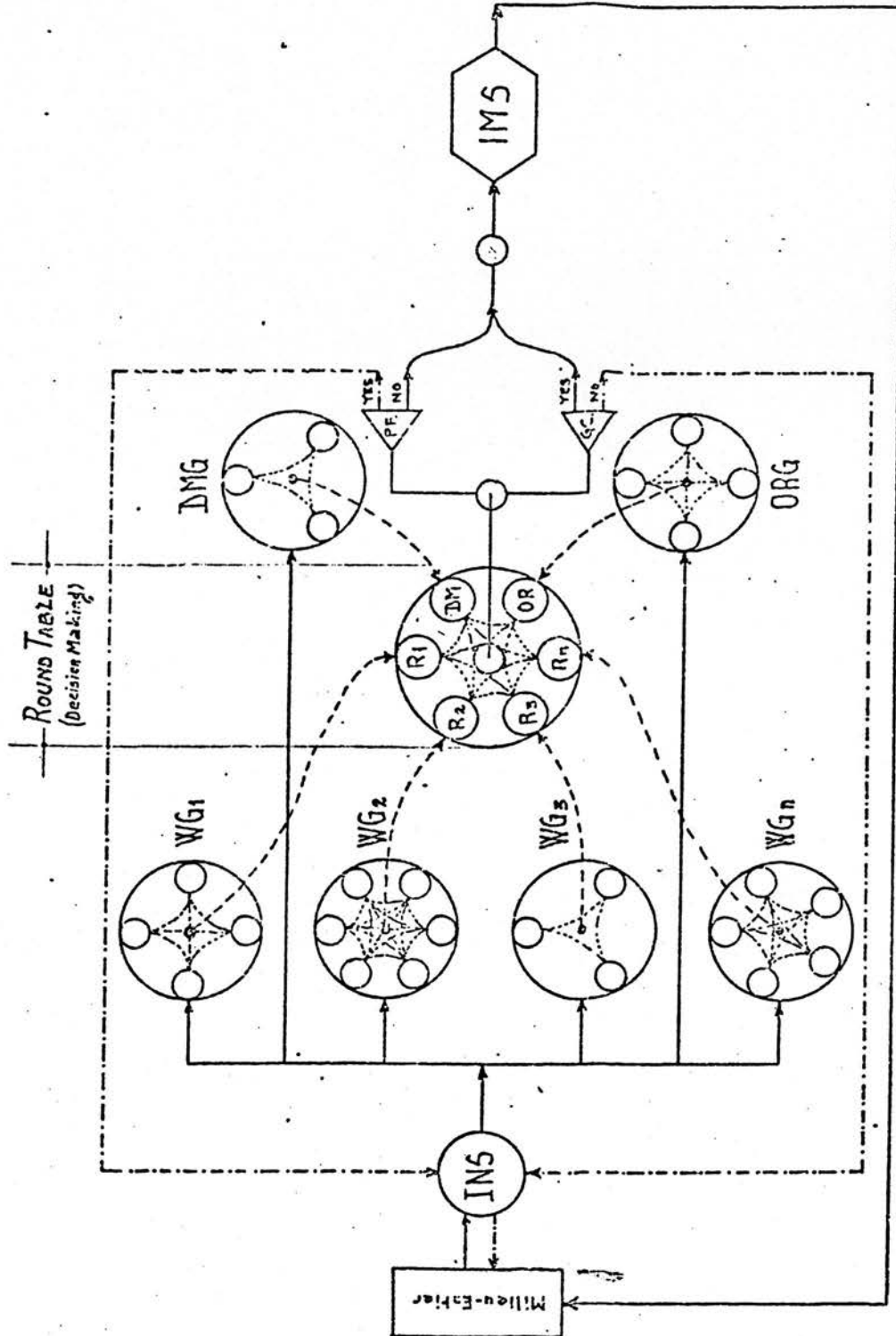


Fig No. 34 'THE SCHEMATIC REPRESENTATION OF AN INTER-STATE AND INTER-DISCIPLINARY ORGANIZATION FOR APPLYING STRUCTURAL REGIONAL PLANNING'

2. Each 'Working Group' (WG_1, WG_2, \dots, WG_n) as well as the 'Decision Making Group' (D-MG) and the 'Other Related Group' (ORG); have a representative or representatives (R_1, R_2, \dots, R_n) at the round table discussions. These representatives are carrying with them the results of every group's general consensus which in turn have to be discussed at the round table.

3. The general consensus of the round table is exposed to dual binary decision points which have to be solved through a series of meetings and reviews to discover firstly whether there is any problem which has not been considered properly and interrelatedly by any of the representatives of the groups: (If the answer is in the affirmative a feedback operation is performed to the various groups which have to gather more data from the Milieu-Entier through the Information Subprocess (INS)): Secondly, whether there is any obstacle to the general consensus, apart from the previous problem mentioned: (If the answer is in the affirmative a similar feedback procedure has to be executed until the general consensus is achieved.)

This apparently easy mechanism is much more complex than it appears at first sight.

Working Groups tend to over-emphasize the role of the area under their study. Moreover, their way of approaching the particular problem with which they are concerned tends to differ amongst them inspite of the very general common goals and objectives. Furthermore, an open mind and attitude is required in the 'Decision Making Group' in which short-term benefits have to be sacrificed for the sake of far-reaching policies.

It is very likely that these two main feedback procedures require numerous round table meetings before a general consensus is accomplished.

4. Once the previous stage is over, the whole procedure is geared towards the 'Implementation Sub-process', which in turn has an immediate impact (as already explained in Chapter VI, Section 6.5.8.) on the Milieu-Entier.

10.3. The North East Region (1)

As mentioned earlier the North East Region is composed of three states: Coahuila (151,571 Km²), Nuevo Leon (64,555 Km²) and Tamaulipas (79,829 Km²) which jointly make 15% of the national territory. (2) (See Figure No.35). Its main geological features are exhibited in Figure No.28; (3) its geomorphology is shown in Figure No. 29 (4); its annual average pluvial pattern is presented in Figure No.30 (5); its climatic zones are represented in Figure No.31 (6); its vegetation is delineated in Figure No.32 (7); its edaphology is shown in Figure No.33 (8); and its river basins are exhibited in Figure No.34 (9).

10.4. Agricultural Development: The First Step Towards Sound Structural Regional Planning

As I have already mentioned when reviewing the Mexican Problematic, agriculture is in a state of crisis. Sound development must start with food self-sufficiency. It is a matter of sheer arithmetic: agricultural output is far inferior to population growth. (10) Staple food

(1) Source: Cortes-Melo, G. "F.2: Análisis Geográfico Físico del Noreste de México" - 'Análisis y Expectativas de la Estructura Urbanística del Noreste de México' (Centro de Investigaciones Urbanísticas de la Univ. Aut. de N.L., Monterrey, N.L.) México, 1976.

(2) When compared with the area covered by Scotland the North East Region makes 71% of the former.

(3)-(9) See Appendix No.4, pp. 296-302

(10) (1.7% vs. 3.5% in 1973) See: Sánchez, D. "Balance Negativo ... op.cit.

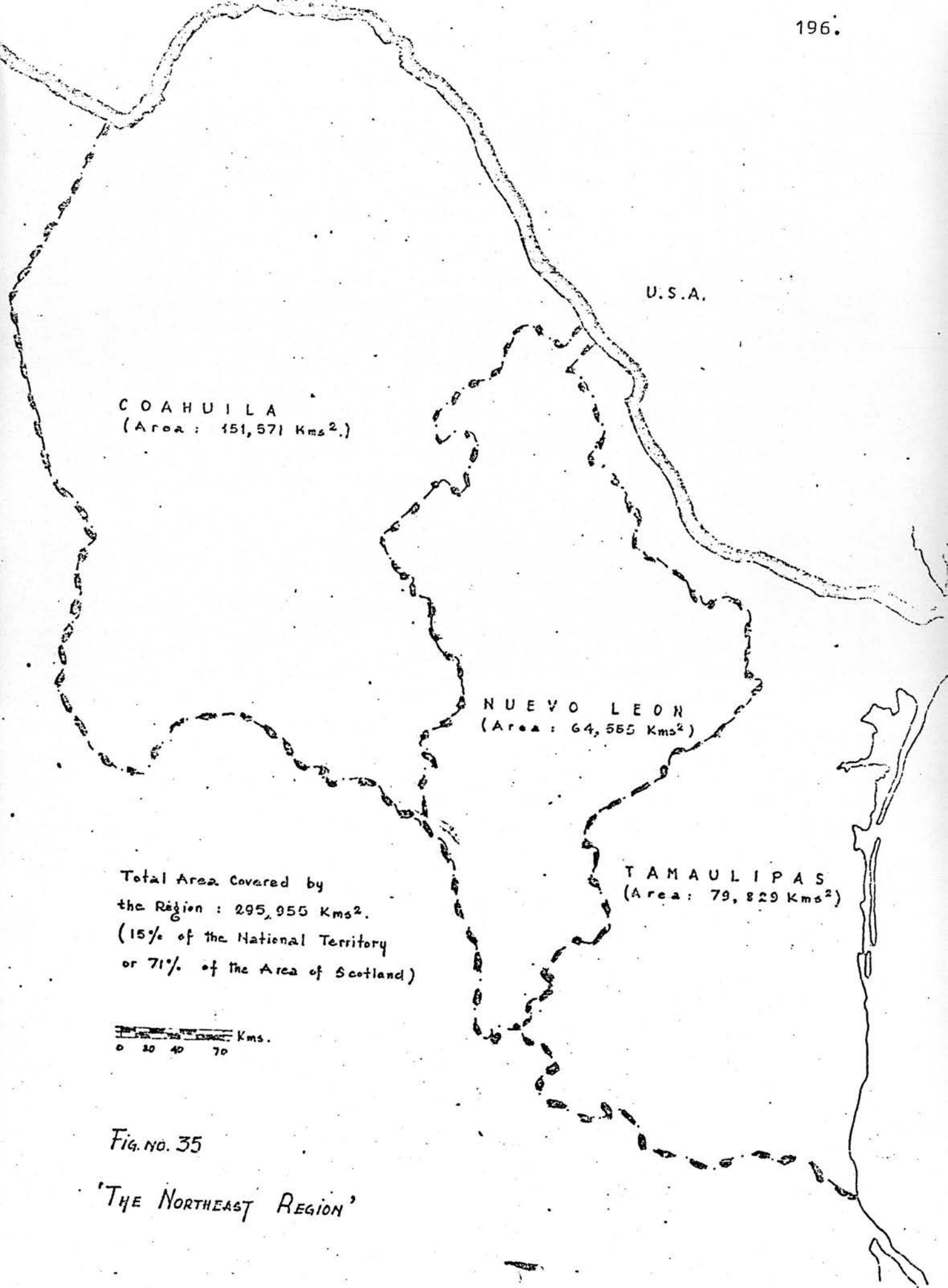


Fig. NO. 35

'THE NORTHEAST REGION'

grains and other products have been imported since 1970 and inspite of the clear and open changes brought about by President Luis Echeverria, the Mexican countryside continues to present a most disturbing picture.

Structural regional planning must aim at restoration of the rural-urban balance within each region as a 'sine-qua-non' of development. But, unfortunately, the problem is not just that of food, or more generally, agricultural output growing at the same speed adn even faster than population growth. Mexico's gross internal agricultural product grew from 1939 to 1965 at a mean annual rate of 5% considerably above the population rise (3% average during the same period) (1) without bringing with it any significant improvement in the standards of living of the rural population. The reason is obvious, capitalistic farming flourished under the stimulus of abundant credit, capital, irrigation, improved seeds, mechanization, infrastructure and political support; whereas the ejidos and Indian communities were systematically neglected.

The problem, as roughly depicted earlier on, is more complex when analysed in its structural set up. Its multidisciplinary perspective demands consideration of cultural, social, economic, political, institutional and ecological aspects of Mexico's agrarian reality.

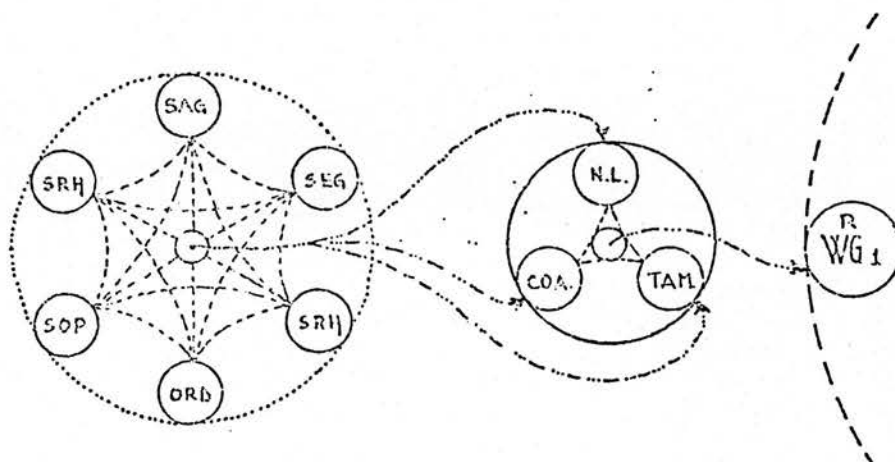
Accordingly, the task at hand is to organize a first 'Working Group' for dealing with this area at regional (interstate) level. There are various specific federal and state organizations which are directly or indirectly connected with agriculture: Sria. de Agricultura y Ganaderia (SAG); Sria. de Obras Publicas (SOP); Sria. de Recursos Hidraulicos (SRH); Sria. de la Reforma Agraria (SRA); at statal level, in Nuevo Leon, the Sna. de Fomento Economico y Obras (SFEO) has a specific branch dedicated to Agricultural Development (i.e. 'agricultural extension', 'livestock extension', 'agricultural

machinery' and 'rural housing improvement'). Some of the so-called 'decentralized organisms' or 'State-affiliated enterprises' also have programmes connected with agriculture and rural development. It is important to note that lack of coordination amongst these organizations leads to problems of overlapping, competition and unnecessary duplications. This phenomenon was so self-evident that the President decreed the formation of a new organism named 'Comision Coordinadora del Sector Agropecuario' (COCOSA) (1) the main task of which is to coordinate the actions of all other dependencies related to the agricultural sector. Moreover, 'COCOSA' has a branch within each state, the 'Comision Coordinadora del Sector Agropecuario Estatal' (COCOSAE) (2) which deals with the problems of coordination at state level.

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- (1) Echeverría, A.L. "Fifth State ... op.cit.
- (2) Adame de León, J.L. "El Municipio, El Federalismo Compartido y la Planeación Agropecuaria y Forestal de México" in (SFEYO), Boletín Bimestral, Vol.1, No.4, Monterrey) Mexico, 1975 (pp. 6-7).

So, a possible integration of the first 'Working Group' (agricultural sector) could be depicted as follows:

(COCOSAR) (1)



KEY

- (SAG) = Sria. Agricultura y Ganaderia;
 (SRA) = Sria. de la Reforma Agraria;
 (SOP) = Sria. de Obras Publicas;
 (SRH) = Sria. de Recursos Hidraulicos;
 (SEG) = Sria. del Gobierno Estatal; and
 (ORD) = Other Related Dependencies.
 (COCOSA) = Comision Coordinadora del Sector Agropecuario;
 (COA) = Coahuila; (NL) = Nuevo Leon; (TAM) = Tamaulipas.
 (RWG₁) = Representative(s) of the Working Group No.1
 (to be fit in the 'round table discussion' as
 shown in Figure No.34.)
 = Point of group's decisions.

FIGURE NO.43 'Working Group No.1: Agricultural Sector'

In the preliminary working paper that I submitted to the COPRODE-NL (2) a very preliminary methodology was used for detecting the agricultural and livestock areas for further study by an organized working group like the

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- (1) 'COCOSAR' should be the Coordination of the agricultural sector at regional level.
 (2) Béjar, L. "Estrategia de Desarrollo Urbano y Regional..." op.cit. (copy available in the Department).

one previously depicted.

10.4.1. Definition of the Most Relevant
Agricultural and Livestock Micro-
Regions in the North East Region.

Based on the information available, the procedure applied was the following:

1. Selection of the municipalities with 15,000 inhabitants or more, these being the potential centres for the development of small and medium agriculture industries. (18 in Coahuila, 14 in Nuevo Leon and 16 in Tamaulipas).
2. Selection of relevant variables which could represent the current state of agriculture and livestock, these being: Agriculture (total hectares, hectares under irrigation, hectares under the 'natural pluvial regime'), Livestock (pasture land and cattle, including horses, asses, mules, pigs and bovines) and Economically Active Population involved in these activities.
3. Generation of the 'regional mean' for each of these variables

$$(\text{r.m.} = \sum_{i=1}^n X_i/n)$$
4. Every single variable was weighted according to its importance and relevance to the region's integral agricultural development.
5. A computer programme was designed, tested and applied (see Appendix No.5, pp. 303-309).
6. After the programme-running procedure was carried out several times satisfactory results were obtained (see Tables No. 3,4,5 in the Appendix No.5, pp. 303-309).

7. From the data presented in the previous tables, two significant concepts were introduced: 'Municipal Diversification' and 'State Specialization', (see Tables No. 6,7,8, in the Appendix No.5). Municipality with (4-5) variables above the 'regional mean' (V) indicated its diversification in both agriculture and livestock. A municipality with 3 variables (V) indicated less degree of diversification, presenting perhaps diversification only in agriculture or only in livestock. A municipality with 1-2 variables (V) indicated no degree of municipal diversification.

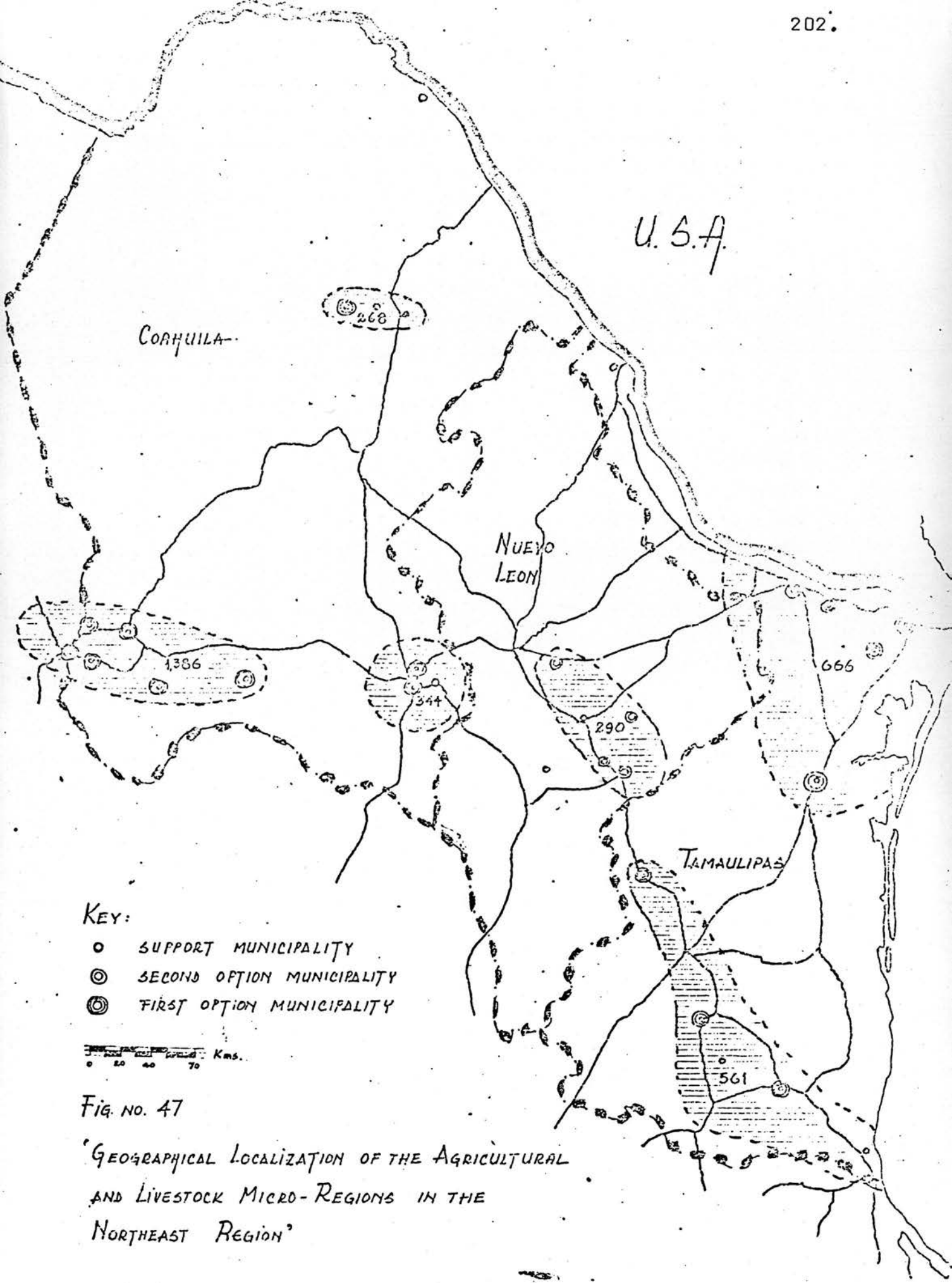
Similarly, analyzing the same information vertically, it was possible to detect the degree of 'state specialization'. For instance, both states Coahuila and Tamaulipas presented a high number of variables above the 'regional mean' (V) in pasture land (eight each) as compared with just two (V) in the state of Nuevo Leon.

8. Total scores were obtained for each Municipality, which were grouped into micro-regions. Three kinds of Municipality were defined: 'First Option', 'Second Option' and 'Support Municipalities'.

9. The micro-regions were geographically localized in each of the three states under study (see Figures No. 44, 45 and 46 in the Appendix) and presented all together in Figure No.47 as a synthesis.

A second methodology which was not used due to the lack of time and information is the one developed in my previous thesis based on the 'Threshold Analysis' as reformulated for agricultural and food production. (1)

(1) Béjar, L. "A Quantitative Methodology ... op.cit. (See especially Chapter 4, pp. 161-237).



KEY:

- SUPPORT MUNICIPALITY
- ⊙ SECOND OPTION MUNICIPALITY
- ⊕ FIRST OPTION MUNICIPALITY

0 20 40 70 Kms.

Fig. no. 47

'GEOGRAPHICAL LOCALIZATION OF THE AGRICULTURAL AND LIVESTOCK MICRO-REGIONS IN THE NORTHEAST REGION'

Nonetheless, both ways of tackling the countryside's dilemma are very limited. They can provide very general guidelines, without touching some other important matters, such as 'land distribution' (1), 'social organization', 'ecological limitations', 'alternative land use', 'crop rotation', 'mechanization', 'ejido's organization', etc... which obviously have to be considered in all their complexity by the Working Group No.1.

10.5. Urban Decentralization: The Second Step Towards Sound Structural Regional Planning

In the specific case of the North East Region a 'Second Working Group' should be organized following the procedure indicated in Figure No.43, which in turn is meant to fit into Figure No.34, by having a representative (or representatives) RWG₂ in the 'round table discussion', in which general consensus must be reached before actions are taken.

As already mentioned, industry is heavily concentrated in the Metropolitan Area of Monterrey. Its importance at national, regional and state level is apparent from the next Table, No.9. First, at national level, Monterrey had in 1965 11.6% of the total national 'capital invested' in industry and was surpassed only by the Federal District. Its gross production was 10.4% and its value-added was 10.6%. A slight reduction occurred in 1970 when the percentages dropped to 11.3, 10.0 and 10.2 respectively.

Second, at regional level, concentration was augmented. Capital invested rose from 64.9% in 1965 to 67.3% in 1970; gross production grew from 61.1% to

(1) A constant factor during López Portillo's political campaign was the public denunciation of new latifundios and illegal land holdings, a big number of which belongs in 1976 to very well known political personalities (see for instance, 'Conexión'-Conacyt since October 1975).

	1		5		6		9		1		7		0		
	Capital Invertido	% Resp. Nación	Producción Bruta	Valor Agregado	% Resp. Nación	Capital Invertido	% Resp. Nación	Producción Bruta	% Resp. Nación	Valor Agregado	% Resp. Nación	Producción Bruta	% Resp. Nación	Valor Agregado	% Resp. Nación
TOTAL NACIONAL	95,361.34	100.0	119,566.07	41,987.16	100.0	156,540.51	100.0	212,390.80	100.0	82,517.62	100.0	212,390.80	100.0	82,517.62	100.0
REGION NORESTE	17,003.13	17.8	20,452.60	7,033.93	16.8	26,299.97	16.8	35,594.59	16.8	12,787.20	15.5	35,594.59	16.8	12,787.20	15.5
COAHUILA	4,391.72	4.6	6,055.71	1,943.44	4.6	6,344.51	4.1	9,721.96	4.6	3,252.91	3.9	9,721.96	4.6	3,252.91	3.9
HUEVO LEON	11,348.00	11.9	12,793.57	4,576.60	10.9	18,471.78	11.8	24,000.16	11.2	8,664.35	10.5	24,000.16	11.2	8,664.35	10.5
MONTERREY*	11,034.92	11.6	12,486.79	4,432.73	10.6	17,712.19	11.3	23,441.29	10.0	8,455.40	10.2	23,441.29	10.0	8,455.40	10.2
TAMAULIPAS	1,263.41	1.3	1,603.32	513.89	1.2	1,483.68	0.9	2,272.87	1.1	869.94	1.1	2,272.87	1.1	869.94	1.1
		% Resp. Región			% Resp. Región		% Resp. Región		% Resp. Región		% Resp. Región		% Resp. Región		% Resp. Región
REGION NORESTE	17,003.13	100.0	20,452.60	7,033.93	100.0	26,299.97	100.0	35,594.59	100.0	12,787.20	100.0	35,594.59	100.0	12,787.20	100.0
NUEVO LEON	11,348.00	66.7	12,793.57	4,576.60	62.6	18,471.78	70.2	24,000.16	66.7	8,664.35	67.3	24,000.16	66.7	8,664.35	67.3
MONTERREY*	11,034.92	64.9	12,486.79	4,432.73	61.1	17,712.19	67.3	23,441.29	65.1	8,455.40	66.1	23,441.29	65.1	8,455.40	66.1
		% Resp. Estado			% Resp. Estado		% Resp. Estado		% Resp. Estado		% Resp. Estado		% Resp. Estado		% Resp. Estado
NUEVO LEON	11,348.00	100.0	12,793.57	4,576.60	100.0	18,471.78	100.0	24,000.16	100.0	8,664.35	100.0	24,000.16	100.0	8,664.35	100.0
MONTERREY*	11,034.92	97.2	12,486.79	4,432.73	96.5	17,712.19	95.9	23,441.29	97.7	8,455.40	97.6	23,441.29	97.7	8,455.40	97.6

fuentes: Dirección General de Estadística, SIC; VIII y IX Censos Industriales (Datos 1965 y 1970).

* Área metropolitana que cubre los siguientes Municipios: Garza García, Guadalupe, Monterrey, San Nicolás de los Garza, Santa Catarina, Gral. Escobedo y Apodaca.

Elaborado por el Comité Promotor del Desarrollo Socio-Económico del Estado de Nuevo León.

Table No.9 Industrial Concentration of the Metropolitan Area of Monterrey 1965 - 1970

65.1% and value-added increased from 63.0% to 66.1%.

Third, at state level, industrial over concentration is apparent. 97.2% in 1965 and 95.6% in 1970 of the 'capital invested' was concentrated in the capital city, itself formed by no more than seven of the fifty-two municipalities into which the state is sub-divided, those seven covering only 3.3% of the total area. Obviously, both gross production and value-added were almost all generated in Monterrey (97.7% and 97.6% in 1970 respectively).

As shown in Figure No.32 the so-called 'industrial cities' and 'industrial estates', which were intended to encourage industrial decentralization outside Monterrey, have not had any significant impact. On the contrary, at regional level they are reinforcing Monterrey's industrial primacy and horizontal sprawl. (See Figure No.48).

The common narrow-minded approach to the idea of industrial towns arises from a belief that because industrial, economic and urban growth are structurally related, industrial change will automatically produce urban innovation. Industry, however, is only one of the variables, not the key variable, in real urban complexity, to which this simplistic interpretation entirely fails to do justice.

In the case study here presented industrial and urban decentralization are unattainable within the context of the State of Nuevo Leon alone. Moreover, sound decentralization must consider many unquantifiable factors. Weightings appropriate to these derive from their regional context. I have already listed as real factors various forms of 'power' concentrated in the big city. The 'Milieu-Entier' of the region has likewise to be understood and properly interpreted.

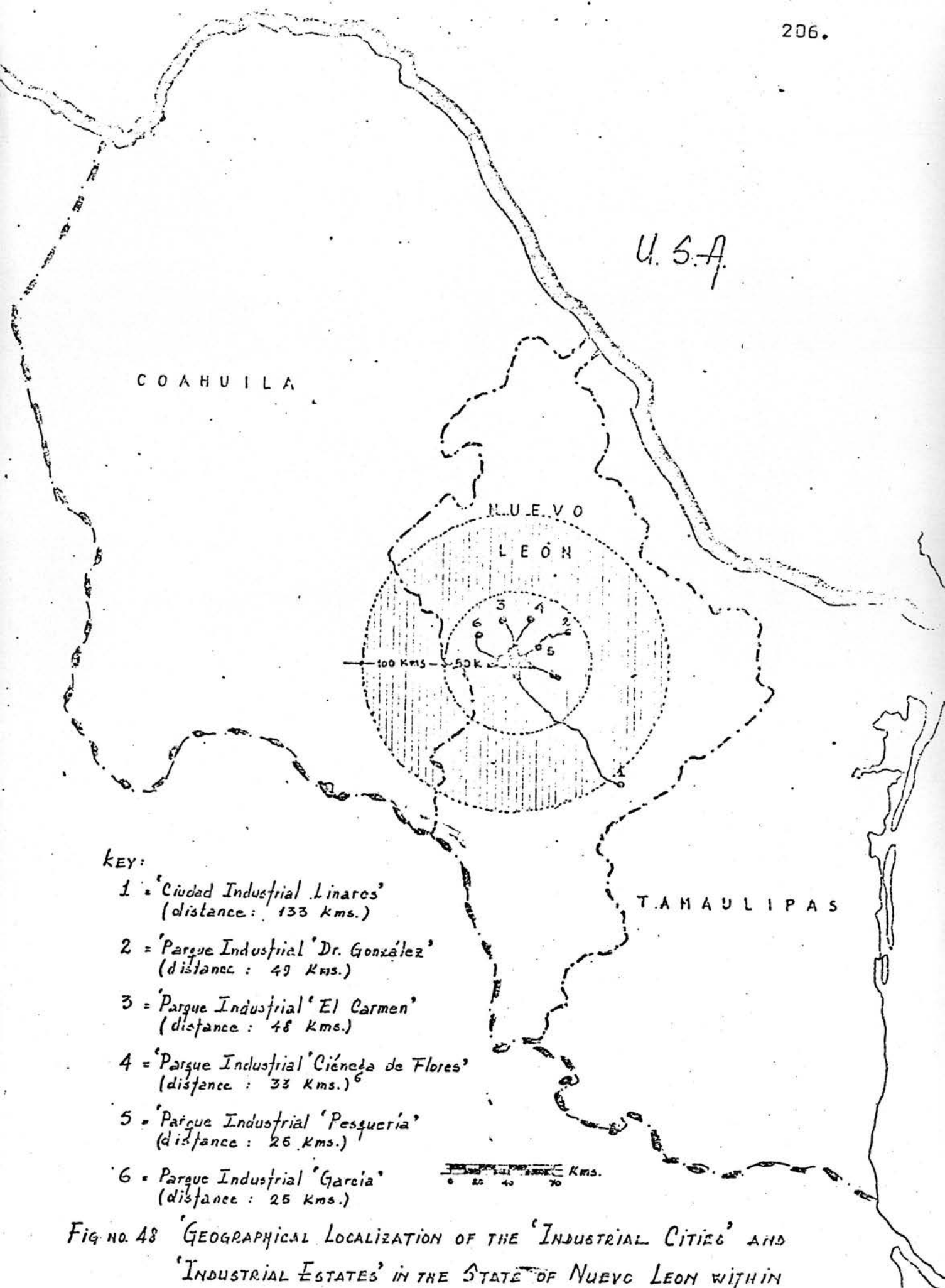


Fig. no. 48 'GEOGRAPHICAL LOCALIZATION OF THE 'INDUSTRIAL CITIES' AND 'INDUSTRIAL ESTATES' IN THE STATE OF NUEVO LEON WITHIN THE CONTEXT OF THE NORTHEAST REGION'

10.5.1. The Concept of Multi-Sectorial Concentrated Decentralization

The concept of 'concentrated decentralization' developed by Rodwin (1) which was the result of his observations about the problems faced in the big cities of underdeveloped regions (1), has been introduced in Mexico by Unikel, Ruiz Chapeto and Garza, Villarreal, as early as 1975. In their work entitled, "El Desarrollo Urbano de Mexico", they recommend that Mexico should perform a kind of concentrated decentralization as the "... only real way out of macrocephalism" (2). A similar idea has been presented by Hansen, who suggested the encouragement of the growth of 'intermediate-size cities' (3), or 'medium-sized cities' (4); by Mumford who talked about the replacement of vast megalopolitan mass by self-contained urban communities (5), and by Ward who in various occasions has put forward the idea of 'intermediate centers' (6), 'counter-magnet cities' (7) and 'integrated centers' (8).

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- (1) Rodwin, L.I. "Nations and Cities" (Houghton, Mifflin) USA, 1970, (pp.4-8).
 - (2) Unikel, L. & Ruíz, Ch.C. & Garza, V.G. "El Desarrollo Urbano de México" (Premio Banamex 1975) in ('Ciencia y Desarrollo, No.3), México J/A, 1975 (p.72).
 - (3) Hansen, N.H. "Intermediate-Size Cities as Growth Centers" (Praeger Pub. N.Y.) USA, 1971 (p.30).
 - (4) Hansen, N.H. "Rural Poverty and the Urban Crisis" (Indiana Univ. Press, Bloomington) USA, 1970 (p.300).
 - (5) Mumford, L, as quoted by Dickinson, R. "The City Region in Western Europe" (Routledge & Kegan P. Ltd., London) GB. 1967, (p.297).
 - (6) Ward, B. "The Home of Man" (Pelican Books, England) GB. 1976 (p.189).
 - (7) Ward, B. & Dubos, R. "Only One Earth" (Pelican Books England) GB. 1972 (p.161).
 - (8) Ward, B. "The Urban Process ... op.cit. (p.56).

The concept of concentrated decentralization was originally stated by Rodwin, in the following terms:

"... to create or expand a few key cities in each of the lagging regions and to do the same in the more prosperous regions. In the case of the former, the aim would be to promote growth; in the case of the latter, it would be either to accommodate growth or to assist in the transformation or renewal of the existing metropolis ... The development of these centers in the lagging regions, and of the new centers in the growing regions, would also permit the largest metropolitan areas to cope more effectively with the population avalanche which now threatens them." (1)

Preliminary analysis of the Region, was undertaken with a view to identifying cities with potential as centers for concentrated decentralization. Two fundamental divergences between the requirements of the theory, and reality in the Region itself are at once apparent. Firstly, the regional context excludes the possibility of creating key cities. The meagre capital available has to be used in curative measures in the big cities, as pointed out in the case of Monterrey, N.L. So-called 'industrial cities' - such as Linares, N.L. (2) - are bound to be failures or to show results very far below the level of expectation. The term 'city' if properly understood, implies much more than the minimum infrastructure for industrial development. Additional social,

(1) Rodwin, Ll. "Nations ... op.cit. (p.7.)

(2) Linares, N.L. has not been the 'Intermediate Metropoly' proposed by the National Commission for Urban Development (CODURPA); see: Pruneda, P.R. "El Sistema Nacional de Ciudades y los Polos de Desarrollo" (Dia Mundial del Urbanismo, Monterrey, N.L.) Mexico, 1975. Moreover, when checking the information more closely, the 'Industrial City of Linares' has not succeeded at all as compared with the other 'industrial estates' established in the same state.

economic, and physical aspects are equally essential if the city is to attract viable forms of development and these do not necessarily respond to a single-sector approach.

Secondly, the idea that the correct aim is to promote growth is outdated. Instead, the idea should be to promote development as defined in this thesis. If a city is selected for concentrated decentralization, combined operations must be carried out for provision of services, infrastructure, employment, institutions, and so on, since it is these which make a city attractive enough to divert the migratory flow of surplus population from the countryside and small cities away from the big city and towards the area selected.

Unikel, Ruiz and Garza emphasized the role of 'industrialization' within the process of decentralization. Their approach to the problem of industrial over-concentration could thus be termed uni-sectorial. In contrast, the idea here developed is that of 'multi-sectorial concentrated decentralization'. This takes into consideration other traditional sectors as well as industry when analysing the characteristics of the cities within the region. The intention is to go beyond the limited, ill-defined and confused concepts of 'Growth Poles' and 'Growth Centres' (1) because they have not contributed much that has been successful in industrial countries (2). They have, moreover, been poorly applied in our context

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- (1) See for instance: Lausen, J.R. "On Growth Poles" in (Urban Studies, Vol.6, No.2) June 1969.
 Darwent, D.F. "Growth Poles and Growth Centers in Regional Planning: A Review" in (Environment and Planning, Vol.I) 1969.
 Kuklinski, A.R. (ed.) "Growth Poles and Growth Centres in Regional Planning" (UNRISD/Mouton & Co.) Netherlands, 1972.
- (2) See for instance: Hansen, N.M. "Intermediate-Size Cities as Growth Centers" (Praeger, N.Y.) USA, 1971. (especially 'Summary and Conclusions' of Chapter 3: "Growth Center Experience").

(1). Hansen's idea of localizing 'intermediate-size cities (2) seems to me quite reasonable, as long as such cities are treated comprehensively and as a function of the development (not growth) of the whole region.

10.5.2. The System of Cities in the North East Region (3)

The system of cities was defined following the next procedure:

1. Selection of cities with 50,000 inhabitants or more. The main reason for the use of this figure was that cities with such a population very likely have a certain urban infrastructure, a certain pattern of social organization and a certain type of predominant economic activity or activities. Four cities were from the State of Coahuila (Torreon, (4) Saltillo, Monclova (5) and Piedras Negras), three cities were from the State of Nuevo Leon (6) (Linares, Sabinas Hgo. and Montemorelos) (7) and six cities were from the State of Tamaulipas (Tampico, (8) N. Laredo,

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- (1) Logan, M.I. "The Spatial System and Planning Strategies in UDCs" (The Geog.Review, Vol.42, No.2) A.1972.
Solis, L. "Against the Industrial Poles Mirage" in (2^{da} Asamblea Plenaria de la Conferencia del Plan Basico 1976-1982 as presented by 'El Porvenir', Monterrey) Mexico. 30/VI/75.
- (2) Hansen, N.M. "Rural Poverty ... op.cit.
- (3) Special acknowledgement is paid here to both Ings. Salvador Inda and Oton for their invaluable help in producing this section.
- (4) Torreón including Gómez Palacio and Lerdo.
- (5) Monclova including Villa Frontera.
- (6) Monterrey was not included, being the Metropoly subject to decentralization.
- (7) These three cities were included in the analysis intentionally even though having a smaller population than specified. The main reason for this was to find out their role at regional level.
- (8) Tampico, including Ciudad Madero.

Matamoros, Reynosa, Victoria and Mante).

2. Census data (1950, 1960 and 1970) (1) were obtained for each of them, divided into the following categories: a) Total Municipal Population; b) Urban Population; c) Labour Force; d) Immigration; e) Economically Active Population in the Primary Sector; f) Economically Active Population in the Secondary Sector (distributed into three sub-groups: Extractive, Transformation and Construction); g) Economically Active Population in the Tertiary Sector (distributed into three sub-groups: Commerce, Transport and Services), and finally, h) Economically Active Population in Insufficiently Specified Activities. (See Tables No. 10,12 and 14 in the Appendix No.6).

3. Based on this information the percentages were produced (See Tables No. 11,13 and 15 in the Appendix No.6 pp. 310-333).

4. The information was reorganized by grouping the 13 cities selected by year and by economic activity. The city with the highest percentage in each specific economic activity (8 branches), was the first on the list, the second highest was second on the list, and so on, till the entry (No.13) of the city with the lowest percentage of participation.

5. From the census data the national averages in each branch of activity for the whole period were obtained as presented in Table 16 in the Appendix.

6. The coefficient of specialization at national level was obtained by dividing the percentage of participation

(1) DGE: VII, VIII, IX. "Censos Nacionales de Población", México, 1950, 1960, 1970.

by the national average. For instance, in Table No.17 MT (Montemorelos) in 1950 had the highest percentage of participation in agricultural activities (76.2%), this figure when divided by the national average ($A_n = 58.3\%$) came to 1.31 coefficient of specialization, indicating that MT (Montemorelos) was at that time and in that specific branch of economic activity highly specialized as compared with the national average.

7. Tables No.17, 18 and 19 (in the Appendix) show the process followed. Table No.20 (in the Appendix) shows the resume of these tables, in which only those activities with coefficient of specialization bigger than 1.0 were considered. Column 1 (A) denotes Agriculture; no.2 (M) = Extractives (like oil and mining); no.3 (I) = Transformation industry; no.4 (K) = Construction; no.5 (E) = Electricity and Gas; no.6 (C) = Commerce; no.7 (T) = Transport and Communications; no.8 (S) = Services and Government. Column No.9 named (No. Ac) is the sum of those economic activities with coefficient of specialization bigger than 1.0. Column No.10 is the sum of the actual values above 1.0 giving a first weighted quantitative approach to the situation of the city as compared with the nation.

8. Based on the results previously obtained in Column No.9, a functional classification was produced and divided up into four major groups: UF = uni-functional (only one out of eight activities with a predominant activity); BF = bi-functional (with only two predominant activities); SD = semi-diversified (with three or four predominant activities) and D = diversified (with five or more economic activities above the national average).

9. The result of this first analysis (see Table No.21 in the Appendix) indicated a very high degree of

Diversification (1) in the states of Coahuila and Tamaulipas. The three small cities examined in the State of Nuevo Leon (without taking into consideration the Metropolitan Area of Monterrey) clearly exhibited their weak position even at national level. (2)

10. A second analysis was accomplished following the same methodology, but reducing the scale from national to regional. Regional averages were obtained in order to find both the 'coefficient of specialization' and the 'degree of diversification' of each city. Tables 22, 23, 24, 25 and 26 (in the Appendix) contained the new information that was used to produce Tables No. 27 and 28 in which data were summarized, (pp.328-329).

11. Each city was given a 'relative regional weight' which was the sum of the 'coefficients of specialization' ($\sum \text{Prt}$) > 1.0 . This value was multiplied by a 'weighting urban factor', this being obtained by comparing the urban population in the municipality with the 'regional urban factor'. See Table No.29 (page330). Simultaneously, a separated sectional analysis was carried through in order to detect the degree of diversification in each of the sectors considered. The results

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- (1) The method applied was basically the same as that used by Aguilar, A.I., Lamadrid, I.A. and Guzmán, F.M.L. "Desarrollo Socioeconomico Comparativo de las Entidades del País (1940-1970)" in ('Comercio Exterior', Vol.23, No.2) Mexico, Feb.1973 (pp. 255-265). Because of this the degree of diversification in the States mentioned corresponds to their results.
- (2) When the State of Nuevo Leon is considered without its capital city, its apparent high and sustained degree of 'diversification' seems to vanish at once due to the single fact that any analysis carried out at national level deals with 'state averages', which in turn, misrepresent the state reality, hiding critical disparities.

are presented in Tables No.30, 31 and 32, (pp.).

12. The final classification of the cities is presented in Table No.33 and depicted in Figure No.49. Another weighting factor was considered, namely the 'Geographic Localization Weighting Factor' ($f_p \propto G$ column 3) which was obtained by dividing the distance (Dist. column 2) of the city under consideration to the Metropolitan Area of Monterrey by the average distance ($a.d. = \frac{\sum_{i=1}^n d_i}{n}$) of the 13 cities under consideration.

13. Three cities were each considered a 'Regional Metropolis' (MR) these being: Tampico, Torreon and Nuevo Laredo, and were classified as Diversified (DI).

Six cities were considered as 'Intermediate Cities' (CI) these being: Victoria, Monclova, Reynosa, Piedras Negras, Salfillo and Matamoros, and were classified as Diversified (DI) or Semi-diversified (SD).

Four cities were considered as 'Support Cities' (CA) these being: Cd. Mante, Sabinas Hgo., Linares and Montemorelos, and were classified as Bifunctional (BF) or Unifunctional (UF).

This preliminary classification of the North East region differs from the one presented by CODURPA (1) (see Figure No.51, page 219) in the following particulars:

First, Nuevo Laredo was defined by the latter as an Intermediate Metropolis, as were Linares and Piedras Negras, whereas in our analysis Nuevo Laredo has the possibility of being, together with Torreon and Tampico, a Regional Metropolis.

(1) CODURPA (an acronym for 'Comisión Nacional del Desarrollo Urbano del País').

Secondly, Monclova was ranked lower than Linares, whereas in our analysis these two came out the other way round. Monclova is a semi-diversified city whereas Linares is unifunctional. (1)

Thirdly, Linares came out in our analysis as a support city, its functional classification being 'UF' (i.e. unifunctional) depending fundamentally on agriculture. Its potentiality for designation even as an 'intermediate city', from the analytical point of view, was very low. In spite of this, CODURPA attempted to create an industrial city near it, though it lacked a whole range of urban requirements (social, economic and physical infrastructure), possessed by, for instance, Ciudad Victoria. The end result has been altogether disappointing. Physical infrastructure is now there, but industry has not moved in.

Lastly, CODURPA's concept (see Figure No.51) of New City (B) is totally irrelevant when operating at regional level. Placing it within a few miles of the Existing City (A) will not detract from the attractiveness of the latter. Moreover, as pointed out in the case of the State of Nuevo, this narrow concept of a city has, indeed, negative effects even on the growth of the existing city, mainly in the increased demand for infrastructure, land speculation, horizontal sprawl, and so on. The idea of a 'Green Belt' (C) surrounding the so-called 'New City' is outdated and unrealistic; and finally the so-called 'Protection Area' (D) bounded by a circle with a radius of 10 kms. is unwarranted and arbitrary.

(1) It is surprising to find that a city like Monclova, highly specialized in industry, was not rated above Linares, which had no industry. Moreover, CODURPA's analysis was meant to be a key analysis for 'industrial decentralization'. The only reason I can find for this mistake is that "... other 'political factors' were also given weight when carrying out the analysis ..." as Arq. Pruneda-Padilla mentioned in his paper presented in the 'Dia Mundial del Urbanismo...' op. cit.

	(1)	(2)	(3)	(4)	(5)
	Prom. $\Sigma \Sigma / 3$	Dist. (Kms)	fPLG	Calif. Final	c.f.
MR Tampico	41.96	576	2.12	89.00	DI
MR Torreón	19.38	365	1.34	26.00	DI
MR Nuevo Laredo	8.68	230	0.84	7.29	DI
CI Victoria	3.58	287	1.05	3.76	DI
CI Monclova	5.30	191	0.70	3.71	SD
CI Reynosa	4.52	225	0.82	3.70	SD
CI Piedras Negras	1.50	524	1.92	2.88	SD
CI Saltillo	9.24	85	0.31	2.86	DI
CI Matamoros	1.57	324	1.19	1.87	SD
CA Cd. Mante	0.21	430	1.52	0.32	BF
CA Sabinas Hgo.	0.04	98	0.36	0.01	BF
CA Linares	X	133	0.49	X	UF
CA Montemorelos	X	82	0.30	X	UF

Metrópolis Regionales

Ciudades Intermedias

Ciudades de Apoyo

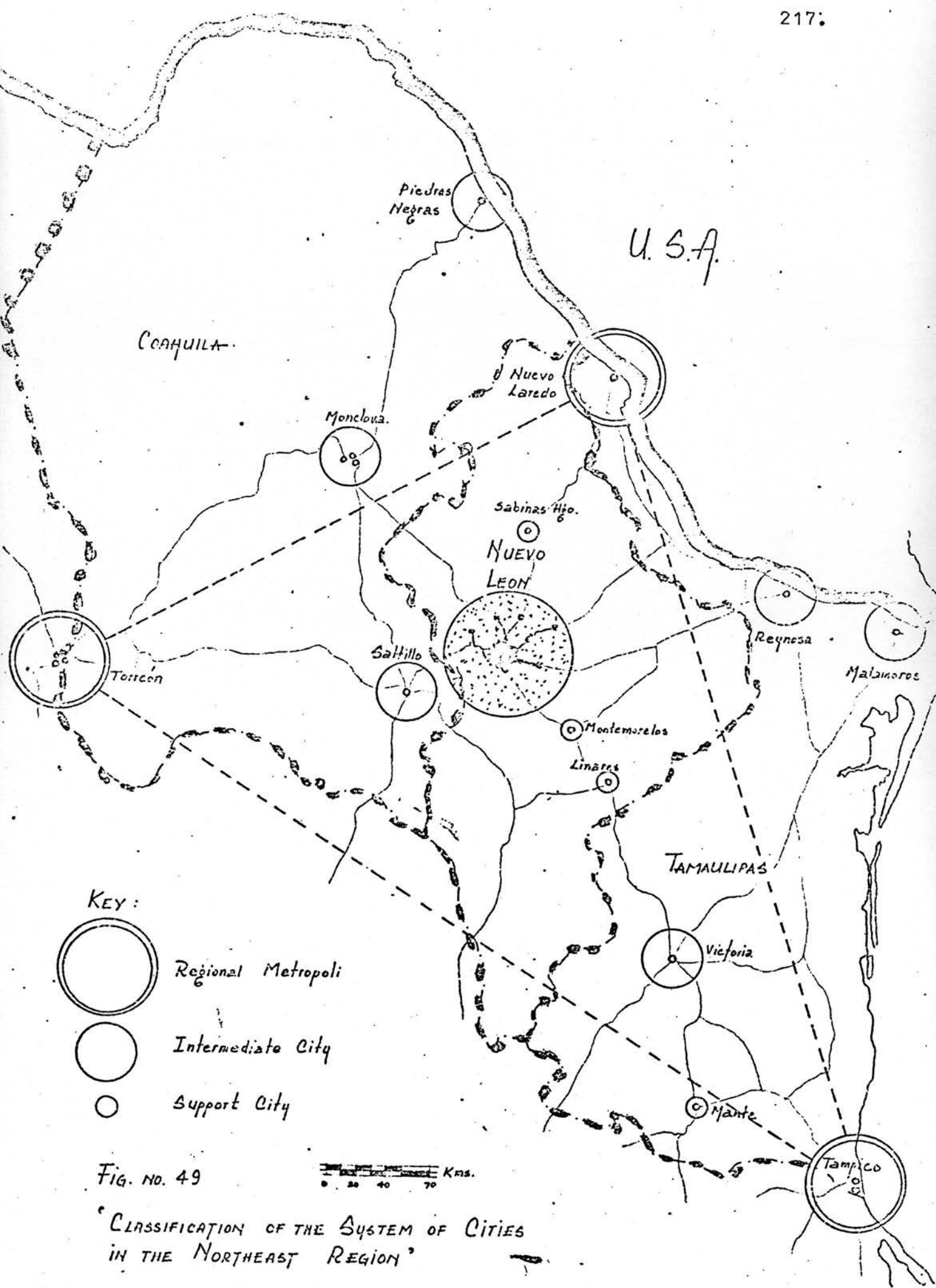
$\Sigma \Sigma / 3$ = Promedio de la Suma de los Pesos Relativos Ponderados para los Sectores Secundario y Terciario de 1950, 1960 y 1970.

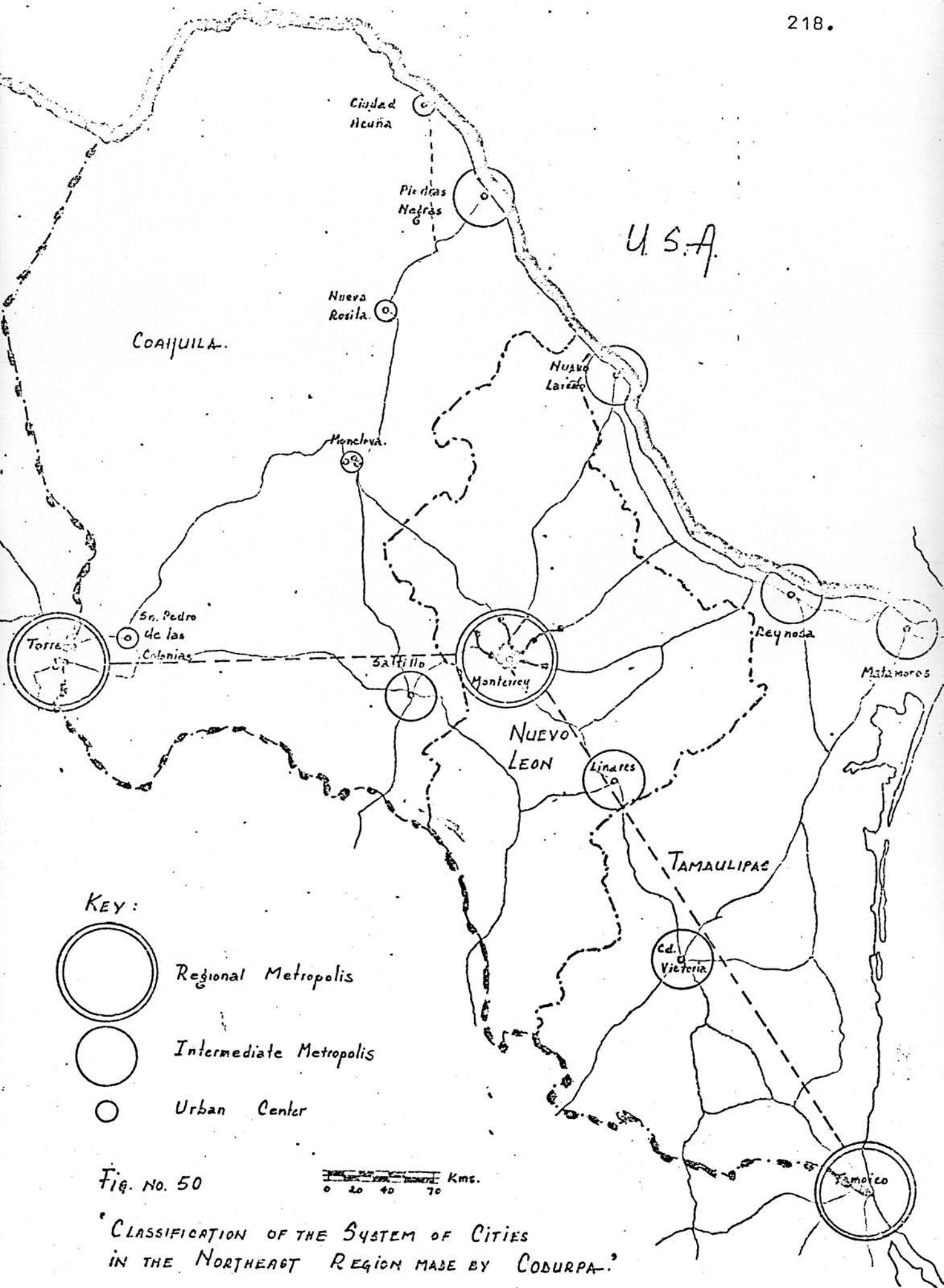
Dist. = Distancia en kilómetros de las Ciudades Analizadas a la Cd. de Monterrey.

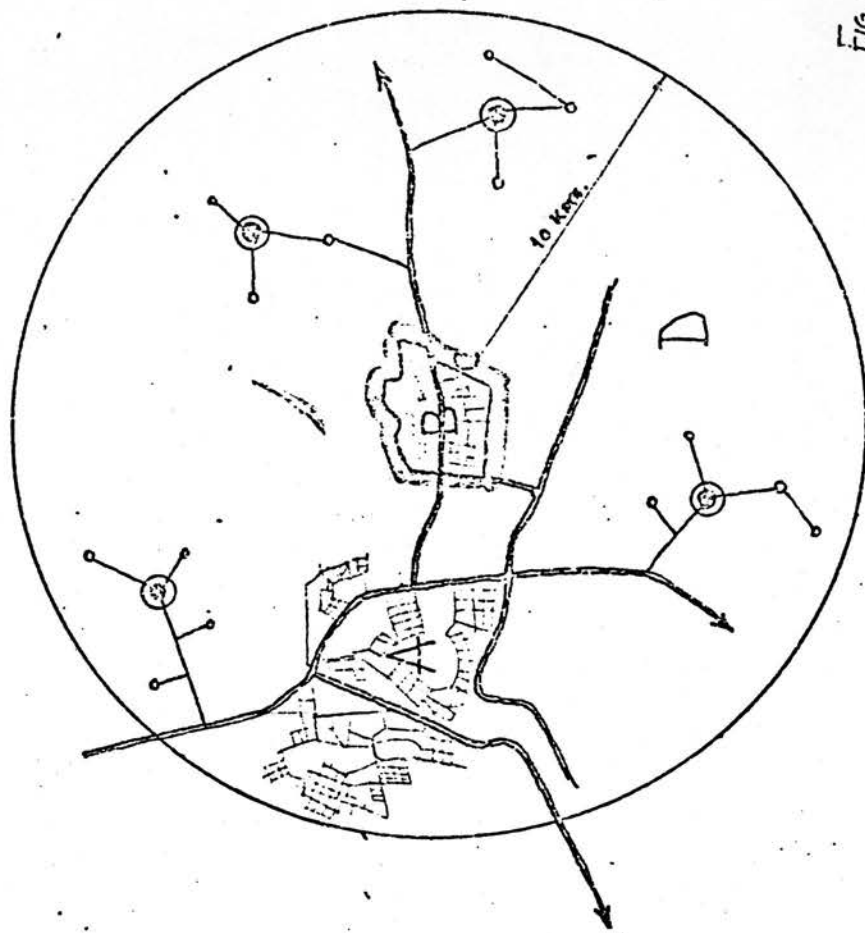
fPLG = Factor de Ponderación por Localización Geográfica. Se obtuvo mediante la división de las distancias en la columna dos entre la distancia media.

Calif. Final = Se obtuvo mediante la multiplicación de $(\Sigma \Sigma / 3) \cdot (fPLG)$

Table No.33 Preliminar Classification of the System of Cities in the Northeast Region







KEY:

- A = Existing City
- B = New City
- C = Village Center
- D = Protection Area. (r = 10 Kms.)
- ⊙ = Village Center
- = Main Road
- = Secondary Road

Source: Prunedo-P. R.: "El Sistema Nacional de Ciudades y los Poles de Desarrollo" (paper presented in the Día Mundial del Urbanismo, Monterrey, N.L., México 1975. Anexo no. 4).

FIG. NO. 51 "CÓDURCA'S CONCEPT OF TWIN CITIES"

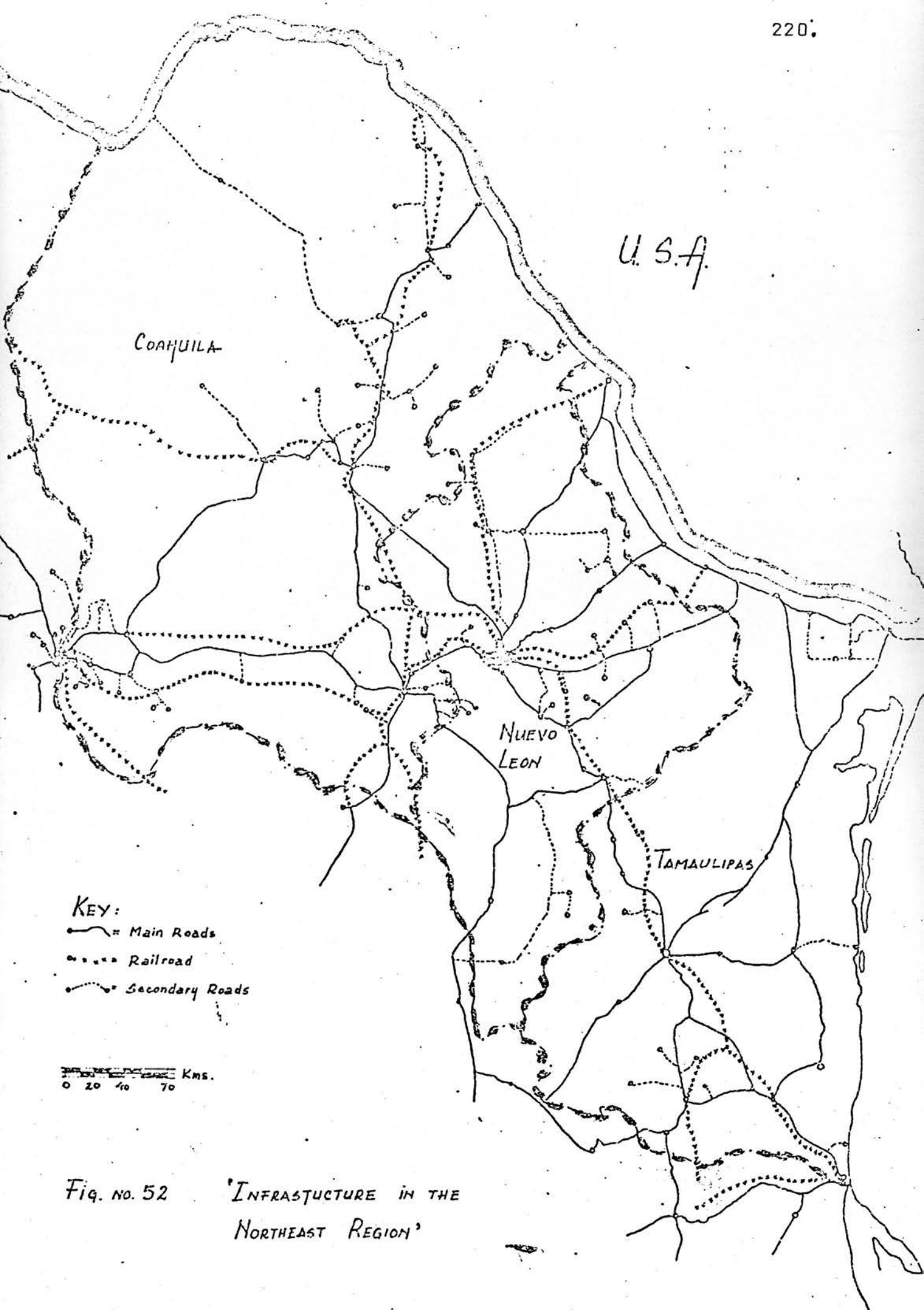
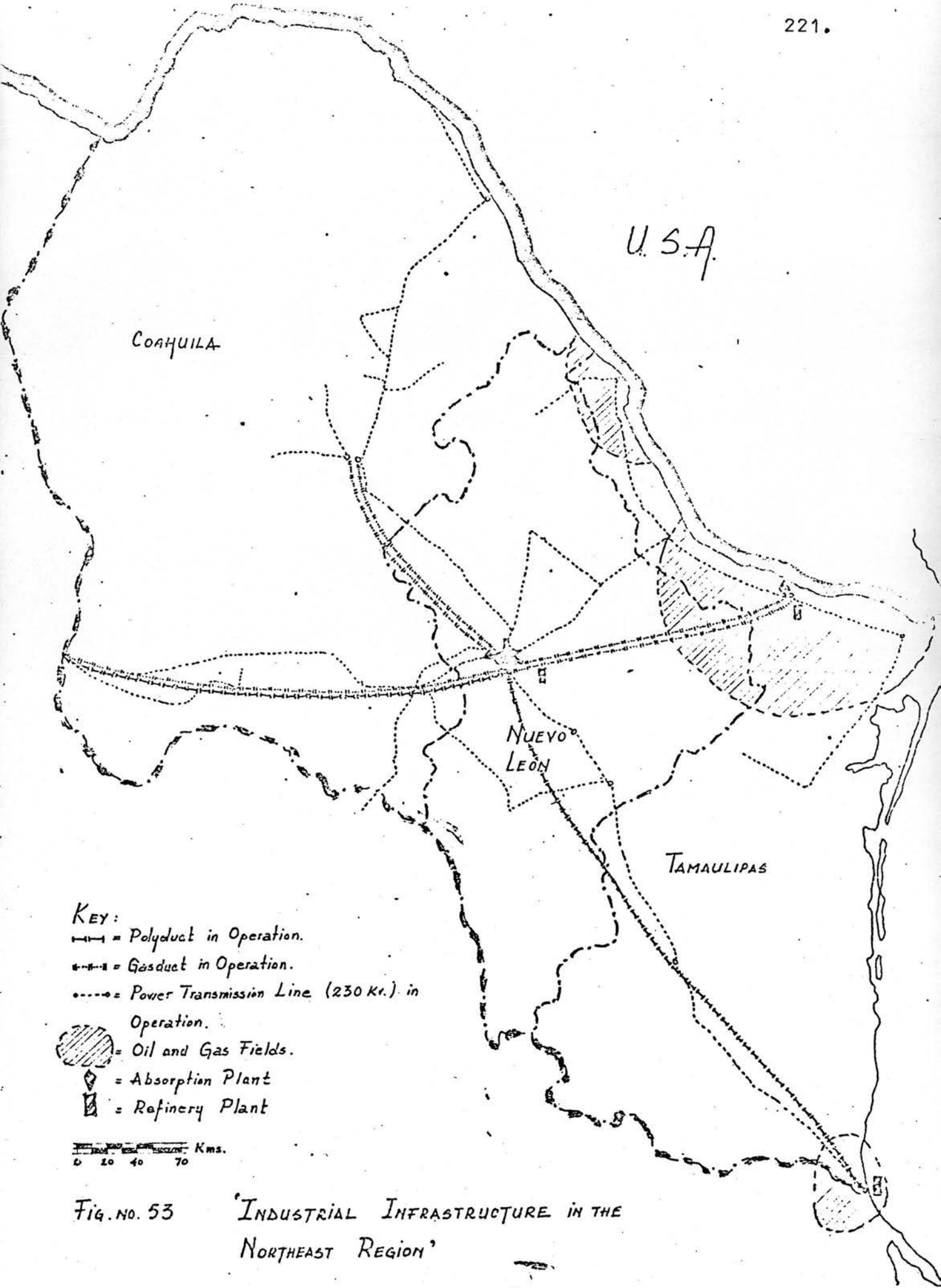


Fig. No. 52 'INFRASTRUCTURE IN THE
NORTHEAST REGION'



KEY:
 —|— = Polyduct in Operation.
 —●— = Gasduct in Operation.
 - - - = Power Transmission Line (230 Kv.) in Operation.
 ▨ = Oil and Gas Fields.
 ◆ = Absorption Plant
 ▤ = Refinery Plant

0 20 40 70 Kms.

FIG. NO. 53 'INDUSTRIAL INFRASTRUCTURE IN THE NORTHEAST REGION'

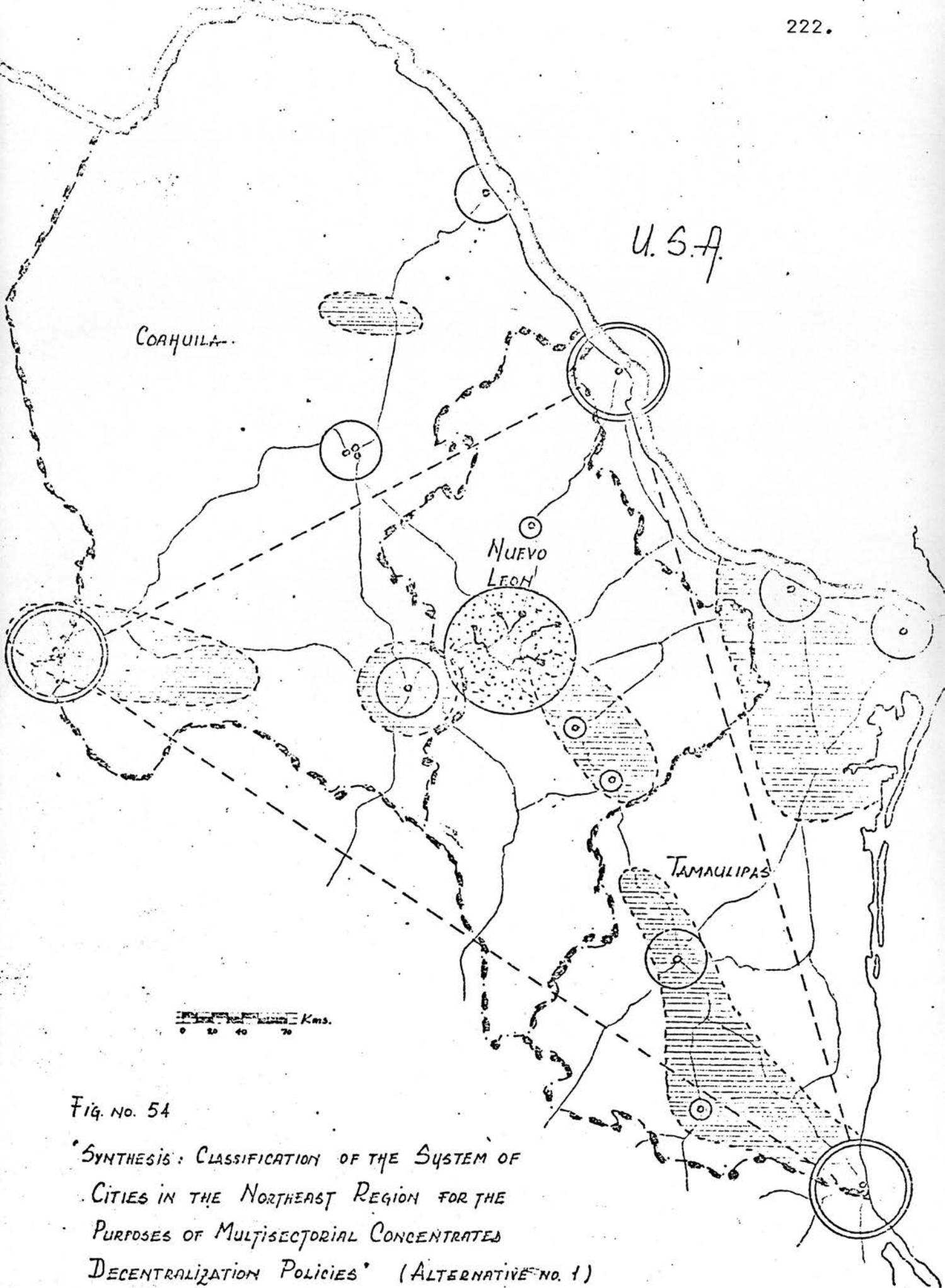


Fig. No. 54

'SYNTHESIS: CLASSIFICATION OF THE SYSTEM OF CITIES IN THE NORTHEAST REGION FOR THE PURPOSES OF MULTISECTORIAL CONCENTRATED DECENTRALIZATION POLICIES' (ALTERNATIVE NO. 1)

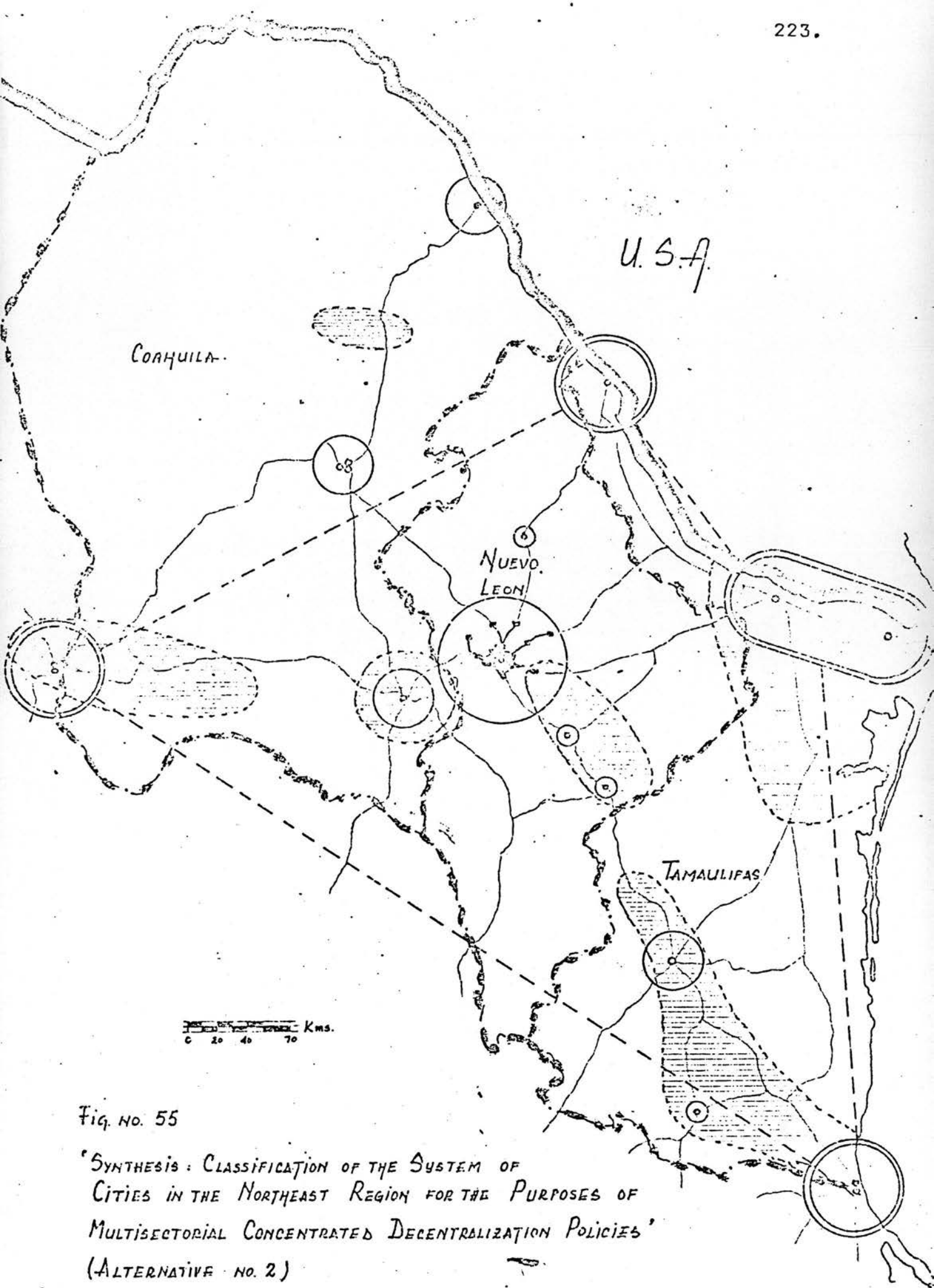


Fig. No. 55

'SYNTHESIS: CLASSIFICATION OF THE SYSTEM OF CITIES IN THE NORTHEAST REGION FOR THE PURPOSES OF MULTISECTORIAL CONCENTRATED DECENTRALIZATION POLICIES' (ALTERNATIVE NO. 2)

10.5.3. Synthesis: The System of Cities and Their Alternative Classification for a Possible Multisectorial Concentrated Decentralization.

Preliminary emphasis has been directed to the inadequacy of a single-sector (i.e. industrial) approach to the problem of urban hypertrophy and overconcentration in the Metropolitan Area of Monterrey, and it has been shown that this does not automatically produce a feasible solution, whereas a multi-sectorial concentrated decentralization approach seems more realistic.

Such an approach is concerned initially to find those cities which, apart from having a high degree of diversification (i.e. four or more branches of economic activity above the regional average), are spatially or geographically connected, being contained in one of the agricultural and livestock micro-regions.

Figure No. 47, (p.202) and Figure No.49 (p.217) when overlapping (*) provide the combined Figure No.54 (p.222) which is the synthesis of both analyses. From this Figure, the following points emerge:

1. Torreon and Tampico appear more clearly as, in each case, a Regional Metropolis.

2. The claim of Nuevo Laredo to be a 'Regional Metropolis' is weakened because it is neither within nor in contact with an agricultural and livestock micro-region. Nonetheless, its industrial potential has been boosted by the recent discovery of "... a number of natural gas wells, ... which will solve the problem of short supply in the country's northern zone". (1)

(*) Here as well Infrastructure (Fig.No.32) and Industrial Infrastructure (Fig.No.53) were considered.

(1) Echeverría, A.L. "Fifth State ... op.cit.

3. Reynosa and Matamoros (in the northeast corner of the region) offer, if considered together, a very attractive alternative in terms of long term policies for decentralization of the Metropolitan Area of Monterrey. Unfortunately, their position is far from the main migratory flows.

4. Cd. Victoria and Saltillo are, together with Torreón and Tampico, the main cities which can offer a significant alternative solution to the problem of inter-regional migration. If jobs are generated within them with a clear policy of decentralization it is very likely that the migratory pressures in the Metropolitan Area of Monterrey can be importantly reduced. Job seeking has been reported as the main cause of migration. (1) Immigration mainly from the poor states of San Luis Potosé and Zacatecas to Monterrey, has not been significantly halted by the above mentioned cities because of the lack of job opportunities.

5. Linares, Montemorelos, and Cd. Mante are the three 'Support Cities' which can reinforce the previously mentioned decentralization programme as long as they are treated as centers for small and medium agro-industry development. Such agro-industry must be complementary, not competitive. (2)

As noted in the case of agricultural development, the work done so far has been to delineate very general quantitative guidelines which give some insight into the problem. It is the task of 'Work Group No.2' to deal in more detail and depth with some other qualitative as well as quantitative aspects of this area of enquiry.

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- (1) Balán, J. "Man in a Developing Society: Geographic and Social Mobility in Monterrey, Mexico" (Latin American Monograph No.3, Univ. of Texas Press)USA, 1973.
- (2) A second alternative would be to reinforce Reynosa and Matamoros as a single Regional Metropolis (see Figure No.55, p.223).

Each of the cities here suggested as viable alternative arenas for working out 'multisectional concentrated decentralization' policies, and hence as receptacles of regional investment, must be studied carefully before the implementation of recommended action. This implies the necessity of further research within the framework of structural planning.

10.6. Industrial Decentralization: The Third Step Towards Sound Structural Regional Planning.

Following the idea of interstate and interdisciplinary coordination, as treated in Section 1.2., and depicted in Figure 34, a third Working Group should be established for dealing with industrial growth, development, decentralization and coordination.

This is perhaps - at least in the case under study - one of the most difficult areas to deal with because it necessarily involves the participation of the 'private sector'.

It is easier to find points of divergence than convergence when both forms of power (i.e. government and entrepreneur) are brought together for work on a common development policy. The normal area of conflict is the goals setting subprocess. Moreover, in a market profits-oriented mixed economy, the role of the government is usually that of direct intervention in the economic system with attempts at keeping free market forces under control.

The main issues are conflicts between the social implications of long term policies and short-term concern of private interests about the implications of government actions.

Specifically, in the case of Nuevo Leon industry has responded favourably to those governmental (federal

state or municipal) policies which offer clear advantage to its own interest. A policy which does not make economic sense is automatically rejected. A policy which is economically acceptable but demands a certain degree of risk is also discarded. The common practice has been, in recent decades, to accept only those policies which offer direct benefits to industry, without any great concern for social and ecological implications.

In the last few years the role of the government has changed markedly. The dominant idea has been to re-establish a balance which had been gravely disturbed. Examination of the data from the Metropolitan Area of Monterrey shows the place to be in danger of being trapped in a cul-de-sac if proper measures are not taken coordinately by the two sectors. The sacrifice of short term extra benefits, would not, (as a prominent entrepreneur has claimed) kill the goose that laid the golden eggs, but is, on the contrary, essential to survival. Without a radical change there is little hope of solving problems of macrocephalism such as those now facing Mexico City. Unfortunately, the seriousness of this problem was not totally perceived by the research group drawn from the Secretaria de la Presidencia (SP) and United Nations Organization (UNO) advisors, who recommend in their study that ...

"...Part of the growth (of the Metropolitan Area of Monterrey) should be oriented to the 'influence zone' (1) in order to accentuate the complementarity and industrial interdependency between Monterrey and the peripheral nuclei". (2)

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- (1) The 'Influence Zone' in the State of Nuevo León is now subject to a great industrialization programme, the consequences of which are the horizontal urban sprawl of the Metropolitan Area and the increased pressure on the basic infrastructure.
- (2) SP/ONU: "Estrategia de Desarrollo Regional Para México" (document No.00955 distributed by the 'Centro de Informacion Industrial de la SIC') Mexico, 1975.

Moreover, they considered important for the region that...

"Monterrey sustains its growth capacity, which results partially from its growing capacity to attract incomes from its hinterland, in which profuse investments are expected". (1)

These kinds of recommendation only reinforce the overconcentration dilemma. Industrial decentralization must be considered in terms of the whole nation (when looking at Mexico City, Guadalajara and Monterrey); but when considered at regional level (with Monterrey as the center of the region) the regional system of cities should receive priority over the periphery zone. Moreover, the hypertrophic growth of Monterrey attracting incomes from the hinterland may improve both the production and income regional averages but at the expense of bigger regional imbalances.

The proper way of dealing with this is through a Working Group formed in the same way as the suggested for the agricultural sector (Figure No.43, page 210) in which the main federal, state and municipal organizations of the three states can work together with the private sector and try to find ways of mutual adjustment leading to agreement.

A Working Group for dealing with the industrial sector at state level produced a report (2) at the time when the present case study was being carried out. Due to the difficulties of coordination no proper exchange of views with this Group was possible. Hopefully, this barrier can be overcome in the future if the proper

(1) ONU: "Estrategia ... op.cit. (p.15)

(2) Garza, C.E./SFEYO: "La Industria en el Estado de Nuevo León" (Unpublished paper, Monterrey, N.L.) México, 1976.

mechanism at national and regional level are established when the 'Centros Regionales de Investigacion y Servicio a la Industria' (Regional Centres of Research and Service to the Industry) (1) come into operation.

10.7. A Critical Assessment of the Urban/Rural Balance.

The case study has substantiated that Mexico, and in particular her North East Region, lacks any satisfactory urban-rural balance. Moreover, development policies in past decades have favoured industrial growth, and encouraged public and private investment to promote and increase production without any marked concern for a countryside which has remained largely isolated from economic, social and cultural progress.

Industrial concentration has had its principal impact in the main urban areas of the region. New factories have been established in Monterrey (2) and small new industrial estates (3) surround the city, increasing not only employment opportunities but its magnetic effect upon job-seekers, (the migratory inflow) causing rapid urban growth (estimated at 6%) (4). This urban growth has accounted for a large proportion of the investment budget, leaving relatively little for rural areas.

As previously stated - in discussing agricultural development - sound regional development must start with aiming for self-sufficiency in food stuffs. The North East Region has important agriculture and livestock micro-regions (see Figure No.47, page 202), which after more specialized and detailed analysis carried by the Working

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- (1) Gálvez, G.C. "CRISINES, para la Pequeña y Mediana Industria" in ('Management Today' No.30) May 1975.
 - (2) Capital invested in industry during 1965 was 11,034.9 and during 1970 was 17,712.2 million pesos, (35% increase in five years).
 - (3) See Figure No.32: "Geographical Location ... (p.194).
 - (4) Zorilla, M.P. "Plan General ... op.cit. (p.4).

Group No.1 (as proposed in Section 10.4, Figure 43, page 199) may offer alternatives for different food products as well as other agricultural products. Small agro-industry must be considered too if the rural/urban balance is to be re-established.

10.8. A Preliminary Survey of the Internal Structure of the Industrial Sector.

A first attempt at industrial evaluation was carried out in the course of this case study. In view of the fact that job generation, employment and income distribution are structurally linked to industrial development (1), an analysis of the internal structure of the industrial sector was performed. The object of this short and preliminary survey was to find out which types of industries best serve the national objectives of job generation, rational use of capital, reduction of both technical and financial dependency, income distribution and rational use of supplies of energy.

Governmental efforts to encourage regional industrialization (2) were noted but there was simultaneous awareness of their inadequacy and incapacity to cope with the increasing demand for jobs, especially in the large metropolitan areas of Mexico. (3)

The multivariable objective in the analysis can be synthesized as follows:

"To detect that type of industry which can satisfy in combination the following objectives: maximization of direct and indirect job generation, maximization of number of establishments per

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- (1) See for instance: Ibarra, D. "Desarrollo y Política de Industrialización en México" in ("Línea") México, 1975. Trejo, R.S. "Industrialización en México y Empleos" (Tesis Doctoral) México, 1971.
- (2) 'State Tax Exemption Laws for Industry', 'Law of New and Necessary Industry', and the 'Garantee and Development Fund'. More recently the 'Public Sector Industrial Policy Coordinating Commision' was set up.
- (3) See for instance: Yates, L.P. "El Desarrollo Regional ... op.cit.

capital invested, optimization of wages, maximization of capital productivity and minimization of consumption of energetics". (1)

Information was derived from the industrial censuses (2) which present the data classified in different 'groups', 'subgroups', 'class' and 'name', by state and by municipality.

A selection was made of some municipalities based on the synthesis produced in Section 10.5.3. (Figure No. 46). Once again the municipalities forming the Metropolitan Area of Monterrey were not considered.

The nine variables used were:

1. Key of industrial type (CLA);
2. Description of the type of industry (DES);
3. Number of establishments (NES);
4. Number of employees (POT);
5. Wages, salaries, social services (SSP);
6. Net Capital Invested (CIN);
7. Gross Total Production (PBT);
8. Payments to Indirect Employees (PPM);
9. Consumption of Energy (CEN).

With this information a computer programme (3) was designed, tested and applied to perform the following instructions:

First: Produce indicator No.1. Number of direct and indirect jobs generated per unit of capital invested. ($IND\ 1 = POT/CIN + (PPM/(SSP/POT))/CIN$).

(1) Béjar, L. "Estrategia de Desarrollo ... op.cit.(p.57).

(2) SIC: "VIII y IX Censos Industriales, Datos 1965 y 1970", Mexico, 1966 and 1971 respectively. There is a marked difference in data as compared with FOGAIN Survey, which unfortunately I received only after the research was finished. Further research must be carried out with this new information.

(3) See Pages No. 334 to 338 in the Appendix No.7.

Second: Produce Indicator No.2. Number of establishments created per unit of capital invested. (IND 2 = NES/CIN).

Third: Produce Indicator No.3. Capital Productivity. Capital produced per capital invested. (IND 3 = PBT/CIN).

Fourth: Produce Indicator No.4. Capital produced per unit of energy consumed (IND 4 = PBT/CEN).

Fifth: Produce Indicator No.5. Average annual payment in each type of industry per person employed (IND 5 = SSP/POT).

~~Table No.34 shows the output of the analysis.~~ The first indicator suggests that with one million pesos invested in industry Type 31 (Chemical Industry) 3 jobs were generated, whereas with the same million pesos invested in industry Type 29 (Leather and its by-product industries) 352 jobs were created, the ratio being of 113.6 times.

The second indicator represents clearly the enormous difference between capital intense industry Type 34 (Basic Metal industry) and that above mentioned. With one million pesos it was possible to establish 179 small industries of the Type 29 whereas the same amount of money meant a very small contribution (0.006) in the formation of an industry which on average required 166.7 million pesos.

The third indicator named as 'capital productivity' indicates that in short term (1 year) the same industry Type 29 produced 4.4 pesos/peso invested, whereas industry Type 14 (Quarry Working and sand, gravel and clay extraction generated only 0.65/peso invested, the ration being 6.8 times.

The fourth indicator shows that - once again industry Type 29 produced 104.7 pesos per peso invested in energetics whereas industry Type 14 (the same as above) consumed much more energy generating just 10.8 pesos/peso invested, the ratio being almost ten fold.

The last indicator - as expected - reversed the order. Capital intensive industries like Type 34 (already mentioned) employ highly trained and specialized workers who receive high wages. The average being 27.6×10^3 pesos/year, whereas this average dropped drastically for the industry Type 29 to a meagre 2.4×10^3 pesos/year.

The analysis was carried still further trying to combine the previous five indicators into one which, after being weighted, could provide a first evaluation and marking of those types of industries which responded more closely to the multivariable objective previously cited. According to this criterion different weights were attached to each indicator, job-generation being the one with the highest mark 11, followed by indicator No.2 with a mark of 8, indicator 5 with mark of 7, indicator 4 with mark of 5, and indicator No.3 with the lowest mark of 3. These values were given subjectively after the importance of each indicator was analysed both separately and in the context of the main national and regional objectives.

The end result ^{shows that} ~~is presented in Table No.35 in which~~ the highest mark (100) was for the type of industry No. 29, and the lowest mark (0.88) for the type of industry No.31 related to the production of chemical products.

The wide variation of type of industries between these two extremes, gives an idea of the kind of industries that could respond more or less closely to the regional needs, according to the resources available in the different cities and micro-regions here defined.

10.9. Other Relevant Factors as Part of a Sound Structural Regional Planning.

There are other relevant areas such as 'Social Welfare', (1) 'Tourism' (2), 'Depressed Areas' (3), and so on, the importance of which is considered so great that they require the formation of regional 'Working Groups' on the lines here suggested. (See Figure No.34, page 193).

So, Working Group No.3 (WG₃) might deal with Social Welfare,

Working Group No.4 (WG₄) might deal with Tourism,

Working Group No.'n' (WG_n) might deal with Depressed Areas.

Two further 'Working Groups' should be mentioned separately:

1. The 'Decision-Making Group' which - as in the case of the Southern Region - would bring together either the Governors of the States involved or their close representatives, to agree on the common general goals and the policies to implement them.

2. The 'Other-Related Group' which inspite of not 'belonging' to the region has something to say and contribute to widening the outlook and expanding the perspectives of the round table discussions when the qualitative as well as the quantitative factors of the regional complex are fully considered. This Group, as well as the Decision-Making one, can bring up for discussion non-economic (as well as the economic) factors of vital importance to the region.

CONCLUSIONS:

1. The grave problems engendered by industrial concentration, overcentralism and urban hypertrophy of the Metropolitan Area of Monterrey cannot be solved within the arbitrary political boundaries which delimit the State of Nuevo Leon.
2. The efforts made so far by different Federal, State and Municipal governmental bodies and agencies within the narrow concept of a 'closed state system', have been both disappointing and negative as far as the accomplishment of decentralization policies is concerned. Moreover, implementation of measures for setting up so-called 'industrial cities' and 'industrial estates' has augmented Monterrey's centripetal force and attractiveness. The results have been increases in infrastructure demand, urban sprawl (i.e. horizontal uncontrolled expansion) and deterioration of already impaired balance within and between states.
3. One possible alternative solution is here suggested and explored, namely, Structural Regional Planning as applied to the North East Region. This Region covers three States - Coahuila, Nuevo Leon and Tamaulipas (with an area of 295,955 km² which means approximately 0.23 times the area covered by Scotland, Wales and England).
4. This Region has distinctive characteristics and a Regional Problematique expressive of its own Milieu-Entier, while also sharing the main traits of the 'Mexican Problematique.
5. A theoretical Inter-state and Interdisciplinary organization is here proposed as one of the most suitable ways of tackling simultaneously and coordinately the main areas of concern within the Region.

6. The first step towards sound Structural Regional Planning is that of self-sufficiency in food and agricultural production. A first Working Group is proposed accordingly. The preliminary definition of agriculture and livestock micro-regions must be further reviewed and developed by the Working Group suggested.

7. The second step towards sound Structural Regional Planning is that of the definition of the regional system of cities. The decentralization of the second wealthiest capital city in the whole country, in a State with no internal prominent cities is not a possibility, indeed no more than an illusion. Within the State is geared to provide something to the capital. It is not an exaggeration to say that the macrocephalic relationship of Monterrey with the rest of the State is much more acute than that of Mexico City with the rest of the nation. A preliminary classification of 'Regional Metropolitan Areas', 'Intermediate Cities' and 'Support Cities' is here presented. Further research is required in order to reinforce or weaken the claims of cities to positions in each class. The main idea was, in this exercise, to detect those cities which can be subject to 'Multi-sectorial Concentrated Decentralization' policies. This concept here developed is opposed to the current trends of uni-sectorial (i.e. industrial) decentralization programmes.

Mexico's scarce economic resources must be maximized. Concentrated decentralization investment in the creation of 'industrial new towns' ignoring the potentialities of the cities already established is a waste of energy, resources and opportunities. An already reasonably diversified city, with its own social, cultural, organizational and institutional set up unquestionably offers the basic requirements for further development.

8. Two of the main objectives, jobs generation and the re-establishment of the rural-urban balance, were brought in simultaneously to a synthesis of the two above mentioned analyses. A dynamic countryside will provide jobs in the agricultural sector; dynamic, diversified cities, intentionally subject to significant decentralization policies, will provide new centers of attraction, capable, perhaps, of diversifying the directions of the migration flow. Systematic governmental backing is fundamental in these and other matters of 'power' decentralization, such as 'education', 'governmental institutions', 'organizations' and so on.

9. Of fundamental importance is the method of dealing with 'industrial decentralization' once the cities have been classified and selected for multi-sectorial concentrated decentralizations. The wrong type of industry can be harmful for a chosen micro-region. A highly capital-intensive chemical industry - for instance - in an area with a surplus of unskilled manpower, and lacking the inputs required by such industry, will create more problems than the ones it can solve. Perhaps, as mentioned earlier in this chapter - the 'average gross production', 'average income per capita' and 'average value added' will show a marked improvement but, in real terms the city and its micro-region will be adversely affected.

A preliminary industry evaluation is here presented which in turn requires further study, and modification made by the 'Working Group No.3'.

The 'Regional Centers of Research and Service to the Industry' (CRISINES) (1) together with CANACINTRA (2),

(1) See for instance: Gálvez, G.C. "CRISINES para la ..." op.cit.

(2) CANACINTRA, an acronym for "Cámara Nacional de la Industria de la Transformación" in Galvez, G.C.: "CRISNES..." op.cit.

and FOGAIN (1) should deal with the subject.

10. The decision-makers are fully aware of this fact as shown in the statement made by the Governor of the State of Nuevo Leon, who said:

"The frame of national urban policies advocates the decentralization of the Metropolitan areas of Mexico, Guadalajara and Monterrey. The frame of regional development for the North East Region made up by the States of Coahuila, Nuevo Leon and Tamaulipas, offers the possibility of balanced growth by encouraging the growth of intermediate cities and by promoting the stagnant subregions".(2)

Nonetheless, a proper inter-state (i.e. North East Regional) organization has not been constituted.

11. The last conclusion is obviously that a similar kind of inter-state and interdisciplinary organism to the one here proposed should be established. Such an organism must face the regional complexity in its wholeness. It is not the task of a single brain, or even a group of single-minded oriented brains. Furthermore, even when multi or interdisciplinary groups are formed, there is no guarantee that they will automatically work. Bitter experience has demonstrated more difficulties than expected in this kind of working groups. That is why I felt the necessity of developing further - together with Professor Rowse and Mrs. Young - the Composite Mind Theory, with the intention of providing the basic structure for the formation of this kind of Group.

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- (1) FOGAIN, an acronym for "Fondo de Garantía y Fomento a la Industria Mediana y Pequeña". See for instance: FOGAIN: "Características de la Industria Mediana y Pequeña en México" (Nacional Financiera Tomos 1 y 2, Mexico, F.) México, 1974.
- (2) Zorrilla, M.P. "Política Urbana para el Estado" in ('El Diario de Monterrey', 22/XI/75), (p.8).

12. In conclusion, it must be emphasized that without radical reforms in the whole planning approach and the policies that spring out of it, there is little possibility of satisfactory solutions to the regional problematique. A new approach to planning is here accordingly proposed - namely Structural Regional Planning, based on the idea that both the planning theory and the planning process, and both the Mexican and the Regional Problematique, have an inbuilt structure which can be detected and tackled simultaneously in its fundamental parameters or components.

13. I have tried to demonstrate the importance of considering the state of Nuevo Leon as an open system within the context of the region. By the same token the North East Region is open as a system to the neighbouring states and regions, and indeed, to the whole world. The poor conditions in which the States of Zacatecas and San Luis Potosi (North Central Region) are at the present, represent a heavy burden on the North East Region's development opportunities if simultaneous action is not taken for their improvement. If the sort of inter-state organization here proposed is properly understood, it can be used in a similar way in the other regions, responding obviously, to a different problematique.

14. It is worth noting the enormous difference between the theory developed in part B of this thesis and the very limited case study presented in part C. The latter is by no means a proper example of the potentiality of the former. Nevertheless, it provides a valid first approach to it. The re-establishment of the bio-socio-dynamic stability based on the reconstruction of the rural-urban balance, implies not only the fundamental role of agriculture and livestock, but the reinforcement of a balanced system of cities, which can serve the countryside, by generating jobs in them. Of fundamental importance is the decentralization of industry and the stimulation of small agro-industries in the intermediate and support cities. Survival in the long term for the region is in direct relation to the capacity for reversing the current tendencies.

A POSTSCRIPT

The Mexican Government is now more concerned and willing to plan the future development of the country with the proliferation of planning agencies at Federal and Statal levels becoming a characteristic feature during the present decade.

Technical planning jargon has, significantly, been incorporated in political statements, especially in Echeverria's current administration. Moreover, the Federal institution in which I worked on the case study, was established as recently as one year before I asked permission to study it. All 'Comite Promotores del Desarrollo Socioeconomico del Estado' (thirty one Socio-economic State Development Committees), are at the present coordinated by a centralized agency known as the 'Direccion General de Desarrollo Regional' (General Direction of Regional Development). This is an indication of the importance being given to planning in the public sector.

That five Governors attended a working meeting in February 1976 along with President Echeverria - setting a precedent in Mexican political history - to discuss common socioeconomic problems and possible inter-state solutions, indicates that Mexico's decision-makers are becoming increasingly aware of such problems and more willing to coordinate their efforts.

The North East Region as a whole, which has considerable resources and a privileged position at national level, has great potential for coordinated inter-state planning activities; yet its three planning agencies have their own 'closed' development plans which are neither interlinked nor coordinated.

A Comprehensive Regional Plan which considers all important parameters as outline in this thesis, should be of great help to the Governors of the three States involved. A possible way of making them aware of the importance of tackling coordinately common regional problems, is to set up a working meeting along with the 'technical secretariates' of the existing 'Comites Promotores del Desarrollo Socioeconomico' and discuss with them the method and general framework here developed as a way of interlinking inter-state regional planning for development, based upon Structural Regional Analysis.

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APPENDIX NO.1

"SOME RELEVANT QUOTATIONS"

1. Carrothers, G.A.P. has said in his conclusions on 'Population Projections' that ...

"This cursory examination of population projection techniques indicates the wide range of error possible in the use of any one method. Each must be employed with considerable caution. None per se can be recommended for general use" (1).

2. Pratt, when researching into the Minimum - Requirements Technique, summed up his findings as follows:

"Careful analysis of the technique finds it lacking in several respects. The technique presents a paradox in that it leads to a group of cities in which each city exports and none imports. The device is not superior to the location quotients for sectorial regional economies into base and service components..." (2)

3. Smith's conclusion when establishing a theoretical Framework for Geographical Studies of Industrial Location was ...

"What is offered here is an approach to industrial location rather than a set of formulae of laws which can provide the immediate solution to particular cases ... it may provide some guidance to planners ... to reveal something of the nature and complexity of the situations which they face" (3)

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- (1) Carrothers, G.A.P. "Forecasting the Population of Open Areas" (MIT Library, Cambridge, Mass. June 1959) as presented by himself in Isard, et.al. "Methods of Regional Analysis: An Introduction to Regional Science," (The MIT Press, Cambridge, Mass.) USA, 1960, (p.32).
- (2) Pratt, R.T. "An Appraisal of the Minimum-Requirements Technique" in ("Economic Geography", Vol.44, No.1, January 1968) (pp.117-118).
- (3) Smith, D.M. "A Theoretical Framework for Geographical Studies of Industrial Location" in Bluden, J. (et.al.) "Regional Analysis and Development" (Open Univ. Press Harper & Row, Ltd., London) GB. 1973 (p.139).

4. The capital/output ratio, designed originally as a theoretical tool in dealing with the problems of economic stagnation and instability in developed countries, has been rejected by Myrdal as a tool for developing countries when stating:

"This model, when used for analysis and planning in underdeveloped countries, implied on a gross scale an unwarranted abstraction from other relevant relationships, misplaced aggregation even in regard to the factors highlighted in the model, and an illegitimate insulation from other changes, induced or spontaneous" (1).

5. The possible place and usefulness of 'Benefit Cost Analysis' in economic development planning for Eckstein, O. is uncertain as he put it in his concluding comments:

"Benefit-cost analysis is a simple and intuitively pleasing way of applying economics to the development planning problems... The most productive uses (of this technique) in the near future are likely to be the humbler ones ... Broader problems of development strategy require a wide and flexible range of analytical tools. Whether the benefit-cost framework serves as a useful conceptual scheme or whether it just gets in the way is a matter I would leave for the investigator to decide in each case." (2)

6. Moreover, one of the general conclusions of the O.E.E.C. Meeting of 1961 was clear about the value of this technique in less industrialized areas:

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- (1) Myrdal, G. "Against the Stream - Critical Essays on Economics" (McMillan Press, Ltd.) GB. 1972 (p.94).
- (2) Eckstein, O. "Benefit-Cost Analysis and Regional Development" in Isard, W. & Cumberland, G.H. "Regional Economic Planning: Techniques of Analysis for Less Developed Areas" (O.E.E.C. Paris) France, 1961 (p.368).

"It was pointed out that where unemployment or under-employment exists, it is necessary to estimate the secondary or indirect effects of a project. Since benefit-cost analysis cannot measure these effects very well, it is of little value in assigning priorities as among alternative resource development projects". (1)

7. When Richardson reviewed some of the 'Regional Planning Techniques' he remarks clearly upon their basic limitations in the following terms:

"The trouble (with 'Regional Accounts') is that the data requirements for regional accounting systems are so heavy, and so much of the information required is inaccessible, that the heavy cost of constructing a workable set of accounts is difficult to justify..." (2)

8. "Despite the 'Linear Programming Techniques' versatility ... they have severe limitations for regional analysis. The assumption of linear relationship ... is at odds with the scale economies, externalities and other agglomeration factors which dominate the build-up of economic activity in certain areas. Linear programming cannot easily handle influences which are non-quantifiable, yet such forces may be important in locational contexts..." (3)

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- (1) Isard, W. & Cumberland, J.H. "Regional Economic ... op.cit. (p.426).
 (2) Richardson, H.W. "Elements of Regional Economics" (Penguin Modern Economics Text) GB. 1969, (p.140).
 (3) Richardson, H.W. "Elements of ... op.cit.(pp.141-142).

9. "'Regional Input-Output Analysis' involves a double disaggregation, since production is not only broken down by commodity but by region as well ... This twofold disaggregation makes it very difficult to give regional input-output models empirical content. The data requirements are very heavy in most countries (and) almost impossible to obtain except via very costly industrial survey methods. Empirical application is only a faint hope unless we make restrictive, often heroic assumptions". (1)
10. "As with all planning techniques, T.A.P. (an acronym for 'Technique for Area Planning') is limited in what it can do and in the fields in which it may be applied. It cannot evaluate the wider effects of policies designed to achieve broader economic or non-economic objectives, but can only measure the direct effects of alternative policies on local economic activity. Moreover, T.A.P. only works effectively when applied to small, specialized areas rather than to very large, diversified regions." (2)
11. "'Comparative Cost Analysis'... has its limitations (too). It is a static analysis which would need to be repeated because of the dynamics of locational change-technological advances, changes in raw material sources or in market conditions, the development of new products. It is confined to a comparison of money cost differentials, whereas an industry may fail to take hold in a region because

(1) Richardson, H.W. "Elements of ... op.cit. (p.142).

(2) Ibid... (p.143).

of attitudinal obstacles and business or worker resistance". (1)

12. "Once again, the technique (of 'Industrial Complex Analysis') has its weaknesses. In particular, it finds difficulty in handling non-quantifiable urbanization and other location-bound external economies, and it cannot be employed in cases where interrelationships among activities are weak". (2)
13. "The Methodology ('Cost-Benefit Analysis') is particularly unsatisfactory for investment projects large enough to affect relative prices and output. What should be included in the benefits? How should benefits be evaluated in view of market imperfections, the difficulties of assigning prices to collective goods and the 'intangible' benefits and costs which either cannot be quantified or which cannot be valued in market terms? In discounting future benefits to the present, what discount rate should be used? How should the analyst allow for uncertainty? There are not fully satisfactory answers to these questions, and the cost-benefit methodology is accordingly much less useful than appears on first sight." (3)
14. Meyer, J.R., summarizing his own conclusions from his survey on 'Regional Economics', has stated that ...
 "Regional Economics is very much what it is today because it has stood ready to attempt analytical solutions to difficult policy problems. Its major contributions thus far have been to provide 'broad measures' and frameworks needed to evaluate and organize these activities" (4)

(1) Ibid... (p.145).

(2) Ibid... (pp.146-147).

(3) Ibid... (pp.147-148).

(4) Meyer, G.R. "Regional Economics: A Survey"(American Economic Review, Vol.53 (1963) in Needleman, L. (ed.): "Regional Analysis" (Penguin Books) GB.,1968, (p.53).

15. Leven, C.L. analyses the problem of 'Regional and Interregional Accounts' from a different viewpoint than the one used by Cumberland and Bramhall, and by Richardson. His approach is more conceptual than methodological. After reviewing critically some fundamental concepts he notes that his remarks are intended ...

"...neither as firm recommendations nor expressive of an explicit theoretical reformulation, although they do reflect hypotheses about the nature of regional growth. Rather, they are meant mainly as a plea for a more flexible use of social accounts. We should be very careful to remember that there is no logically correct way of setting up regional, or any other accounts ... independently of a preconceived analytical purpose to which they are to be put." (1)

16. In turn, Tiebout, C.M., is much more explicit than Cumberland and Richardson in his appraisal of the 'Regional and Interregional Input-Output Models' he says:

"The empirical results of regional input-output analysis present us with a set of data which is supposed to describe reality. Unfortunately, there is no alternative set of data with which the researchers' results may be compared. Hence, it is vital to scrutinize the method and assumptions to see such limitations as may exist. It seems fair to state that most operational regional studies have produced only the most tentative results. Basically this stems from two considerations: 1) The lack of adequate data; and 2) the necessity to make certain operational assumptions which depart, in varying degrees, from what

(1) Leven, C.L. "Regional and Interregional Accounts in Perspective" (Regional Science Association, Paper and Proceedings, Vol.13, 1964) (p.143).

we usually assume about reality." (1)

17. Alonso, W. recognizes certain limitations in his 'Location Theory' when remarking that:

"We have concentrated on transport costs because they vary in a patterned way over space, and 'only touched' on such things as labour costs and taxes, which vary in no regular way ... (for doing so) ... the theory has little to say on some important topics which remain matters of judgment rather than scientific analysis ... "Demand has been taken for granted. External economies are hard to quantify ... Further, and most difficult of all, are the problems of uncertainty and of time, (for) the future is usually uncertain ... and time is not sufficiently considered in the existing location theory" (2)

18. Moving to the field of models used in planning (not just in regional planning) Lee, C. acknowledges certain problems and limitations when dealing with 'Linear Models' he has mentioned that:

"The main limitation on the use of linear models is the fact that many of the relationships with which planners are concerned may not be linear in form ... This situation is, (further) complicated by the fact that a low correlation coefficient, although it indicates no strong linear relationship, does not necessarily mean that there is no significant relationship between the variables". (3)

When dealing with 'Gravity-Models' he has affirmed that:

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- (1) Tiebout, C.M. "Regional and Interregional Input-Output Models; An Appraisal," (South Econ.Journal, Vol.24, 1957, p.146).
- (2) Alonso, W. "Location Theory" in J. Friedmann, & W. Alonso (eds.): "Regional Development & Planning: A Reader", (MIT Press, Camb. Mass.) USA, 1964,(p.103).
- (3) Lee, C. "Models in Planning: An Introduction to the Use of Quantitative Models in Planning" (Pergamon Press, Belland Bain Ltd., Glasgow, Scotland) GB. 1973, (p.48).

19. "There is still no adequate explanation of the gravity model in behavioural terms, so that it is difficult to see exactly what the proposition of the gravity formulation really means in terms of human behaviour... They may describe interaction and activity patterns satisfactorily, they do not explain them" (1).
20. 'The Lowry Model' that has been used in several planning studies has ...
 "...problems related to the structure and operation of the model which limit its usefulness and validity as a planning tool. Its main theoretical and practical limitations are: 1) the model is essentially a static one ... 2) It is an equilibrium model, it assumes that all the activities represented ... are in equilibrium throughout the whole study area. 3) It deals only with simplified relationships between highly aggregated variables. 4) Because ... it is based very strongly on an economic base model it has all the weaknesses associated with economic base theory." (2)
21. Lastly, when evaluating the 'Optimising Models' which he based on J.P. Lewis's research, he asserted: that..."even the simple objectives involve a large amount of subjectivity ... so the so-called 'objective function' is objective only in the sense that it has been objectively chosen. Furthermore, even if and when all of these questions can be answered objectively ... is itself probably a subjective decision" ... "Moreover, for many of the variables considered, the assumption of linearity is obviously not met in practice ... and ... Another inherent disadvantage ... is the need for continuous rather than discrete values

(1) Lee, C. "Models ... op.cit. (p.67).

(2) Lee, C. "Models ... op.cit. (p.99).

for the variables specified in the model." (1)

22. Cowling and Steeley have suggested some limitations in Threshold Analysis, when evaluating its application in Gragemouth/Falkirk sub-region:

"The difficulty of obtaining accurate estimates of costs is a major obstacle. A more fundamental criticism, however, is that the approach puts too much emphasis on the cost of infrastructure and not enough on studying the systems which this infrastructure is designed to accommodate." (2)

23. Lee, D.B.Jr., who evaluates in some detail the fundamental flaws in the attempts to construct and use 'Large-Scale Models', summarizes his conclusions in three main points:

"1. In general, none of the goals held out for large-scale models have been achieved, and there is little reason to expect anything different in the future; 2. For each objective offered as a reason for building a model, there is either a better way of achieving the objective (more information at less cost) or a better objective (a more socially useful question to ask); 3. Methods for long-range planning - whether they are called comprehensive planning, large-scale systems simulation, or something else - need to change drastically if planners expect to have any influence in the long run." (3)

24. The main limitation for the utilization of improved techniques for analysis represents for Steiss a danger:

"However, in the 'scientification' of planning

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- (1) Lee, C. "Models ... op.cit. (p.127).
 (2) Cowling, T.M. & Steeley, G.C. "Sub-Regional Planning Studies: An Evaluation" (Urban and Regional Planning Series, Vol.6, Pergamon Press, Oxford) GB.1973 (p.105).
 (3) Lee, D.B.Jr. "Requiem for Large-Scale Models" (AIP Journal, Vol.39, No.3, May 1973) (p.163).

lies the inherent danger of the chronological
determinism..." (1)

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- (1) Steiss, A.W. "Fundamental Trends in the Planning
Process Model in the United States" in (Planning
Outlook, Vol.13, Autumn 1973) (p.23).

APPENDIX NO.2

"LESSONS FROM THE WORLD OF PRACTICAL REALITIES
AS COMPARED WITH THE THEORETICAL ACADEMIC WORLD"

Inspite of the grave limitations in the methods, theories and techniques of Regional Development and Regional and indeed in General Planning (analyzed in the previous chapter), planning has still a tremendous reputation for being successful in some rich and poor countries.

There is the conviction that 'bridges' have been built using some of the most common tools from the 'planning kits'. One way of assessing its effectiveness is measuring the 'performance level' (1), not in quantitative but rather in qualitative terms, as in the brief review which follows dealing eclectically, first with developed countries and then with underdeveloped ones.

Planning in Developed Countries

Developed countries are intentionally taken first because they and their problems produced the originators of the whole set of methodologies, theories and techniques. Much research has been done in this area of which a few cases are taken as representative, not for the sake of simplicity but because of time and span constraints upon the present work:-

a. A. Glikson has considered our era as a period of reaction against planning, he stated that:

"In many countries planning has been converted into a merely technological operation, subordinated to the demands of industrial development, to general shortsighted projects in communications, engineering, etc. (2).

(1) Friedmann, J. "The Future of Comprehensive Urban Planning: A Critique" (P.A.R. Vol.31, No.3) M/J 1971, op.cit. (p.324).

(2) Glikson, A. "The Ecological Basis ... op.cit.(p.51).

b. In the Western world there is a tremendous confusion about planning. For instance, Tinbergen, J. advocates a 'economic development' (1); whereas Hirschman, A.O. comes out with the contrary proposition generating the theory of 'planned imbalance' (2) claiming that this approach will bring forth automatic equilibrating mechanisms.

c. 'Central Planning' as it has been dealt with in the USA and other parts of the world in the last three or four decades has little to do with actual performance (3). In Friedmann's words so-called 'Comprehensive Planning' has ... "turned out to be a colossal failure" (4). Wildavsky, A. has cited the Soviet Union's experience in National Economic Planning saying that in spite of having central planning and having experienced economic growth...

"the growth has not been exceptional and has not followed the plan." (5)

Hansen, N.M. on the one hand, after describing and evaluating what is being done to alleviate conditions of poverty, concludes that in the USA... "most current programmes are ineffective ... and that ... planning may at best contribute marginally within the context of much stronger forces" (6).

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- (1) Tinbergen, J. "Development Planning" (McGraw-Hill) London, 1967 (p.31).
 - (2) Hirschman, A.O. "The Strategy of Economic Development" (New Haven, Yale University Press) USA. 1958.
 - (3) See for instance: Hagen, E.E. "Planning Economic Development" (R.D. Invin, Inc., Ill, USA) 1963.
 - (4) Friedmann, J. "The Future of Comprehensive ... op.cit. (p.317).
 - (5) Wildavsky, A. "If Planning is Everything, Maybe It's Nothing" (Policy Sciences, Vol.4, No.2) 1973 (p.146).
 - (6) Hansen, N.M. "Rural Poverty & Urban Crisis" (Indian Univ. Press) USA, 1970 (p.297).

d. When reviewing the role of Regional Planning in Britain, McCrone, G. has said:

"Since Britain's present attempts at planning have so far failed to tackle the quantitative aspects satisfactorily (let alone the qualitative), there is little likelihood that they can deal with the spatial one in the foreseeable future." (1)

e. According to Miyazaki, I. Of the dozen or so economic plans formulated in Japan after the Second World War, five were officially adopted and four have been implemented "In the four cases the actual rate of growth of the GNP & private equipment investment have gone far beyond the projections." The Plans have under-represented reality which in the case of Japan took the form of astonishingly high achievements (2).

f. Wildavsky concludes his research by saying:

"... the very fact ... that it is hard to name an example (of successful national economic planning) suggests that the record of planning has hardly been brilliant. For all we know, the few apparent successes (if there are any) are no more than random occurrences" (3).

g. Ozbekhan, H. on one hand, and Fromm, E. on the other, have reached similar conclusions when analysing the performance of 'planning' from the human point of view:

"... it should be added immediately that until relatively recently, planning has played an implicit rather than an explicit role in our studies of human behaviour and of decision

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- (1) McCrone, G. "Regional Policy in Britain" (Unwin University Books, Ltd., London) GE. 1969, (p.247).
 (2) Miyazaki, I. "Economic Planning in Postwar Japan" (the J. of the I.D.E., Vol.VIII, No.4) December 1970 (as quoted by Wildavsky), (p.148).
 (3) Wildavsky, A. "If Planning is ... op.cit. (p.146).

making process ... Hence, our knowledge of it remains, at best, fragmentary, not to say incomplete and inadequate" (1).

"In effect there is a good deal of evidence to show that (we) in the United States and the whole Western industrialized world ... find ourselves in a severe crisis which is not so much economic as a human crisis" (2).

From what has been quoted here, (based on a large amount of others research) one gets the feeling that certainly there are other factors which actually play the most important role in the process of development. The 'performance level' of planning using all kinds of sophisticated mathematical models, lags far behind what is expected, for the simple reason that the 'Milieu Entier' in every country can not be measured by oversimplified, biased, and unrealistic methods, theories and techniques.

h. That this is the case is becoming more self evident here in the United Kingdom since the Commonwealth began to vanish, since it became trapped in the 'oil-war', once it became unable to counteract the effects of the international monetary crisis with its sinking pound sterling, once the Common Market started to demand too much from it, once 'some other political issues' at national and international level began to affect its capacity to keep growing etc...

The logical question that follows is: How can such mistakes be afforded ...? Obviously the answer is because the developed countries are rich, and their bridge has been constructed with other's bricks (i.e. colonial and

(1) Ozbekhan, H. "Planning and Human Action" in P.H. Weiss, "Hierarchically Organized Systems in Theory and Practice" (Hafner Publications Co. N.Y.) USA, 1971, (p.169).

(2) Fromm, E. "Humanistic Planning" ... op.cit. (p.71).

post-colonial exploitation). They have more resources on which to draw, more skilled and trained people to make use of their 'appropriate technology' and better social organization. With all this they can afford more failures as well as capitalize on their successes. Gross miscalculations such as the one on the Concorde Project (at least 4.1 times more than the original cost, from £250 million to more than a billion pounds (1); the doubtful usefulness of the gigantic computerized car-control center installed in Swansea (in Great Britain), and BART (2) which has been called 'a disaster' or the 'costly cripple', the fastest, most advanced, most talked-about rapid transit service in San Francisco, USA, which cost 1.6 billion dollars and is losing over 20 million dollars a year; (the cost of the computer system itself was 35 million dollars and the end result is still far from achieving the promised performance (3).

These are some of the examples of how some big failures in certain areas of 'planning' in rich countries can actually be absorbed by their wealth.

Planning in Less-Developed Countries

As one would expect, planning in underdeveloped countries has had less impact than in developed ones. Lacking money, capable manpower, useful data, and real governmental willingness for transformation, most of the 'plans' remain nothing more than 'plans on paper'.

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- (1) Wilson, A. "The Concorde Fiasco" (Penguin Special, London) GB. 1973. He says: "After 11 years and more than a billion pounds we have Concorde. Nobody else wants it and it's too noisy to live with. Concorde seems fated to end up as a symbol, an extravagant Gothic monument of government failure".
- (2) BART is an acronym for 'Bay Area Rapid Transit'.
- (3) Irvine, M. "Roulette on Wheels" (The Financial Times, GB., 3rd. April, 1975).

i. In my previous thesis I reached the following conclusion when dealing with Mexico:

"Planning has been a mere static (disjointed and incomplected) activity of which the main task has been (and still is unfortunately) to produce technical recommendations according to the prevailing political needs. This conclusion is based on the observation of the clear government unwillingness to share power and responsibilities ... (and the difficulty of implementing 'indicative planning' in a mixed economy system (i.e. private and public sectors))" (1).

j. This is further reinforced by similar statements produced by Urquidi, V.L. (2), Carrillo, A.R. (3), by King, T. et.al. (4), Shafer, R.J. (5), Wionczek, M.S. (6), Vernon, R. (7), and more recently by Solis, L. (8). The latter refers to the facts that 'attempts to produce investment programmes, including both public and private sectors which was extremely difficult, and plans never

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- (1) Bejar, L. "A Quantitative Methodology ...op.cit. (pp. 44-45).
- (2) Urquidi, V.L. "Perfil General: Economia y Poblacion" in "El Perfil de Mexico en 1980" Vol.I, (Ed. Siglo XXI S.A.) Mexico, 1971.
- (3) Carrillo, A.R. "An Empirical Test on Interregional Planning" (Rotterdam Univ.Press,N) 1970 and "Las Experiencias de Planificacion en Mexico" (Linea, No.16, J/A) Mexico, 1975.
- (4) Barkin, D. et.al. "Los Beneficiarios del Desarrollo Regional" (Sep.Setentas No.52) Mexico, 1972.
- (5) Shafer, R.J. "Mexico: Mutual Adjustment Planning" (Syracuse Univ. Press, N.Y.) USA, 1966.
- (6) Wionczek, M.S. "Incomplete Formal Planning: Mexico" in (Hagen, E.E. et.al. "Planning ... op.cit.).
- (7) Vernon, R. "The Dilemma of Mexico's Development" (Harvard Univ. Press, Camb.Mass.)USA, 1963.
- (8) Solis, L. "Planes de Desarrollo Economico y Social en Mexico" (SEP Setentas No.215) Mexico, 1975.

were implemented as planned'. Benveniste, G. concluded his work on 'Bureaucracy and National Planning in Mexico' with the following result, which is similar to that of the present study:

"... it is evident that the economists who were asked to elaborate an Overall Plan of Education (the so-called 'Eleven Year Plan of Primary Education') did not, qua economists, have a long history of technical planning successes behind them. The type of 'planning' they were already engaged in was 'heavily political in character'. While they were 'hired' by the Minister of Education to play the role of technicians, it is evident that their more important concerns would have to be political' (1).

The end result of this failure is that Mexican education inspite of some slow advances, is in a state of crisis, as Fuentes-Molinar, O. (2) has proved so convincingly in his research.

Mexico suffers from what is known as projectismo, which consists essentially of constructing plans without much critical analysis and then assuming the plans to be an accomplished fact. Planners tend to feel their plans as a form of reality deriving great satisfaction out of it, but most of their work exists only in their minds or on the paper. A case of the latter, is the recent work produced by a group of researchers who used seven highly sophisticated computerized models (Dinamico, Energeticos, Intercon, Chac, Bajio, Exporta, and Pacifico) with the idea that with them there is the possibility of providing a perfect representation of the true world, even though they applied the general equilibrium approach, and that they assumed linearity, homogeneity, continuity, perfect competitive market, absence of externalities, economies

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- (1) Benveniste, G. "Bureaucracy and National Planning: A Sociological Case Study in Mexico" (Praeger Publishers, N.Y.) USA, 1970, (p.90).
- (2) Fuentes-M.,O. "Ensenanza Primaria y Desigualdad Regional" (Desarrollo Educativo, M/A) Mexico, 1974, (pp.11-16).

of scale etc. (1)

k. When moving outwards, towards other 'less-developed', 'under-developed' or 'developing' countries, a similar pattern of behaviour was detected by Caiden, N. & Wildavsky, A. (2) who conducted a major research through intensive interviewing in a dozen nations. They perceived certain remarkable numbers of similarities despite the variations in wealth, culture and political systems, the major constraints being poverty, uncertainty and instability.

They did not, however, perceive that these common 'psycho-social traits' spring from the fact that almost all the countries concerned had been subject to conquest, subjugation and exploitation.

They found, nonetheless, that ...

"Economic development, for them (the leaders or politicians) may be a by-product of more important political goals rather than something to be achieved for its own sake,"

and also that the possibilities of change through 'planning' are indeed meagre, because planners lack power, and knowledge...

"They can not determine what their government will do against opposition. Little resource allocation is done in accord to the plan. Planned expenditure often does not appear in the budget document. Allocative decisions are made by political leaders and personnel in spending departments and ministries of

(1) Gioreux, L.M. & Manne, A. (eds.): "Multi-Level Planning: Case Studies in Mexico" (North-Holland, Amsterdam, 1973).

(2) Caiden, N. & Wildavsky, A. "A Constant Quantity ... op.cit. (p.xi).

finance in a series of ad hoc encounters throughout the year..."

"When they do make decisions, they are unable to determine the consequences. They just cannot control future events, planners are unable to achieve the targets set up in their plans".

As a consequence they make 'elegant paper plans that are not implemented...' (1)

(1) Caiden, N. & Wildavsky, A. "A Constant Quantity ... op.cit. (See especially the Prologue).

APPENDIX NO.3

"THE THEORETICAL, PSYCHOLOGICAL AND PHILOSOPHICAL
FOUNDATIONS OF THE COMPOSITE MIND (CoMi) AS ONE
OF THE WAYS OF TACKLING COMPLEX SYSTEMS".

Introduction

In my previous thesis, composed while attending this University (1), I offered a very general introduction to the Composite Mind Theory -restricted in scope mainly by limitation of time. Since then, however, it has been possible to continue the work. This has fortunately been carried on under the supervision of both Professor E.A.A. Rowse and Mrs. I. Young, a psychoanalyst. Professor Rowse made use of a theory of the kind to be investigated here, as early as 1934, in connection with the staffing arrangements for the London School of Planning and Research for National Development (2). Mrs. Young has provided advice on the psychological aspects, having become interested in the theory of composite mind in the course of the current year (1976). Personal and academic interactions with both Professor Rowse and Mrs. Young have been so rich that it would be the negation of the Composite Mind's approach if I were to speak of 'my' theory. 'We', 'us' and 'our' are in this section intentionally, and in all fairness, used when required.

2. Complexity and the Different Modes of Approaching It.

Complexity is part of reality. It is all-pervasive from the macro to the micro scale. For instance, the study of the cosmos (i.e. astronomy, astrophysics and the space sciences in general (3), deals with complexity at the macro level, whereas, neurophysiology (4) (a field which studies the neuron in the human brain), for example, deals with complexity at the other extreme of the scale: the micro level.

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- (1) Bejar, L. "A Quantitative ... op.cit. (see especially 'Implications of the Recommendations') (pp.259-263).
- (2) Personal Communication. (Letter dated 19 June, 1976.
- (3) See for instance: Blamont, J.E. (et.al.): "Astrophysics and Space Science Library" (formed by 45 volumes) (D. Reidel Publ. Co., Boston) USA (1963-1974).
- (4) See for instance: Eccles, Sir J.C. "The Neurophysiological Basis of Mind: The Principles of Neurophysiology" (Clarendon Press, Oxford) GB. 1953.

In the field of 'planning' - complexity is accepted too, as one of the main elements to deal with when confronted by the 'real world'. (I have discussed this when dealing with 'Systems' and the 'systems approach to planning' in this thesis).

One way of approaching complexity is through 'Reductionist Methodology' in which the whole system is divided and investigated in isolated parts. As I have mentioned in Chapter II, Section 2.3. page 16, the fault of reductionism is that it produces a partial understanding of real, complex and dynamic systems. The separate analysis of the parts does not produce the real image of the whole because their interactions are simply not considered.

The other approach is to face complexity as it is and try in different ways to confront it. Interdisciplinary (1), Multidisciplinary (2), Meta-disciplinary (3)

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- (1) See for instance: Oszlak, O. "Development Planning and the Planning Process" (Paper presented at the UN meeting, November 1970 (as reported by Caiden & Wildavsky in 'A Constant ... op.cit.'). Piaget, J. "Main Trends in Interdisciplinary Research" (George Allen, London) GB. 1970.
- (2) See for instance: Kuhn, A. "The Study of Society: A Multidisciplinary Approach: A Unified Approach" (Associated Book Publishers, London) GB. 1966.
Bigwood, R.T. "Guidelines for Making Decisions in a Flexible Planning Process" (Mimeographed discussion paper, PRU/Dept. of U.D. and R.P. Univ. of Edinburgh) Scotland, 1972.
Rowse, E.A.A. "World Community" (unpublished papers, in one of which Composite Mind as a Multidisciplinary Group was presented).
Hamilton, H.R. (et.al.) "Systems simulation for Regional Analysis" (MIT Press, Camb. Mass.) USA, 1972 (See especially "The Management of a Multidisciplinary Research Project).
- (3) Alonso, W. "Beyond the Interdisciplinary Approach to Planning" in "The Second International Symposium on Regional Development" (Tokyo,) Japan, 1968.

and Transdisciplinary (1) approaches have been suggested in the last decade as the most suitable ways of facing complexity.

Ackoff, R.L. has considered 'interdisciplinary research' as that ...

"... in which the problem complex (was) not disassembled into disciplinary parts, but was treated as a whole by representatives of different disciplines working collaboratively." (2)

Nevertheless, doubt has been expressed about the idea that 'interdisciplinary collaboration' is the keystone to problems of planning, by Alonso, W. who, after 15 years of endeavouring to use this approach, has plainly said:

"... I have participated in many interdisciplinary teams, and I have participated in many discussions of this subject. I now think that the interdisciplinary approach is of limited validity, and that the apparent common sense of this approach hides a great many pitfalls". (3)

He substantiates his position by analyzing three main difficulties faced by collaborative teams, these being: The mechanics of the team's organization; time and capacity applied by individuals to the team's work; and scientific heterogeneity with its concomitant disciplinary differences.

Caiden and Wildavsky have reacted even more strongly against the creation of interdisciplinary teams by saying:

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- (1) Janchtch, E. "Inter and Transdisciplinary University: A Systems Approach to Educational and Innovation" in Policy Science, Vol.1, No.4, Dec. 1970.
- (2) Ackoff, R.L. "Science in the Systems Age:..." op.cit. (p.669).
- (3) Alonso, W. "Beyond ... op.cit. (p.9).

"Perhaps the trouble lies not with a single variable but with the absence of an entire disciplinary perspective. Sociology, psychology, anthropology (just make out your own list) are all potentially useful. The solution is simple; create an interdisciplinary team. The larger the team the more disciplines represented the more theories and variables it is likely to consider relevant; that it looks less like a working group and sounds more like the Tower of Babel is no surprise." (1)

In Professor E.A.A. Rowse's own experience the multidisciplinary organization of his afore-mentioned school did not work because of the difficulties presented by human behaviour and the impossibility of communication amongst the members of the staff.

Whereas Dr. Hale when explaining the formation of the Centre of Human Ecology at this University has stated that ...

"... the reason which made the creation of the Centre important - (is that) it had to be multidisciplinary for it to be really valuable".(2)

From my own limited experience in the formation of an interdisciplinary group named 'GIEIViPo' (3) of which the main task was the study and research of low-cost

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- (1) Caiden, N. & Wildavsky, A. "A Constant Quantity ... op.cit. (p.31).
 - (2) Hale, L.J. "Centre for Human Ecology: A New Venture" (Bulletin, Univ. of Edinburgh, Vol.10, No.1) October 1973, (p.4).
 - (3) 'GIEIViPo' (an acronym for 'Grupo Interdisciplinario de Estudios e Investigacion de la Vivenda Popular') which produced at least 7 research papers and an International Seminar in Low-Cost Housing during 1969-1971. See for instance: Gonzalez-A, J.A. & Bejar-F, L. "Memoria del Seminario Interamericano de la Vivienda Popular" (ITESM, Monterrey, N.L. Mex.) Mexico, 1971.

housing, I can recall permanent obstacles which appeared not only because of the different disciplines involved (20'specialists') - but, far more important - because of the failure to establish both common grounds and language, and deep organizational structure.

One possible alternative for dealing with such problems is the creation suggested by W. Alonso, of a 'meta-disciplinary' expert, who can adapt himself much better to the team formation. He said:

"My concept of the 'meta-disciplinary' expert of the professional in this area is not that of a Leonardo da Vinci. Rather, he is a man whose sustained and substantive and technical concern with the concrete issues has made him particularly good at dealing with them"... This suggests a distinction between what we may call 'ordinary planning' and 'unusual planning'. (1)

Unfortunately, it seems to us that his approach to the metadisciplinary expert (i.e. generalist) and his role within the interdisciplinary team (transformed into 'meta-disciplinary' by the presence of the latter) do not explain at all the still thorny problems of group formation.

His approach falls into the same mechanical mistake that he criticized: "... take a physical planner, a sociologist, an economist; (all of them meta-disciplinary experts); beat the mixture until it blends;"... and then you will have 'unusual planning' performed by a

(1) Alonso, W. "Beyond the Interdisciplinary ... op.cit. (p.16).

'meta-disciplinary team'. (1)

In the field of Interdisciplinary research, Piaget, J. has concluded:

"By grouping interdisciplinary problems around realities - structure or rules, values and meanings - that are common to them all, we have referred to the three great manifestations of the activity of this natural subject; it remains in conclusion for us to see how the human sciences regard this subject as a subject, for this is perhaps one of the most promising points of consequence to be kept in mind for the future ..." (2).

Once again, Piaget tackles the problem of inter- and intra-disciplinarity from the scientific point of view without analyzing the so-called system man (3) and the necessary repercussions which he creates in the theoretical arena. In other words, it seems to us that the most suitable 'inter'-'intra' or 'meta' disciplinary set up will be seriously jeopardized in the world of practical realities, if the 'experts' are chosen only on the basis of their academic curricula as parts to fit into the schematic idea of a group (i.e. team) without too much concern about their human qualities and their capacity to interact in full creativity.

Our new approach to the Theory of the Composite Mind (CoMi), which intends to fill this gap will be discussed in the following sections.

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- (1) This fault of Alonso shows his meagre approach to what Ackoff has named the need for 'metadisciplines' as the need for bringing the interdisciplines together for tackling complexity. Ackoff goes even further by saying that the 'metadisciplines' are in need for what he called 'systemology' (See Ackoff, R.L. 'Science in the Systems ... op.cit.
- (2) Piaget, J. "Main Trends in Interdisciplinary Research" (George Allen & Unwin Ltd., London) GB. 1973, (p.63).
- (3) Fromm, E. "Humanistic Planning ... op.cit.

3. The Theoretical Foundations of the Composite Mind (CoMi).

Important among the published sources bearing upon the theory of composite mind, is the following synthesis by Professor Rowse, upon which the theory is based:

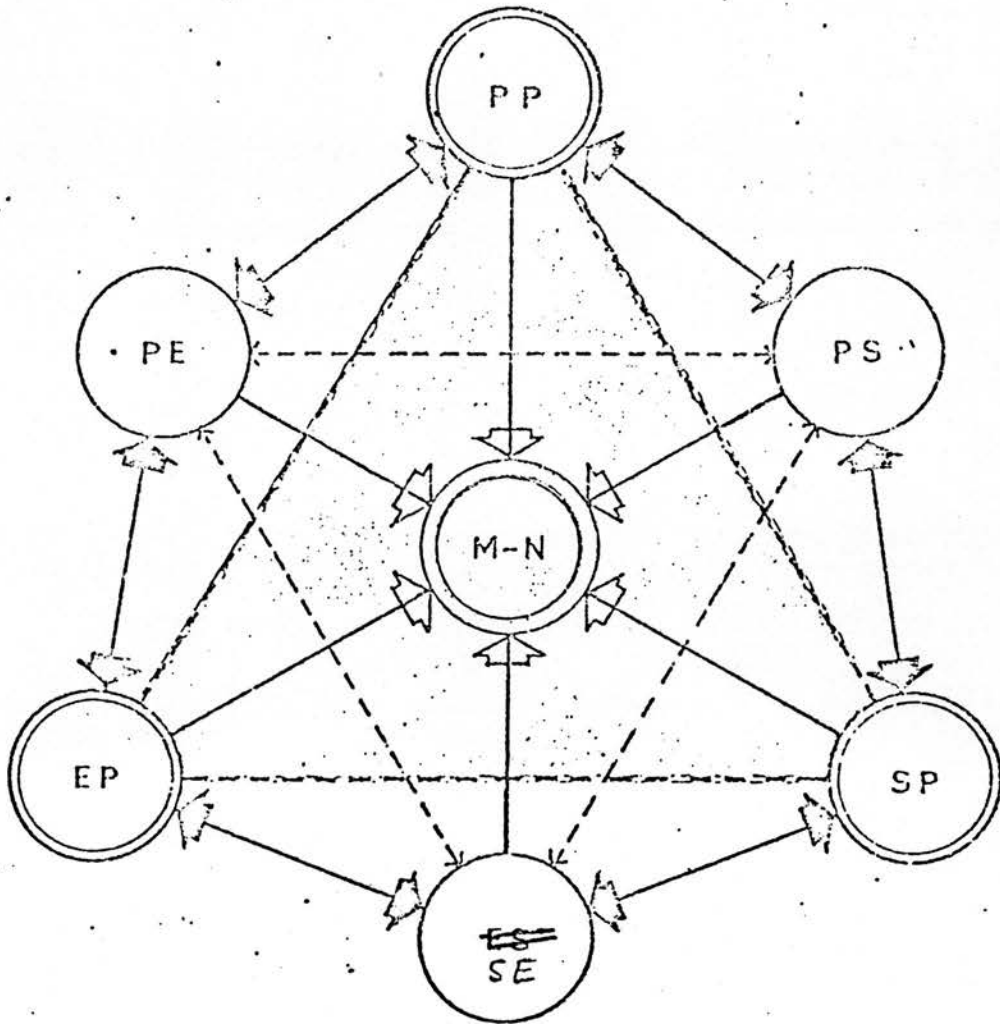
"The theoretical intention of the 'Composite Mind' is to organize the continuum of knowledge and experience in a structure composed of individual, related brains, each specialized in one or more fields, to achieve as an ultimate objective optimum mastery over the environment, in the service of the survival and further evolution of mankind.

Ideally, these brains should have undergone an educational experience extending from infancy, which would enable them to create the climate of behaviour of the 'meek' or gentle - 'who shall inherit the earth' - in which the ideal planner can work. Without such preparation, bitter experience has shown that the uncertain control of the amygdala, and its proximity to the rationalizing areas in the frontal lobes of the brain, result in the repeated breakdown of collaborative associations, for the maintenance of which rational behaviour is essential." (1)

His endeavour at that time was to create a 'Composite Mind' (2) generated by the multi-disciplinary linkages existing amongst the members of a group of more than a hundred specialists (~~see Figure No.16, page~~),

(1) Rowse, E.A.A. "Comprehensive Environmental Development as Applied to Africa" in Wolstenholme, G. & O'Connor, M. (eds.) "Man and Africa" (J & A. Churchill Ltd. London) GB. 1965, (p.346).

(2) Mind is defined as: 'The organized totality of psychic structures and processes, conscious, unconscious, and endopsychic; philosophically, rather than psychologically, the entity or substratum underlying these structures and processes'.



KEY:

- PP = Physical Planning
- EP = Economic Planning
- SP = Social Planning
- PE = Physico-Economic Sciences
- PS = Physico-Social Sciences
- ~~SE~~ ~~ES~~ = Socio-Economic Sciences
- M-N = Dual system: Man - Nature
- = Direct feed-back system
- = Indirect feed-back system
- = Integrated Comprehensive Planning
- = One-way relationship

FIGURE NO.17

"Schematic representation of the "Composite Mind" Adapted at National Level"

the main task of which was to support a World Authority.

Later on, he accepted an adaptation taken from my previous thesis, the intention of which was to serve as one possible approach to the problem of comprehensive national planning for Mexico. (See Figure No.17, page and its tentative list of disciplines). The sub-groups or panels were to be composed of representatives of the following disciplines. The list is tentative:

Physical Planning: Panel No.1

Physics, Chemistry, Seismology, Geology, Mineralogy, Pedology (or Edaphology), Climatology, Oceanography, Hydrology and Engineering, (Civil and Mechanical).

Social Planning: Panel No.2

Sociology, Religion and Ideology, Ethics, Philosophy, History, Anthropology, Education, Social Psychology, Social Structure and Organization, Mass Psychology Media and Sciences of Communication.

Economic Planning: Panel No.3

Economy, National Trade and Commerce, National Banking, National Finance.

Physico-Economic Sciences: Panel No.4

Geography, Building, City Planning and Landscape, Industrial Chemistry, Applied Technology (i.e. Appropriate Technology), Agricultural Engineering, Biochemistry, Genetics (animal and plant), Veterinary, Silviculture and Pisciculture.

Physico-Social Sciences: Panel No.5

Regional Physical Organization, Utility Organization and Development Cost Estimating.

Economic-Social Sciences: Panel No.6

Statistics and Demography.

Man-Nature Sciences: Panel No.7

Medicine (clinical and preventive), Dietetics, Public Hygiene, Human Genetics, Botany and Ecology.

Although Professor Rowse explained the way in which the 'group' of individual brains should be organized, his approach to the ideal educational experience (not published) was mainly concentrated on preparing the 'new generation' rather than considering the possible re-education of the current generation as the first step forward in the advancement of the Composite Mind.

Fortunately, as we will explain later, there is a branch of psychoanalysis (Group Dynamics) which offers a means of providing 're-educational experience' (a kind of group therapy) which ... "would enable the CoMi-Group to create the climate of behaviour of the meek, ... in which the ideal planner can work". (1)

But before moving into the psychological field, we felt the necessity of explaining that the new way of approaching the Composite Mind Theory is discussed here neither on the world scale nor at the national scale but concerns rather the inner (2) formation of a 'CoMi-Group' of which the number - recommended by group psychoanalysts - should be around six ($\pm \sim 2$). (3)

- (1) Rowse, E.A.A. "Comprehensive Environmental ... op.cit. (p.346).
- (2) By 'inner formation' we mean the formation of the deep psychological structure of both the individual and the group.
- (3) See for instance: Foulkes, S.H. & Anthony, E.J. "Group Psychotherapy. The Psychoanalytical Approach" (Penguin Books, Ltd., England) GB. 1968, (2nd Edition).

As shown in Figure No.18 (see below), a hypothetical 'CoMi-Group' organized for specific purposes can be expanded by 'contact' with a 'CoMi-Group No.2', 'CoMi-Group No.3', ... 'CoMi-Group No. 'n'' until their combined action may cover the sphere of planning required.

4. 'The Psychological Foundations of a CoMi-Group'

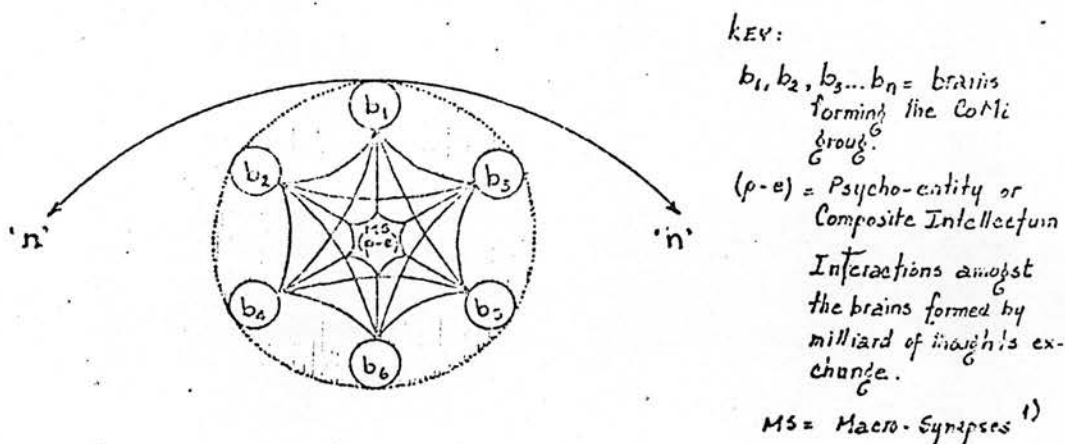


FIGURE NO.18 'Hypothetical CoMi-Group and the Generation of its Psycho-Entity (p-e) Through the Macro-Synapses (1) Phenomenon'

The core idea is the belief that the 'Macro-Synapses'(1) phenomenon can actually happen in the 'vacuum center' of the interactions (mature and primitive) performed by the individual brains within the 'CoMi-Group' generating a new kind of semi-independent 'psycho-entity' (p-e)

(1) 'Macro-Synapses' resembles for us the synapses phenomenon but in the macro scale (see page 289) for further explanation.

(1) or Composite Intellection Synapses.

Characteristic of such a psycho-entity is that its 'Creative Potentiality' $(p-e)_{cp}$ is far beyond the simple aggregation of individual brains with different capacities $(b.c._i)$, this is to say $(p-e)_{cp} \neq (b.c._1 + b.c._2 + b.c._3 + \dots + b.c._{n-1} + b.c._n)$ or $\neq (b.c._i)$ (see Figure No.19, page 280). Moreover, such creative potentiality does not respond either to an unlimited linear relationship of the form $(p-e)_{cp} \neq a+b (b.c._i)$, or to an infinite exponential relationship of the form $(p-e)_{cp} \neq \exp. (b.c._i)$; but rather it more likely fits a logistic relationship of the form $d (p-e)_{cp} / d (bc)_i \approx r (p-e)_{cp} (1-(p-e)_{cp}/k)$ (*) (see Figures No.20, 21 and 22) (o), which corresponds more closely to a single brain development.

(1) For reinforcing our belief we will quote - Anthony, E.J. who has said: "The space between individuals is, of course, unoccupied, so that nothing in fact happens there; but if one's psychological antennae are properly attuned to such experiences, the area often becomes 'atmospheric' with feelings. One should stress that this is not a mystical but a phenomenological experience of interacting groups. If one allows one's 'floating attention', to record automatically its own observations one begins eventually to respond to 'pressures' and 'temperatures'". - Foulkes, S.H. & Anthony E.J. "Group Psychotherapy" op.cit.

(*) Which can be expressed as $(p-e)_{cpn} = f (b.c._{n-1})$

(o) Page no. 280

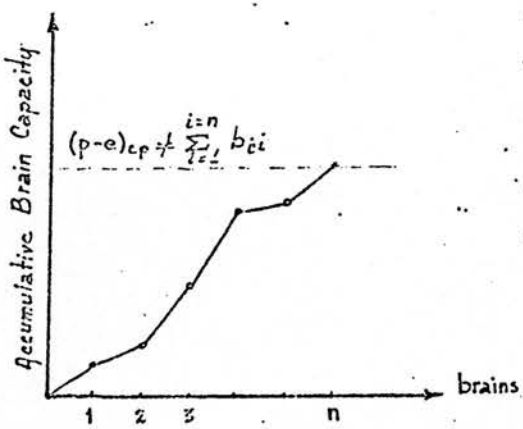


FIG. NO. 19 BRAIN CAPACITY 2)
ARITHMETICAL AGGREGATION

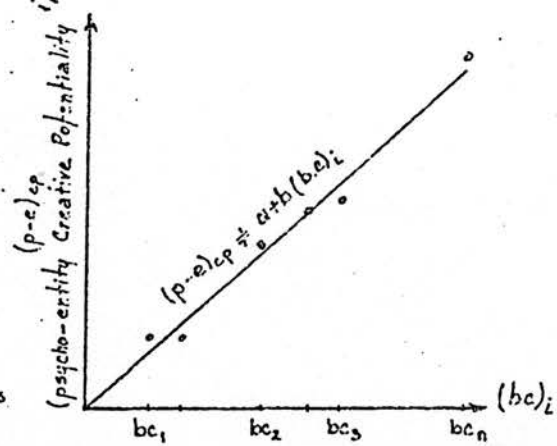


FIG. NO. 20 LINEAR RELATIONSHIP 3)

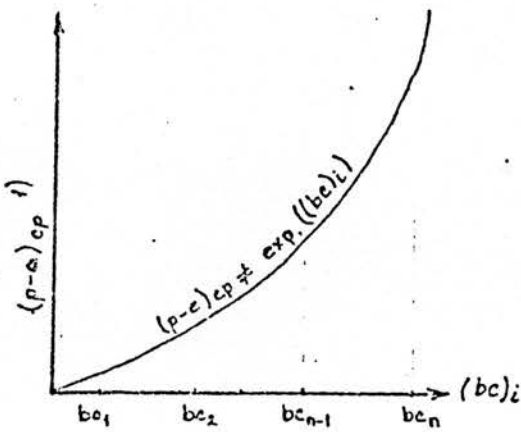


FIG. NO. 21 $(p-e)_{cp}$ AS EXPONENTIAL
RELATIONSHIP 4)

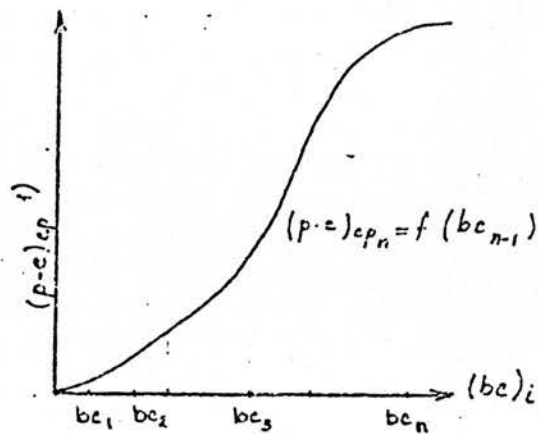


FIG. NO. 22 $(p-e)_{cp}$ AS LOGISTIC
RELATIONSHIP 5)

- (1) 'Creativity' of the individual and of groups has been a field of vast research. For the former see for instance:
Taylor, C.W. (Ed.) "Creativity: Progress and Potential" (McGraw-Hill Co. N.Y.) USA. 1964. (It contains a bibliography of 750 references on the field.)
Vernon, P.E. (Ed.) "Creativity" (Penguin Books, Ltd. England) GB. 1970.
For the latter see for instance:
Gordon, W.J.J. "Synectics. The Development of Creative Capacity" (Harper and Row, N.Y.) USA. 1961.
- (2) Asch, S.E. "Social Psychology" (Prentice Hall Inc. Englewood Cliffs, N.J.) USA, 1957 (see especially Chapter 9 : "An Introduction to Group Theory" and Chapter 17: "The Study of Small Groups").
- (3) See for instance: Fine, N.J. "Introduction to Modern Mathematics" (Allen & Unwin) GB. 1967.
- (4) Ibid...
- (5) Ibid...

The creative potentiality of any 'CoMi-Group' will be in direct relation to the following two vital forms of integration which have to be performed simultaneously:

1. 'Self-integration' of each individual mind
2. 'Group-integration' of each individual mind with one another.

It is fundamentally both 'the quality' (not the quantity) of brains and the 'quality in richness and amplitude of their interactions' which will achieve increment day by day, synergically, within the 'CoMi-Group's creative potentiality'. (1) Being and permanently becoming in a continuous process of dual integration, it is our belief that the 'psycho-entity' may very likely follow the different stages of human growth (i.e.) birth, childhood, adolescence, maturity and death), with the enormous difference that death may be seen in a different way: brain renewal $(br)_i$. (2)

-
- (1) In this area we share a lot with the Synectics theory which is applied to the integration of diverse individuals into a problem-solving group. It is an operational theory for the conscious use of the preconscious psychological mechanisms present in man's creative activity. The fundamental difference lies in the aim for which such creativity is developed. For a synectics group (i.e. the Cambridge Synectics group) the goals are to attack invention problems, to implement them after investigating market potentials and to teach the theory; whereas the Composite Mind theory's main objective is the survival of the intellection in a world that is gravely affected by the irresponsible production of marketing goods which do not necessarily respond to the basic human needs. See for instance: Gordon, W.J. "Synectics" (Harper & Row) USA, 1961.
 - (2) Brain renewal $(br)_i$ implies death, retirement or absolute disagreement because of which a highly trained brain has to withdraw from the CoMi-Group (See Figure No.24 point P1).

The main task of any CoMi-Group is to confront open and dynamic systems, therefore, it becomes axiomatic to say that it should be open and dynamic by nature. A new mind incorporated which is in a process of self-integration and open to human interactions, necessarily brings fresh ideals, ideas and human experiences and objectives which will, on the one hand, enrich the CoMi-Group's outlook, but simultaneously, on the other hand, may introduce undesirable disturbances capable of affecting and even reducing the 'creative potentiality' in the mature psycho-entity. (See Figure 24, point P2). In human ecological terms, a CoMi-Group can become a 'stable system' in so far as its homeostatic mechanism can correct the interference created by the process of brain renewal. Being a kind of 'human ecosystem' in which attitudes, values, judgments and will are at play, this homeostatic mechanism can be subject to transformation, reinforcement and further development, augmenting its capability to correct - through highly sensitive responses - the slight imbalances brought about in the CoMi-Group when a new brain is introduced. (See Figure No.24, point P3).

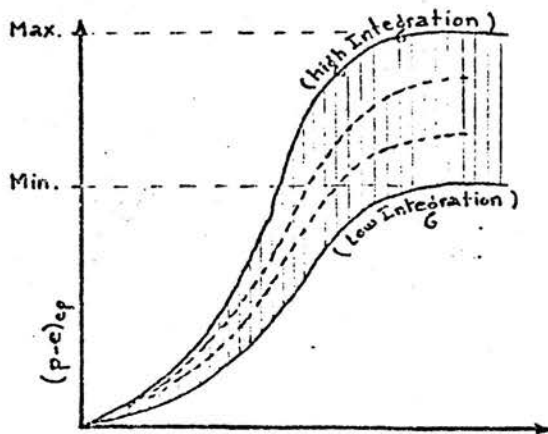


FIGURE NO.23
Effects of the Processes
Of Self-and-Group Integration
on the (p-c) cp.

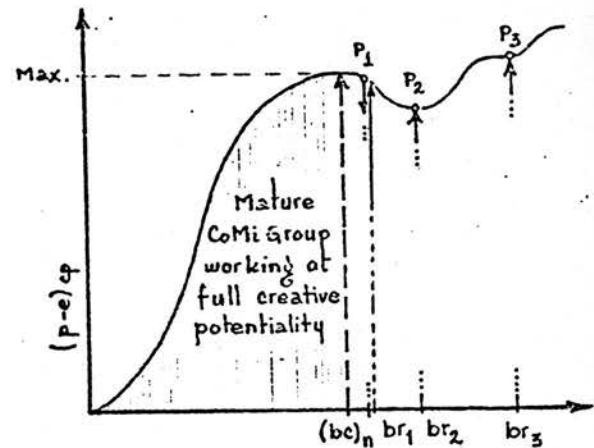


FIGURE NO.24
Effects of the Process of
Brain Renewal in the (p-e)cp
of a Mature CoMi-Group.

Figure No.23 depicts the two extremes of creative potentiality of a CoMi-Group. The 'minimum level' suggests that both processes of self and group integration are performed at their lowest level. Individual brains (1) and the group in this condition normally have loss of energy and capacity because of internal frictions. The 'maximum level' suggests the contrary, both processes are performed in their highest level, therefore waste of energy through friction is reduced to the minimum and the creative potentiality is increased considerably. Between these two extremes there is a 'range' which will denote how much the group can actually produce.

Figure No.24 shows the possible behaviour of a CoMi-Group which after reaching maturity (i.e. the psycho-entity's full productive capacity) has to face the effects of brain renewal.

We have just mentioned that the creative potentiality of any CoMi Unit depends vitally on the two fold process of integration: 'self-integration' and 'group integration' performed simultaneously. Further analysis into these two key areas provides us with more insights in the understanding of the fundamental and dynamic structure required for the CoMi theory to become operative and to be implemented in our world of realities.

(1) We have been using the words 'brain' and 'mind'. It is not within our scope to deal with the brain in biological terms at this stage but it is imperative to state the obvious: without brain there is no intelligence. We will deal with mind and its mechanisms, after defining brain as the "... anterior part of central nervous system, ... enlarged in connection with aggregation of sense organs in the head region. To a varying degree co-ordinates reactions of whole body." (See for instance: Abercrombie, M. (et.al.): "A Dictionary of ...op.cit. (p.43).

5. The Process of Self-Integration of the Individual Mind. (1)

In psychiatric terms a person is mature (2) or emotionally stable once she/he has been able to reach a 'reasonable degree' of 'self-integration towards wholeness', meaning by this both that she/he is functioning within a certain 'range of operancy' present in her/his 'Milieu-Entier', and that she/he is resolving the inner dichotomy brought into play since the first moment of her/his existence. As Laing has said:

"There is a conflict between the demands of conformity and the demands of our instinctive energies, explicitly sexual ... Our civilization represses not only 'the instincts', not only sexuality, but any form of transcendence" (3).

Emotional stability is not a static but rather a dynamic state of balance subject to natural fluctuations. The ecological term, homostatic mechanism, may be understood in this context - in so far as any individual mind has its own sensitive responses (self-defence, self-healing and self-adjusting) by which it avoids or neutralizes anything appearing to it as abnormal and/or detrimental.

Emotional stability is, therefore, a permanent process of being and becoming (or in Piaget's words... "in a constant duality, or bipolarity, of always being

- (1) Not only as concerned with internal psychological processes, endopsychic reality and intra-psychic mechanisms or dynamics; but also with the psychological and emotional reactions and repercussions when in 'contact' with the physical, social and metaphysical environments. See for instance: Laing, R.D. "Self and Others" (Penguin Books, England) GB. 1969.
- (2) According to Erich Fromm ... "the syndrome of attitudes which are to be found in the mature person is formed by care, responsibility, respect, and knowledge which are mutually interdependent" (See, "The Art of Loving" ... op.cit. (p.29).
- (3) Laing, R.D. "The Divided Self" (Penguin Books, England) GB. 1965 (p.).

simultaneously 'structuring' and 'structured'" (1) always confronted with a new set of circumstances, variables and stimuli, presented by 'reality', the main characteristics of which are its complexity, diversity and dynamicacy, moving forwards (from past to present and to the future) in the fourth dimension, time.

Self-integration implies three main conditions, 'sine-qua-non', these being: First, 'knowledge' acquired through both, the painful analysis of the past as a source of information relevant to current behaviour, and an open attitude towards the present based upon an assortment of human experiences (2), reason and intuition being the proper tools to use when dealing with both the inner and outer environment. Second, 'capacity to love' (3) based on faith and self-acceptance, controlling the natural narcissism and being able to give and receive (i.e. interacting) with the 'other' including both human and non-human beings. This capacity drives the person's powers into creative and productive work. Third, 'objectivity': knowing and loving oneself and knowing and loving the 'other', the recognition and admission of the existence of one's own and other's talents and one's own and other's limitations in their real dimension, which together constitute the 'meek' approach towards reality.

Schematically the process of self-integration can be represented by a sphere formed by two triangles in constant dynamic interaction: the 'inner' working

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- (1) Piaget, J. "Structuralism ... op.cit. (p.10)
- (2) This is the most obvious and the most important precept in the old "know thyself" we must deepen our insight into the causal concatenations governing our own behaviour.
- (3) Without 'love' aggression will lead necessarily to the destruction of self and others.

'inwards' (introversion i.e. psycho-centripetal force and the 'outer' working 'outwards' (extraversion, i.e. psycho-centrifugal force) - balancing each other when advancing through time.

Introspection: Observation by an individual of his own mental process; systematic self-observation.

Introversion: Interest in own thoughts and feelings.

Intuition: Immediate perception or judgement, without any conscious mental step in preparation.

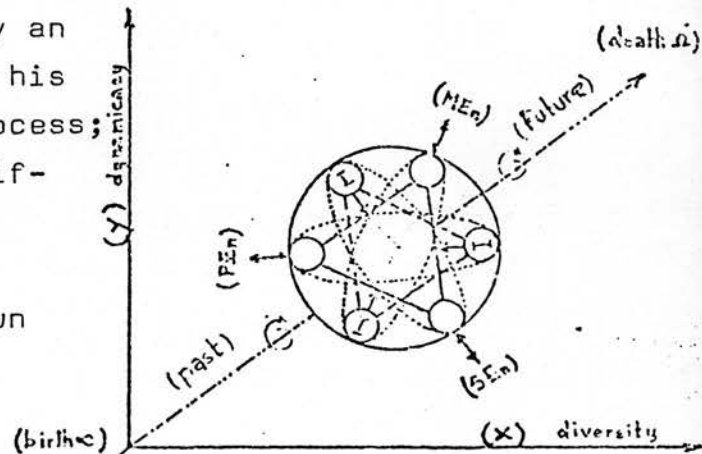


FIGURE No.25 'Schematic Representation of the Self-Integration Process of the Individual Mind'..

The 'inner triangle' (the hatched one), representing the 'endopsychic reality' (1) is formed by a triad: (I) introspection; (I) introversion and (I) intuition, and their permanent intra-psychic mechanism.

The 'outer triangle' representing the 'exopsychic reality' - as far as communication with the outside world is concerned - is formed by the continuous interactions (\leftrightarrow) between the main and the Physical Environment (PE_n), Social Environment (SE_n) and the Metaphysical Environment (ME_n).

The 'space' (third dimension) in which the sphere of self-integration is happening, is formed by an ever increasing level of diversity, complexity and dynamicity.

This unfolding is taking place in the time scale (fourth dimension) formed by another trinity (past, present, future) from the birth (∞) to the death (Ω) of the person.

So, inspite of the apparent ever increasing level of disintegration, the area of contact between self-integration and its 'space', the mature person - the whole one - is able not only to maintain her/his unity, but to face with creativity and transcendancy the dilemma of a synergically augmented disruptive force created by the triad of diversity, complexity and dynamicacy.

6. The Process of Group-Integration of the Composite Mind.

The hypothetical CoMi-Group was initially depicted as formed by individuals who are striving how to be educated simultaneously for the two vital forms of integration: that of the self, and group-integration for decision-making. Having dealt with the former, as the basic condition, it is now time to analyse the latter.

We, all human beings, have had our own past history and some traumatic experiences. Our current actions are loaded by our background and our personal traits. We all have difficulties greater or lesser, when communicating with the 'other', or with 'the others' in a group. Normally there is a lot of waste of energy and serious limitations upon the creative potentiality of groups due principally to immaturity, inactivity, emotional instability and disturbing conflicts of one or more members of the group. Conformity, authority, dependency

(1) (From previous page)
'endopsychic reality' is that which makes use of the processes within the unconscious of a different order from conscious processes. The 'exopsychic reality' is the counterbalancing action.

and change are the most common human conflicts in a group, and these can provoke serious problems of aggression (1), grudges and jealousy.

In tackling these problems a branch of psychotherapy, 'Group-Analysis' (2) has a bearing on all human activities and experiences. It was originally applied in clinics and institutions in private practice, but is now going beyond this as a result of the growing realization of its significance. It may offer solutions of interest to philosophy, semantics, psychology, psychoanalysis, education, art religion and social and cultural movements and organizations.

-
- (1) 'Aggression' being one of the vital forces acting in groups, one of the main biological treatises in the field, by Lorenz, K., is, "On Aggression" (Methuen & Co. Ltd. London) GB. 1974 (5 eds.), see also Storr, A. "Human Aggression" (Allen Lane, The Penguin Press, London) GB. 1968, and Montagu, M.F.A. (ed.) "Man and Aggression" (Oxford Univ. Press, N.Y.) USA, 1968.
- (2) Once again we are faced with a tremendous field of research in its own right and out of our scope. Nonetheless, its importance for the enrichment of the Composite Mind Theory and Philosophy is so great that we felt the need to touch upon it, in order to provide a first general framework subject to further advancements.
- See for instance: Bion, W.R. "Experiences in Groups" (Tavistock Publ. London) GB. 1961.
- Olmsted, M.S. "The Small Group" (Random House, N.Y.) USA, 1959.
- Sprott, W.J.H. "Human Groups" (Penguin Books, Ltd. England) GB. 1958-1975.
- Newcomb, T.M. & Hartley, E.L. "Readings in Social Psychology" (Holt, N.Y.) USA, 1952.
- Sherif, Muzafer and Wilson (eds.) "Group Relations at the Crossroads" (Harper & Bros. N.Y.) USA, 1953.
- Cartwright, P. & Zander, A. (ed.) "Group Dynamics" (Tavistock Publ., London) GB, 1954.
- Durkin, H.E. "The Group in Depth" (International Universities Press N.Y.) USA, 1964.
- Taylor, F.K. "The Analysis of Therapeutic Groups" (Oxford Univ. Press, London) GB. 1961.

One concept originating in the field of Group Analysis which seems to us of fundamental importance is that of 'group network' or 'group matrix' (1). A group, let us say a 'CoMi-Group', is a matrix of both interpersonal relationships and interpersonal interactions, and the events which occur in it are interpersonal phenomena. These relationships, interactions and events become in part the source of energy required for the 'Macro-Synapses' phenomenon to happen in the vacuum centre of the CoMi-Group. We base our theory on the following reasoning:

1. A synapse is commonly formed by contact of the tip of a terminal branch of the axon belonging to one nerve-cell with the cell body or with a dendrite of the other nerve cell (2).
2. Synapsis is therefore the 'bio-chemical process within the brain which generates the electric energy required for the Synapse phenomenon to happen in millions of nerve cells at once in fractions of seconds' (3) (This is what we might call 'micro-synapses').

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- (1) Ruesch, J. & Bateson, G. "Communication; The Social Matrix of Psychiatry" (Norton, N.Y.) USA, 1951.
 - (2) The concept of 'synapse' was originated by: Sherrington, C.S. "Integrative Action of the Nervous System" (Yale Univ. Press, New Haven and London) Gb. 1906.
 - (3) This single highly complex brain's phenomenon has been deeply studied by: Eccless, J.C. "The Physiology of Synapses" (Springer-Verlag OHG, Berlin) Germany, 1964 (His list of references cover more than a thousand different books and research papers). McLennan, E. "Synaptic Transmission" (W.B. Saunders Co. Philadel.) USA, 1963. (He concentrated his work on: the morphology of synaptic regions; the electrical consequences of synaptic activation and the nature of the chemical transmitter substances involved). (His list of references cover around 600 books and research papers). 'Progress in Brain Research' (Series of 40 research papers produced in the last decades).

3. There is the increased awareness that the 'experience' in 'the contact' between two or more brains resembles the synapse phenomenon, which has been compared with a certain 'psycho-atmosphere' and named the 'transpersonal network' (1).
4. Therefore, 'Macro-Synapsis' (MS) (see Figure No.18); resembles the synapsis phenomenon but in the 'Macro' scale, (as in contrast with the 'micro') involving 'n' number of brains. This being not a biochemical but rather a psychological process.

In other words the CoMi Unit can be pondered as the possible generator of a new kind of semi-independent 'psycho-entity' emerging from the 'macro-synapsis', of which the source of 'energy' is considered to be, both the individual brain electrical potentials and the richness of their interpersonal relationships, interactions and events (communication) within the group in permanent dynamic stability. (2)

This resembles quite closely what happens in the complex network of nerve cells of each individual mind. (3) In the CoMi-Group 'psycho-entity' is concentrated and in permanent struggle with the biopolarity of human forces; on the one hand, what we know as positive-creative forces: love, sympathy, empathy, affinity, liking, common interest and deep communication; and on the other hand what are accepted as negative - destructive forces: hatred, jealousy, rivalry, greed, mistrust and fear. (4)

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- (1) Foulkes, S.H. "Wider Theoretical Formulations and Applications of Group-Analytic Psychodynamics" in Foulkes, S.H. & Anthony, E.J. "Group ... op.cit.
 - (2) A lot of elements in this direction can be found in the 'Proceedings of the Annual Symposium of Behaviour and Brain Electrical Activity' (1973), edited by Burch, N. and Altshuler, H.L. in which 47 contributors were listed (Plenum Press, N.Y.) 1975.
 - (3) Magoun, H.W. "The Waking Brain" (Ch.C.Thomas, Publ. Springfield, Ill.) USA, 1969 (4th Edition).
 - (4) These have commonly been accepted in Group-Analytic Psychodynamics as the driving human forces. See also: Suttie, I.D. "The Origins of Love and Hate" (Kegan Paul, T.T. & Co. London) GB. 1948.

The natural birth, growth, development and maturity of this psycho-entity depends fundamentally on the permanent control of the positive - creative forces over the negative - destructive ones; whereas the opposite: abortion, decline, degeneration and immaturity is the expected outcome of the overwhelming control of the latter over the former forces.

The new 'psycho-entity' can be considered as the centre of all interactions and all mental processes in the group in the same way as the individual 'mind' is the operational basis for all mental processes of the individual, from this springs the name: 'Composite Mind'.

The individual becomes a 'nerve cell' who receives and transmits energy and creativity. Her/his personality, individuality and freedom must be preserved in permanent dynamic balance with the norms, flexibility and structure of the group. (1)

7. The Role of the Psychoanalyst Within The CoMi-Group.

It is not suggested that the CoMi Unit should be established as a group for individual therapeutic purposes but rather for the generation of the new 'psycho-entity'. The richness of its interactions i.e. communication - becomes the second half of the equation once each individual is working towards her/his own integration. Whatever the method of 'group dynamics' (2) used by a

(1) An approach similar to ours is that of Ruesch and Bateson, and Foulkes, S.H. For the former speaks of a 'cultural network', of 'intrapersonal communication' and 'interpersonal communication in the group', whereas the latter speaks of what he called a 'transpersonal network' comparable to a magnetic field. But none of them have taken it as a possible source of potential creativity beyond the therapeutic purposes. This is the area of our main interest.

(2) Sprott, W.J.H. in his book: "Human Groups" has said: "if we seek, as surely it is reasonable to do, to provide for the expansion of all the richness of variety which human beings are capable of displaying we must see to it that our application of such principles of 'group dynamics' as we may discover should safeguard individual differences." (P.199).

psychoanalyst within the CoMi Group, the key idea of her/his indispensable inclusion (1) holds validity because of her/his help to:

- a. Accelerate both vital interdependent processes: self-and-group integration.
- b. Minimize the wastes of energy and to disclose, as soon as they appear, the disturbing conflicts (i.e. 'frictions') amongst the members of the CoMi Group in order to eliminate them in their early stages.
- c. Minimize the time span required by the CoMi-Group to reach maturity.
- d. Maximize the creative potentiality of the CoMi Group by both, liberating the listed positive creative - forces of each individual and by increasing 'synergically' the positive interactions amongst the unit members for realizing the new semi-independent psycho-entity.
- e. Perform the role of the psycho-entity's homeostatic mechanism' with regard to controlling the listed-negative - destructive forces of each individual and correcting in time slight disturbances generated mainly by the tendencies of sub-grouping, member isolation, monopolism, leader centeredness, etc... and
- f. Perform the same role above mentioned as regards dealing with the disturbances brought into the mature CoMi Group by the process of brain renewal.

8. The Philosophical Foundation of the Composite Mind.

Once we have analysed the theoretical and psychological characteristics of the Composite Mind, we will proceed very briefly to explain what seems to us the philosophical foundations.

(1) Rice, A.K. in his book "Learning for Leadership" has suggested this same need. His approach is obviously different from ours but still holds some validity. (Tavistock Publ. London) GB. 1965.

The concept of 'Reality', 'the real world', or 'Milieu-Entier' has been approached in many different ways throughout the history of mankind. It is beyond our scope and interest to pursue details in this field. Nonetheless, we have our own philosophical approach which is open to discussion and further advancement. Our own conditioned perception of reality, does not pretend to universal validity, but is congruent with the theoretical and psychological approach hitherto presented.

The presence of 'triads' (1) is all pervasive in the very deep structure of man and nature in the same way as 'dualities' or 'polarities' pervade all areas of enquiry.

For instance it is required to have the 'I' and 'You' in order to have a latent 'Us', which itself is exposed to a duality: integrating (positive-creative) vs. disrupting (negative-destructive) forces.

'Nature' in its broader sense is formed by a trinity of spheres: atmosphere (air and climate); hydrosphere (oceans, lakes, rivers) and lithosphere (soils of all kinds); similarly we can represent 'Man' as formed by another trinity of spheres: gnosphere (the sphere of knowledge), sociosphere (the sphere of social interactions) and technosphere (the sphere of technical advancement) but Man and Nature form a symbiotic 'dual' system interacting permanently.

Time may be considered as a Trinity: past (time that has gone by); present (time that is dynamically now becoming past) and future (time that is due to come)

(1) One of the fundamental 'mysteries of faith' within the Roman Catholic Church is the mystery of the 'Trinity': The Father, The Son and The Holy Spirit. The fundamental dichotomies are those of salvation or damnation (reward or punishment); (God or evil, love or hate.)

which is confronted with the dichotomies of birth and death (i.e. being or non being), time-anti-time and matter-anti-matter.

A family is a trinity composed by mother, father and offspring, but the family forms part of the social trinity: individual, family and community exposed in turn to a duality: integration or disintegration.

The dual system of being and becoming or structuring and structured is confronted with a trinity of consciousness, crisis and renewal.

The trinity of broad categories of ideas in Piaget's approach to interdisciplinary research.

"Structures (or forms or organizations); functions, (sources of qualitative or energetic values; and 'measures'; give rise to (a duality of problems) 'diachronic' - (evolution and construction) or 'synchronic' - (balance and control)" (1)

Our main intention is not to explore and create endless lists of trinities and dualities, but rather to propose a philosophical structure for the Composite Mind theory, itself open to further revision.

The highly schematic representation of a mind having limits in a process of self-integration illustrates our approach, a dual polarity of forces (integrative i.e. centripetal vs. disintegrative i.e. centrifugal) consists of a dual system of trinities and their dynamic stability and is represented by the 'inner' triangle, (Introspection, Introversion and Intuition) and the 'outer' triangle interacting with the environment: physical, social and metaphysical. All this is happening in the 'space' created by the trinity of diversity, complexity and dynamicacy (see Figure 25, p.310) - Another trinity is fundamental: "knowledge, love and objectivity" (as a

(1) Piaget, J. "Main Trends on Interdisciplinary... op.cit. (p.18).

condition for maturity).

When moving into the CoMi-Group, a new 'psycho-entity' (or semi-independent 'us') is generated by a trinity which can happen when over two or more people are involved: relationship, interaction (communication) and events. This is exposed, like the single brain, to the struggle of the two sets of forces already mentioned, the positive-creative vs. the negative-destructive. Dynamic stability is seen to be opposed to static balance (or a permanent state of equilibrium). The CoMi-Group is to be regarded as an 'open' system subject to renewal, as opposed to a 'closed' system. Synergism (incrementing energy) is the new psycho-entity's creative potentiality, as opposed to waste of energy due to the internal frictions.

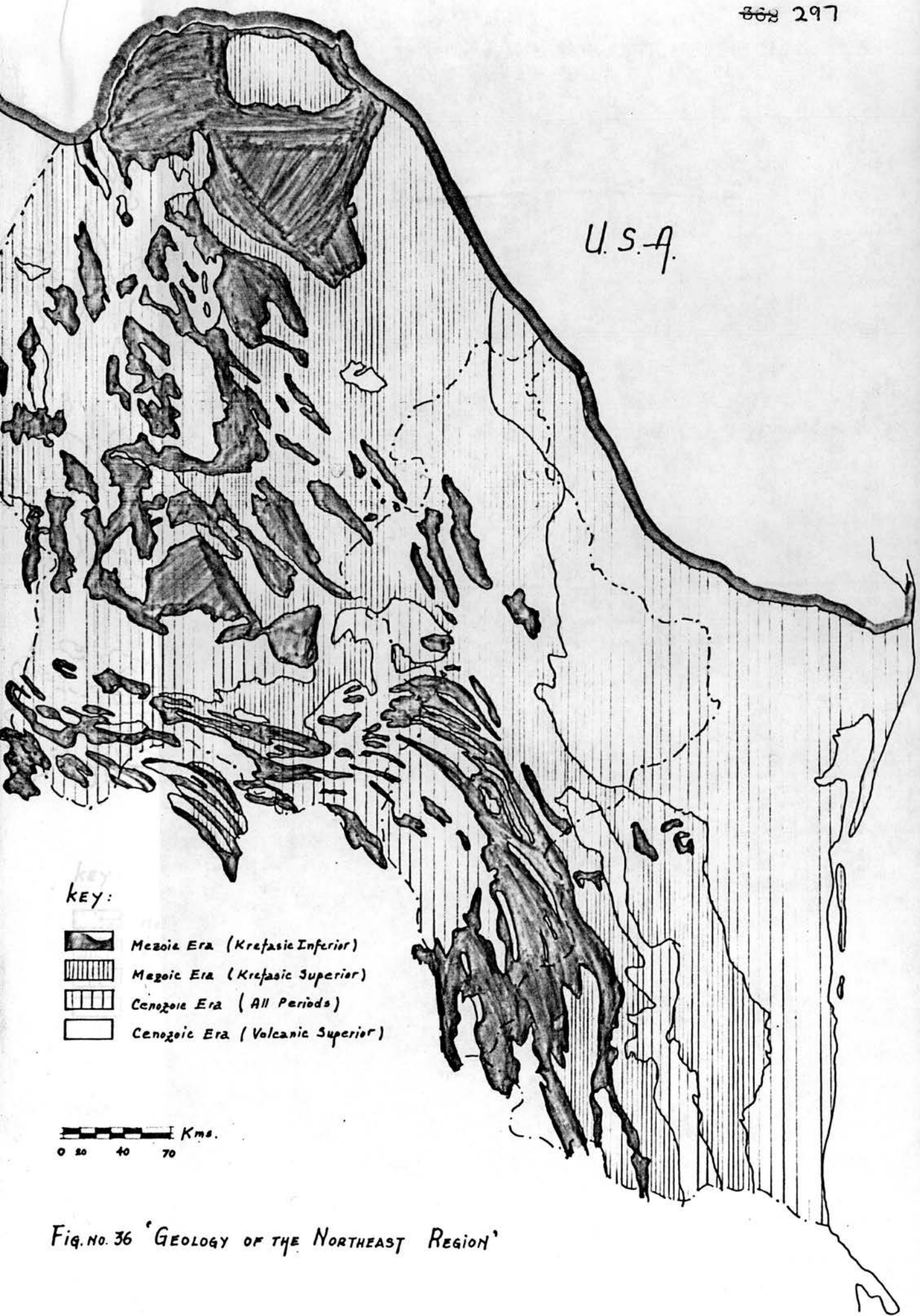
Our approach which is presented as a trinity (Theoretical, Psychological and Philosophical) attempts to tackle the fundamental duality of integration: self-integration () group-integration. Both the 'internal system' (psyche) and the 'external system' (group-psyche) must be in permanent symbiotic and dynamic stability (i.e. homeostatic equilibrium).

Finally, the whole Composite Mind Theory is based upon a triad: Intellection (1) (composite intellection synapses), Decision (which has to be taken in the 'center' of any CoMi-Group) and Implementation (Decision without Action remains in the realm of wishful thinking).





(1) Professor Rowse's hopes were "... that eventually what may be formed multi-brain intellection will be recognized as an important field in psychology". (See: Rowse, E.A.A. "Comprehensive Environmental ... op.cit. (p.309).

APPENDIX NO.4

"MAIN GEOLOGICAL FEATURES OF THE
NORTH EAST REGION"



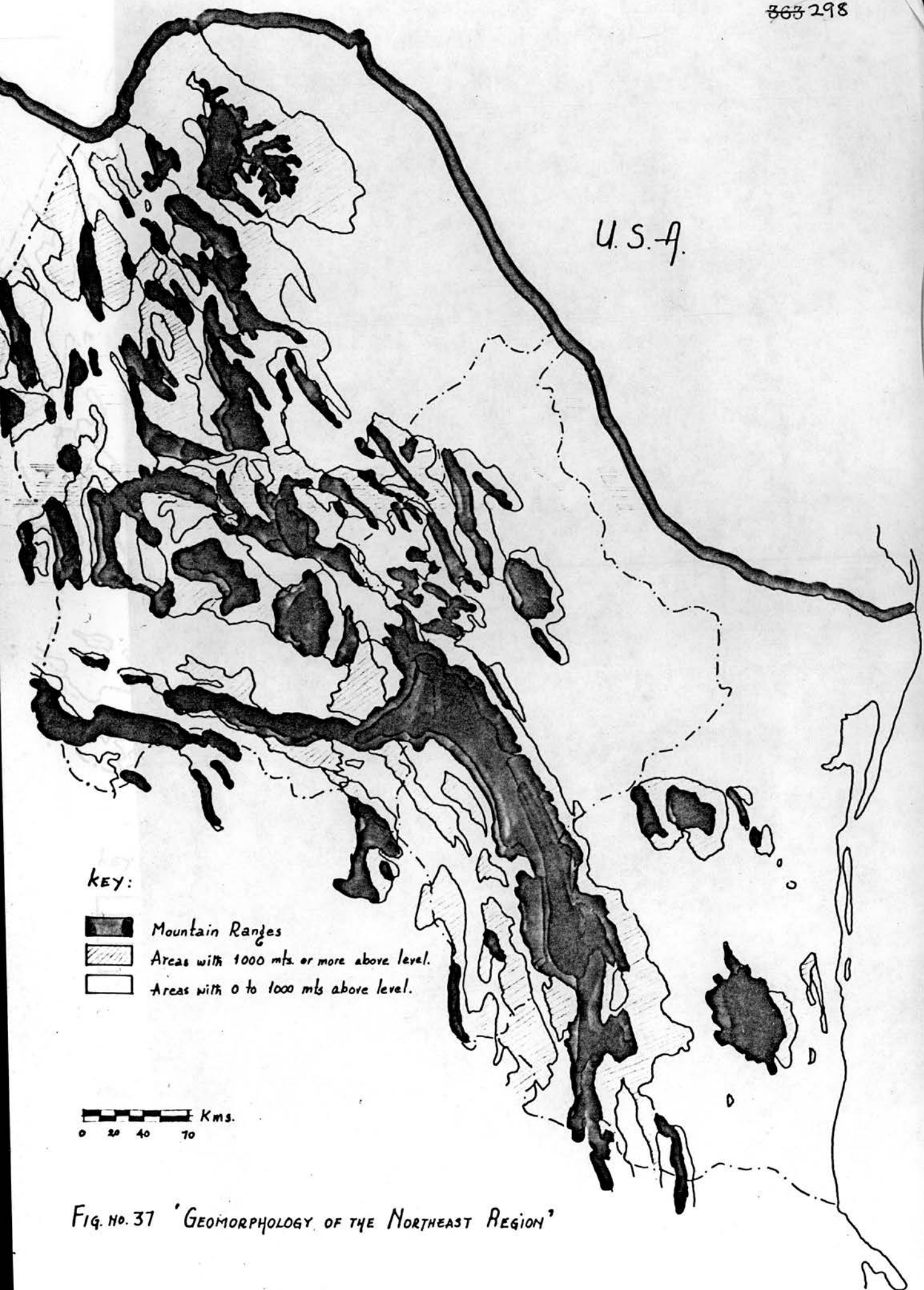
KEY:

-  Mezoic Era (Krefasic Inferior)
-  Mezoic Era (Krefasic Superior)
-  Cenozoic Era (All Periods)
-  Cenozoic Era (Volcanic Superior)

0 20 40 70 Kms.

FIG. NO. 36 'GEOLOGY OF THE NORTHEAST REGION'

U.S.A.



KEY:

- Mountain Ranges
- Areas with 1000 mts. or more above level.
- Areas with 0 to 1000 mts. above level.

Kms.
 0 20 40 70

FIG. NO. 37 'GEOMORPHOLOGY OF THE NORTHEAST REGION'

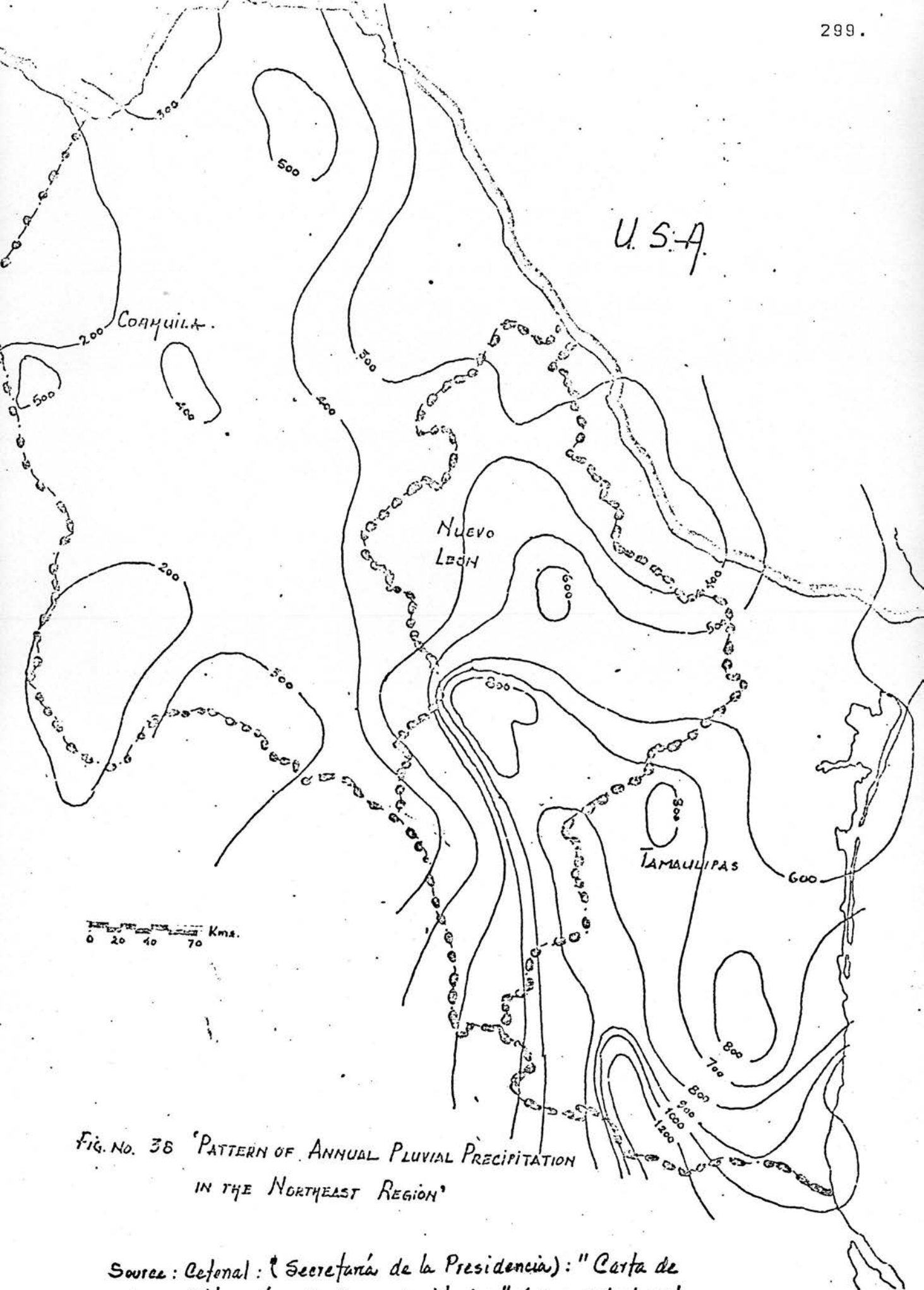


FIG. NO. 38 'PATTERN OF ANNUAL PLUVIAL PRECIPITATION
IN THE NORTHEAST REGION'

Source: Cefonal: (Secretaría de la Presidencia): "Carta de
Situación y Régimen de Lluvias" (13-R-IV/V/VI/VII/
14-R-III/IV/V/VII/VIII/14-Q-I/II) México, 1970.

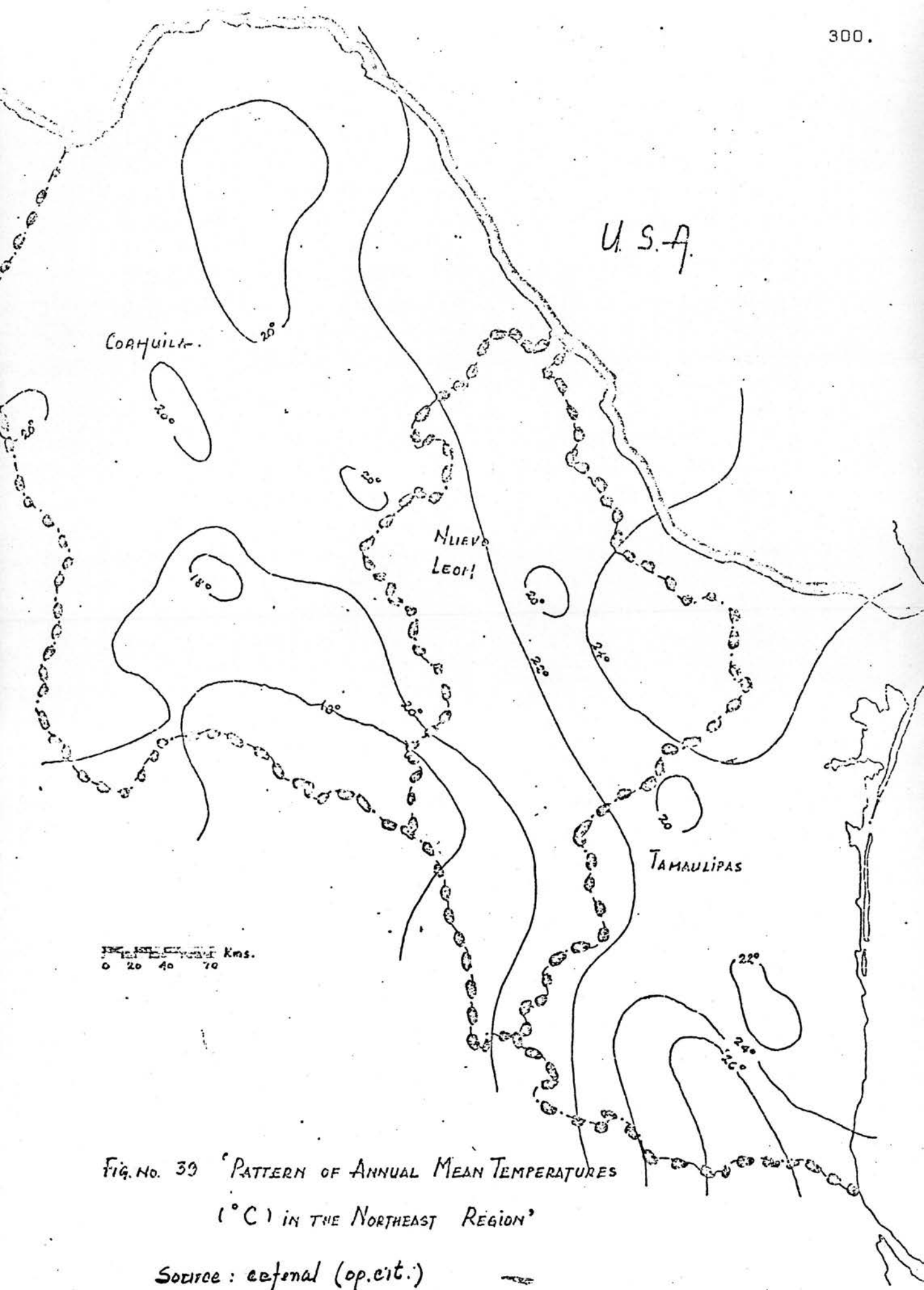


FIG. NO. 39 'PATTERN OF ANNUAL MEAN TEMPERATURES
(°C) IN THE NORTHEAST REGION'

Source : *cefenal (op.cit.)*

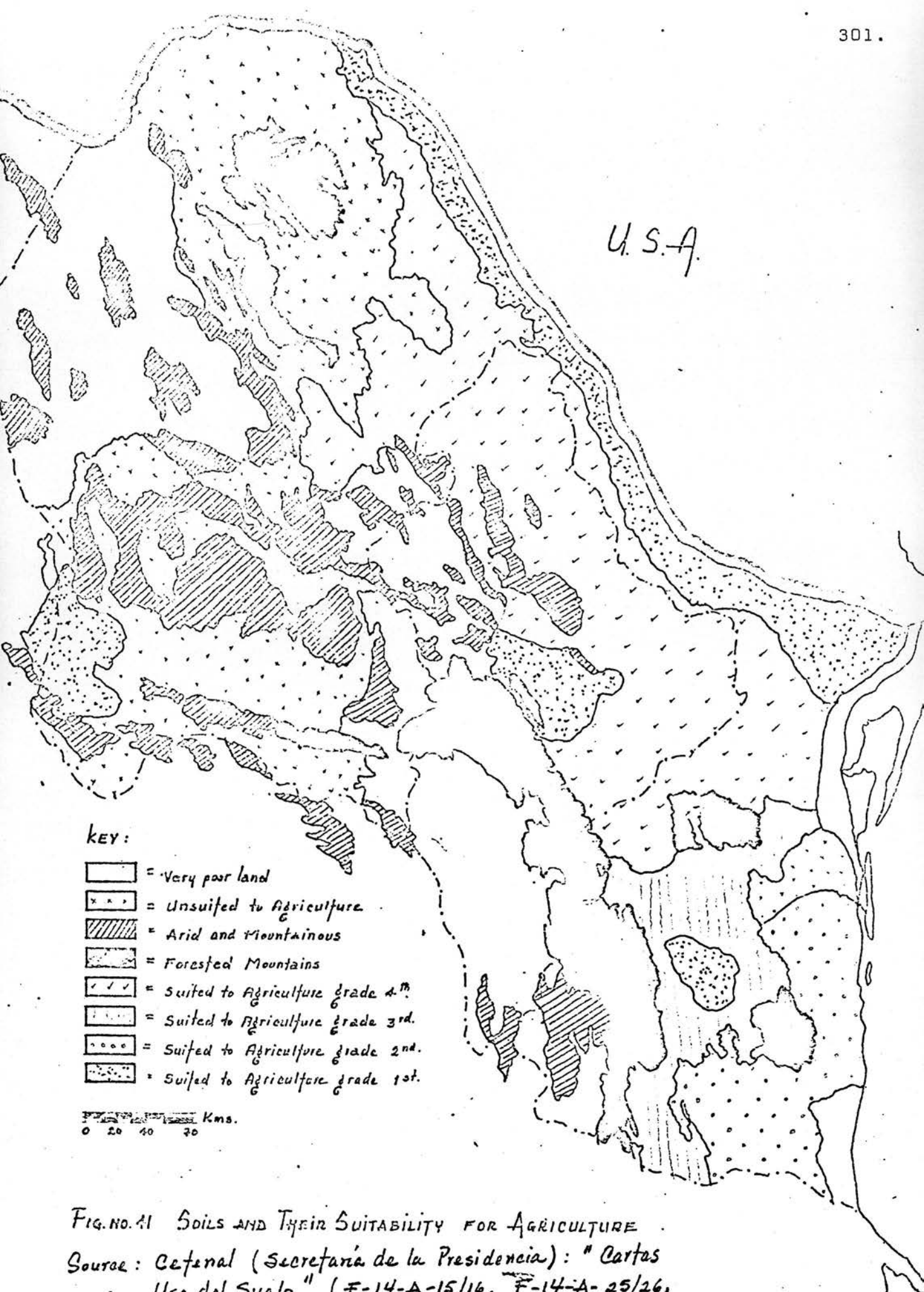


FIG. NO. 41 SOILS AND THEIR SUITABILITY FOR AGRICULTURE

Source: Cefenal (Secretaría de la Presidencia): "Cartas
Uso del Suelo" (F-14-A-15/16, F-14-A-25/26,
F-14-A-35/36, F-14-A-45/46) México, 1972.

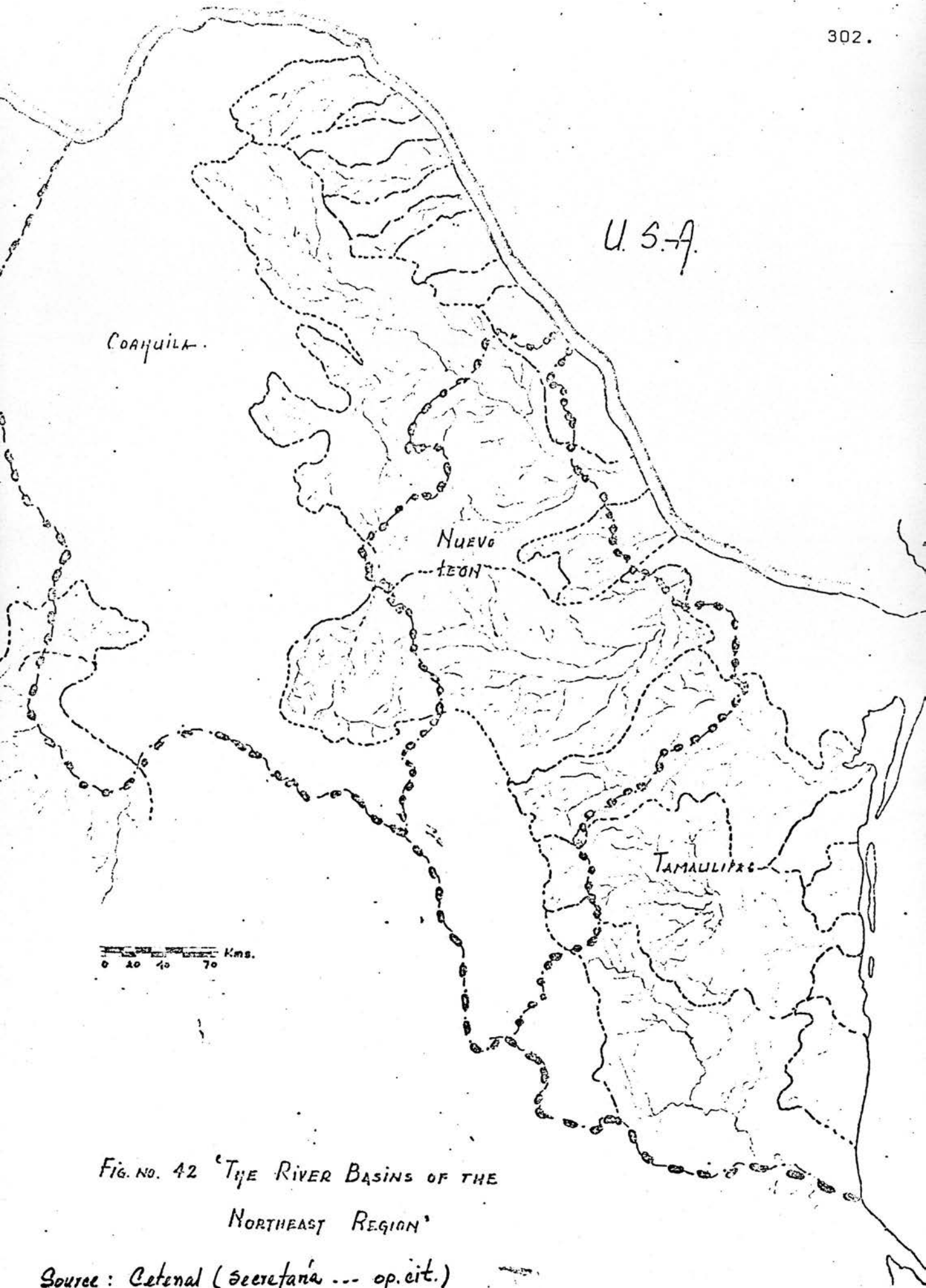


FIG. NO. 42 'THE RIVER BASINS OF THE
NORTHEAST REGION'

Source: Cetnal (Secretaría ... op.cit.)

Appendix No 5
Basic Agricultural Information for the North East Region

VARIABLE MUNICIPAL	Hect. Riego	Hect. Temporal	Hect. Agostadero	Hect. Posibles	G. Vacu no	G. Porcino	G. Capri no	PEA Sect. prim.	TOTAL (Diversificación Municipal)
ACUISA	V	V	V	V	V	V	V	V	4V
ARTEAGA	V	V	V	V	V	V	V	V	2V
FCO. I. MADERO	V	V	V	V	V	V	V	V	2V
NATAMOROS	V	V	V	V	V	V	V	V	4V
MONCLOVA	V	V	V	V	V	V	V	V	2V
MUZQUIZ	V	V	V	V	V	V	V	V	4V
PARRAS	V	V	V	V	V	V	V	V	4V
PIEDRAS NEGRAS	V	V	V	V	V	V	V	V	0V
R. ARIZPE	V	V	V	V	V	V	V	V	3V
SABINAS	V	V	V	V	V	V	V	V	3V
SALTILLO	V	V	V	V	V	V	V	V	4V
S.J. SABINAS	V	V	V	V	V	V	V	V	2V
SAN PEDRO	V	V	V	V	V	V	V	V	4V
TORREON	V	V	V	V	V	V	V	V	4V
VIESCA	V	V	V	V	V	V	V	V	4V
TOTAL (especialización estatal)	4V	5V	6V	1V	4V	9V	8V	6V	3V

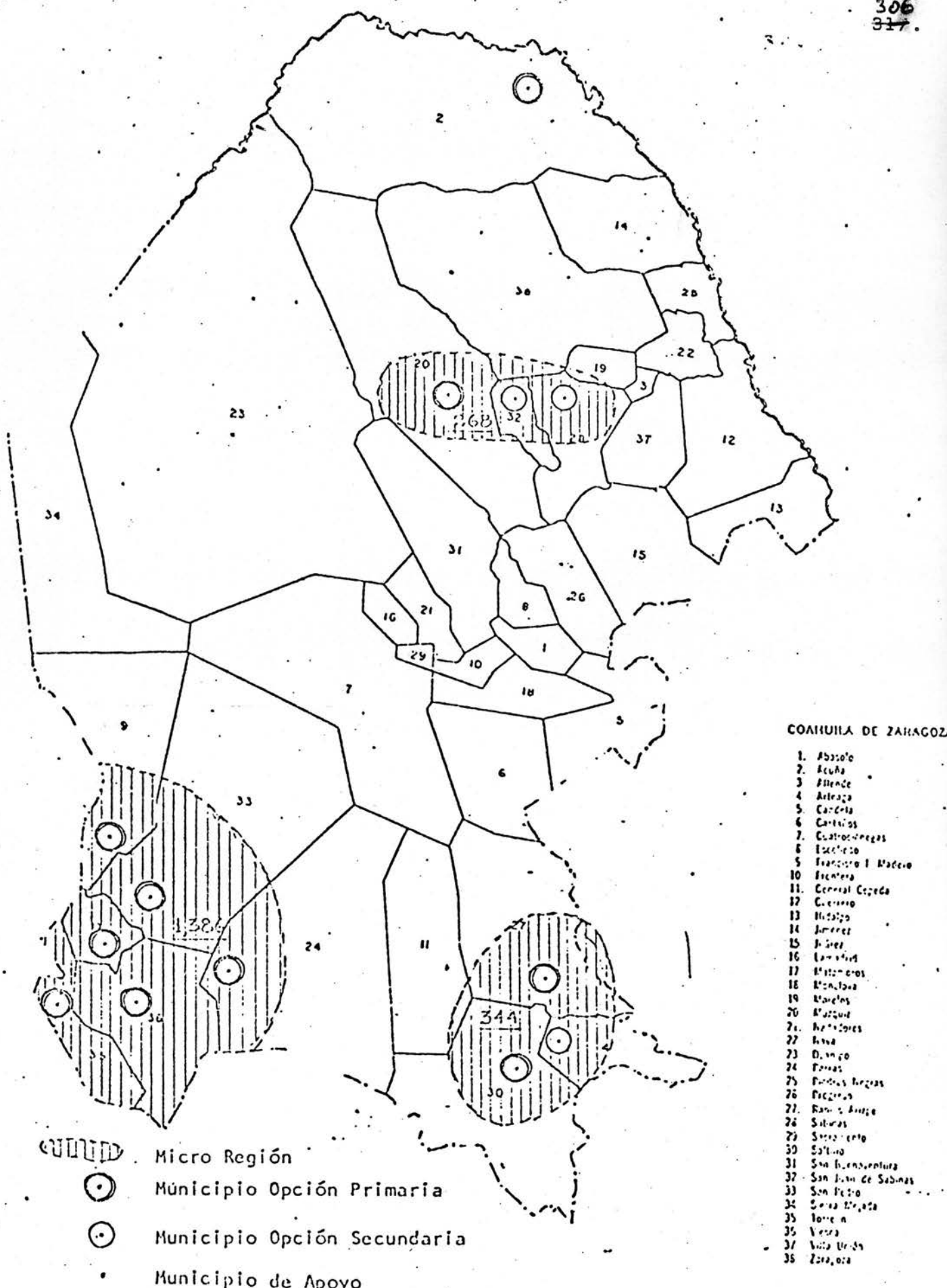
Table No. 6. 'Analysis of Municipal Diversification and Statal Specialization of the State of Coahuila'

VARIA BLE MUNICIPIO	Hect. Riego	Hect. Tempo ral	Hect. Agos- tadero	Hect. Posi- bles	G. Vacu no	G. Por- cino	G. Capri- no	PEA Sect. Prim.	TOTAL (Diversificación Municipal)
ALLENDE	v	v	v	v	v	v	v	v	0V
ANAHUAC	v	v	v	v	v	v	v	v	3V
ARAMBERRI	v	v	v	v	v	v	v	v	1V
CADEREYTA	v	v	v	v	v	v	v	v	1V
CHINA	v	v	v	v	v	v	v	v	1V
DR. ARROYO	v	v	v	v	v	v	v	v	3V
GALEANA	v	v	v	v	v	v	v	v	4V
GRAL. TERAN	v	v	v	v	v	v	v	v	0V
LINARES	v	v	v	v	v	v	v	v	3V
MONTEMORELOS	v	v	v	v	v	v	v	v	2V
SABINAS HGO.	v	v	v	v	v	v	v	v	0V
SANTIAGO	v	v	v	v	v	v	v	v	0V
TOTAL (especialización estatal)	0V	2V	1V	5V	0V	2V	5V	4V	

Table no. 7 'Analysis of Municipal Diversification and Statal Specialization of the State of Nuevo Leon'

MUNICIPALIDAD	VARIA BLE	Hect. Riego	Hect. Tempo ral	Hect. Agos- tadero	Hect. Posi- bles	S. Vacu- no	S. Por- cino	S. Capri- no	PEA Sect. Prim.	TOTAL (Diversificación Municipal)
ÁLTAMIRA	V	V	V	V	V	V	V	V	V	1V
GONZALEZ	V	V	V	V	V	V	V	V	V	4V
HIDALGO	V	V	V	V	V	V	V	V	V	3V
LLEBA	V	V	V	V	V	V	V	V	V	3V
MANTE	V	V	V	V	V	V	V	V	V	4V
MATAMOROS	V	V	V	V	V	V	V	V	V	5V
NUEVO LAREDO	V	V	V	V	V	V	V	V	V	2V
REYNOSA	V	V	V	V	V	V	V	V	V	5V
RIO BRAVO	V	V	V	V	V	V	V	V	V	4V
SAN FERNANDO	V	V	V	V	V	V	V	V	V	5V
TULA	V	V	V	V	V	V	V	V	V	2V
VALLE HERMOSO	V	V	V	V	V	V	V	V	V	2V
VICTORIA	V	V	V	V	V	V	V	V	V	3V
XICOTENCALT	V	V	V	V	V	V	V	V	V	2V
TOTAL (especialización estatal)	2V	8V	1V	10V	10V	6V	6V	2V	6V	6V

Table No. 8 'Analysis of Municipal Diversification and Statal Specialization of the State of Tamaulipas'



'Geographical Localization of the Agricultural and Livestock Micro-Regions in the State of Coahuila'

Figure 44

NUEVO LEON

1. Abasco
2. Aguilillas
3. Aldama, los
4. Alamo
5. Anillas
6. Apodaca
7. Aramberri
8. Bustamante
9. Caceres Jimenez
10. Carron
11. Cerralto
12. Ciénega de Flores
13. China
14. Doctor Breyer
15. Doctor Coos
16. Doctor González
17. Galeana
18. Garza
19. Garza García
20. General Bravo
21. General Escobedo
22. General Terán
23. General Treviño
24. General Zaragoza
25. General Zuñiga
26. Guadalupe
27. Herrerias Los
28. Higuera
29. Huastecas
30. Huideobal
31. Iruja
32. Llaneros de Narango
33. Llaneros
34. Mante
35. Martín García
36. Mier y Terán
37. Mina
38. Montemurros
39. Múzquiz
40. Paredes
41. Paredes
42. Paredes, los
43. Paredes
44. Salinas Hidalgo
45. Salinas Victoria
46. San Felipe de los Carrizos
47. San Juan, Hidalgo
48. Santa Catarina
49. Santiago
50. Viesgo
51. Villahermosa
52. Colombia



Micro Región



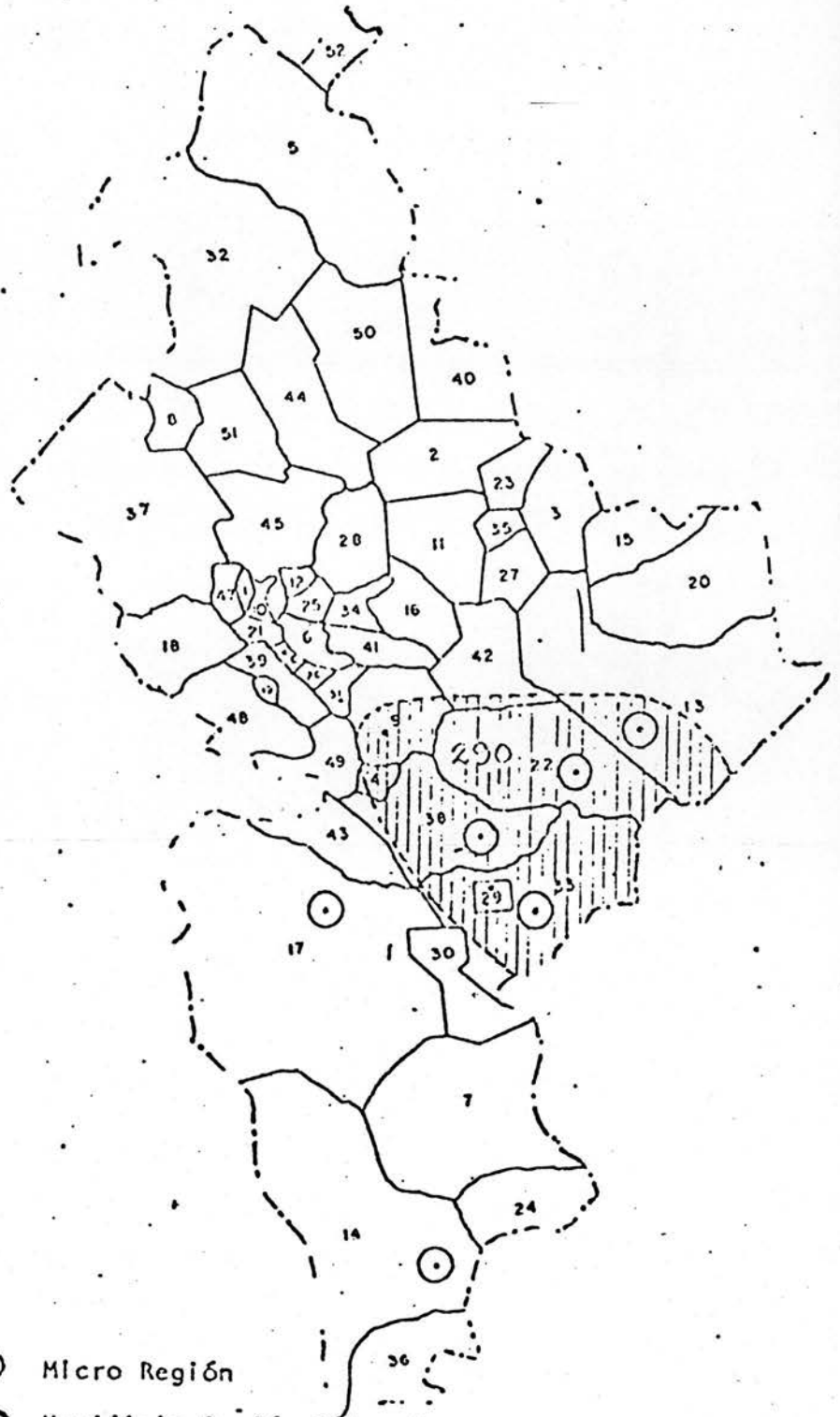
Municipio Opción Primaria



Municipio Opción Secundaria



Municipio de Apoyo

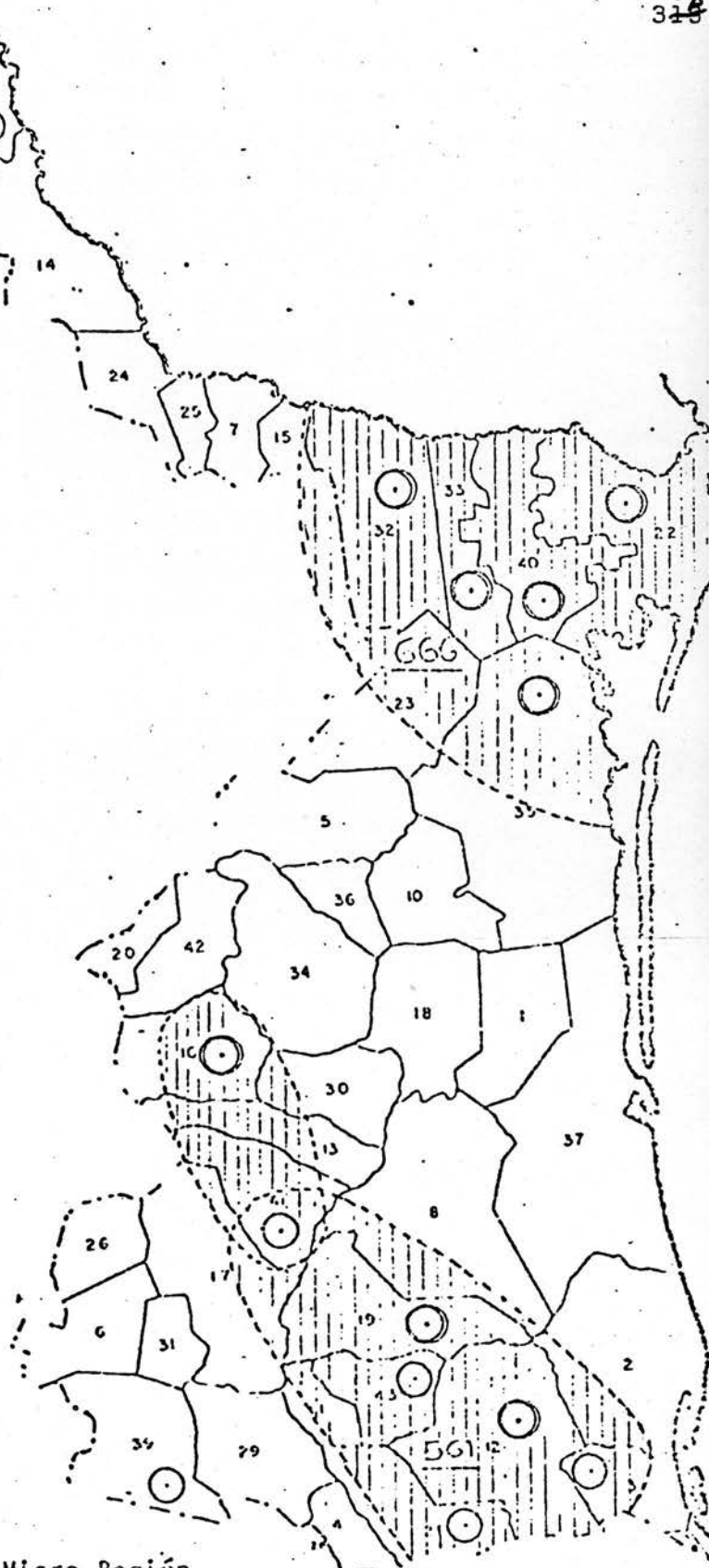


'Geographical Localization of the Agricultural and Livestock Micro-Regions in the State of Nuevo Leon'

Figure 45

TAMAULIPAS

1. Atzacola
2. Atzacola
3. Atzacola
4. Antonio Morales
5. Burgos
6. Páez
7. Carrizosa
8. Casas
9. Ciudad Madero
10. Coahuila
11. Gomez Farías
12. González
13. Guadalupe
14. Guerrero
15. Gustavo Díaz Ordaz
16. Huasteca
17. Huasteca
18. Jiménez
19. Llera
20. Madero
21. Monte
22. Matamoros
23. Matamoros
24. Matamoros
25. Matamoros
26. Miguel Alemán
27. Tampamolón
28. Tampamolón
29. Victoria
30. Victoria
31. Victoria
32. Victoria
33. Victoria
34. San Andrés
35. San Andrés
36. San Andrés
37. San Andrés
38. Tancitaro
39. Tancitaro
40. Villa Hermosa
41. Victoria
42. Victoria
43. Victoria



Micro Región



Municipio Opción Primaria



Municipio Opción Secundaria



Municipio de Apoyo

'Geographical Localization of the Agricultural and Livestock Micro-Regions in the State Of Tamaulipas'

Figure 46

APPENDIX NO.6

"CLASSIFIED CENSUS DATA (1950-60-70) OF THE
MOST IMPORTANT CITIES OF THE NORTH EAST
REGION AND THEIR COEFFICIENT OF SPECIALIZATION"

DATOS POBLACIONALES DE LOS MUNICIPIOS MAS IMPORTANTES DEL ESTADO DE COAHUILA

(en número de personas)

	POBLACION 1950		FUERZA TRABAJO		MOV. MIG. MUNICIPI		SECTOR PRIMARIO		SECTOR SECUNDARIO			ST		SECTOR TERCARIO		Inscr. ESPECIF.	
	Municipio	Ciudad	Nativa		Immig.		SST		Extr	Trans	Const	EYG	Comer.	Transp	Serv.		
			Trabajo	Fuerza	Nativa	Immig.	Primario	Secundario									Terciario
1960																	
Torreón	250,177	188,203	81,513	169,241	90,935	29,555	18,654	785	12,722	3,571	466	26,567	11,531	3,899	11,087	6,737	
Saltillo	98,603	69,842	30,780	78,351	20,252	9,501	8,014	268	5,901	1,598	167	10,735	2,717	1,926	5,042	2,530	
Salamanca	32,614	28,490	9,716	18,951	2,575	2,244	3,576	48	3,025	437	65	2,820	1,013	750	1,057	1,076	
Negras	31,665	27,581	9,751	25,659	6,006	3,717	1,948	85	1,379	414	69	3,373	1,385	373	1,615	713	
1970																	
Torreón	345,929	258,757	108,839	241,216	104,713	38,407	24,779	1,090	17,802	4,989	828	42,500	15,104	6,674	19,722	3,153	
Saltillo	127,772	98,839	43,191	107,013	20,759	12,952	12,239	435	8,940	2,656	208	16,075	5,121	2,430	8,524	1,925	
Salamanca	61,543	57,374	19,142	55,104	6,439	3,690	9,453	123	8,283	994	43	5,595	1,931	1,257	2,408	403	
Negras	48,408	44,992	13,381	39,458	8,950	4,293	3,298	247	2,440	570	32	4,580	1,461	539	2,580	1,210	
1970																	
Torreón	438,461	335,565	112,924	353,747	84,714	27,927	26,697	942	12,413	6,462	379	49,922	15,005	5,900	28,927	8,308	
Saltillo	190,994	161,114	49,475	162,797	28,197	7,629	17,325	660	12,792	3,633	240	21,987	5,759	2,576	12,534	3,652	
Salamanca	109,857	78,134	27,574	99,430	10,427	2,260	13,489	243	11,209	2,008	29	10,142	2,976	1,549	5,517	1,683	
Negras	45,698	41,033	12,130	39,815	6,883	1,957	3,711	121	2,792	748	50	5,509	1,630	434	3,444	954	

Torreón + Gómez Palacio + Lerdo.

Salamanca + Villa Frontera.

Fuente: Censos Nacionales de 1950, 1960, 1970 SIC

SST = Suma Total Sector Secundario

Extr = Extractivas

Trans = Industria de la Transformación

Const = Construcción

EYG = Electricidad y Gas

ST = Suma Total Sector Terciario

Comer = Comercio

Transp = Comunicaciones y Transportes

Serv. = Gobierno y Servicios

Insuf. Especific = Insuficientemente Especificados

Table No. 10 'Classified Census Data 1950-1960-1970, of Coahuila's Selected Cities'

DATOS POBLACIONALES DE LOS MUNICIPIOS MAS IMPORTANTES DEL ESTADO DE COAHUILA

(en porcentajes)

Municip.	POBLACION 1950		FUERZA TRABAJO	MOV. MIG. MUNICIPI		SECTOR PRIMARIO	SS†	SECTOR SECUNDARIO			ST‡	SECTOR TERCIARIO			INSUF. ESPECIF	
	Ciudad			Nativa	Immig.			Extr.	Trans.	Const.		Eys	Comer.	Trans.		Serv.
Torreón	100.0	72.3	31.3	65.0	35.0	36.3	22.9	1.0	16.8	4.5	0.6	32.6	14.2	4.8	13.6	8.3
Saltillo	100.0	70.8	31.2	79.5	20.5	30.9	26.0	0.9	19.5	5.2	0.5	34.9	12.2	6.3	16.4	8.2
Monclova	100.0	67.4	29.8	58.1	41.9	23.1	35.8	0.5	31.1	4.5	0.7	29.0	10.4	7.7	10.9	11.1
P. Negras	100.0	67.1	30.8	61.0	19.0	38.1	20.0	0.9	14.1	4.2	0.7	34.6	14.2	3.8	16.6	7.3

1960

Torreón	100.0	74.8	31.5	69.7	30.3	35.3	22.8	1.0	16.4	4.6	0.8	39.0	14.8	6.1	18.1	4.0
Saltillo	100.0	77.4	33.8	83.8	16.2	30.0	20.3	1.0	20.7	6.1	0.5	37.2	11.9	5.6	19.7	4.5
Monclova	100.0	93.2	31.1	89.5	10.5	19.3	49.4	0.5	43.3	5.2	0.3	29.2	10.1	6.6	12.6	2.1
P. Negras	100.0	77.9	27.6	81.5	18.5	32.1	24.6	1.3	18.3	4.3	0.2	34.2	10.9	4.0	19.3	9.0

1970

Torreón	100.0	76.5	25.8	80.7	19.3	24.7	23.5	0.9	16.3	5.7	0.8	44.2	13.4	5.2	25.6	7.4
Saltillo	100.0	84.4	25.9	85.2	14.8	15.4	35.0	1.3	25.9	7.3	0.5	42.1	11.6	5.2	25.3	7.4
Monclova	100.0	95.4	25.4	90.5	9.5	8.2	48.9	0.3	40.7	7.3	0.1	36.8	10.8	6.0	20.0	6.1
P. Negras	100.0	67.9	26.0	85.3	14.7	16.1	30.6	1.0	23.0	6.2	0.4	45.4	13.4	3.6	28.4	7.9

Table no. 11 (In Percentages)

DATOS POBLACIONALES DE LOS MUNICIPIOS MAS IMPORTANTES (MENOS EL
AREA METROPOLITANA DE MONTERREY) DEL ESTADO DE NUEVO LEON
(en número de personas)

Municip	POBLACION 1950		FUERZA TRABAJO	MOV. MIG. MUNICIPAL		SECTOR PRIMARIO	SS-	SECTOR SECUNDARIO			SIT	SECTOR TERCIARIO		INSUF. ESPECIF.		
	Ciudad			Nativa	Inmig			Extr	Transp	Const		Eyg	Comer		Transp.	SerV.
Linares	33,983	13,473	10,957	15,741	1,159	7,375	965	6	725	207	30	960	216	859	578	
	12,047	8,631	3,960	5,304	171	2,390	505	11	365	126	3	391	112	255	316	
	27,326	7,564	8,437	12,611	12	6,432	546	4	441	91	13	573	141	511	231	
1950																
Linares	34,893	13,592	11,269	32,176	2,717	7,295	1,391	37	997	352	15	995	378	1,205	4	
	14,182	11,592	5,132	13,395	786	2,754	1,042	42	753	236	12	537	256	525	17	
	28,667	11,641	9,672	27,126	1,541	6,824	950	25	687	223	23	708	343	784	45	
1970																
Linares	49,621	24,456	14,250	45,969	3,652	7,199	1,778	61	1,191	489	37	1,474	527	2,518	654	
	19,163	17,429	5,357	17,867	1,236	1,878	1,242	21	696	498	27	551	179	1,119	368	
	37,265	20,860	10,530	34,755	2,510	4,862	1,622	18	1,200	313	66	894	355	1,934	813	

Fuente: Censos Nacionales de 1950, 1960 y 1970 SIC

Table No. 12 'Classified Census Data 1950-1960-1970 of Nuevo Leon's Selected Cities'

DATOS POBLACIONALES DE LOS MUNICIPIOS MAS IMPORTANTES DEL ESTADO
DE NUEVO LEON. (SIN TOMAR EN CUENTA AL AREA METROPOLITANA DE MONTERREY)

(en porcentajes)

POBLACION 1950	FUERZA TRABAJO		MOV. MIG. MUNICIPI		SECTOR PRIMARIO	SST			SECTOR SECUNDARIO			ST	SECTOR TERCIARIO			INSUF. ESPECIF
	Municip.	Ciudad	Native	Inmig.		Extr.	Trans.	Const.	Eyg	Comer.	Trans.		Serv.			
100.0	39.6	32.2	46.3	53.7	67.3	3.8	0.0	6.6	1.9	0.3	18.6	8.8	2.0	7.8	5.3	
100.0	71.6	32.9	48.2	51.8	50.4	12.8	0.3	9.2	3.2	0.0	18.9	9.6	2.8	6.4	8.0	
100.0	27.7	30.9	49.8	50.2	75.2	6.5	0.0	5.2	1.1	0.2	14.5	6.8	1.7	6.1	2.7	
1960																
100.0	39.0	32.3	92.2	7.8	64.7	12.3	0.3	8.8	3.1	0.1	22.9	8.8	3.4	10.7	0.0	
100.0	81.7	36.2	94.5	5.5	53.7	20.3	0.0	14.7	4.6	0.2	25.7	10.5	5.0	10.2	0.3	
100.0	40.6	33.7	94.6	5.4	70.6	10.0	0.3	7.1	2.3	0.3	18.9	7.3	3.5	8.1	0.5	
1970																
100.0	49.3	23.7	92.6	7.4	50.5	12.5	0.4	8.4	3.4	0.3	32.4	10.3	3.7	18.4	4.6	
100.0	91.0	23.0	93.2	6.8	35.1	22.2	0.4	13.0	9.3	0.5	34.5	10.3	3.3	20.9	7.2	
100.0	56.0	23.4	93.3	6.7	46.9	15.3	0.2	11.3	3.0	0.8	30.1	8.4	3.4	18.3	7.7	

Table No. 13 (In Percentages)

DATOS POBLACIONALES DE LOS MUNICIPIOS MAS IMPORTANTES DEL ESTADO DE TAMAULIPAS
(en número de personas)

POBLACION 1950	FUERZA TRABAJO		MOV. MIG. MUNICIP.		SECTOR PRIMARIO	SST	SECTOR SECUNDARIO			STT	SECTOR TERCARIO		INSUF. ESPECIF.		
	Municip	Ciudad	Trabajo	Nativa			Inmig.	Extr.	Trans.		Const.	EyG		Comer.	Transp.
137,685	135,419	44,930	85,582	93,247	3,044	16,260	7,197	6,834	1,787	442	19,873	7,829	3,304	8,740	5,743
59,496	57,668	19,178	25,990	33,506	3,537	3,962	48	2,554	1,234	117	9,931	3,264	1,981	4,686	1,757
128,347	72,353	41,487	69,321	59,026	26,023	4,020	39	2,954	941	76	9,165	4,580	966	3,620	2,278
69,428	38,717	23,596	28,707	40,721	13,133	3,237	654	1,643	881	59	5,769	2,410	643	2,716	1,457
42,659	31,815	13,772	38,156	4,503	3,113	2,537	44	1,548	877	68	5,610	1,956	777	2,877	895
35,327	21,291	11,842	21,334	14,063	6,349	1,673	22	1,312	308	31	2,902	1,372	260	1,270	916
1950															
178,632	176,163	62,608	119,593	52,039	6,707	25,878	9,391	12,216	3,859	412	29,199	11,015	4,576	13,508	824
96,043	92,627	30,576	47,600	48,443	7,090	6,866	134	4,653	1,802	221	16,426	5,009	2,348	9,069	198
143,043	92,327	45,802	50,029	44,334	22,456	7,353	294	5,359	1,530	170	15,959	6,502	1,850	7,617	104
134,659	91,640	44,925	53,861	66,008	23,096	8,307	2,161	4,343	1,691	108	13,455	5,435	1,490	5,530	71
60,482	50,797	19,446	54,181	6,301	6,557	4,006	151	2,802	1,009	104	8,762	2,873	1,074	4,815	61
42,874	22,919	16,543	34,530	15,444	8,156	3,133	52	2,615	407	59	5,231	2,144	767	2,320	23
1970															
276,293	270,414	76,682	201,179	75,119	4,058	27,655	10,606	10,352	6,507	190	40,947	11,769	4,053	25,175	4,172
151,253	142,867	39,453	96,473	54,780	4,397	10,789	181	7,780	2,582	146	21,271	5,712	1,880	13,679	3,006
186,146	127,749	49,467	142,276	43,870	13,311	10,378	197	7,179	2,846	156	22,851	6,703	1,717	14,431	2,927
150,766	137,383	38,032	101,460	49,326	6,122	12,783	5,586	4,095	2,958	144	16,511	5,352	1,295	9,864	2,616
95,785	83,897	24,905	88,571	7,214	4,923	6,093	163	3,581	2,000	151	12,613	3,031	904	6,678	1,366
82,387	51,247	20,756	63,100	19,287	8,287	3,703	108	3,004	499	92	7,721	2,618	779	4,324	1,045

También
Municipio
Nuevo Laredo
Laredo
Matamoros
Reynosa
Victoria
Olaondo
etc

en abrev
Municipio
Laredo
Matamoros
Reynosa
Victoria
etc

en abrev
Municipio
Laredo
Matamoros
Reynosa
Victoria
etc

Fuente: Censos Nacionales de 1950, 1960 y 1970 SIC

Table No. 14 'Classified Census Data 1950-1960-1970 of Tamaulipas's Selected Cities'

DATOS POBLACIONALES DE LOS MUNICIPIOS MAS IMPORTANTES DEL ESTADO DE TAMAULIPAS
(en porcentajes)

	POBLACION 1950		FUERZA TRABAJO		MOV. MIG. MUNICIP		SECTOR PRIMARIO	SST	SECTOR SECUNDARIO			SECTOR TERCARIO			I. P. F. ESPECTIF.		
	Municip.	Ciudad	TRABAJO		Nativa	Inmig.			Extr.	Trans.	Const.	Eyg	STT			Comer.	Trans.
							Comer.	Trans.									
1960																	
Tampico	100.0	50.4	25.1	37.3	62.2	37.3	6.5	25.2	15.0	15.2	4.0	1.0	44.2	17.4	7.3	19.4	12.1
Nvo. Laredo	100.0	96.9	32.2	56.3	43.7	56.3	18.4	20.5	0.3	13.3	6.4	0.5	51.7	17.0	10.3	24.4	9.1
Matamoros	100.0	55.3	32.3	46.0	54.0	46.0	62.7	9.5	0.1	7.1	2.2	0.1	22.0	11.0	2.3	8.7	5.4
Reynosa	100.0	55.7	33.9	58.7	41.3	58.7	55.6	13.7	2.7	6.9	3.7	0.2	24.4	10.2	2.7	11.5	6.1
Victoria	100.0	74.5	32.2	10.6	89.4	10.6	34.4	13.4	0.3	11.2	6.3	0.4	40.7	14.2	5.6	20.8	6.4
Cd. Mante	100.0	60.1	33.4	39.7	60.3	39.7	53.6	14.1	0.1	11.0	2.5	0.2	24.5	11.5	2.1	10.7	7.7
1970																	
Tampico	100.0	93.6	35.0	33.1	65.9	33.1	10.7	31.2	15.0	19.5	6.1	0.6	46.6	17.6	7.4	21.6	1.3
Nvo. Laredo	100.0	95.4	31.8	50.4	49.6	50.4	23.1	22.4	0.5	15.2	5.8	0.7	53.7	16.3	7.5	29.6	0.6
Matamoros	100.0	64.5	32.0	31.0	69.0	31.0	48.9	16.0	0.5	11.6	3.3	0.3	34.8	14.1	4.0	16.6	0.2
Reynosa	100.0	67.9	33.3	48.9	51.1	48.9	51.4	18.4	4.3	9.6	3.7	0.2	29.9	12.0	3.3	14.5	0.1
Victoria	100.0	83.9	32.1	10.4	89.6	10.4	33.7	20.9	0.7	14.4	5.1	0.5	45.6	14.7	5.5	24.7	0.3
Cd. Mante	100.0	45.8	33.1	30.9	69.1	30.9	49.3	18.9	0.3	15.8	2.4	0.3	31.6	12.9	4.6	14.0	0.1
1970																	
Tampico	100.0	98.0	27.8	27.2	72.8	27.2	5.3	35.0	13.8	13.4	6.4	0.2	53.3	15.3	5.3	32.7	5.4
Nvo. Laredo	100.0	98.4	26.0	35.2	63.8	35.2	11.1	27.3	0.4	19.7	6.7	0.4	53.9	14.4	4.7	34.6	7.6
Matamoros	100.0	74.0	26.5	23.6	76.4	23.6	26.9	20.9	0.4	14.5	5.7	0.3	46.2	13.5	3.4	29.1	5.9
Reynosa	100.0	91.1	25.2	32.7	67.3	32.7	16.0	33.6	14.7	10.7	7.7	0.4	43.4	14.0	3.4	25.9	6.8
Victoria	100.0	87.5	26.0	7.5	92.5	7.5	19.7	24.3	0.7	14.3	8.7	0.5	50.4	12.1	3.6	34.7	5.4
Cd. Mante	100.0	62.2	25.2	23.4	76.5	23.4	39.9	17.8	0.5	14.4	2.4	0.4	37.2	12.6	3.7	20.8	5.0

Table No. 15 (In Percentages')

POBLACION ECONOMICAMENTE ACTIVA A NIVEL NACIONAL, EN LAS DIFERENTES RAMAS DE LA ACTIVIDAD ECONOMICA

PEAT	%	SECUNDARIO										Terciario					P.S.F. ESPECIF.		
		PRIMARIO		Ext.	%	Trans.	%	Const.	%	Eyc	%	Com	%	Trans.	%	Serv.		%	
		Acq.	%																
8'272.093	32.07	4'823.921	58.32	57.143	1.17	972.542	11.76	224.512	2.71	24.956	0.30	694.052	8.27	210.592	2.55	879.379	10.63	334.556	4.23
11'332.010	32.36	6'143.540	54.21	141.530	1.25	1'556.091	13.73	408.279	3.60	41.443	0.37	1'075.174	9.49	355.939	3.14	1'527.229	13.48	81.791	0.72
12'555.057	43.60	5'103.519	39.39	180.175	1.39	2'189.074	16.74	571.095	4.41	53.255	0.41	1'195.878	9.24	368.813	2.85	2'554.783	19.60	747.525	5.77
	3.20		2.45		3.83		4.82		6.16		5.20		4.63		5.39		5.68		
	1.35		1.84		2.44		3.33		3.41		2.55		1.08		0.36		5.32		
	2.27		0.28		3.14		4.09		4.78		3.86		2.84		2.84		5.50		

- 1) Este porciento es la relación entre la PEA (Población Económicamente Activa) y la Fuerza de Trabajo
- 2) Todos los demás porcentajes se obtuvieron en relación con la PEA Total
- 3) Tasa de Crecimiento Anual en el período analizado.

Fuente: Resúmenes de los Censos Nacionales de Población 1950, 1960 y 1970.

Table No. 16 'Determination of the National Averages of Economically Active Population'

1950

1960

1970

A	An= 58.3%
MT = 76.2%	1.31
LI = 67.3	1.15
MA = 62.7	1.08
SH = 60.4	1.04
RE = 55.6	0.95
CM = 53.6	0.92
PN = 38.1	0.65
TO = 36.3	0.62
VI = 34.4	0.59
SA = 30.9	0.53
MO = 23.1	0.40
NL = 18.4	0.32
TA = 6.8	0.12

A = Agropecuario

A	An= 54.2%
MT = 70.6%	1.30
LI = 64.7	1.19
SH = 53.7	0.99
RE = 51.4	0.95
CM = 49.3	0.91
MA = 48.9	0.90
TO = 35.3	0.65
VI = 33.7	0.62
PN = 32.1	0.59
SA = 30.0	0.55
NL = 23.1	0.43
MO = 19.3	0.36
TA = 10.7	0.20

An = Promedio Nacional en el Sector

A	An= 39.4%
LI = 50.5%	1.28
MT = 46.9	1.19
CM = 39.9	1.01
SH = 35.1	0.89
MA = 26.9	0.68
TO = 24.7	0.63
VI = 19.7	0.50
PN = 16.1	0.41
RE = 16.0	0.41
SA = 15.4	0.39
NL = 11.1	0.28
MO = 8.2	0.21
TA = 5.3	0.13

M	Mn= 1.2%
TA = 16.0%	13.33
RE = 2.7	2.25
TO = 1.0	0.83
SA = 0.9	0.75
PN = 0.9	0.75
MO = 0.5	0.42
SH = 0.3	0.25
NL = 0.3	0.25
VI = 0.3	0.25
MA = 0.1	0.08
CM = 0.1	0.08
LI = 0.0	0.00
MT = 0.0	0.00

M = Extractivas

M	Mn= 1.3%
TA = 15.0%	11.50
RE = 4.8	3.69
PN = 1.8	1.38
TO = 1.0	0.77
SA = 1.0	0.77
SH = 0.8	0.62
VI = 0.7	0.54
MO = 0.6	0.46
MA = 0.6	0.46
NL = 0.6	0.46
CM = 0.3	0.23
LI = 0.3	0.23
MT = 0.3	0.23

Mn = Promedio Nacional en la rama

M	Mn= 1.4%
RE = 14.7%	10.50
TA = 13.8	9.86
SA = 1.3	0.93
PN = 1.0	0.71
MO = 0.9	0.64
TO = 0.8	0.57
VI = 0.7	0.50
CM = 0.5	0.36
NL = 0.4	0.29
MA = 0.4	0.29
LI = 0.4	0.29
SH = 0.4	0.29
MT = 0.2	0.14

I	In= 11.8%
MO = 31.1%	2.64
SA = 19.5	1.65
TO = 16.8	1.42
TA = 15.2	1.29
PN = 14.1	1.19
NL = 13.3	1.13
VI = 11.2	0.95
CM = 11.0	0.93
SH = 9.2	0.78
MA = 7.1	0.60
RE = 6.9	0.58
LI = 6.6	0.56
MT = 5.2	0.44

I = Industria de la Transformación

I	In= 13.7%
MO = 43.3%	3.16
SA = 20.7	1.57
TA = 19.5	1.42
PN = 18.3	1.34
TO = 16.4	1.20
CM = 15.8	1.15
NL = 15.2	1.11
SH = 14.7	1.07
VI = 14.4	1.05
MA = 11.6	0.85
RE = 9.6	0.70
LI = 8.8	0.64
MT = 7.1	0.52

In = Promedio Nacional en la rama

I	In= 16.7%
MO = 40.7%	2.44
SA = 25.9	1.55
PN = 23.0	1.38
NL = 19.7	1.18
TO = 16.3	0.98
MA = 14.5	0.87
CM = 14.4	0.86
VI = 14.3	0.86
TA = 13.4	0.80
SH = 13.0	0.78
MT = 11.3	0.68
RE = 10.7	0.64
LI = 8.4	0.50

Computation of the 'Coefficient of Specialization' of the Main Regional Cities.

1950

1960

1970

K	K= 2.7%
NL = 6.4%	2.37
VI = 6.3	2.33
SA = 5.2	1.93
TO = 4.5	1.67
MO = 4.5	1.67
PN = 4.2	1.56
JA = 4.0	1.48
RE = 3.7	1.37
SH = 3.2	1.19
CM = 2.6	0.96
MA = 2.2	0.81
LI = 1.9	0.70
MT = 1.1	0.41

K = Construcción

K	K= 3.6%
TA = 6.1%	1.67
SA = 6.1	1.69
NL = 5.8	1.61
MO = 5.2	1.44
VI = 5.1	1.42
TO = 4.6	1.28
SH = 4.6	1.28
PN = 4.3	1.19
RE = 3.7	1.03
MA = 3.3	0.92
LI = 3.1	0.86
CM = 2.4	0.67
MT = 2.3	0.64

Kn = Promedio Nacional en la rama

K	K= 4.4%
SH = 9.3%	2.11
VI = 8.7	1.98
TA = 8.4	1.91
RE = 7.7	1.75
MO = 7.3	1.66
SA = 7.3	1.66
NL = 6.7	1.52
PN = 6.2	1.41
TO = 5.7	1.30
MA = 5.7	1.30
LI = 3.4	0.77
MT = 3.0	0.68
CM = 2.4	0.55

EyG En= 0.3%

EyG	En= 0.3%
TA = 1.0%	3.33
MO = 0.7	2.33
PN = 0.7	2.33
NL = 0.6	2.00
TO = 0.5	2.00
SA = 0.5	1.67
VI = 0.4	1.33
LI = 0.3	1.00
RE = 0.2	0.67
CM = 0.2	0.67
MT = 0.2	0.67
MA = 0.1	0.33
SH = 0.0	0.00

EyG = Electricidad y Gas

EyG En= 0.4%

EyG	En= 0.4%
TO = 0.8%	2.00
NL = 0.7	1.75
TA = 0.6	1.50
VI = 0.5	1.25
SA = 0.5	1.25
MA = 0.3	0.75
MO = 0.3	0.75
CM = 0.3	0.75
MT = 0.3	0.75
RE = 0.2	0.50
PN = 0.2	0.50
SH = 0.2	0.50
LI = 0.1	0.25

En = Promedio Nacional en la rama

EyG En= 0.4%

EyG	En= 0.4%
TO = 0.8	2.00
MT = 0.8	2.00
VI = 0.6	1.50
SA = 0.5	1.25
SH = 0.5	1.25
NL = 0.4	1.00
PN = 0.4	1.00
RE = 0.4	1.00
CM = 0.4	1.00
MA = 0.3	0.75
LI = 0.3	0.75
TA = 0.2	0.50
MO = 0.1	0.25

C Cn= 8.3%

C	Cn= 8.3%
TA = 17.4	2.10
NL = 17.0	2.05
VI = 14.2	1.71
TO = 14.2	1.71
PN = 14.2	1.71
SA = 12.2	1.47
CM = 11.5	1.39
MA = 11.0	1.33
MO = 10.4	1.25
RE = 10.2	1.23
SH = 9.6	1.16
LI = 8.8	1.06
MT = 6.8	0.82

C = Comercio

C Cn= 9.5%

C	Cn= 9.5%
TA = 17.6	1.85
NL = 16.3	1.72
TO = 14.8	1.56
VI = 14.7	1.55
MA = 14.1	1.48
CM = 12.9	1.36
RE = 12.0	1.26
SA = 11.9	1.25
PN = 10.9	1.15
LI = 10.7	1.13
SH = 10.2	1.07
MO = 10.1	1.05
MT = 8.1	0.85

Cn = Promedio Nacional en la rama

C Cn= 9.2%

C	Cn= 9.2%
TA = 15.3	1.66
NL = 14.4	1.57
RE = 14.0	1.52
MA = 13.5	1.47
TO = 13.4	1.46
PN = 13.4	1.46
CM = 12.6	1.37
VI = 12.1	1.27
SA = 11.6	1.26
MO = 10.8	1.17
LI = 10.3	1.12
SH = 10.3	1.12
MT = 8.4	0.91

'Computation of the 'Coefficient of Specialization' of the Main Regional Cities'

1950

T	Tn = 2.6%
NL = 10.3%	3.96
MO = 7.7	2.96
TA = 7.3	2.81
SA = 6.3	2.42
VI = 5.6	2.15
TO = 4.8	1.85
PN = 3.8	1.46
SH = 2.8	1.08
RE = 2.7	1.04
MA = 2.3	0.88
CM = 2.1	0.81
LI = 2.0	0.77
MT = 1.7	0.65

T = Comunicaciones y Transportes

1960

T	Tn = 3.1%
NL = 7.6%	2.45
TA = 7.4	2.39
MO = 6.6	2.13
TO = 6.1	1.97
SA = 5.6	1.81
VI = 5.5	1.77
SH = 5.0	1.61
CM = 4.6	1.48
MA = 4.0	1.29
PN = 4.0	1.29
MT = 3.5	1.13
LI = 3.4	1.10
RE = 3.3	1.06

Tn = Promedio Nacional en la rama

1970

T	Tn = 2.9%
MO = 6.0%	2.07
TA = 5.3	1.83
TO = 5.2	1.79
SA = 5.2	1.79
NL = 4.7	1.62
CM = 3.7	1.28
LI = 3.7	1.28
PN = 3.6	1.24
VI = 3.6	1.24
MA = 3.4	1.17
RE = 3.4	1.17
MT = 3.4	1.17
SH = 3.3	1.14

S Sn = 10.6%

S	Sn = 10.6%
NL = 24.4%	2.30
VI = 20.8	1.96
TA = 19.4	1.83
PN = 16.6	1.57
SA = 16.4	1.55
TO = 13.6	1.28
RE = 11.5	1.08
MO = 10.9	1.03
CM = 10.7	1.01
MA = 8.7	0.82
LI = 7.8	0.74
SH = 6.4	0.60
MT = 6.1	0.58

S = Gobierno y Servicios

S Sn = 13.5%

S	Sn = 13.5%
NL = 29.6%	2.19
VI = 24.7	1.83
TA = 21.6	1.60
SA = 19.7	1.46
PN = 19.3	1.43
TO = 18.1	1.34
MA = 16.6	1.23
RE = 14.5	1.07
CM = 14.0	1.04
MO = 12.6	0.93
LI = 10.7	0.79
SH = 10.2	0.76
MT = 8.1	0.60

Sn = Promedio Nacional en la rama

S Sn = 19.8%

S	Sn = 19.8%
VI = 34.7%	1.75
NL = 34.6	1.75
TA = 32.7	1.65
MA = 29.1	1.47
PN = 28.4	1.43
RE = 25.9	1.31
TO = 25.6	1.29
SA = 25.3	1.28
SH = 20.9	1.06
CM = 20.8	1.06
MO = 20.0	1.01
LI = 18.4	0.93
MT = 18.3	0.92

SS_T SSn = 15.9%

SS _T	SSn = 15.9%
MO = 36.8%	2.31
TA = 36.2	2.28
SA = 26.0	1.64
TO = 22.9	1.44
NL = 20.6	1.30
PN = 20.0	1.26
VI = 18.4	1.16
CM = 14.1	0.89
RE = 13.7	0.86
SH = 12.8	0.81
MA = 9.6	0.60
LI = 8.8	0.55
MT = 6.5	0.41

SS_T SSn = 19.0%

SS _T	SSn = 19.0%
MO = 49.4	2.60
TA = 41.2	2.17
SA = 28.3	1.49
PN = 24.6	1.29
TO = 22.8	1.20
NL = 22.4	1.18
VI = 20.9	1.10
CM = 18.9	0.99
RE = 18.4	0.97
MA = 16.0	0.84
SH = 14.7	0.77
LI = 8.8	0.46
MT = 7.1	0.37

SS_T SSn = 23.0%

SS _T	SSn = 23.0%
MO = 48.9	2.13
TA = 36.0	1.57
SA = 35.0	1.52
RE = 33.6	1.46
PN = 30.6	1.33
NL = 27.3	1.19
VI = 24.3	1.06
TO = 23.6	1.03
SH = 23.2	1.01
MA = 20.9	0.91
CM = 17.8	0.77
MT = 15.3	0.67
LI = 12.5	0.54

SS_T = Total Sector Secundario SSn = Promedio Nacional en el Sector
 "Computation of the 'Coefficient of Specialization' of the
 Main Regional Cities"

TABLA CONCENTRACION DATOS*

	1	2	3	4	5	6	7	8	9	
	A	M	I	K	E	C	T	S	No. Ac.	
1950										
Torreón	X	X	1.42	1.67	2.00	1.71	1.85	1.28	6	9
Saltillo	X	X	1.65	1.93	1.67	1.47	2.42	1.55	6	10
Monclova	X	X	2.64	1.67	2.33	1.25	2.96	1.03	6	11
P. Negras	X	X	1.19	1.56	2.33	1.71	1.46	1.57	6	9
Linares	1.15	X	X	X	X	1.06	X	X	2	2
Sabinas Hgo.	1.04	X	X	1.19	X	1.16	1.08	X	4	4
Montemorelos	1.31	X	X	X	X	X	X	X	1	1
Tampico	X	13.33	1.29	1.48	3.33	2.10	2.81	1.83	7	26
Nvo. Laredo	X	X	1.13	2.37	2.00	2.05	3.96	2.30	6	13
Matamoros	1.08	X	X	X	X	1.33	X	X	2	2
Reynosa	X	2.25	X	1.37	X	1.23	1.04	1.08	5	6
Victoria	X	X	X	2.33	1.33	1.71	2.15	1.96	5	9
Cd. Mante	X	X	X	X	X	1.39	X	1.01	2	2
1960										
Torreón	X	X	1.20	1.28	2.00	1.56	1.97	1.34	6	9
Saltillo	X	X	1.57	1.69	1.25	1.25	1.81	1.46	6	9
Monclova	X	X	3.16	1.44	X	1.96	2.13	X	4	7
P. Negras	X	1.38	1.34	1.19	X	1.15	1.29	1.43	6	7
Linares	1.19	X	X	X	X	1.13	1.10	X	3	3
Sabinas Hgo.	X	X	1.07	1.28	X	1.07	1.61	X	4	5
Montemorelos	1.30	X	X	X	X	X	1.13	X	2	2
Tampico	X	11.50	1.42	1.67	1.50	1.85	2.39	1.60	7	21
Nvo. Laredo	X	X	1.11	1.61	1.75	1.72	2.45	2.19	5	10
Matamoros	X	X	X	X	X	1.48	1.29	1.23	3	4
Reynosa	X	3.69	X	1.03	X	1.26	1.06	1.07	5	3
Victoria	X	X	1.05	1.42	1.25	1.55	1.77	1.83	6	3
Cd. Mante	X	X	1.15	X	X	1.36	1.48	1.04	4	5
1970										
Torreón	X	X	X	1.30	2.00	1.46	1.79	1.29	5	7
Saltillo	X	X	1.55	1.66	1.25	1.26	1.79	1.28	6	8
Monclova	X	X	2.44	1.66	X	1.17	2.07	1.01	5	6
P. Negras	X	X	1.38	1.41	X	1.46	1.24	1.43	5	5
Linares	1.28	X	X	X	X	1.12	1.28	X	3	3
Sabinas Hgo.	X	X	X	2.11	1.25	1.12	1.14	1.06	5	6
Montemorelos	1.19	X	X	X	2.00	X	1.17	X	3	4
Tampico	X	9.86	X	1.91	X	1.66	1.83	1.65	5	16
Nvo. Laredo	X	X	1.18	1.52	X	1.57	1.62	1.75	5	7
Matamoros	X	X	X	1.30	X	1.47	1.17	1.47	4	5
Reynosa	X	10.50	X	1.75	X	1.52	1.17	1.31	5	16
Victoria	X	X	X	1.98	1.50	1.27	1.24	1.75	5	7
Cd. Mante	1.01	X	X	X	X	1.37	1.28	1.06	4	4

A= Agropecuario (agricultura, ganadería, pesca, forestal y caza); M= Extractivas (petróleo y minería); I= Industria de la transformación; K= Construcción; E= Electricidad y Gas; C= Comercio; T= Comunicaciones y Transportes; S= Servicios (Servicios y Gobierno).

No. Ac = Número de Actividades con Peso Relativo mayor que 1.

Σ PrT = Suma Total de Pesos Relativos

* La ponderación se hizo en función de los promedios nacionales.

'Summary of the First Analysis at National Level'

ACTIVIDADES PREDOMINANTES, CLASIFICACION FUNCIONAL Y PESO DE
LOS MUNICIPIOS MAS IMPORTANTES DE LA REGION NORESTE 1950-1970*

	1	9	5	0	6	0	9	7	0		
Actividades Predominantes	No. de Actos.	Clasif. Funcional	Peso Relat.	Actividades Predominantes	No. de Actos.	Clasif. Funcional	Peso Relat.	Actividades Predominantes	No. de Actos.	Clasif. Funcional	Peso Relat.
(COAHUILA)											
Torreón	6	DI	9.93	E-TCKS	6	DI	9.35	E-TCKS	5	DI	7.0
Saltillo	6	DI	10.00	T-KISCE	6	DI	9.03	T-KISCE	6	DI	8.7
Monclova	6	DI	11.68	I-TAC	4	SD	7.79	I-TACS	5	DI	8.3
P.Negras	6	DI	9.62	S-MITKC	6	DI	7.78	C-SKIT	5	DI	6.5
(NUEVO LEON)											
Linares	2	BF	2.21	A-CT	3	SD	3.42	A-TC	3	SD	3.0
Montemorelos	1	UF	1.31	A-T	2	BF	2.43	E-AT	2	SD	4.3
Sabinas Hgo.	4	SD	4.47	T-KCI	4	SD	5.03	K-ETCS	5	DI	6.6
(TAMAULIPAS)											
Tampico	7	DI	26.17	M-TCKSEI	7	DI	21.93	M-KTCS	5	DI	16.9
Nvo.Laredo	6	DI	13.81	T-SECKI	6	DI	10.83	S-TCKI	5	DI	7.0
Matamoros	2	BF	2.41	C-TS	3	SD	4.00	C-SKT	4	SD	5.4
Reynosa	5	DI	6.97	M-C-TX	5	DI	3.11	M-KCST	5	DI	16.2
Cd.Victoria	5	DI	9.48	S-TCKEI	6	DI	8.87	K-SECT	5	DI	7.7
Cd.Mante	2	BF	2.40	T-CIS	4	SD	5.03	C-TSA	4	SD	4.72

1) La actividad económica predominante se divide en ocho ramas de actividades: A= agropecuaria, M= extractiva, I= industria de la transformación, K= construcción, E= electricidad, C= comercio, T= comunicaciones y transportes, y S= servicios. En esta tabla están ordenadas de izquierda a derecha, de acuerdo con el valor decreciente del peso relativo

2) UF= unifuncional, BF= bifuncional, SD= semidiversificado (hasta cuatro ramas de actividad con puntuación > 1.0), y D= Diversificado (con cinco o más ramas de actividad con puntuación > 1.0).

3) El Peso relativo se obtuvo dividiendo la PEA en cada rama de actividad, entre la PEA promedio nacional respectiva; así por ejemplo, si la PEA en agricultura en el año X del municipio 'n' fuese de 50.1% y la PEA promedio nacional para la misma rama de actividad y el mismo año fuese 45.4% entonces el Peso Relativo sería 1.103.

* La ponderación en este caso se hizo tomando los promedios nacionales.

Table No. 21 'Functional Classification and Relative Weight of the
Main Regional Cities'

1950

1960

1970

A Ar= 42.37%

MT = 76.2%	1.76
LI = 67.3	1.55
MA = 62.7	1.45
SH = 60.4	1.39
RE = 55.6	1.28
CM = 53.6	1.24
PH = 38.1	.88
TO = 36.3	.84
VI = 34.4	.79
SA = 30.9	.71
MO = 23.1	.53
NL = 18.4	.42
TA = 6.8	.16

A = Agropecuario

A Ar= 40.22%

MT = 70.6%	1.75
LI = 64.7	1.61
SH = 53.7	1.33
RE = 51.4	1.28
CM = 49.3	1.23
MA = 48.9	1.22
TO = 35.3	0.88
VI = 33.7	0.84
PH = 32.1	0.80
SA = 30.0	0.75
NL = 23.1	0.57
MO = 19.3	0.48
TA = 10.7	0.27

Ar = Promedio Regional en el Sector

A Ar= 24.29%

LI = 50.5%	2.08
MT = 46.9	1.93
CM = 39.9	1.64
SH = 35.1	1.44
MA = 26.9	1.11
TO = 24.7	1.02
VI = 19.7	0.81
PH = 16.1	0.66
RE = 16.0	0.66
SA = 15.4	0.63
NL = 11.1	0.46
MO = 8.2	0.34
TA = 5.3	0.22

M Mr= 1.78%

TA = 16.0%	8.99
RE = 2.7	1.52
TO = 1.0	0.56
SA = 0.9	0.50
PH = 0.9	0.50
MO = 0.5	0.28
SH = 0.3	0.17
NL = 0.3	0.17
VI = 0.3	0.17
MA = 0.1	0.06
CM = 0.1	0.06
LI = 0.0	0.00
MT = 0.0	0.00

M = Extractivas

M Mr= 2.14%

TA = 15.0%	7.01
RE = 4.8	2.24
PH = 1.8	0.84
TO = 1.0	0.47
SA = 1.0	0.47
SH = 0.8	0.37
VI = 0.7	0.33
MO = 0.6	0.28
MA = 0.6	0.28
NL = 0.6	0.28
CM = 0.3	0.14
LI = 0.3	0.14
MT = 0.3	0.14

Mr = Promedio Regional en la rama

M Mr= 2.73%

RE = 14.7%	5.38
TA = 13.8	5.05
SA = 1.3	0.47
PH = 1.0	0.37
MO = 0.9	0.33
TO = 0.8	0.29
VI = 0.7	0.26
CM = 0.5	0.18
NL = 0.4	0.15
MA = 0.4	0.15
LI = 0.4	0.15
SH = 0.4	0.15
MT = 0.2	0.07

I Ir= 12.86%

MO = 31.1%	2.42
SA = 19.5	1.52
TO = 16.8	1.31
TA = 15.2	1.18
PH = 14.1	1.10
NL = 13.3	1.03
VI = 11.2	0.87
CM = 11.0	0.85
SH = 9.2	0.71
MA = 7.1	0.55
RE = 6.9	0.54
LI = 6.6	0.51
MT = 5.2	0.40

I = Industria de la Transformación

I Ir= 16.57%

MO = 43.3%	2.61
SA = 20.7	1.25
TA = 19.5	1.18
PH = 18.3	1.10
TO = 16.4	0.99
CM = 15.8	0.95
NL = 15.2	0.92
SH = 14.7	0.89
VI = 14.4	0.87
MA = 11.6	0.70
RE = 9.6	0.58
LI = 8.8	0.53
MT = 7.1	0.43

Ir = Promedio Regional en la rama

I Ir= 17.35%

MO = 40.7%	2.34
SA = 25.9	1.49
PH = 23.0	1.32
NL = 19.7	1.13
TO = 16.3	0.94
MA = 14.5	0.83
CM = 14.4	0.83
VI = 14.3	0.82
TA = 13.4	0.77
SH = 13.0	0.75
MT = 11.3	0.65
RE = 10.7	0.62
LI = 8.4	0.48

Computation of the 'Coefficient of Specialization' of the Main Regional Cities'

1950

K Kr= 3.83%

NL = 6.4%	1.67
VI = 6.3	1.64
SA = 5.2	1.36
TO = 4.5	1.17
MO = 4.5	1.17
PN = 4.2	1.10
TA = 4.0	1.04
RE = 3.7	.96
SH = 3.2	.83
CM = 2.6	.68
MA = 2.2	.57
LI = 1.9	.50
MT = 1.1	.29

K = Construcción

1960

K Kr= 4.35%

TA = 6.1%	1.40
SA = 6.1	1.40
NL = 5.8	1.33
MO = 5.2	1.19
VI = 5.1	1.17
TO = 4.6	1.06
SH = 4.6	1.06
PN = 4.3	.99
RE = 3.7	.85
MA = 3.3	.76
LI = 3.1	.71
CM = 2.4	.55
MT = 2.3	.53

Kr = Promedio Regional en la rama

1970

K Kr= 6.29%

SH = 9.3%	1.48
VI = 8.7	1.38
TA = 8.4	1.33
RE = 7.7	1.22
MO = 7.3	1.16
SA = 7.3	1.16
NL = 6.7	1.06
PN = 6.2	.98
TO = 5.7	.91
MA = 5.7	.91
LI = 3.4	.54
MT = 3.0	.48
CM = 2.4	.38

E Er= .43%

TA = 1.0%	2.32
MO = 0.7	1.63
PN = 0.7	1.63
NL = 0.6	1.39
TO = 0.6	1.39
SA = 0.5	1.16
VI = 0.5	1.16
LI = 0.3	0.70
RE = 0.2	0.46
CM = 0.2	0.46
MT = 0.2	0.46
MA = 0.1	0.23
SH = 0.0	0.00

E = Electricidad y Gas

E Er= .38%

TO = 0.8%	2.10
NL = 0.7	1.64
TA = 0.6	1.58
VI = 0.5	1.31
SA = 0.4	1.05
MA = 0.3	0.79
MO = 0.3	0.79
CM = 0.3	0.79
MT = 0.3	0.79
RE = 0.2	0.53
PN = 0.2	0.53
SH = 0.2	0.53
LI = 0.1	0.26

Er = Promedio Regional en la rama

E Er= .44%

TO = 0.8	1.62
MT = 0.6	1.62
VI = 0.6	1.36
SA = 0.5	1.14
SH = 0.5	1.14
NL = 0.4	0.91
PN = 0.4	0.91
RE = 0.4	0.91
CM = 0.4	0.91
MA = 0.3	0.68
LI = 0.3	0.68
TA = 0.2	0.45
MO = 0.1	0.23

C Cr= 12.12%

TA = 17.4%	1.43
NL = 17.0	1.40
VI = 14.2	1.17
TO = 14.2	1.17
PN = 14.2	1.17
SA = 12.2	1.01
CM = 11.5	0.95
MA = 11.0	0.91
MO = 10.4	0.86
RE = 10.2	0.84
SH = 9.6	0.79
LI = 8.8	0.73
MT = 6.8	0.56

C = Comercio

C Cr= 12.64%

TA = 17.6%	1.39
NL = 16.3	1.29
TO = 14.8	1.17
VI = 14.7	1.16
MA = 14.1	1.11
CM = 12.9	1.02
RE = 12.0	0.95
SA = 11.9	0.94
PN = 10.9	0.86
LI = 10.7	0.85
MO = 10.1	0.80
MT = 8.1	0.64

Cr = Promedio Regional en la rama

C Cr= 12.32%

TA = 15.3%	1.24
NL = 14.4	1.17
RE = 14.0	1.14
MA = 13.5	1.09
TO = 13.4	1.09
PN = 13.4	1.09
CM = 12.6	1.02
VI = 12.1	0.98
SA = 11.6	0.94
MO = 10.8	0.88
LI = 10.3	0.84
SH = 10.3	0.84
MT = 8.4	0.67

'Computation of the 'Coefficient of Specialization' of the Main Regional-Cities'

Table 232

1950

1960

1970

T Tr= 4.57%

NL = 10.3%	2.25
MO = 7.7	1.68
TA = 7.3	1.68
SA = 6.3	1.38
VI = 5.6	1.22
TO = 4.8	1.05
PN = 3.8	0.83
SH = 2.8	0.61
RE = 2.7	0.59
MA = 2.3	0.50
CM = 2.1	0.46
LI = 2.0	0.44
MT = 1.7	0.37

T Tr= 5.12%

NL = 7.6%	1.48
TA = 7.4	1.44
MO = 6.6	1.29
TO = 6.1	1.19
SA = 5.6	1.09
VI = 5.5	1.07
SH = 5.0	0.97
CM = 4.6	0.90
MA = 4.0	0.78
PN = 4.0	0.78
MT = 3.5	0.68
LI = 3.4	0.66
RE = 3.3	0.64

T Tr= 4.19%

MO = 6.0%	1.43
TA = 5.3	1.26
TO = 5.2	1.24
SA = 5.2	1.24
NL = 4.7	1.12
CM = 3.7	0.88
LI = 3.7	0.88
PN = 3.6	0.86
VI = 3.6	0.86
MA = 3.4	0.81
RE = 3.4	0.81
MT = 3.4	0.81
SH = 3.3	0.79

T = Comunicaciones y Transportes

Tr = Promedio Regional en la rama

S Sr= 13.33%

NL = 24.4%	1.83
VI = 20.8	1.56
TA = 19.4	1.45
PN = 16.6	1.24
SA = 16.4	1.23
TO = 13.6	1.02
RE = 11.5	0.86
MO = 10.9	0.82
CM = 10.7	0.80
MA = 8.7	0.65
LI = 7.8	0.58
SH = 6.4	0.48
MT = 6.1	0.46

S Sr= 16.90%

NL = 29.6%	1.75
VI = 24.7	1.46
TA = 21.6	1.28
SA = 19.7	1.16
PN = 19.3	1.14
TO = 18.1	1.07
MA = 16.6	0.98
RE = 14.5	0.86
CM = 14.0	0.83
MO = 12.6	0.74
LI = 10.7	0.63
SH = 10.2	0.60
MT = 8.1	0.48

S Sr= 25.75%

VI = 34.7%	1.35
NL = 34.6	1.34
TA = 32.7	1.27
MA = 29.1	1.13
PN = 28.4	1.10
RE = 25.9	1.01
TO = 25.6	0.99
SA = 25.3	0.98
SH = 20.3	0.81
CM = 20.8	0.81
MO = 20.0	0.78
LI = 18.4	0.71
MT = 18.3	0.71

S = Gobierno y Servicios Sr = Promedio Regional en la rama

'Computation of the 'Coefficient of Specialization' of the Main Regional Cities'

1950

1960

1970

ST _T		ST _n = 21.5
NL =	51.7	2.40
TA =	44.2	2.06
VI =	40.7	1.89
SA =	34.9	1.62
PN =	34.6	1.61
TO =	32.6	1.52
MO =	29.0	1.35
CM =	24.5	1.14
RE =	24.4	1.13
MA =	22.0	1.02
SH =	18.9	0.88
LI =	18.6	0.87
MT =	14.5	0.67

ST _T		ST _n = 26.1
NL =	53.7	2.06
TA =	46.6	1.79
VI =	45.0	1.72
TO =	39.0	1.49
SA =	37.2	1.43
MA =	34.8	1.33
PN =	34.2	1.31
CM =	31.6	1.21
RE =	29.9	1.15
MO =	29.2	1.12
SH =	25.7	0.98
LI =	22.9	0.88
MT =	18.9	0.72

ST _T		ST _n = 31.9
NL =	53.9	1.69
TA =	53.3	1.67
VI =	50.4	1.58
MA =	46.2	1.45
PN =	45.4	1.42
TO =	44.2	1.39
RE =	43.4	1.36
SA =	42.1	1.32
CM =	37.2	1.17
MO =	36.8	1.15
SH =	34.5	1.08
LI =	32.4	1.02
MT =	30.1	0.94

ST_T = Total Sector
TerciarioST_n = Promedio Nacional en el SectorPU/PM_n = 69.1

TA =	98.4	1.42
NL =	96.9	1.40
MO =	87.4	1.26
PN =	87.1	1.26
VI =	74.5	1.08
TO =	72.3	1.05
SH =	71.6	1.04
SA =	70.8	1.02
CM =	60.1	0.87
MA =	56.3	0.81
RE =	55.7	0.81
LI =	39.6	0.57
MT =	27.7	0.40

PU/PM_n = 73.6%

TA =	98.6	1.34
NL =	96.4	1.31
MO =	93.2	1.27
PN =	92.9	1.26
VI =	83.9	1.14
SH =	81.7	1.11
SA =	77.4	1.05
TO =	74.8	1.02
RE =	67.9	0.92
MA =	64.5	0.88
CM =	45.8	0.62
MT =	40.6	0.55
LI =	39.0	0.53

PU/PM_n = 80.0

NL =	98.4	1.22
TA =	98.0	1.21
MO =	95.4	1.18
RE =	91.1	1.13
SH =	91.0	1.13
PN =	87.9	1.21
VI =	87.5	1.08
SA =	84.4	1.04
TO =	76.5	0.95
MA =	74.0	0.91
CM =	62.2	0.77
MT =	56.0	0.69
LI =	49.3	0.61

PU/PM = Población Urbana vs Municipal
MunicipalPU/PM_n = Promedio Nacional

PUR Prom = 53,927

TO =	188,203	3.49
TA =	135,419	2.51
MA =	72,353	1.34
SA =	69,842	1.30
NL =	57,668	1.07
RE =	33,717	0.72
VI =	31,815	0.59
MO =	28,490	0.53
PN =	27,581	0.51
CM =	21,291	0.39
LI =	13,473	0.25
SH =	8,631	0.16
MT =	7,504	0.14

Prom = 78,712

TO =	258,757	3.29
TA =	176,163	2.24
SA =	98,839	1.26
NL =	92,627	1.18
MA =	92,327	1.17
RE =	91,640	1.16
MO =	57,374	0.73
VI =	50,797	0.65
PN =	44,992	0.57
CM =	22,919	0.29
LI =	13,592	0.17
MT =	11,641	0.15
SH =	11,592	0.15

Prom = 116,012

TO =	335,565	2.89
TA =	270,414	2.33
SA =	161,114	1.39
NL =	148,867	1.28
MA =	137,749	1.19
RE =	137,383	1.18
VI =	83,897	0.72
MO =	78,134	0.67
CM =	51,247	0.44
PN =	41,033	0.35
LI =	24,456	0.21
MT =	20,860	0.18
SH =	17,439	0.15

PUR = Población Urbana en la Región

Prom = Promedio

'Computation of the 'Coefficient of Specialization' of the
Main Regional Cities'

1950

ST _T	ST _n = 21.5
NL = 51.7	2.40
TA = 44.2	2.06
VI = 40.7	1.89
SA = 34.9	1.62
PN = 34.6	1.61
TO = 32.6	1.52
MO = 29.0	1.35
CH = 24.5	1.14
RE = 24.4	1.13
MA = 22.0	1.02
SH = 18.9	0.88
LI = 18.6	0.87
MT = 14.5	0.67

ST_T = Total Sector
Terciario

1960

ST _T	ST _n = 26.1
NL = 53.7	2.06
TA = 46.6	1.79
VI = 45.0	1.72
TO = 39.0	1.49
SA = 37.2	1.43
MA = 34.8	1.33
PN = 34.2	1.31
CH = 31.6	1.21
RE = 29.9	1.15
MO = 29.2	1.12
SH = 25.7	0.98
LI = 22.9	0.88
MT = 18.9	0.72

ST_n = Promedio Nacional en el Sector

1970

ST _T	ST _n = 31.9
NL = 53.9	1.69
TA = 53.3	1.67
VI = 50.4	1.58
MA = 46.2	1.45
PN = 45.4	1.42
TO = 44.2	1.39
RE = 43.4	1.36
SA = 42.1	1.32
CH = 37.2	1.17
MO = 36.8	1.15
SH = 34.5	1.08
LI = 32.4	1.02
MT = 30.1	0.94

PU/PM_n 69.1

TA = 98.4	1.42
NL = 96.9	1.40
MO = 87.4	1.26
PN = 87.1	1.26
VI = 74.5	1.08
TO = 72.3	1.05
SH = 71.6	1.04
SA = 70.8	1.02
CH = 60.1	0.87
MA = 56.3	0.81
RE = 55.7	0.81
LI = 39.6	0.57
MT = 27.7	0.40

PU/PM = Población Urbana vs Municipal
MunicipalPU/PM_n = 73.6%

TA = 98.6	1.34
NL = 96.4	1.31
MO = 93.2	1.27
PN = 92.9	1.26
VI = 83.9	1.14
SH = 81.7	1.11
SA = 77.4	1.05
TO = 74.8	1.02
RE = 67.9	0.92
MA = 64.5	0.88
CH = 45.8	0.62
MT = 40.6	0.55
LI = 39.0	0.53

PU/PM_n = Promedio NacionalPU/PM_n = 80.9%

NL = 98.4	1.22
TA = 98.0	1.21
MO = 95.4	1.18
RE = 91.1	1.13
SH = 91.0	1.13
PN = 87.9	1.21
VI = 87.5	1.08
SA = 84.4	1.04
TO = 76.5	0.95
MA = 74.0	0.91
CH = 62.2	0.77
MT = 56.0	0.69
LI = 49.3	0.61

PUR Prom= 53,927

TO= 188,203	3.49
TA= 135,419	2.51
MA= 72,353	1.34
SA= 69,842	1.30
NL= 57,668	1.07
RE= 38,717	0.72
VI= 31,815	0.59
MO= 28,490	0.53
PN= 27,581	0.51
CH= 21,291	0.39
LI= 13,473	0.25
SH= 8,631	0.16
MT= 7,564	0.14

Prom= 78,712

TO= 258,757	3.29
TA= 176,163	2.24
SA= 98,839	1.26
NL= 92,627	1.18
MA= 92,327	1.17
RE= 91,640	1.16
MO= 57,374	0.73
VI= 50,797	0.65
PN= 44,992	0.57
CH= 22,919	0.29
LI= 13,592	0.17
MT= 11,641	0.15
SH= 11,592	0.15

Prom=116,012

TO= 335,565	2.89
TA= 270,414	2.33
SA= 161,114	1.39
NL= 148,867	1.28
MA= 137,749	1.19
RE= 137,383	1.18
VI= 83,897	0.72
MO= 78,134	0.67
CH= 51,247	0.44
PN= 41,033	0.35
LI= 24,456	0.21
MT= 20,860	0.18
SH= 17,439	0.15

PUR = Población Urbana en la Región Prom = Promedio
 'Computation of the Coefficient of Specialization' of the
 Main Regional Cities'

TABLA DE CONCENTRACION DE DATOS*

AÑO	SECTOR SECUNDARIO					SECTOR TERCIARIO					SECTOR PRIMARIO										
	M	I	K	E	C	T	S	100	2	3	4	5	6	7	8	9	PFP (U) T	PFP SS	PFP ST	PFP SP	
1960	X	1.31	1.17	1.39	1.17	1.05	1.02	6	7.11	3.87	3.24	1.05	3.49	3.25	3.68	3.43	24.31	14.24	11.11	X	
	X	1.52	1.35	1.15	1.01	1.36	1.23	6	7.65	4.04	3.82	1.22	1.20	1.05	1.59	1.30	6.38	6.38	5.03	X	
	X	2.42	1.17	1.63	X	1.68	X	4	6.90	5.22	3.77	1.25	0.53	0.25	0.71	0.35	3.85	3.71	0.60	X	
	X	1.10	1.10	1.53	1.17	X	1.24	5	6.24	3.83	2.41	1.25	0.51	0.41	0.35	0.54	3.13	1.46	1.65	X	
	X	X	X	X	X	X	X	1	1.55	X	X	0.57	0.25	0.81	0.19	0.26	0.39	X	X	X	1.25
	X	X	X	X	X	X	X	1	1.45	X	X	1.04	0.16	0.26	0.10	0.10	0.23	X	X	X	0.15
	X	X	X	X	X	X	X	1	1.75	X	X	0.10	0.14	0.71	0.11	0.15	0.25	X	X	X	0.19
	X	8.59	1.04	2.32	1.43	1.63	1.45	7	18.09	13.53	4.55	1.42	2.51	0.24	3.20	2.56	35.41	43.30	11.67	X	
	X	1.03	1.57	1.39	1.40	2.25	1.93	6	9.57	4.09	5.18	1.40	1.07	0.39	0.70	1.23	10.24	3.9	7.01	X	
	X	1.45	X	X	X	X	X	1	1.45	X	X	0.31	0.34	2.87	0.51	1.18	1.94	X	X	4.16	
1960	X	1.23	1.52	1.16	1.17	1.22	1.56	5	6.75	2.09	3.55	1.08	0.59	0.52	0.50	0.72	3.93	0.97	2.84	X	
	X	1.24	X	X	X	X	X	1	1.24	X	X	0.87	0.39	0.70	0.35	0.37	0.43	X	X	0.87	
	X	X	1.06	2.10	1.17	1.19	1.07	5	6.52	3.15	-3.43	1.02	3.29	3.34	2.95	3.39	21.68	9.35	11.59	X	
	X	1.25	1.40	1.05	X	1.00	1.16	3	5.95	3.70	2.25	1.05	1.26	1.13	1.46	1.28	7.50	5.40	2.83	X	
	X	2.61	1.19	X	X	1.23	X	3	5.09	1.20	1.20	1.27	0.73	0.22	1.13	0.44	3.72	4.29	0.57	X	
	X	1.10	X	X	X	X	1.14	2	2.24	1.10	1.14	1.26	0.57	0.37	0.39	0.35	1.58	0.43	0.41	X	
	X	X	X	X	X	X	X	1	1.61	X	X	0.53	0.17	0.64	0.17	0.20	0.27	X	X	X	1.03
	X	X	X	X	X	X	X	2	2.39	1.05	X	1.11	0.15	0.15	0.12	0.10	0.36	0.13	X	X	0.28
	X	X	X	X	X	X	X	1	1.75	X	X	0.55	0.15	0.55	0.11	0.15	0.25	X	X	X	0.35
	X	7.01	1.40	1.58	1.39	1.44	1.28	7	15.28	11.17	4.11	1.34	2.24	0.53	3.09	2.32	34.22	34.52	9.53	X	
1970	X	1.99	1.15	1.14	X	1.24	X	4	5.17	1.82	2.33	0.95	2.89	3.87	2.54	3.26	14.94	4.62	7.60	X	
	X	2.34	1.15	X	X	1.24	X	4	5.03	3.79	1.24	1.04	1.20	1.06	1.65	1.44	6.99	5.25	1.79	X	
	X	...	X	X	X	1.43	X	3	4.23	3.50	1.43	1.19	0.67	0.31	1.28	0.65	3.30	5.73	0.94	X	
	X	...	X	X	X	1.10	X	3	3.32	1.10	2.19	1.21	0.35	0.27	0.35	0.35	1.50	0.40	0.79	X	
	X	X	X	X	X	X	X	2	2.02	X	X	0.61	0.21	0.95	0.17	0.30	0.44	X	X	X	2.06
	X	X	X	X	X	X	X	3	4.03	2.52	X	1.13	0.15	0.23	0.11	0.12	0.51	X	X	X	0.37
	X	X	X	X	X	X	X	2	2.75	1.22	X	0.69	0.18	0.65	0.15	0.21	0.63	X	X	X	1.33
	X	5.05	1.33	X	1.24	1.25	1.27	5	10.15	6.38	3.77	1.21	2.33	0.55	2.63	2.68	23.55	9.92	15.78	X	
	X	1.13	1.06	X	1.17	1.12	1.34	3	5.94	2.19	2.53	1.22	1.28	0.51	1.02	1.39	7.45	2.26	5.05	X	
	X	15.38	1.22	X	1.09	X	1.13	3	6.35	6.60	2.22	0.61	1.19	0.28	0.69	1.40	3.26	X	3.2	2.04	

A= Agricultura, ganadería, pesca, forestal y caza; B= Extractivas (petróleo y mineral); C= Industria de la Transformación; D= Construcción; E= Electricidad y Gas; F= Comercio; G= Comunicaciones y Transportes y S= Servicios (Servicios y Gobierno); H= Suma de Pesos Relativos; I= Número de Actividades con un índice de trabajadores excedente mayor que 1.0; J= Suma de Pesos Relativos; K= Suma de Pesos Relativos en el Sector Secundario; L= Suma de Pesos Relativos en el Sector Terciario; M= Suma de Pesos Relativos en el Sector Primario; N= Factor de Ponderación por Población Urbana; O= Factor de Ponderación por Población en el Sector Secundario; P= Factor de Ponderación por Población en el Sector Terciario; Q= Factor de Ponderación por Población en el Sector Primario; R= Suma de Pesos Relativos; S= Factor de Ponderación por Población en el Sector Terciario; T= Factor de Ponderación por Población en el Sector Secundario; U= Factor de Ponderación por Población en el Sector Primario; V= Suma de Pesos Relativos; W= Suma de Pesos Relativos; X= Suma de Pesos Relativos; Y= Suma de Pesos Relativos; Z= Suma de Pesos Relativos.

ACTIVIDADES PREDOMINANTES, CLASIFICACION FUNCIONAL Y PESO DE
LOS MUNICIPIOS MAS IMPORTANTES DE LA REGION NOROCCIDENTE 1950-1970*

	1	9	5	0	1	9	6	0	1	9	7	0
Actividades Predominantes	No. de Actos.	Clasif. Funcional	Peso Relat.	Actividades Predominantes	No. de Actos.	Clasif. Funcional	Peso Relat.	Actividades Predominantes	No. de Actos.	Clasif. Funcional	Peso Relat.	
LA) Coahuila												
Torreón	6	DI	7.11	E-TCSK	5	DI	6.59	E-TCA	4	SD+	5.17	
Saltijo	6	DI	7.66	K-ISTE	5	DI	5.95	I-TKE	4	SD+	5.03	
Matamoros	4	SD+	6.90	(I-TK)	3	SD-	5.02	(I-TK)	3	SD-	4.93	
Mantua	5	DI	6.24	S-I	2	BF	2.24	(I-SC)	3	SD-	3.32	
San Pedro												
LEON) Nuevo Leon												
San Carlos	1	UF	1.55	A	1	UF	1.61	A	1	UF	2.03	
San Juan	1	UF	1.73	A	1	UF	1.75	A-E	2	BF	3.75	
San Mateo	1	UF	1.45	A-K	2	BF	2.29	K-AE	3	SD-	4.06	
San Miguel												
IPAC) TAMAUCAPO												
Tampico	7	DI	18.09	M-ETKCSI	7	DI	15.28	M-KSTC	5	DI	10.15	
San Antonio	6	DI	9.57	E-STKC	5	DI	7.69	S-CITK	5	DI	5.82	
San Juan	1	UF	1.45	A-C	2	BF	3.33	S-AC	3	SD-	3.33	
San Mateo	2	BF	2.80	M-A	2	BF	3.52	M-KCS	4	SD+	8.75	
San Pedro	5	DI	6.75	S-EKCT	5	DI	6.17	K-ES	5	SD-	4.09	
San Vicente	1	UF	1.24	A-C	2	BF	2.25	A-C	2	BF	2.65	

actividad económica predominante se divide en ocho ramas de actividades: A= agropecuaria, M= extractiva, I= industria de la transformación, construcción, E= electricidad, C= comercio, T= comunicaciones y transportes, y S= servicios. En esta tabla están ordenadas de izquierda a derecha, de acuerdo con el valor decreciente del peso relativo.

= unifuncional, BF= bifuncional, SD=semidiversificado (hasta cuatro ramas de actividad con puntuación > 1.0), y D= Diversificado (con cinco o más ramas de actividad con puntuación > 1.0).

Peso relativo se obtuvo dividiendo la PEA en cada rama de actividad, entre la PEA promedio nacional respectiva; así por ejemplo, si la PEA en agricultura en el año X del municipio 'n' fuese de 50.1% y la PEA promedio nacional para la misma rama de actividad y el mismo año fuese de 5.4% entonces el peso relativo sería 1.103.

La ponderación en este segundo caso se hizo tomando los promedios regionales.

Table No. 28 - 'Functional Classification and Relative Weight of the Main Regional Cities Using Regional Averages' Cifras en la Table 21

SINTESIS DEL ANALISIS CON UN FACTOR REGIONAL
PARA EL TOTAL DE LA ACTIVIDAD ECONOMICA

Municipio	1 9 5 0			1 9 6 0			1 9 7 0			Prom. $\frac{\Sigma(3)}{3}$	c.f.
	(1) ΣPrT >1.0	(2) f Pu	(3) (1)·(2)	(1) ΣPrT >1.0	(2) f Pu	(3) (1)·(2)	(1) ΣPrT >1.0	(2) f Pu	(3) (1)·(2)		
Tampico	18.09	2.51	45.41	15.28	2.24	34.22	10.15	2.63	23.65	34.43	DI
Torreón	7.11	3.49	24.81	6.59	3.29	21.63	5.17	2.54	14.94	20.43	DI
Nvo. Laredo	9.57	1.07	10.24	7.69	1.18	9.97	5.82	1.28	7.45	8.92	DI
Saltillo	7.66	1.30	9.96	5.95	1.26	7.50	5.03	1.39	6.99	8.15	DI
Reynosa	2.80	0.72	2.02	3.52	1.16	4.00	8.75	1.18	10.33	5.43	SD
Victoria	6.75	0.59	3.93	6.17	0.55	4.01	4.09	0.72	2.94	3.64	DI
Monclova	6.90	0.53	3.66	5.09	0.73	3.72	4.93	0.67	3.30	3.56	SD
Matamoros	1.45	1.34	1.94	3.33	1.17	3.90	3.33	1.19	3.96	3.26	SD
P. Negras	6.24	0.51	3.13	2.24	0.57	1.23	3.32	0.35	1.60	1.37	SD
Cd. Mante	1.24	0.39	0.48	2.25	0.29	0.65	2.66	0.44	1.17	0.77	BF
Sabinas Hgo.	1.45	0.16	0.23	2.39	0.15	0.36	4.05	0.15	0.61	0.40	BF
Montemorelos	1.76	0.14	0.25	1.75	0.15	0.26	3.75	0.18	0.68	0.40	UF
Linaires	1.55	0.25	0.39	1.61	0.17	0.27	2.08	0.21	0.44	0.37	UF

$\Sigma PrT > 1.0$ = Suma Total de los Pesos Relativos mayores de 1.0 $\Sigma PrT = (PrA + PrK + PrI + PrK + PrE + PrC + PrT + PrS)$
 f Pu = Factor de Ponderación en función de Población Urbana.
 $\frac{\Sigma(3)}{3}$ = Promedio de los totales parciales 1950, 1960 y 1970.
 c.f. = Clasificación funcional

DI = Diversificado BF = Bifuncional
 SD = Semidiversificado UF = Unifuncional

Table No. 29. 'Synthesis of the Regional Analysis for the Total Economic Activity'

SINTESIS DEL SECTOR SECUNDARIO

Municipio	1 9 5 0		1 9 6 0		1 9 7 0		Prom. $\frac{\Sigma(3)}{3}$	c.f.	
	(1) $\Sigma PRSS$ > 1.0	(2) f Pss	(3) (1)·(2)	(2) f Pss	(3) (1)·(2)	(2) f Pss			
Tampico	13.53	3.20	43.30	3.02	34.50	6.38	2.63	16.78	DI
Torreón	3.87	3.68	14.24	2.95	5.35	1.82	2.54	4.62	DI
Saltillo	4.04	1.58	6.38	1.46	5.40	3.79	1.65	6.25	DI
Monclova	5.22	0.71	3.71	1.13	4.29	3.50	1.28	5.78	SD
Reynosa	1.52	0.64	0.97	0.99	2.22	6.60	1.22	8.05	SD
Nvo. Laredo	4.09	0.78	3.19	0.82	2.50	2.19	1.03	2.26	DI
Victoria	2.80	0.50	1.40	0.49	1.22	2.74	0.56	1.59	DI
P. Negras	3.83	0.38	1.46	0.39	0.43	1.13	0.35	0.40	SD
Sabinas Hgo.	X	0.10	X	0.12	0.13	X	0.11	X	BF
Matamoros	X	0.79	X	0.88	X	X	0.49	X	SD
Cd. Mante	X	0.33	X	0.37	X	X	0.35	X	BF
Linares	X	0.19	X	0.17	X	X	0.17	X	UF
Montemorelos	X	0.11	X	0.11	X	X	0.15	X	UF

$\Sigma PRSS > 1.0$ = Suma de los Pesos Relativos mayores de 1.0 en el Sector Secundario
 $\Sigma PRSS = (PRM + PRI + PRK + PRE)$
 f Pss = Factor de Ponderación de la Población dedicada a actividades secundarias
 $\frac{\Sigma(3)}{3}$ = Promedio de los totales parciales 1950, 1960 y 1970
 c.f. = Clasificación funcional
 DI = Diversificado BF = Bifuncional
 SD = Semidiversificado UF = Unifuncional

Table No.30. 'Synthesis of the Regional Analysis for the Secondary Sector'

SINTESIS DEL SECTOR TERCIARIO

Municipio	1 9 5 0			1 9 6 0			1 9 7 0			Prom. $\frac{\Sigma(3)}{3}$	c.f.
	(1) ΣPrst >1.0	(2) f Pst	(3) (1)·(2)	(1) ΣPrst >1.0	(2) f Pst	(3) (1)·(2)	(1) ΣPrst >1.0	(2) f Pst	(3) (1)·(2)		
Tampico	4.56	2.55	11.67	4.11	2.32	9.53	3.77	2.68	10.10	10.43	DI
Torreón	3.24	3.43	11.11	3.43	3.38	11.59	2.33	3.25	7.50	10.10	DI
Nuevo Laredo	5.48	1.28	7.01	4.52	1.31	5.92	3.63	1.39	5.05	5.99	DI
Saltillo	3.62	1.39	5.03	2.25	1.29	2.89	1.24	1.44	1.79	3.23	DI
Victoria	3.95	0.72	2.84	3.69	0.70	2.58	1.35	0.82	1.11	2.18	DI
Matamoros	X	1.13	X	1.11	1.27	1.41	2.22	1.49	3.31	1.57	SD
Reynosa	X	0.74	X	X	1.07	X	2.15	1.09	2.32	0.77	SD
P. Negres	2.71	0.44	1.06	1.14	0.35	0.41	2.19	0.35	0.75	0.75	SD
Monclova	1.66	0.36	0.60	1.29	0.44	0.57	1.43	0.65	0.94	0.70	SD
Cd.Mante	X	0.37	X	1.02	0.42	0.12	1.02	0.50	0.51	0.21	BF
Linares	X	0.26	X	X	2.20	X	X	0.30	X	X	UF
Sabinas Hgo.	X	0.10	X	X	0.10	X	X	0.13	X	X	BF
Montemorelos	X	1.15	X	X	0.15	X	X	0.01	X	X	UF

ΣPrst > 1.0 = Suma de los Pesos Relativos mayores de 1.0 en el Sector Terciario
 Prst = (PrC + PrT + PrS)
 f Pst = Factor de Ponderación de la Población dedicada a actividades terciarias
 Σ(3)/3 = Promedio de los totales parciales 1950, 1960 y 1970
 c.f. = Clasificación funcional:
 DI = Diversificado BF = Bifuncional
 SD = Semidiversificado UF = Unifuncional

Table No. 31 'Synthesis of the Regional Analysis for the Tertiary Sector'

SINTESIS DE LA SUMA DEL SECTOR SECUNDARIO
CON EL SECTOR TERCIARIO

Municipio	1 9 5 0		1 9 6 0		1 9 7 0		Prom. $\Sigma \Sigma / 3$	c. f.
	(1)	(2)	(1)	(2)	(1)	(2)		
	Σ Prt.(P) SS	Prf.(P) ST	(3) Σ SS+ST	Prf.(P) ST	Prf.(P) SS	Prf.(P) ST		
Tampico	43.30	11.67	54.97	9.53	16.72	10.10	26.80	DI
Torreón	14.24	11.11	25.35	11.52	4.25	7.60	11.85	DI
Saltillo	6.35	5.03	11.41	2.92	6.25	1.79	8.04	DI
Nvo. Laredo	3.19	7.01	10.20	5.92	2.26	5.05	7.31	DI
Monclova	3.71	0.60	4.31	0.57	5.73	0.94	6.72	SD
Reynosa	0.97	X	0.97	X	6.05	2.32	10.37	SD
Victoria	1.40	2.84	4.24	2.53	1.59	1.11	2.70	DI
Matamoros	X	X	X	1.41	X	3.31	3.31	SD
P. Negras	1.46	1.06	2.52	0.41	0.40	0.75	1.15	SD
Cd. Mante	X	X	X	0.12	X	0.51	0.51	BF
Sabinas Hgo.	X	X	X	0.13	X	X	X	BF
Linares	X	X	X	X	X	X	X	UF
Montemorelos	X	X	X	X	X	X	X	UF

Prf(P)SS = Peso Relativo Ponderado Sector Secundario
 Prf(P)ST = Peso Relativo Ponderado Sector Terciario
 Σ SS+ST = Suma de ambos pesos
 $\Sigma \Sigma / 3$ = Promedio de la Suma de Σ SS+ST en 1950, 1960 y 1970
 c. f. = Clasificación Funcional

Table No. 32 'Synthesis of the Regional Analysis for Both
Secondary and Tertiary Sectors'

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