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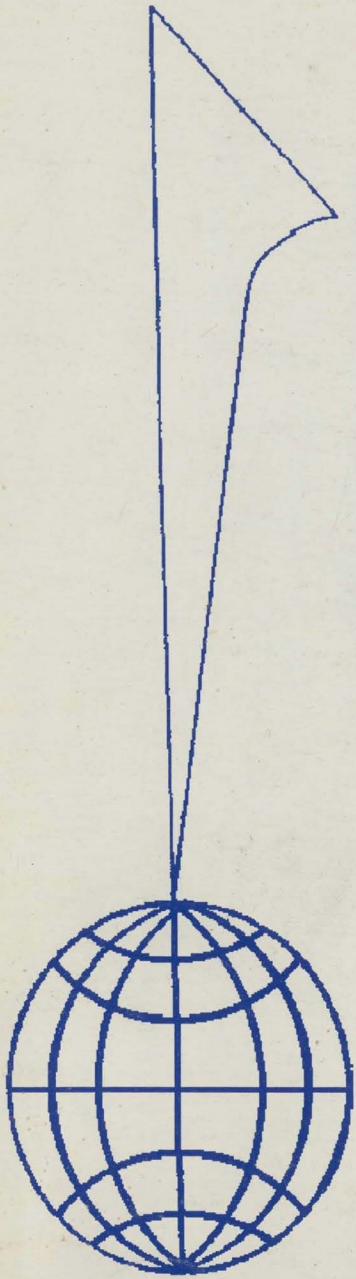

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REVUE ROUMAINE DE GÉOGRAPHIE

TOME 42, 1998

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La vie scientifique géographique

Comptes Rendus

ON THE 90th ANNIVERSARY OF VICTOR TUFESCU, MEMBER OF THE ROMANIAN ACADEMY

DAN BĂLTEANU

The doyen of the Romanian geographers and President of the Romanian National Geographic Committee, Prof. Victor Tufescu has reached the venerable age of 90 (1998).

A worthy follower of Simion Mehedinţi, George Vâlsan and Vintilă Mihăilescu, whom he met in his youth, Victor Tufescu has directly contributed to the development of modern Romanian geography.

He was born in Botoşani town, on November 19, 1908. His father, Constantin Tufescu, was an appreciated high-school teacher. His mother, Ecaterina, came from an old family of landowners. A very sensitive and artistic nature, Victor was first violin and conductor of the high-school orchestra in his native town.

Victor Tufescu attended in parallel (1927–1932) the courses of the Iaşi University – the faculties of sciences and law–, taking his BS degree with *magna cum laude*.

A passionate participant in the student scientific life, he was one of the founding members of the "Dimitrie Cantemir" Geographical Society (1929).

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The Professor's teaching career began in 1932, first as a preparator, then as an assistant at the Iaşi University – Faculty of Sciences, Palaeontology and Geology sections, Chair of Prof. Ion Atanasiu.

His research work from that time materialised in a Ph.D. thesis (1936) on land form and settlements in Dealul Mare – Hârlău area. In 1935, together with other 180 candidates, he competed for the position of a teacher at the "Meşotă" high-school in Braşov city. And he got it. A scholarship granted by the Romanian Academy enabled Victor Tufescu to continue his studies at the Sorbonne in Paris (1938–1939). There he met Prof. Emm. de Martonne who supervised his study term. His marriage to Liliana Dolinescu, a teacher from the girls' high-school in Botoşani, offered him a quiet family background so very necessary for his future scientific work. He has two children, a boy – Mircea Alexandru, a biology researcher in Toronto (Canada), and a girl – Astrid, now a music teacher in Perth (Australia).

He carried on with the teaching profession at the Higher Teacher Training School in Bucharest (1939–1941) rising to the degree of lecturer and professor at the Academy of Higher Commercial and Industrial Studies, renamed Academy of Economic Studies after 1946. Together with Prof. Vintilă Mihăilescu and other outstanding geographers, Professor Tufescu founded the Romanian Institute for Geographical Researches (1944) and the Institute's Geographical Review. Between 1944 and 1950 he was head of the Physical Geography Section.

Ousted from the educational network (1951–1955) and jailed for political reasons (November 1955), he was to be released from detention after eight months, as no charges could be laid against him.

The professor developed a sustained research activity within the Academy's geography team, focusing on agricultural problems. Head of the Physical Geography Section at the Institute of Geology and Geography under the aegis of the Romanian Academy since 1958, and head of department (1968–1973) at the Bucharest University – the Faculty of Geology and Geography, Victor Tufescu was known as an outstanding scientific personality. After 1989, he has been acting as a consultant professor.

His vast work (over 300 scientific papers), tackling a wide diversity of physical and human geography topics, has been published at home and abroad. His earliest articles concentrate on geomorphological investigations, more precisely on the impact of tectonics in creating regional relief differences in the Moldavian Plateau (1934, 1942), the Lower Siret Plain (1945, 1974) and the Banat-Crişana Plain (1957. In his fundamental work entitled *Natural Modelling of the Relief and Accelerated Erosion*, published over thirty years ago, and awarded the Gh. Munteanu-Murgoci Prize by the Romanian Academy (1966), the Professor draws attention to the dangers posed by human activity for the environment.

His studies on present-day geomorphological processes, based on in-depth field investigations, deal with fluvial modelling in junction areas, mass

movements (1959, 1964, 1968) and piping processes. His interest in levelled surfaces materialised in a number of theoretical contributions (1946), and various regional studies (1970, 1971). Aware of the relationships between natural environmental components and human activity, the Professor succeeded in defining the Subcarpathians from a geographical viewpoint.

Environmental issues and the extremely complex problematique related to this subject, as well as man-induced imbalances and the need to look into inter-geosphere connections (1980, 1981) as well as land use aspects (1963, 1964) have increasingly become a focal concern of Victor Tufescu's works.

On the same line goes his synthesis work: *Romania, Nature, Man, Economy* (1974).

In the area of human geography, his studies address aspects of labour migrations in agriculture (1937, 1941), in forestry exploitations (1962) and in mining (1964), as well as displacement of population (1965, 1986). These contributions imposed geography as a synthesis science at the Academy of Economic Studies, with important practical applications also in various fields connected with the development of agriculture and silviculture.

His investigation into the Romanian village looked at aspects of size and typology of rural settlements (1957, 1972); in urban geography, Prof. Tufescu broached problems of town development from a historical perspective.

Reconsidering the activity of Simion Mehedinţi, the founder of modern geography in Romania, was a central concern with Prof. Tufescu. So, in 1994, with the assistance of geographer-editors Silviu Neguţ and Gabriel Matei from the Encyclopaedical Publishing House, a new edition of Mehedinţi's monumental work – *Terra. An Introduction to Geography as Science* was put out. Victor Tufescu also authored a study devoted to his master's life and work.

As a recognition of his activity, Prof. Tufescu was elected member of Romania's Academy of Sciences (1942), an institution whose secretary he was for a lapse of two years; corresponding member of the Romanian Academy in 1990, and full member in 1992.

His long activity is also marked by editorial work: secretary of the Editorial Board of the Bulletin of the Royal Romanian Geography Society (1940–1942); member on the editorial board of the Romanian Academy's geography journals (since 1966) and editor-in-chief since 1990. He was the coordinator of the National Geographical Atlas (1970–1978) and a staunch supporter of the elaboration of *A Historical-Geographical Atlas of Romania*. Professor Tufescu was active in various international events, *e.g.* Romanian-French colloquia, academic missions (*e.g.* in Mongolia), member in some specialized commissions of the International Geographical Union and of foreign scholarly societies.

Today, the doyen of the Romanian geographers continues to be active in the country's geographical movement in his capacity as President of the Romanian National Geographic Committee, editor-in-chief of the Romanian Academy's geography journals and member on the Scientific Council of the Academy's Institute of Geography.

MAIN WORKS

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L'INDICE DE CONNEXITÉ DU RÉSEAU DES VOIES DE COMMUNICATION DE LA ROUMANIE

ALEXANDRU UNGUREANU

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Key words: connectivity index, communication network, Romania.

The connectivity index of Romania's communication network. The author suggests an improved connectivity index, taking into account the type of the network connexions, their quality and the number of the blind bottoms. Applied to Romania's territory, divided after the natural units and sub-units, the new index emphasizes the priority role played by the natural conditions, firstly by the relief, in the organization of the communicational network; it is followed by the specific regional pattern of the rural settlements, the economic and social standard of the regions, the border effect and the political interest of the autoritarian state. The distribution of the resulting values indicates the areas with a high communicational potential which could be better used by the future investors for the location of the industry – the Tecuci Plain, the north-eastern part of the Transylvanian Basin, the Caransebeş Corridor, the Buzău Plain, etc. – but also the backward regions, where a much more substantial effort is needed, in order to develop the present infrastructure – the Bârlad Plateau, the Danube Delta, the high Plain of Bălăciţa a.s.o.

Couramment, dans la littérature internationale (Garrison, 1960; Cox, 1972, etc.), l'indice de connexité du réseau des voies de communications (B) est calculé en rapportant le nombre des liaisons du réseau respectif (L) au nombre des nœuds (N), d'après la formule:

$$\beta = \frac{\sum L}{\sum N}.$$

En Roumanie, un premier essai d'appliquer cette manière de calcul a été fait par V. Nimigeanu (1976) dans une étude sur la Plaine collinnaire de la Jijia, située dans le nord-est du Plateau Moldave.

Dans ce qui suit, nous nous sommes proposé de compléter et de nuancer cette formule de l'indice de connexité, en l'adaptant aussi au spécifique géographique de la Roumanie, de la manière suivante:

Premièrement, nous avons introduit une distinction entre les types de liaisons, dans le réseau, ainsi qu'entre les différentes qualités des liaisons, accordant à chaque type de liaison et de qualité des coefficients de transformation, notés $k_1, k_2 \ldots k_3$[1].

Deuxièmement, pour le dénominateur de la fraction, nous avons considéré que, à côté du nombre des nœuds du réseau, il faudrait introduire aussi le nombre des têtes de ligne et, tenant compte du fait que celles-ci (C) contribuent substantiellement à une diminution de la connexité, on les a multipliées par 2.

C'est ainsi que la nouvelle formule de l'indice du connexité deviendrait, pour chaque unité spatiale, la suivante:

$$\beta = \frac{L_1 \cdot k_1 + L_2 \cdot k_2 + \ldots L_n \cdot k_n}{\sum N + 2\sum C}.$$

On a introduit dans les calculs, à côté des chemins de fer, les routes publiques retenues dans les bulletins officiels des directions de la voirie des départements, les routes forestières et pétrolières, plus nombreuses dans les régions carpatique et sous-carpatique, mais l'on a renoncé aux routes d'exploitation des grandes régions agricoles, généralement inaccessibles aux moyens modernes de transport par mauvais temps.

Les calculs, très laborieux, ont été effectués au niveau des unités et des sous-unités naturelles (Al. Ungureanu, I. Ungureanu, I. Donisă, 1994–1995) et pas à celui des unités administratives, car celles-ci (les départements) ne disposent malheureusement plus de sous-unités convenables comme dimensions,

[1] On a adopté pour les liaisons ferroviaires des coefficients de transformation de 1 à 12: chemins de fer à voie étroite, sans trafic de passagers = 1, chemins de fer à voie étroite et trafic de passagers = 2, chemins de fer normaux sans trafic de passagers = 4, chemins de fer normaux sans trafic de passagers = 6, chemins de fer à trafic exprès ou international = 8, chemins de fer simples électrifiés ou chemins de fer doubles à traction Diesel = 10, chemins de fer doubles électrifiés = 12.

Pour les routes, nous avons adopté aussi des coefficients allant de 1 à 12: routes communales et départementales sans couverture ou macadamisées, routes forestières et pétrolières = 1, routes nationales macadamisées = 2, routes communales et départementales asphaltées = 3, routes nationales asphaltées = 4, routes européennes = 6, routes nationales et européennes à quatre bandes = 8, autoroutes = 12.

Enfin, pour le transport sur l'eau, on a adopté des coefficients allant de 4 à 14: transport fluvial = 4, transport fluvio-maritime = 6, transport maritime = 14.

On n'a pas pris en considération le transport aérien, insignifiant pour la vie des collectivités locales, et les transports spéciaux, pour lesquels il n'y a pas d'informations précises.

sont, par conséquent, trop étendues, ne permettant pas de détailler l'analyse spatiale, et sont aussi, souvent, très hétérogènes, ce qui mènerait à une uniformisation anormale des valeurs obtenues.

La valeur moyenne de l'indice de connexité, pour tout le territoire de la Roumanie, d'après la formule de calcul exposée ci-dessus, s'avère assez modeste, de 3,63, ce qui, dans notre opinion, place notre pays au niveau de la catégorie supérieure des pays en voie de développement. D'un autre côté, les différences régionales sont appréciables et indiquent une grande variété de situations, pour un espace national relativement étroit. Cette distribution régionale des valeurs représente évidemment l'effet combiné de plusieurs facteurs, dont nous considérons les suivants comme les plus importants, dans une hiérarchie qui veut souligner la spécificité géographique du pays :

a. *Les conditions naturelles*, surtout le relief, s'imposent d'une manière frappante (Fig. 1), exprimant une adaptation excessive du réseau des voies de communication aux grandes lignes orographiques, en fonction de l'insuffisance des moyens financiers pour construire de grands travaux d'art. Même certaines voies de communications qui avaient réussi, temporairement, la traversée de quelques lignes de faîte ont été délaissées, faute de pouvoir lutter contre les glissements de terrain (par ex., le chemin de fer Piteşti–Râmnicu Vâlcea).

Évidemment, le relief met son empreinte sur l'infrastructure des communications de la manière la plus significative, dans la région carpatique, menant à l'apparition de nombreuses têtes de ligne qui laissent certains massifs montagneux en dehors de la circulation nationale et internationale. Cela explique pourquoi la valeur moyenne de l'indice de connexité de la région carpatique n'est que de 2,30, descendant même, dans trois cas (les montagnes de Retezat, Vrancea et Călimani) au-dessous de 1,00.

D'un autre côté, le relief oblige les fascicules des voies de communication à une concentration au long des bassins intracarpatiques, des couloirs dépressionnaires et des lignes de contact entre les grandes unités naturelles, déterminant ainsi des valeurs élevées de l'indice de connexité dans l'aire dépressionnaire de contact Cibin – Sălişte – Apold (8,42 – la plus grande valeur du pays), dans le couloir Arieş – Mureş – Strei (6,23), dans le bassin du Pays de Bârsa – Trei Scaune (7,50), dans le bassin houiller de Petroşani (6,85), dans le couloir de Caransebeş (7,77) ainsi que le long du contact entre la Plaine Roumaine et le chaînon sous-carpatique d'Istriţa.

Le réseau hydrographique est généralement celui qui conditionne les directions empruntées par la plus grande partie des voies de communication, en fonction du relief; pourtant, certaines rivières importantes et, surtout, le Danube créent aussi des difficultés à la traversée, ce qui donne naissance à un grand nombre de têtes de ligne, déterminant un bas indice de connexité, malgré les

possibilités de développement du transport sur l'eau (le cas le plus explicite est celui de la Plaine alluviale du Danube, avec un indice moyen de connexité qui n'est que de 2,98).

b. *L'organisation spatiale spécifique du réseau de villages*, souvent en accord avec les mêmes conditions naturelles, représente le deuxième facteur déterminant de l'indice de connexité. D'habitude, dans les régions caractérisées par une dispersion accentuée de l'habitat rural, la longueur totale du réseau des voies de communication est excessive, celles-ci ne pouvant pas être entretenues d'une manière convenable, tenant compte aussi des moyens financiers modestes des petites collectivités, et le nombre des têtes de ligne est très grand, tout cela expliquant les basses valeurs de la connexité dans des sous-unités naturelles comme le Piémont de Cotmeana (2,64), les Collines de la Tutova (2,44), les chaînons de flysch de Bucovina (2,11) ou les Montagnes de Poiana Ruscă (1,77).

Au contraire, dans les zones de plaine, en Dobroudja, dans les grands bassins intracarpatiques et dans le sud du Bassin Transylvain la concentration de la population rurale en grands villages, relativement éloignés l'un de l'autre, réduit au minimum le développement nécessaire du réseau des voies de communication, celles-ci pouvant être entretenues dans de meilleures conditions, alors qu'à chaque nœud revient un nombre supérieur de liaisons radiaires. Cela explique les valeurs plus ou moins élevées de la connexité dans le secteur tabulaire de la Plaine Roumaine (5,21), dans le secteur de transition de la Plaine de la Tisa (7,66), en Dobroudja centrale (6,21), sur les Hauteurs du Hârtibaci (4,37), etc.

c. *Le niveau du développement économique et social* se reflète sur l'indice de connexité surtout par l'intermédiaire de la qualité des liaisons, dans le réseau, et, de ce point de vue, l'indice respectif peut être considéré comme un bon indicateur du niveau économique d'ensemble d'une région quelquonque.

Conformément aux données présentées dans la figure 1, les aires dynamiques et les pôles de développement sont clairement mis en évidence, comme dans le cas de la Plaine de la Tisa, dans son ensemble (avec une valeur moyenne de 5,62, celle-ci étant la seule unité naturelle n'ayant aucune sous-unité au-dessous de la moyenne du pays), des aires marginales du Bassin Transylvain, étroitement liées aux ressources de la couronne carpatique, du secteur nord de la plaine Roumaine, le long de l'axe Piteşti – Târgovişte – Ploieşti – Buzău, du sud et du centre de la Dobroudja, de la gouttière dépressionnaire centrale des Carpates Orientales et de l'axe du Siret, dans l'ouest du Plateau Moldave.

Contraires à celles-ci, les aires stagnantes, déterminées par l'isolement et des conditions naturelles plutôt défavorables, mais où la stagnation conditionne, à son tour, le retard du désenclavement et du processus d'intégration dans l'économie de marché, sont dessinées d'une manière non moins évidente. Parmi

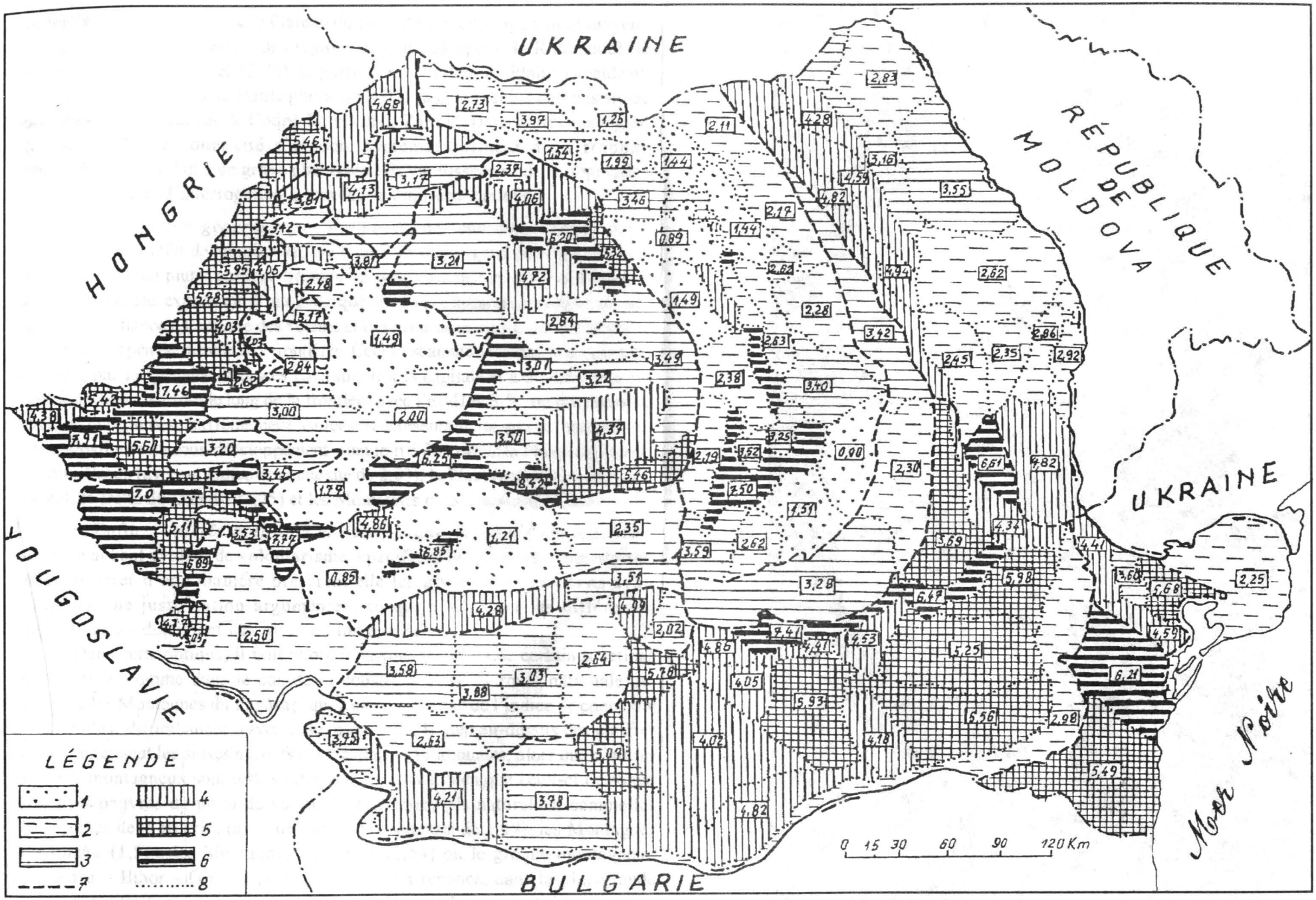

Fig. 1 – La répartition territoriale des valeurs de l'indice de connexité du réseau des voies de communication en Roumanie: 1, au-dessous de 2,00; 2, de 2,00 à 2,99; 3, de 3,00 à 3,99; 4, de 4,00 à 4,99; 5, de 5,00 à 5,99; 6, au-dessus de 6,00; 7, limites des unités naturelles; 8, limites des sous-unités naturelles.

celles-là, on peut remarquer le Plateau du Bârlad (qui, avec une valeur moyenne de 2,57, est la plus étendue des régions sous-développées de Roumanie), les Sous-Carpates de Vrancea (2,30), la partie centre-sud de la «Plaine» accidentée de Transylvanie (2,84), la Haute plaine de Bălăciţa (2,63) et les collines situées aux pieds des montagnes de Codru-Moma et de Zarand. Dans toutes ces régions le bas indice de connexité s'associe systématiquement à un frappant dépeuplement rural et à un grave phénomène de vieillissement de la population, qui met un signe d'interrogation à tout leur avenir économique.

d. *La position géographique* s'exprime, par endroits, surtout par le truchement de l'effet de marginalité, qui a joué un rôle négatif dans le cadre d'un territoire national plutôt enfermé pendant les décennies qui ont suivi la Deuxième Guerre Mondiale, expression d'une politique de relative autarcie économique, ainsi que de la méfiance à l'adresse des voisins et des propres citoyens, qui ont donné un caractère très peu perméable aux frontières. Cela s'est ajouté à une faible accessibilité produite par les grandes distances par rapport à la capitale et à d'autres pôles de développement, surtout le long de la frontière avec l'ex-U.R.S.S., où des exemples d'aires marginales, extrêmement isolées et présentant un grand nombre des caractéristiques du sous-développement, sont loin d'être rares: la Plaine collinnaire de Jijia-Başeu (avec un indice de connexité de 2,83), la Plaine collinnaire de Fălciu (2,92), le Delta du Danube (2,25) et les Montagnes du Maramureş (1,26).

e. Enfin, *l'intérêt politique et économique de l'État* est intervenu, avec un accent évident de volontarisme, spécifique aux régimes autoritaires, pour orienter d'une manière préférentielle les investissements, sans avoir toujours une justification argumentée, ce qui a accentué les différences régionales au détriment des aires moins agréées.

Dans cette optique, il faut aborder surtout les effets de certaines actions de prestige, comme dans le cas de la construction de la route nationale qui traverse les Montagnes du Făgăraş, qui a élevé la valeur de l'indice de connexité de ce massif difficilement traversable jusqu'à 2,14, bien au-dessus des chiffres qui caractérisent les autres massifs des Carpates Méridionales, alors que d'autres massifs montagneux sont restés relativement isolés, bien que ceux-ci ne soient pas plus pauvres du point de vue de leurs possibilités naturelles, comme les Montagnes de la Bistriţa (avec un indice de connexité de 1,49), les Montagnes du Buzău (1,51), les Montagnes du Ţibleş (1,54) ou le groupe montagneux Vlădeasa – Bihor – Gilău (1,49). De plus, on a renoncé, dans la plus grande partie des massifs montagneux carpatiques, au moyen de transport si économique qui était celui des chemins de fer à voie étroite, le résultat étant même, par endroits, celui d'une baisse de l'indice de connexité.

Partant des mêmes considérants de prestige, la seule autoroute construite jusqu'à présent a été dirigée depuis la capitale vers Piteşti, le résultat étant, de nouveau, une certaine hausse de la valeur de l'indice de connexité, cette fois dans le nord-ouest de la Plaine Roumaine.

L'ouverture, au prix de gros efforts matériaux, des exploitations de lignite, pétrole et gaz naturel dans les Sous-Carpates de l'Olténie, accompagnée de la construction de nouveaux chemins de fer et de routes d'accès, explique le détachement, dans un sens positif, de ce secteur des Sous-Carpates (avec un indice de connexité de 4,28), contrastant avec d'autres secteurs, plus pauvres en ressources du sous-sol, qui ont été fréquemment délaissés, sous le rapport d'un réseau acceptable de voies de communication.

L'analyse régionale présentée dans la figure 1 infirme aussi certaines images-standard, concernant le niveau du développement, qui ont pris racine depuis longtemps dans la géographie économique roumaine, mais qui ne correspondent plus exactement à la réalité.

C'est ainsi que l'image classique, de région sous-développée, de la Dobroudja, est contredite (à l'exception du Delta du Danube) par les hautes valeurs de l'indice de connexité, ce qui prouve le caractère effectif des progrès enregistrés par cette province dans les décennies de construction économique programmée, quand elle a bénéficié d'impressionnants investissements prioritaires: la seule sous-unité de la Dobroudja à être restée plus isolée est celle des Hauteurs, encore bien boisées, du Niculiţel, mais même la valeur de l'indice de cette aire restreinte (3,60) n'est pas loin de la moyenne nationale.

Dans le sens opposé, l'image traditionnelle, de région assez développée, des Sous-Carpates, dans leur ensemble, est contredite par un indice moyen qui ne monte qu'à 3,33, restant au-dessous de la valeur du pays, même dans les secteurs d'ancienne exploitation des ressources du sous-sol, comme dans les Sous-Carpates de la Valachie centrale (3,38);la grade dispersion rurale et la présence de nombreux petits villages, difficilement accessibles, perchés sur des versants instables ou même sur des interfluves, à côté des grandes routes, en sont des explications indiscutables. Même la zone d'influence urbaine immédiate de Bucarest n'est pas mise en évidence d'une manière exceptionnelle, dans le contexte national, l'indice de connexité de la Plaine de Vlăsia, de 5,93, reflétant le contraste entre la capitale proprement dite et toute une série de secteurs ruraux assez mal servis par le réseau de routes.

Les résultats de cette analyse peuvent avoir aussi, dans notre opinion, une valeur appliquée, d'abord parce qu'ils mettent en évidence l'existence de certaines aires bénéficiant d'une bonne infrastructure, très connectives, mais dont le potentiel communicationnel n'a pas été suffisamment mis en valeur par des investissements industriels ou d'une autre nature. Ces aires mériteraient

une attention plus grande de la part des investisseurs et nous indiquons, parmi celles-ci, la *Plaine du Buzău*, avec l'exceptionnel nœud ferroviaire de Făurei, la *Plaine de Tecuci*, qui a la plus grande valeur de l'indice de connexité de toute la Moldavie (6,61), le *Couloir de Caransebeş*, dans les Collines du Banat, et le *nord-est du Bassin Transylvain*, avec de nombreux nœuds, utilisés seulement en partie – Beclean, Salva, Sărăţel, Măgheruş-Şieu, Deda, etc.

La carte qui résulte de cette analyse attire, en même temps, l'attention sur les problèmes aigus des régions sous-développées, où le réseau des voies de communication est nettement déficitaire. Dans ce sens, nous soulignons le poids élevé de ce type de régions dans le *Piémont Gétique* (dont la valeur moyenne de l'indice de connexité n'est que de 3,12), le *Plateau Moldave* (avec une moyenne de 3,36), les *Collines de la Crişana* (3,26), le *nord-ouest* et le *centre du Bassin Transylvain*. Ce sont, à bien des points de vue, les régions dont l'avenir économique et social nous semble le plus problématique.

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L'EFFICACITÉ DU RÉSEAU FERROVIAIRE ET L'ACCESSIBILITÉ TERRITORIALE EN ROUMANIE

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Efficiency of the railway network and territorial accessibility in Romania. Like every young national territory of Central Europe, born after World War I, the modern Romanian territorial construction still keeps the traces of the ancient political and historical organization. In the earlier industrial revolution, when the railway system was traced inside different economically and politically centralized spaces, the present Romanian territory has evolved in two separate spatial matrices: the former kingdom (Moldavia and Wallachia countries, in Union since 1859) and Transylvania (formerly included in the Austro-Hungarian Empire). After the Great Union (1918), first the interwar period governments and then the communist political authority tried to connect the cities inside the national territory.

Political projects were largely advantaged in the strategy of connecting the two railway systems. The result was materialized in space by a low territorial efficiency, because some medium-sized cities and some peripheral regions were ignored in the name of general regional disendowment and national central integration.

By using a geostatistical method of *krigging* and spatial accessibility, this paper is trying to prove the spatial failure of the railway system construction. Simultaneously, this paper is a proposal for railway territorial efficiency increasing strategy based on a hypothetical model of some new railway construction.

A l'instar des autres États de l'Europe Centrale et Orientale, en Roumanie aussi les transports ferroviaires continuent à jouer le rôle de vecteur principal des flux de marchandises et de personnes. Dans le contexte du désenclavement de plus en plus accentué des territoires locaux et de l'augmentation de leur intégration aux systèmes socio-économiques régionaux, nationaux et internationaux, leur position spatiale par rapport au réseau ferroviaire s'avère être d'une très grande importance. Cela reste valable tant pour les programmes d'organisation et d'aménagement territorial menés par le pouvoir central que pour les projets d'insertion supra-locale des agents locaux. La distribution spatiale des

combustibles et des matières premières pondéreuses, l'écoulement de la production agricole et industrielle, le fonctionnement des flux touristiques majeurs, la diffusion territoriale des informations et des innovations par l'intermédiaire des contacts interpersonnels, l'équilibrage des aires d'influence des centres tertiaires, voilà quelques éléments fortement dépendants de la capacité d'organisation spatiale des chemins de fer. Le degré dont l'un ou l'autre des territoires locaux est plus ou moins accessible en fonction du réseau ferroviaire peut être déterminant pour son avenir et pour son devenir.

Notre démarche peut être critiquée par ceux qui considèrent que les transports routiers ont la tendance à remplacer à tour de rôle les fonctions du transport ferroviaire.

Pourtant, l'évolution du monde contemporain nous donne raison. Les problèmes liés au futur des ressources pétrolières et la pollution de l'environnement, les embouteillages et l'insécurité sur les routes, les nouvelles techniques de transport (ferroutage par exemple), ont toutes les chances de rendre pour longtemps aux chemins de fer le rôle principal dans le déroulement des activités macro-économiques. D'autant plus en Roumanie, vu le parc automobile très réduit quantitativement et qualitativement, et vue aussi la qualité moyenne des routes nationales et régionales.

La méthodologie de l'étude de l'accessibilité des unités territoriales est encore loin de pouvoir offrir des résultats immuables, parce que la plupart des méthodes utilisées jusque là sont strictement relatives aux objectifs ciblés et aux variables prises en compte. Par exemple, l'accessibilité en terme de prix d'un lieu quelconque est considérée en fonction des buts du déplacement, du niveau des ressources financières de l'agent qui se déplace et aussi de son degré de motivation. Ces considérations nous ont obligés de présenter dans cet article seulement les principes de l'analyse fondamentale de l'accessibilité territoriale en fonction des stations de chemin de fer de la Roumanie.

LA MÉTHODE ET LES DONNÉES STATISTIQUES

La théorie des graphes, adoptée par la géographie après la deuxième guerre (Haggett, 1973), constitue pour l'instant le plus puissant moyen d'analyse des structures réticulaires. Le principal inconvénient de cette méthode est le fait que le réseau est considéré d'une perspective topologique, comme une somme de liaisons (arrêtes) qui relient un ensemble de points (sommets ou nœuds), dans un espace isotrope. L'isotropie de l'espace peut être annulée (ou au moins diminuée) soit par l'utilisation des graphes orientés (avec des directions de flux), soit par l'utilisation des arrêtes valuées. Dans le cadre de notre analyse nous avons utilisé la deuxième voie, les arrêtes décrivant l'anisotropie de l'espace

par des valeurs différentes de la distance entre deux stations (plus grandes dans les plaines, moindres dans les collines et dans les montagnes) ou du temps nécessaire à parcourir cette distance (plus grand pour la même distance dans les montagnes que dans les plaines, moindre, pour la même distance, sur les tronçons doubles électrifiés que sur ceux simples et non électrifiés), etc. Le graphe utilisé est celui du réseau des chemins de fer roumains, représenté par les 2 112 stations et gares, hiérarchiquement réparties sur les 10 710 km des voies ouvertes au trafic (en 1996–1997).

Les arrêtes entre ces stations sont valuées (en kilomètres et minutes) conformément aux données du *Mersul Trenurilor* (L'indicateur des trains) *1996–1997*, pour les trains de voyageurs en régime local. L'analyse de l'accessibilité ferroviaire du territoire roumain a été effectuée en deux étapes: d'abord *le calcul de l'accessibilité* de chaque station et *ensuite la régionalisation des résultats* obtenus afin d'estimer l'efficacité du réseau de transport ferroviaire.

LE CALCUL DE L'ACCESSIBILITÉ DES STATIONS DE CHEMIN DE FER

Dans un graphe quelconque, l'indice d'accessibilité (de centralité) de tout sommet x_i peut être calculé en partant de la matrice de l'éloignement du réseau (Rouget, 1976). Si d_i est la somme des écarts entre le sommet (ici la station) x_i et l'ensemble de tous les autres sommets (stations) x_j, respectivement

$$d_i = \sum_{j=1}^{n} d_{ij}$$

et D este la somme totale des écarts du réseau, respectivement

$$D = \sum_{i=1}^{n} \sum_{j=1}^{n} d_{ij}$$

alors l'indice vectoriel d'accessibilité $a_{\rightarrow i}$ est le rapport entre la somme de toutes les distances du réseau et la somme des écarts du sommet (station) considéré (x_i), respectivement

$$a_{\rightarrow i} = \frac{D}{d_i} = \sum_{i=1}^{n} d_{ij}.$$

Il est évident que la plus accessible station sera la station pour laquelle la longueur du plus long chemin jusqu'à l'ensemble de toutes les autres est minimale, respectivement

$$a_{\rightarrow i} = \min \max \sum_{i=1}^{n} d_{ij}.$$

L'indicateur ainsi obtenu est *l'indicateur d'accessibilité générale* qui, pour les stations de la Roumanie, varie entre 636 239 km et 1 325 860 km. Les chiffres obtenus (de très grandes valeurs) et la méthodologie utilisée sont très peu intuitives et il est plus acceptable d'utiliser *l'indicateur d'accessibilité spécifique* ($as_{\rightarrow i}$), c'est-à-dire du plus court trajet entre une station quelconque et la plus éloignée autre station, à savoir

$$as_{\rightarrow i} = \min \max d_{ij}$$

qui, pour la Roumanie, varie entre 578 et 1 051 km pour l'accessibilité kilométrique et entre 13,7 et 24,03 heures pour l'accessibilité temporelle.

LA RÉGIONALISATION DE L'ACCESSIBILITÉ DES STATIONS DE CHEMINS DE FER

L'accessibilité générale (et aussi l'accessibilité spécifique) peut être cartographiée par la méthode des points dimensionnés, mais l'image obtenue sera celle de la situation de l'une ou de l'autre des stations en fonction de toutes les autres et non celle de l'accessibilité des espaces avoisinant cette station ou avoisinant un secteur quelconque de voie. L'absence de corrélation entre le réseau ferroviaire et les différents niveaux d'organisation administrative rend l'analyse encore plus difficile, surtout pour les méthodes classiques d'étude des réseaux de transport.

Ces inconvénients peuvent être éliminés par la *régionalisation des résultants* (Cicéri, Marchand, Rimbert, 1977). Une variable régionalisée, dans ce cas l'accessibilité spécifique $as_{\rightarrow i}$, est une variable qui prend les valeurs $as_{\rightarrow i(p)}$ dans chaque point p de l'espace analysé en fonction des points p pour lesquels les valeurs de la variable sont déjà connues. L'hypothèse de départ est celle selon laquelle pour des déplacements égaux dans l'espace, la croissance des valeurs de la variable est constante. Cela signifie qu'à cette variable on peut ajuster un plan qui représente la tendance de croissance des valeurs dans l'espace considéré. Si ce plan est oblique, alors la variation des valeurs est dépendante de l'origine des mesures, et donc la variation peut être décrite par une dérivée (par exemple les valeurs augmentent linéairement ou exponentiellement dans une certaine direction). En considérant les valeurs $as_{\rightarrow i}$ dans deux points séparés par la distance d, à savoir $as_{\rightarrow i(p)}$ et $as_{\rightarrow i(p+d)}$, et prenant n_d pour le nombre des autres points situés à la distance d on obtient la fonction intrinsèque $\gamma_{(p)}$:

$$\gamma_{(d)} = \frac{1}{2n_d} = \sum_{i=1}^{n_d} \left(as_{\rightarrow i(p)} - as_{\rightarrow i(p+d)}\right)^2.$$

Pour chaque paire de pointes p et $p + d$ séparées par la distance d, la variable $as_{\rightarrow i}$ prend d'habitude des valeurs différentes. Le carré de la différence des deux valeurs, à savoir $(as_{\rightarrow i(p)} - as_{\rightarrow i(p+d)})^2$, indique la variation de la variable sur la distance d et la moyenne du carré de cette variation, c'est-à-dire la fonction intrinsèque $\gamma_{(d)}$ dépend seulement de l'intervalle d qui sépare les paires de points et pas d'un quelconque autre point précis. Autrement dit, $\gamma_{(d)}$ mesure l'influence moyenne de chaque point jusqu'à la distance d. Si on calcule $\gamma_{(d)}$ pour les valeurs strictement croissantes de d on obtient un variogramme qui résume la structure spatiale de la variable. Le variogramme offre des informations importantes sur la variation de la variable (linéaire ou non linéaire). La croissance sur la distance d peut être mesurée en toute direction, ce qui mène forcément à des variogrammes différents parce que sur chaque direction l'espace a des caractéristiques différentes, à cause de l'anisotropie spatiale. Dans nos calculs nous avons gardé les mêmes valeurs de l'anisotropie pour toutes les directions et cela pour des raisons multiples:

- la trajectoire changeante des voies ne permet pas l'étude différenciée de l'anisotropie;
- le but de l'analyse est d'estimer l'accessibilité autour de chaque station or, les distances entre les stations étant très réduites, les agrégats de stations induisent de toute façon une puissante anisotropie perpendiculairement sur le sens de leur succession et des tendances isotropiques sur la direction de leur succession;
- le but final n'est pas une typologie locale mais une typologie régionale du territoire en fonction de son accessibilité ferroviaire.

Après la construction du variogramme, on peut lui associer la fonction mathématique (linéaire, lognormale, exponentielle, etc.) qui ajuste le mieux possible la variation spatiale de $\gamma_{(d)}$. Pour notre analyse, nous avons utilisé la fonction linéaire $\gamma_{(d)} = Ed$, où E est l'échelle des composantes structurelles du variogramme et d est la distance qui sépare les couples de points et qui montre la vitesse de la variation de E avec sa croissance (Isaaks, Mohan, 1989). En régionalisant avec cette fonction les valeurs connues (par interpolation), leur distribution discontinue est transformée dans une distribution continue. La surface résultante est en effet l'expression de l'estimation de la valeur de chaque point du territoire en fonction des points situés dans un voisinage immédiat (méthode appelée *krigeage* en français, *krigging* en anglais), la cartographie ultérieure de ces valeurs lissées étant très simple (Béguin, Pumain, 1994).

LE CALCUL DE L'EFFICACITÉ DU RÉSEAU FERROVIAIRE

L'estimation de l'accessibilité d'une station quelconque est effectuée, comme nous l'avons vu, soit en fonction du nombre minimum de kilomètres qui doivent être parcourus entre cette station et la plus éloignée autre station, soit en fonction du temps minimum nécessaire à parcourir la distance qui sépare une station quelconque de la plus éloignée (en temps) autre station.

L'analyse de cet indicateur doit être faite très attentivement car dire que Timişoara a une accessibilité réduite, en temps et en espace (Fig. 1 et 2), ne

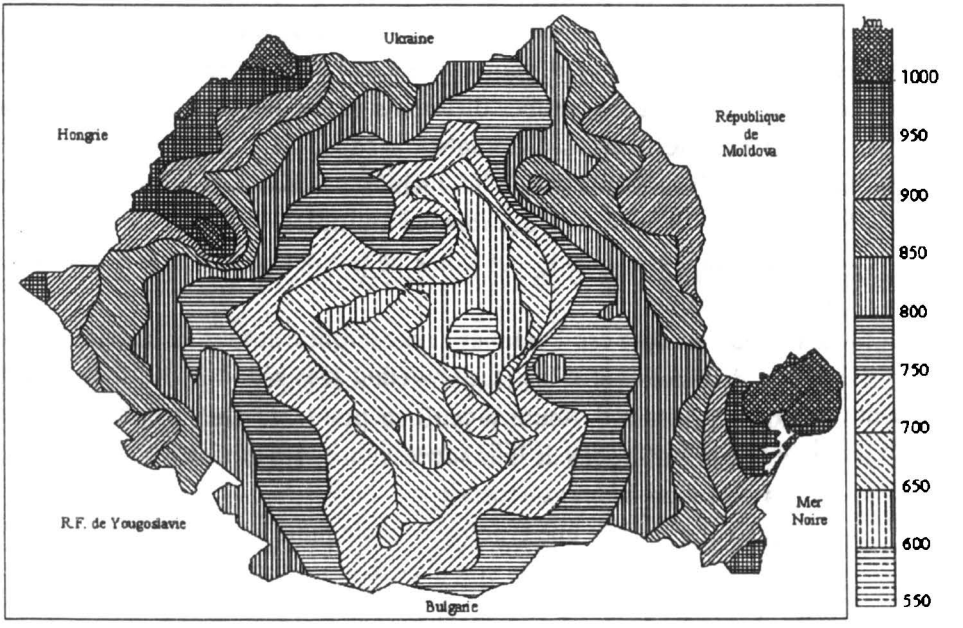

Fig. 1 – L'accessibilité ferroviaire kilométrique du territoire roumain (*krigging* à partir de l'accessibilité spécifique de chaque station, dont la valeur est égale au plus court itinéraire entre une station quelconque et la plus éloignée autre station de chemin de fer, trains de voyageurs.

signifie ni le manque d'infrastructure ferroviaire ni une faible efficacité du réseau local. Cela signifie seulement que la distance moyenne et le temps moyen nécessaire au déplacement entre Timişoara et autre station ont des valeurs plus élevées que pour la plupart des autres stations de la Roumanie. Si, par contre, on affirme que le réseau qui desservit Miercurea Ciuc (Fig. 3) a une efficacité réduite, cela signifie que la vitesse moyenne qui permet la réalisation de la liaison entre Miercurea Ciuc et les autres stations est plus réduite que ce qu'on aurait dû enregistrer si le réseau avait été distribué de façon homogène sur tout

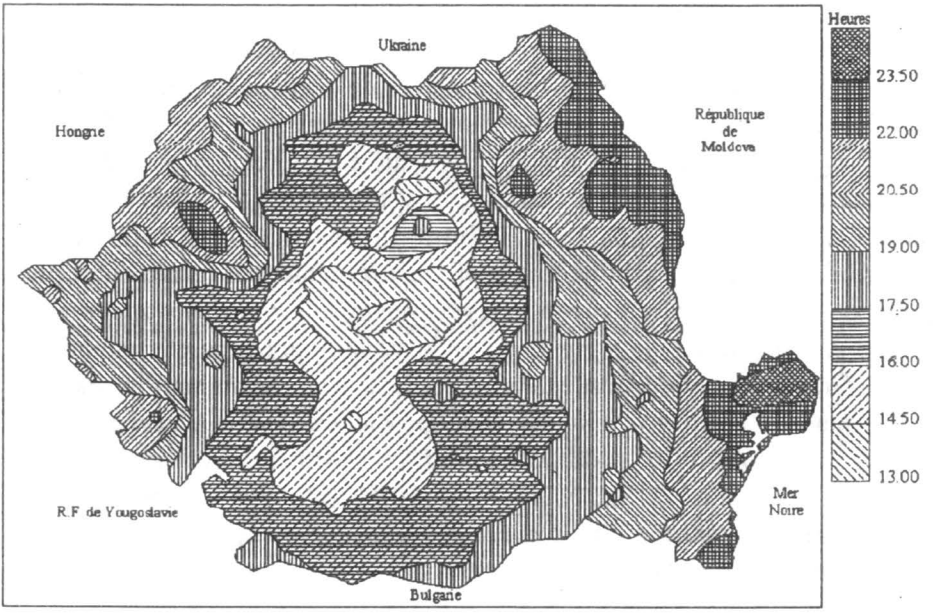

Fig. 2 – L'accessibilité ferroviaire horaire du territoire roumain (*krigging* à partir de l'accessibilité spécifique de chaque station, dont la valeur est la plus courte distance-temps entre une station quelconque et la plus éloignée autre station de chemin de fer, trains de voyageurs).

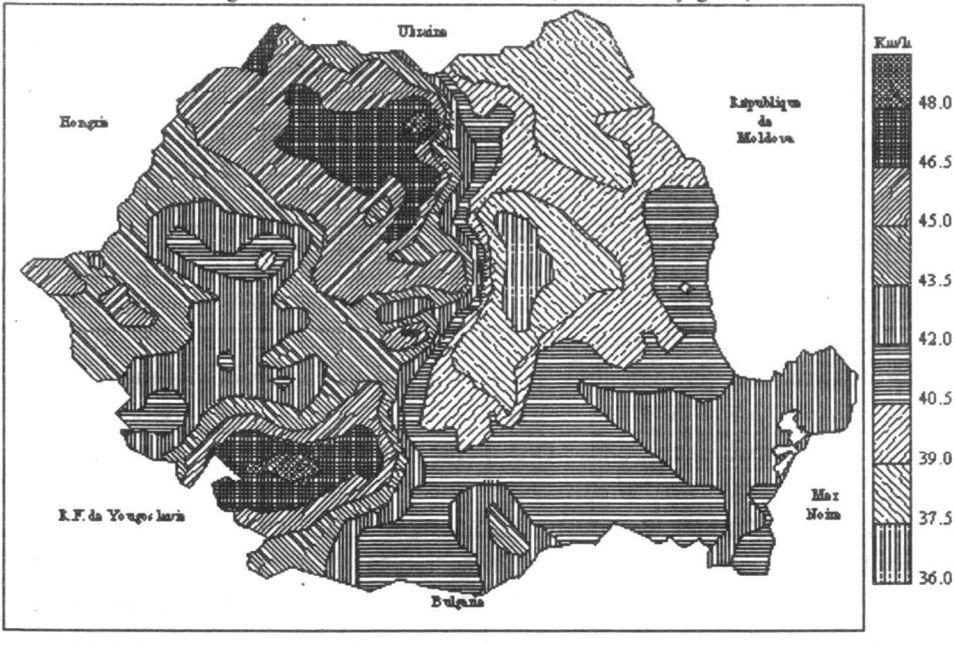

Fig. 3 – L'efficacité du réseau ferroviaire (*krigging* à partir de la localisation des stations en fonction de la vitesse moyenne établie sur le plus court itinéraire mesuré en distance kilométrique et en distance-temps entre une station quelconque et la plus élognée autre station de chemin de fer, trains de voyageurs).

le territoire. Si l'on compare la position des deux villes dans le système ferroviaire (Fig. 1, 2 et 3), il est évident que, grâce à sa position centrale, l'accessibilité de Miercurea Ciuc est supérieure à l'accessibilité de Timişoara, mais que, suite aux différences qualitatives du réseau, la situation est inverse quant à l'efficacité.

Il est évident que l'estimation de l'efficacité du réseau ne peut être faite qu'en mettant en relation les deux types d'accessibilité: kilométrique et temporelle. En sachant que l'accessibilité kilométrique est différente de l'accessibilité temporelle (l'itinéraire le plus court n'étant pas forcément le plus rapide), on peut estimer l'efficacité du réseau ferroviaire comme le rapport entre l'accessibilité kilométrique *minmax* d_{ij} et l'accessibilité temporelle minmax t_{ij} (Cattan, Grasland, 1997). Ainsi calculée, l'efficacité du réseau pour la station i, respectivement E_{ri} *est la vitesse moyenne ferroviaire (km/h) nécessaire pour atteindre ladite station en partant de toutes les autres stations, ce qui revient à faire le rapport entre le plus court trajet mesuré en distance kilométrique et le plus court trajet mesuré en distance-temps qui sépare la station analysée i de la plus éloignée autre station j*:

$$E_{ri} = \frac{\min \max d_{ij}}{\min \max t_{ij}}.$$

L'indicateur obtenu est très flexible et assez proche de la réalité car il prend en compte simultanément l'accessibilité kilométrique (trajet optimal, liaisons directes, ou au contraire) et l'accessibilité temporelle (le rôle du relief et de la qualité de l'infrastructure sur la durée du déplacement).

L'ACCESSIBILITÉ DU TERRITOIRE ET L'EFFICACITÉ DU RÉSEAU FERROVIAIRE ROUMAIN

La construction du territoire roumain moderne (1859–1918–1945) dans une forme quasi circulaire et aussi ses grands traits géomorphologiques qui ont imposé l'organisation du réseau ferroviaire dans des anneaux concentriques, sont en grande partie les responsables de la façon dont sont ordonnées aujourd'hui les valeurs de *l'accessibilité spécifique*. La géométrie de ces valeurs met en évidence une diminution presque uniforme, de l'espace central plus accessible vers les périphéries de moins en moins accessibles. L'allongement méridien des plages des valeurs est une expression évidente des contraintes politiques et morphologiques qui ont régi l'expansion du réseau ferroviaire et surtout une expression des actions des dernières décennies socialistes qui ont ciblé le perfectionnement et la modernisation des connexions ferroviaires.

Le réseau ferroviaire roumain est un réseau structurellement composite car il témoigne d'un héritage historique différent et des logiques territoriales différentes. Les régions qui étaient intégrées à l'empire Austro-Hongrois durant l'expansion initiale des chemins de fer (Bucovine, Transylvanie, Maramureş, Crişana, Banat) gardent encore une orientation est-ouest dominante des trajets ferroviaires[1], specifique pour toutes les périphéries orientales des espaces contrôlés autrefois par le noyau administratif Budapest – Vienne (cela est visible aussi par exemple en Silésie, Galicie/Galicija ou dans l'ouest de la Pologne, jadis prussienne). Le manque d'intérêt – au moins dans une première étape – vis-à-vis des liaisons avec les ports du Bas-Danube est expliqué par la polarisation exercée sur le réseau du Banat par des ports plus proches (Baziaş et Orşova, par exemple).

Le réseau initial du Royaume de la Roumanie, mis en place selon une logique commerciale, était fondé sur un réseau demi-circulaire qui suivait de près les Sous-Carpates, à partir duquel rayonnaient vers les ports du Danube et la Mer des axes secondaires[2] qui supportaient les flux d'exportation (bois, sel, pétrole, céréales). La même logique strictement commerciale qui recherchait le Danube et la mer fut à la base des interconnexions transcarpatiques réalisées sur la relation Ciceu-Adjud-Mărăşeşti-Galaţi entre le réseau transylvain et le réseau du Royaume. L'annexion de la Bessarabie a empêché Iaşi de s'affirmer comme un nœud ferroviaire important de la Moldavie par l'abandon d'un projet de construction d'un chemin de fer sur la Vallée du Prut et d'un réseau direct vers Odessa, tandis que l'annexion de la Bucovine du Nord a retardé et, ensuite, a rendu peu intéressante la construction d'une liaison directe Piatra Neamţ–Târgu Neamţ–Fălticeni–Berchişeşti vers le tronçon Suceava Nord–Cernăuţi qui ouvrait les routes européennes.

D'abord après 1918 et ensuite après 1945, tant pour les gouvernements de l'entre deux guerres que pour le pouvoir communiste de plus tard, dans la construction de nouvelles voies ferrées est devenue dominante une stratégie politique d'intégration à tout prix des régions historiques par leur encadrement dans un réseau ferroviaire cohérent. Il est évident que dans ces conditions l'efficacité territoriale du réseau est restée au second plan. La position

[1] Principaux chemins de fer de l'époque: Baziaş – Oraviţa (1856); Oraviţa – Anina (1863); Jimbolia – Timişoara (1857), prolongé ensuite avec Timişoara – Stamora Moraviţa – Jasenevo (1858) en liaison directe avec Vienne; Oradea – Borş (1858), puis Oradea – Cluj (1870) et Cluj – Braşov (1873) et Curtici – Arad (1858), puis Arad – Alba Iulia (1868), les deux en relation directe avec Budapest; Suceava – Cernăuţi (1868), avec liaison pour Vienne par Lvov et Cracovie, etc.

[2] Principaux chemins de fer de l'époque: Bucureşti – Giurgiu (1869); Bucureşti – Suceava et Bucureşti – Piteşti (1869–1872); Iaşi – Paşcani (1870); Constanţa – Cernavodă (1860), reliée par le pont de Cernavodă (1895) avec la voie Bucureşti – Feteşti (1887); Piteşti – Craiova – Vârciorova (1874).

méridionale excentrée de Bucarest, qui devait absolument devenir le noyau central d'un territoire unitaire est le facteur décisif qui a imposé le choix de privilégier les relations nord-sud au détriment des relations est-ouest. La concentration des fascicules de voies par trois grandes vallées transcarpatiques (les vallées du Jiu, de l'Olt et de la Prahova) qui rassemblent les chemins de fer qui convergent vers la Transylvanie venant de l'est (la Moldavie) ou de l'ouest (Crişana, Banat) a nettement favorisé la partie centrale du pays, fait mis en relief sur toutes les figures du texte. La relation Craiova–Turnu Severin–Caransebeş fait figure de liaison secondaire et un peu redondante (la légère croissance de l'accessibilité de l'Olténie ne peut pas cacher les valeurs réduites qui caractérisent le Banat, cf. Fig. 1 et 2).

Toutes les trois premières cartes mettent en évidence les trajets des lignes magistrales qui ont été construites et ensuite connectées conformément au principe du moindre effort (dans le sens donné par Zipf, 1949).

Les vallées des rivières et les points obligatoires de passage transcarpatique prolongent les plages des valeurs indiquant une bonne accessibilité du centre du pays (Transylvanie) vers la Moldavie (Ilva–Suceava, Ciceu–Adjud), vers Crişana (Dej–Oradea), vers Banat (Deva–Arad) et vers l'Olténie (Simeria–Filiaş–Craiova). Le même principe du moindre effort est souligné aussi par la liaison Moldavie–Mer Noire, qui évite une ligne directe passant par Galaţi ou Brăila, techniquement difficile, au profit des liaisons déjà existantes par Bărăgan et le pont de Feteşti–Cernavodă.

Dans le cadre du réseau ferroviaire roumain le principe du moindre effort ne garde pas trop de sa substance parce qu'il a été soumis plus aux intérêts politiques et stratégiques qu'aux intérêts économiques. Le dessin actuel du réseau reflète le fait que sa logique intrinsèque fut d'intégrer des territoires en tant que tels (régions historiques et même économiques comme la Plaine de la Jijia ou les bassins de pétrole et de charbon), ignorant les points de résistance de ces espaces que sont les villes. Même le vocabulaire courant, mais aussi celui scientifique, en témoigne: on parle, par exemple, des «liaisons qui relient les régions d'un côté et l'autre des Carpates», de «désenclavement de la Moldavie», «liaisons avec la Transylvanie», etc. On est arrivé ainsi à une belle organisation concentrique des valeurs de l'accessibilité du territoire (Fig. 1 et 2) qui cache en fait un déséquilibre profond de l'efficacité du système (Fig. 3).

L'analyse du réseau des chemins de fer des figures 1 et 2 met en évidence le fait que des villes moyennes parfois de taille importante, qui auraient pu se constituer dans de véritables moteurs régionaux (Iaşi, Bacău, Galaţi, Brăila, Constanţa, Tulcea, Bârlad) sont périphériques non seulement parce qu'elles ont vraiment une position excentrée dans le réseau, mais parce qu'elles ont été enclavées au nom du désenclavement de la région dans laquelle elles sont situées. Les coûts supérieurs qui auraient dû être payés pour vaincre les contraintes

hydrogéologiques et géomorphologiques sur certaines directions ont forcé le choix de quelques trajets moins difficiles mais aussi peu efficaces en plan territorial. La relation Roman–Buhăieşti à la place d'une relation directe Bacău–Vaslui/Bârlad, plus difficilement réalisable, mais qui aurait mis en relation deux centres majeurs de la Moldavie est un exemple. Braşov, dépourvu de relation directe avec les grandes villes de l'Olténie et de la Moldavie en est un autre. Parfois même les territoires sont restés à un niveau très bas d'intégration: la Moldavie (où la Vallée du Prut est un véritable *no man's land*) et la Dobrogea sont des cas déjà classiques.

Dans ces conditions il n'est pas inexplicable le fait que la moitié occidentale du pays soit équipée d'un réseau plus efficace, assurant des liaisons plus fluides des territoires locaux avec le reste du territoire national. En Transylvanie, au Banat et en Crişana le projet ferroviaire initial a été régi clairement, conformément aux contraintes de la première révolution industrielle, par les principes de l'efficacité économique. Dans l'espace olténien, la combinaison de la logique politique (création des connexions transcarpatiques) avec la logique économique (relations avec les exploitations de pétrole et de charbon) a conduit finalement à une augmentation évidente de l'efficacité du réseau ferroviaire. A l'est, où la construction des voies a été plus tardive, où l'orientation vers Bucarest témoigne principalement d'un projet politique[3], et où les fortes contraintes politiques ont interdit la construction d'un chemin de fer au long du Prut, le réseau est moins efficace, la plupart de villes principales ont des liaisons difficiles avec le reste du territoire.

Pour tester l'efficacité du réseau dans les conditions hypothétiques où la logique socio-économique aurait été déterminante, nous avons refait les calculs dans l'hypothèse de l'augmentation du degré de connectivité du graphe des chemins de fer, en ajoutant théoriquement 780 km de voie répartis entre 71 nouvelles gares. Ces nouvelles voies ont été choisies soit pour relier des gares terminus situées en cul-de sac (Vaşcău–Gurahonţ, Nehoiaşu–Întorsura Buzăului, Hârlău–Botoşani, Bixad–Sarasău), soit pour mettre en liaison directe des centres urbains importants et pour désenclaver des espaces périphériques (Piatra Neamţ–Târgu Neamţ–Fălticeni–Suceava; Târgu Neamţ–Toplița, Bacău–Bârlad; Iaşi–Huşi–Galaţi–Tulcea, Odorheiu Secuiesc–Miercurea Ciuc, Breţcu–Oneşti, Săveni–Darabani). Les figures 4 et 5 montrent une amélioration nette de l'accessibilité spatio-temporelle des aires périphériques, mais le phénomène le plus important est la diminution de l'organisation nord-sud du réseau au profit d'une augmentation de l'importance des liaisons est-ouest, ce qui signifie d'abord une homogénéisation temporelle de l'accessibilité ferroviaire du territoire. Par contre, l'efficacité de réseau a la tendance de diminuer quantitativement (Tableau 1), fait

[3] Et où un sous-système spatial du réseau, à savoir la Bucovine, a été dès le début orienté vers le nord ou vers l'ouest, conformément aux projets stratégique et économique des Autrichiens qui ont gouverné cette région entre 1775 et 1918.

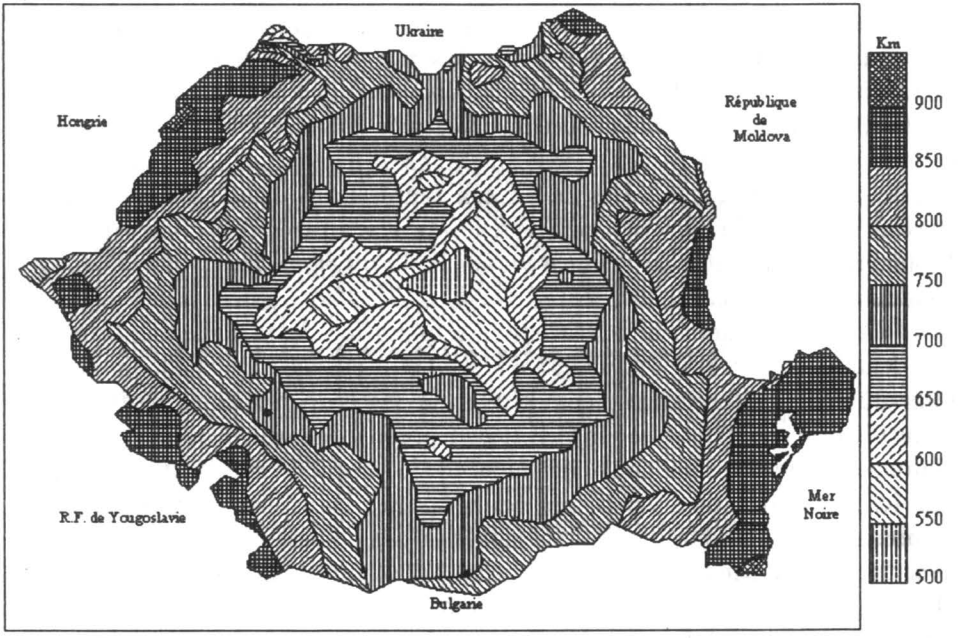

Fig. 4 – L'accessibilité ferroviaire kilométrique du territoire roumain dans l'hypothèse d'augmentation de la connectivité du réseau (*krigging* à partir de l'accessibilité spécifique de chaque station, dont la valeur est égale au plus court itinéraire entre une station quelconque et la plus éloignée autre station de chemin de fer, trains de voyageurs).

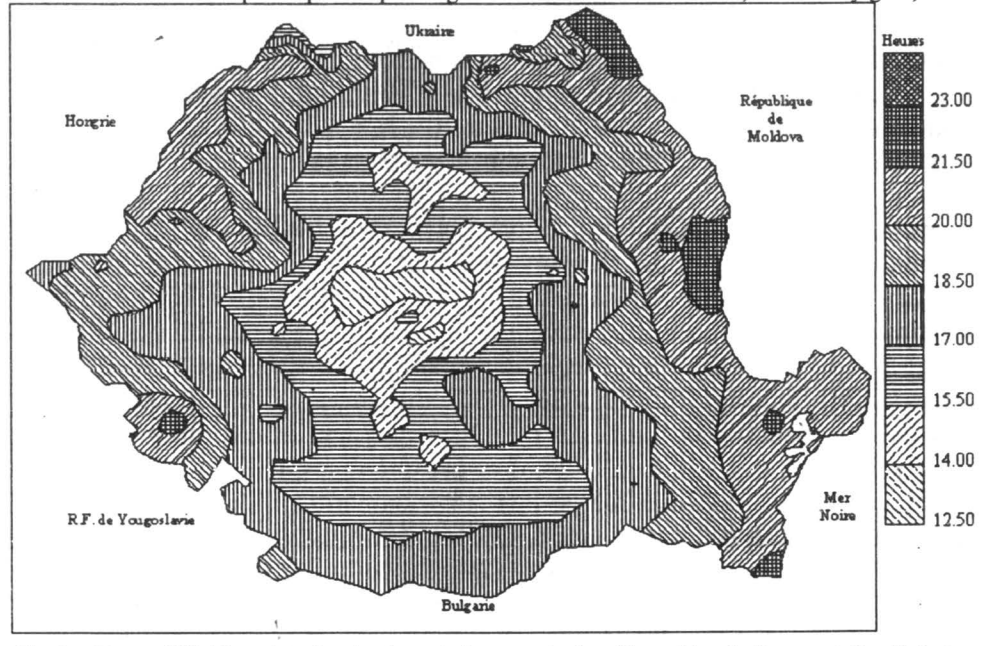

Fig. 5 – L'accessibilité ferroviaire horaire du territoire roumain dans l'hypothèse de l'augmentation (*krigging* à partir de l'accessibilité spécifique de chaque station, dont la valeur est la plus courte distance-temps entre une station quelconque et la plus éloignée autre station de chemin de fer, trains de voyageurs).

Tableau 1

	Accessibilité kilométrique (km)			Accessibilité horaire (heures)			Efficacité du réseau (km/h)		
	max.	moyenne	min.	max.	moyenne	min.	max.	moyenne	min.
Réseau réel	1036	788,30	572	24,03	18,43	13,68	48,97	42,89	36,76
Réseau hypothétique	914	734,14	497	22,85	17,74	12,51	49,24	41,46	35,41
Différence	122	54,16	75	1,18	0,69	1,17	-0,27	1,43	1,35

normal d'ailleurs car les trajets ajoutés traversent des aires difficiles, montagneuses ou collinnaires, ou s'inscrivent dans les espaces des périphéries extrêmes du territoire national, augmentant le temps d'accès.

Par contre, qualitativement, – et c'est très important – le réseau hypothétique est caractérisé par une très avancée tendance d'homogénéisation des valeurs de l'efficacité (Fig. 6). De la perspective de la gestion du réseau, son homogénéité – même avec le prix initial de la diminution de son efficacité – est une nécessité fondamentale dans les processus globaux de modernisation des équipements et des infrastructures. Les activités de construction des voies doubles, de l'électrification et de la réalisation des connexions locales en relation avec les demandes générales du système sont des opérations qui exigent avant

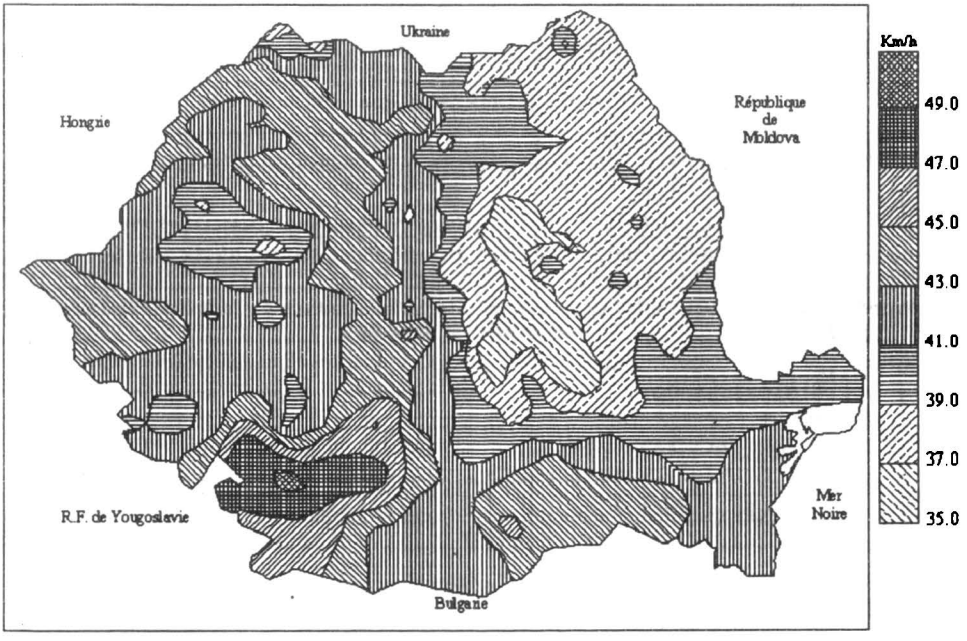

Fig. 6 – L'efficacité du réseau ferroviaire de la Roumanie dans l'hypothèse d'augmentation de la connectivité du réseau (*krigging* à partir de la localisation des stations en fonction de la vitesse moyenne établie sur le plus court itinéraire mesuré en distance kilométrique et en distance-temps entre une station quelconque et la plus éloignée autre station de chemin de fer, trains de voyageurs).

toute chose une harmonisation territoriale des valeurs de l'efficacité du réseau. Dans le cas contraire, les dysfonctionnements sont très fréquents: précarité des tronçons Suceava–Ilva Mică, Bârlad–Iaşi, Filiaşi–Simeria, Craiova–Caransebeş, où alternent des secteurs simples avec des secteurs doubles, des secteurs électrifiés avec des secteurs non électrifiés; le rallongement injustifié des relations Iaşi–Braşov–Craiova via Ciceu, Iaşi–Timişoara via Cluj, Oradea/Baia Mare/ Satu Mare–Constanţa via Ploieşti, etc.

Notre analyse garde surtout le niveau d'une étude méthodologique, car d'un côté le manque des données statistiques interdit les calculs de l'accessibilité pour les trains de marchandises et, d'autre côté, la prise en compte seulement des stations en trafic de voyageurs en régime rapide aurait réduit l'intérêt de cet article. Dans une perspective pratique, notre analyse est justifiée par la réalité, car la plupart des déplacements sur des moyennes et longues distances (100–250 km) s'effectuent en train tant par la population urbaine que par la population rurale. Plus encore, les indicateurs obtenus offrent une image d'ensemble sur l'accessibilité ferroviaire du territoire et sur l'efficacité générale du réseau ferré roumain. Vu le retour en force des transports par chemin de fer dans l'espace mondial, l'intérêt accordé à l'étude de l'accessibilité territoriale à travers le réseau ferroviaire ne peut qu'augmenter.

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SUSTAINABLE RURAL DEVELOPMENT OF THE LOWLAND COUNTRYSIDE IN ROMANIA. GEOGRAPHICAL CONSIDERATIONS

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Key words: village, hamlet, rural development, Romanian Plain.

Le développement durable du village roumain de la plaine. Considérations géographiques. La Plaine Roumaine a offert depuis toujours des conditions naturelles extrêmement favorables au développement de l'agriculture, surtout aux céréales et à l'élevage. Par conséquent, jusqu'au milieu du XX[e] siècle le village de la plaine s'identifie, par excellence, au développement de l'agriculture. Après la guerre son évolution a été distorsionnée: on lui a imposé une tout autre voie de développement de type «socialiste», impropre à ses conditions géo-historiques et à la tradition de ses habitants. Depuis 1989 le village roumain se trouve à un important croisement de routes. Le retour à l'économie de marché – la seule option valable – ouvre au village, non sans difficulté et par une longue étape de transition, la voie vers un développement rural durable plurifonctionnel et efficace au point de vue économique et, en même temps, dans des limites supportables pour le géosystème.

Over the past few centuries, the Romanian village has been engaged primarily in agricultural activities, particularly so in the lowland countryside, where the plain covers one-third of the national territory and natural conditions are very good for farming. Even today, village development and the practice of agriculture are intimately related and interdependent. Apparently, this evolution will continue over the next few years, too. But, as the present stage is left behind, the relationship between the two elements will progressively change.

Having an understanding of the issues the Romanian village is facing does not necessarily mean that its stringent demands should be urgently met at all costs. A correct assessment and elaboration of short-term programmes should rely on a critical approach of previous evolutions. And this is precisely what this paper attempts to do, proceeding from a brief overview of the Romanian village in the plain area over the last two centuries, analysing the impact of its demographic decline and its chances for a sustainable development in the Romanian Plain.

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DEVELOPMENT OF AGRICULTURE IN THE LOWLAND VILLAGE
(19th–20th centuries)

All along the centuries, the lowland village in Romania has represented an intimate unity between the genealogical group and the estate (commons) inherited from ancient times.

The Romanian Plain has always been an open area, where the autochthons have witnessed the passage or temporary settlement of populations coming from the east, south-east but also from the south of the river Danube. Under these circumstances, village size and its population as well as the development of farming were fairly limited, much of the plain area being covered by oak forests. The locals practiced an agriculture of subsistence, raising animals as a rule, and cultivating a few plants. The greatest part of the plain was divided among huge lordly and monastery estates. The majority population of free peasants possessed only 25–30% of the Romanian Plain area.

Beginning with the 19th century, lowland village life changed profoundly. As the Turkish monopoly was abolished and trade on the Danube was liberalised (1829), people started cultivating crop plants. They cut the forest to make room for cropland. Over the 1829–1864 period alone, the cultivated area in the Danube Plain registered a sevenfold increase. As from the mid-19th century, the agricultural output was destined to the market. Agricultural production itself underwent changes, cereals for sale rising to the top of the table. The land reforms and the successive amendments (1864, 1889, 1894, 1923 and 1946) reduced the large lordly estates, gradually strengthening the medium-sized peasant holding (10–50 ha).

As a consequence, by mid-20th century, the lowland village was identified with the *social group* derived from the old *genealogical peasant community*, formed of peasant farmers who used to grow mainly cereals (wheat, maize). The Romanian village from the southern plain was synonymous with *agrarian economy*, the farmers representing 80–90% of the population of each village. Village development went hand in hand with the development of agriculture.

In the years 1948–1950 this process came to a sudden halt (Fig. 1). During a long period of transition (1948–1962), a socialist model of development alien

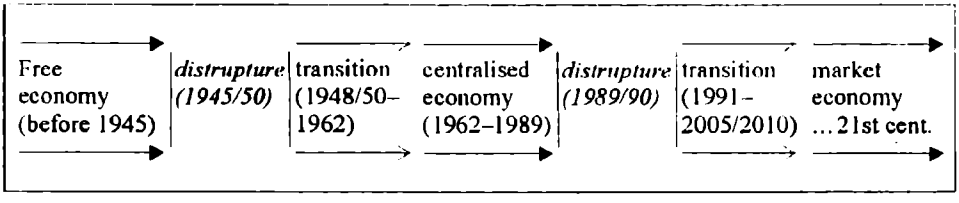

Fig. 1 – Transition, a stage in the development of Romania during the latter half of the 20th century.

to local specificity, was being enforced. Several cohercive measures (expropriation of holders of over 50 ha; imposition of the aberrant quota system over agricultural output; forcible enrollment in agricultural "associations" later turned into collective farms, etc.) concluded the collectivisation of agriculture in the years 1960–1962. It was taken to be a great success, at that time.

There is no denying that some positive results were obtained (increased overall outputs and soil productivity through the use of mechanical works, chemisation, irrigation, crop rotation), but the social effects were very disastrous and they had negative consequences in the long run, *e.g.*:

1. private property rights over the land estate were abolished;
2. the peasant became estranged from the land he was working on, turning simply into a farm employee;
3. the peasantry, the main social class in prewar Romania, was dismantled.

A second disruptive event took place during 1990–1991 when the Romanian village entered a new phase of transition, which has continued throughout this decade. This time it was a reverse process, namely, from a highly centralised economy in a state of crisis, towards a free market economy based on the private individual (family) farm.

In a first phase of transition (1990–1997) the village registered socio-economic regression, becoming weaker economically, with direct negative effects on most villagers' quality of life. However, there are some encouraging, though timid signs of a possible stepwise revigoration of the lowland countryside, visible especially after the 1995–1996 period.

THE DEMOGRAPHIC DECLINE AND ITS IMPACT ON SUSTAINABLE DEVELOPMENT IN THE OLTENIA PLAIN COUNTRYSIDE

The demographic component is an element of overriding importance in the lowland village geosystem, moreover so, as the technical endowment is quite deficitary.

The relationship between the demographic factor and village development is particularly relevant in the western part of the Romanian Plain. Our case-study covers Dolj and Olt counties, largely overlapping the Oltenia Plain, the northern half of the Boian Plain (east of the Olt Valley) and the south of the Getic Piedmont (a plain-to-lower plateau transitional zone). The study refers to the Oltenia Plain and its neighbouring areas, a densely populated zone with a robust economy not so very long ago. Despite being polarised by Craiova city, one of the large urban centres of Romania, the studied zone is undergoing a process of severe depopulation and demographic regression that alters its normal structures. The rural population also strives to cope with an agriculture, itself experiencing a deep-going process of restructuring.

Looking at the recent numerical evolution of villagers in Oltenia and their current structure (1995 level), it emerges that a steep demographic decline took place in the 1980s and 1990s. As a matter of fact, this is the most striking feature: the village (or part of it) appears sometimes deserted. Obviously, the phenomenon takes up different forms of manifestation, but the number of inhabitants and its dynamics by commune, age and sex structure is quite conclusive.

Numerical evolutions over the last 25 years (1977–1995) reveal a generalised decreasing trend, a demographic involution with up to 50% losses in 1995 as against the 1977 total.

The decrease was the more dramatic (by 25–50%) in the settlements located inside the plain, especially alongside the small valleys (the Teslui, Olteț, Drincea and Desnățui) and in the plateau zones in the north of the plain. Percentages under 25% were recorded by the villages sited in the Olt, Jiu and Danube valleys. In general, each communal seat usually maintained its population, or registered smaller losses. The situation is really warrying in the component villages themselves.

A first consequence is that *population density decreased* in 1995 below the national average of 95.14 inhab./sq km to 75 inhab./sq km in over three fourths of the communes of the Romanați and Boian plains, and to under 50 inhab./sq km in half of the villages of Olt and Dolj counties.

In some 50% of the rural settlements the demographic decline began in the years 1966–1970, differentiated in the territory as follows: 1976–1980 in the north of the plain, and 1981–1985 in the urban neighbourhood where they represented rather a small category.

A second consequence is the *decrease of middle-sized villages* on either side of the Jiu river, from 2,000 to some 1,500–1,600 inhabitants, concomitantly with the numerical increase of small villages (under 500 inhab.) and the reduction of large and very large settlements (2,500–5,000 inhab., respectively). At the same time, the demographic rank of each village has been declining. In other words, the demographic decline of the lowland village has acquired a generalised character, with direct impact on its demographic potential, as the respective area is emptied of its active population.

The size decrease of the rural settlements over 1977–1995 brings into the limelight the question of hamlets, a specific type of settlement in the Romanian countryside of previous centuries.

The existence of the *hamlet* as a settlement was legalised in 1864 as a first level of habitation under the administration of communes (the second level being the village). The law rules that settlements with less than 100 inhabitants fall into the category of hamlets, those with over 100 inhabitants form a village. In 1884, the threshold was raised to 500 persons. In 1950 the hamlet was left

out of Romania's administrative-territorial structure, nor was it included in 1968, when a new nation-wide administrative and territorial division was put into effect. However, the latest evolutions in the countryside might show the hamlet to be a viable category of rural settlements not only in the hill and mountain regions, where small rural settlements are a characteristic feature, but also in the lowlands where there is space enough for the village to expand. And, as an illustration of the above, the number of hamlets over 1966–1992 nearly doubled in Olt county, from 45 to 85, and from 26 to 44 in Teleorman county. In Dolj county, more precisely within the boundaries of the Romanați Plain, they increased from 12 to 20.

The immediate causes of village population decrease in the Oltenia Plain are the reduction of the natural increase by an alarming drop in birth rates and the active population's exodus to town in the 1970s and 1980s.

The socio-economic factors that caused radical differences between the urban and the rural, turning the latter into a second-hand category with limited habitat conditions and, moreover, incapable of offering the individual socio-professional opportunities, continue to be in place this very day.

Some of the major consequences will show up in time, after the lapse of one or two decades, generating hardly foreseeable structural changes.

So, for example, is the changing age and sex structure of the village population in the southern plain, as recorded by the last census (1977–1992). The ensuing demographic processes have had radical repercussions on the respective rural area: the process of aging and feminisation of communes in-between the major valleys is generalising. The elderly population (aged 60 and over) frequently amounts to 25–30%, which means the doubling or trebling of the normal share of this social group within the total population.

Women, in their turn, have come to represent up to 51–52% of the communal population. At the same time, the young group (0–14-year-old) has dropped significantly to under 20% in the majority of cases, and even under 15% in some of the villages (1992) (Drăgoteşti, Robăneşti, Pieleşti, Ghercești, etc., in Dolj county; Radomireşti, Văleni, Mihăileşti, etc. in Olt county).

The proportion of elderly people within the total population gives the *demographic aging indicator.* Last census figures (1992) show that there are two, or even three elderly people to one young person in nearly four fifths of the Oltenia Plain communes (Ghercești, Robăneşti, Drăgoteşti, Radomireşti, Mihăileşti, Vela, etc.). This trend got momentum after 1990. The population vitality indicator is given by the ratio between the group of the under 14-year-old and the group aged 60 and over. This indicator is even more relevant of the width and breadth of population aging and devitalisation throughout the studied plain (Fig. 2).

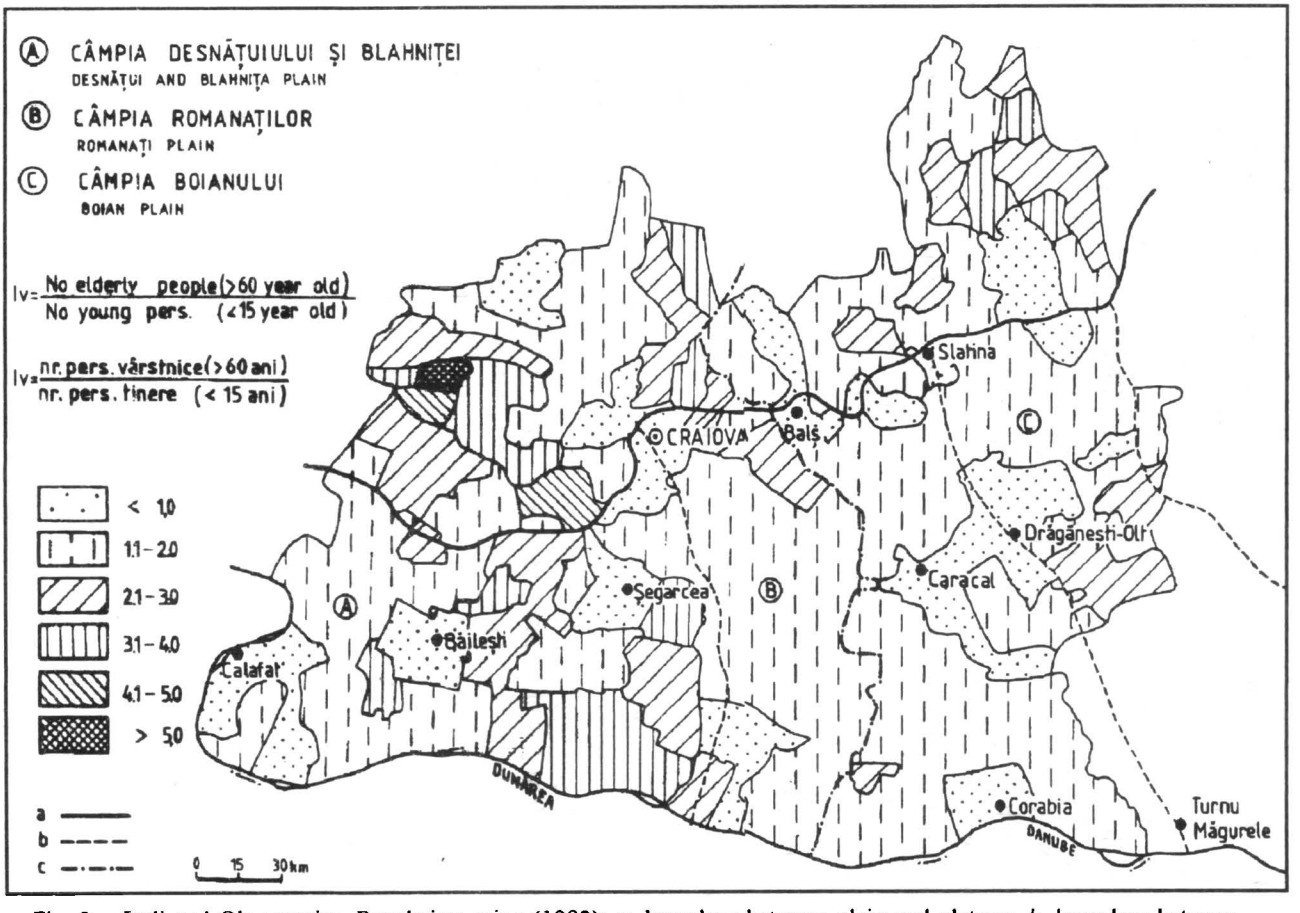

Fig. 2 – Dolj and Olt counties. Population aging (1992): *a*, boundary between plain and plateau; *b*, boundary between lowland sub-units; *c*, boundary between Dolj and Olt counties.

In the overwhelming majority of cases the ratio is 0.5–1 youth/1 elderly person, and even more dramatic (0.25/0.50) in-between the valleys, and also (and especially) in the Teslui Valley (Romanaţi Plain) and the Călmăţui Valley (Boian Plain), and this situation tends to expand. Apart from towns, where values are still close to normal, there are few places where things look fairly positive; exceptions are the villages located in the neighbourhood of the urban areas, or discharging a wider range of activities (Devesel, Fărcaşele, Potcoava, Sadova, Bechet).

As it is, the inactive/active population ratio is increasing at a fast pace, presumably continuing to do so over the next decade, too.

The impact of the demographic decline in the lowland village is mirrored by social costs, sometimes indirect but of overwhelming significance. For example, the strong traditional household (5–6 pers.) – the economic and social hardcore of the Romanian village – is falling apart, being replaced by the family household formed of 2–3 persons, and more recently of 1–2 persons. The mass-media (especially TV) dissemination of the town-life model has accelerated the value-changing process in the lowland village and people's attitude towards work. All these and many more not tackled herein, are the expression of a demographic decline in the Romanian Plain, part of which is the Oltenia Plain, affecting the human capital – as labour resource – both in quantity and quality (structure).

The *physiological density indicator* is another tool of evaluating the human capital of the lowland village on both sides of the Jiu and the Olt rivers (Fig. 3). This indicator is given either by the total population/agricultural land ratio, or by the farming population/agricultural area. In the latter case there is an average of one active farmer/3–4 ha agricultural land (0.00–0.25 pers/ha) in the north of the Oltenia and Boian plains and 1 pers./2–3 ha in the south of the plains.

There are a few cases when there is one farmer/1–2 ha agricultural land in the Danube Valley and the lower course of the Olt (Bechet, Urzica, Vlădila, Tia Mare, Izbiceni, Giuvărăşti, etc.).

In view of the technical endowment of agriculture in the Oltenia Plain, the above physiological density values are pretty low. However, in terms of total active population, values are slightly modified–one active pers./2–3 ha agricultural land. Since human pressure in the Danube and the Olt valleys is somewhat higher, the ratio is one pers./1–2 ha. Towns get more easily individualised, with a ratio of one pers./under 0.50 ha.

It follows that over 1995–1997, inside the Romanaţi, Desnăţui, and Boian plains there was labour shortage, while in the southern countryside the agricultural workforce was fairly sufficient.

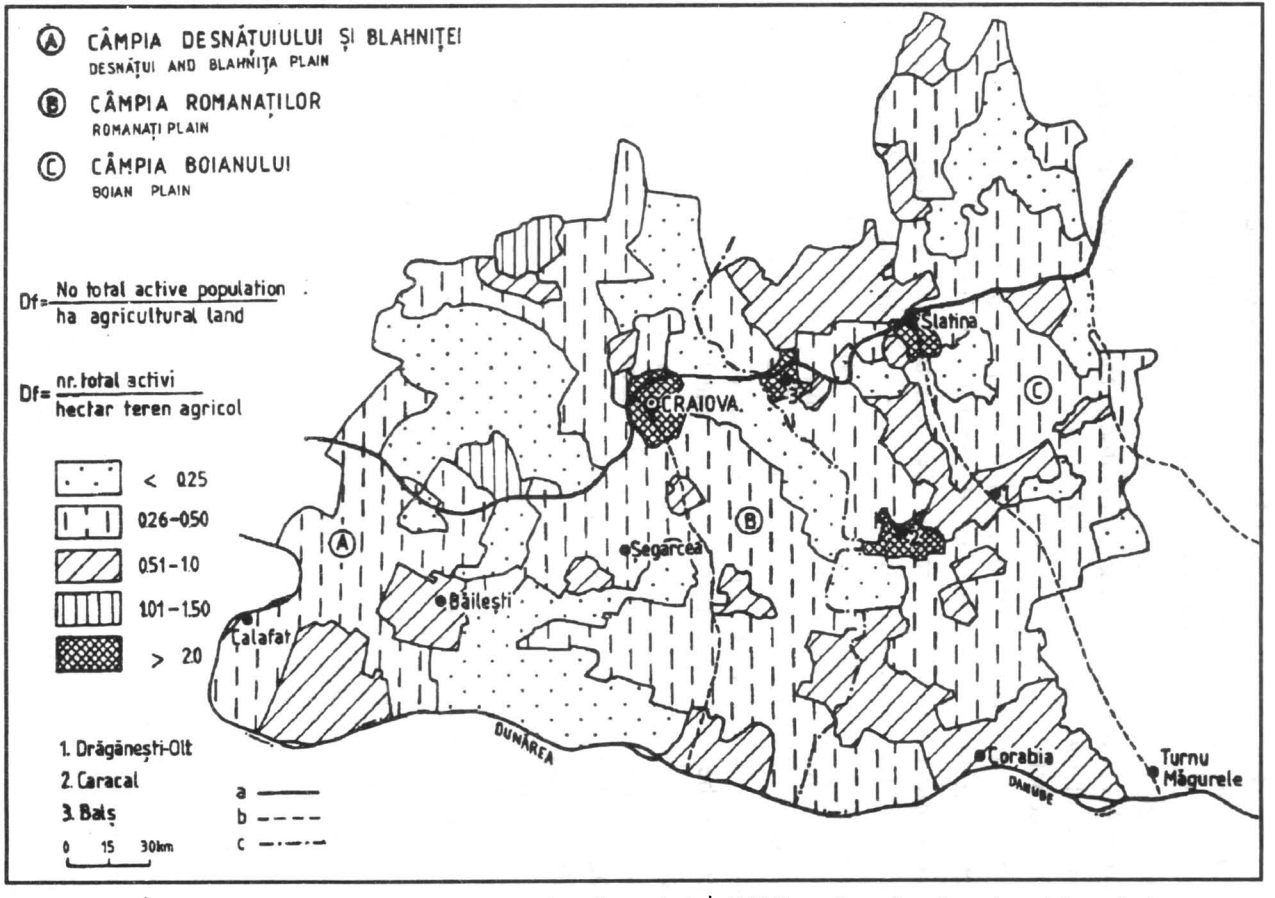

Fig. 3 – Dolj and Olt counties. Physiological density of population (1992): *a*, boundary between plain and plateau; *b*, boundary between lowland sub-units; *c*, boundary between Dolj and Olt counties.

THE LOWLAND ROMANIAN VILLAGE BETWEEN AGRICULTURAL AND RURAL DEVELOPMENT

In the mid-1990s the village of the Romanian Plain[1] was at a crucial moment. In order to emerge from the state of transition and move forward it has to overcome its fragile socio-economic situation determined by the evolution of some fundamental, conjunctural and specific factors, which converging, could revigorate the rural, generally.

What should be done is *to stabilise demographic regression* lest it should fall below the depopulation threshold (leading to the self-dissolution of some settlements through natural extinction of their families) and *to halt the degradation of demographic structures* (excessive aging, feminisation, villages of pensioners only, etc.).

Of similar importance is the preservation of *social group cohesion*, the outcome of a very homogeneous rural community, with close ties forged through centuries of common genealogy. At present, this group no longer resembles the villages community of the past. The local rural communities of the Romanian Plain are very homogeneous from an ethnical and religious point of view (an aspect of little relevance for the topic under discussion). Nowadays, they tend to become heterogeneous economically and socially, having clear-cut individual interest. The renowned village solidarity ought to materialise now in efficient local organisation to cope with the demands of a rural economy in transition to the market system.

An in-depth analysis of the present and a new outlook on the immediate future lie under the sign of a joint interest and greater awareness of belonging to the local community. What is also needed is a change of the traditionalistic village mentality, too conservative and fatalistic, and an opening to novelty, participation and initiative. Adopting a new attitude and accepting new concepts that explain man's place in a well-administered geosystem, in which other factors besides the economic one, ought to be given due consideration, is perhaps the most important thing.

In this light, people might opt for the ecological management of the rural area, maintaining it as part of an integrated geographical system (rural–urban), and for the extension of non-agricultural activities (processing and marketing outputs; related activities; activities of special interest; recreation and agreement, etc.) which, in some cases (peri-urban areas), may acquire greater importance than the agricultural development characteristic of the lowland village.

[1] The conclusions of this chapter rely on the results of a study under Romanian Academy's Grant No. 87/1998, on the *Revigoration of the Romanian village within complex geographical areas, Buzău County, a case-study.*

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INDUSTRIAL RESTRUCTURING AND THE UNEQUAL CHANCES OF ROMANIAN URBAN CENTERS[1]

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Key words: industry, restructuring, towns, Romania.

Restructuration industrielle et les chances inégales des villes de Roumanie. Analysée en termes théoriques et expérimentée au début par les sociétés capitalistes, la restructuration économique en général et celle industrielle en particulier, ont été récemment «adoptées» par les économies post-socialistes. Les particularités de la restructuration post-socialiste ont renouvelé le débat théorique, en ajoutant de nouvelles significations et profondeurs. De même, elle a enrichi la casuistique internationale avec des expériments originaux qui ont donné un regard inédit sur les certitudes et métaphores du développement. La transition économique a déterminé des conditionnements et des conjonctures specifiques qui ont marqué les trajectoires évolutives. L'un des effets majeurs de la restructuration est le déclin industriel urbain. Les évolutions particulières des villes sont analysées comparativement, mettant en évidence les corrélations entre la taille, la spécialisation, le contexte local et l'intensité du déclin. La restructuration a des effets différents sur les villes selon leur position dans la hiérarchie urbaine nationale.

Semantically speaking, 'restructuring' means changing an existing structure for a better, more efficient one, or an attempt at preventing destructuring risks. Originally conceived and experimented by the capitalist economies, the economic restructuring, in general, and the industrial one in particular, has recently been 'adopted' by the post-socialist economies, too. The peculiarity of post-socialist restructuring has renewed the theoretical debate, adding to it new signification and depth. It also has enriched the international casuistics with original experiments, giving a fresh outlook to development certitudes and metaphors.

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INDUSTRIAL RESTRUCTURING AND ITS IMPACT ON THE GLOBAL ECONOMY

The term 'restructuring' appeared at the end of the 1960s, when economic recession, viewed as a structural crisis, set in. The economic and, moreover, the industrial system, which 'consumer' societies had used to promote was suddenly disturbed by complex dysfunctions. This led to a difficult process of structural adjustment. Defining restructuring and understanding its dynamics means explaining model changes conjointly at global and local scales. The many possible approaches to industrial restructuring depend on the space scale and the point of reference. The space scale numbers localities, regions and the nation-state.

There are usually three points of reference which focus the discussion: the capital (firms, corporations, and industries), the labour force (employees and trade-unions) and the state (governments, industrial policies, laws and procedures). In terms of capital, industrial restructuring means comprehensive adjustment to changing contexts. In reality, it is a question of industrial mobility: putting up with competition requires manufacturing units to close down, merge, or transfer functions from the local to the international level. Restructuring may alter the functions exerted by corporate firms with vertical integration. Changes may entail fluxes of materials and information which may alter the position of firms in wielding power. All in all, restructuring signifies a change of strategy in matters of industrialisation and transition from one historical stage to another. The term restructuring has very broad conceptual connotations, involving legislative, financial, organisational, technological, spatial, property and sectorial transformations. In substance and scope, it represents one of the fundamental problems of present development worldwide (Popescu, 1990).

In the beginning, industrial restructuring was strictly a local concern, with focus on two types of area: the old, classical ones (mining, metallurgy and textile) and the big metropolises. As coal-mining was declining, shock-waves spread to the relating processing sectors, dysfunctions propagating in a chain reaction and generating imbalances throughout the economic, social and ecological systems. The crisis affected the big urban agglomerations, too, jeopardising industrial activities. In time, industrial restructuring and its problems spread also to other areas, the economic environmental crisis losing its strictly local character. At present, restructuring has affected most areas, whatever their industrial origin and specialisation. Industrial growth has acquired a punctual character.

CHARACTERISTIC TRAITS OF 'TRANSITION'

The shift from the centralised to the free-market economy, currently labelled 'transition' is a new, complex and many-sided process in time, yet contradictory in structure. Inevitably, there is incoherent understanding of the process of change. That this is so, is shown by the very name attached to the period we are going through: period of transition, a pretty ambiguous term that has temporal connotations, yet no clue as to the sense of evolution. Therefore, the period of transition cannot be defined by its content or significations: what can be said is that it represents a passage from the socialist to the capitalist mode of production, with industrial restructuring being the cornerstone of economic and social transformation.

A first element in boosting industrial development was the elaboration of a new legal framework. Law no. 15/1990 regulated the legal reorganisation of industrial enterprises, turning them into autonomous state-run companies and trading companies. The former grouped the strategic branches – armament, energy, mining and natural gas and were subsidised from the central state budget in order to cover possible financial deficits; the state warranted internal or external banking credits. The latter group included processing industries, organised as equity-based or limited liability trading companies. They are scheduled for privatisation and receive no state subsidies. The fact that the energy, extractive and processing sectors follow distinct trajectories is the consequence of the government supporting exclusively the energy and extractive branches, leaving the processing industry to 'float' freely and adjust to the new economic context. While the mining sector registered a slight numerical labour decrease (1990–1995), the number of employees in the energy sector was rather increasing; a dramatic slowdown marked the processing industry, betelling the general trend throughout the national industry (a total of 1.2 million jobs were lost). In time, lest restructuring should trigger social unrest, the processing sector with its giant siderurgical, petrochemical and machine-building manufacturing units received subventions from the state.

The state-shielded industries maintained their forms of organisation whereas the sectors obliged to resist on their own, had to experiment various forms in order to adjust to the new evolutions. Some would decentralise production, dividing the parent plant into several independent profile units: production, sales, supply, transport, imports-exports, research-design. The idea was that economic progress was more sustainable within a small-enterprise framework, which could be better managed, have greater flexibility and be more likely to establish profitable cooperation ties than a large manufacturing unit. However, what actually happened was that greater opening and the new competitional framework, together with the need to cope with the foreign market

and avoid unfair competition at home produced mergers. In an attempt at organisational adjustment, with an obvious preference for centralised industrial activities, the emerging trusts, groups and holdings were in effect a faithful copy of the former industrial estates. The most dynamic sector in this respect was the processing one, compelled to adjust to an economy 'in transition'. The artificially maintained positive evolutions in the area of state-protected industries generated financial imbalances which, cumulating, called for the elaboration of a bankruptcy law (no. 64/1995) and of provisions for the liquidation, closure, or conservation of inefficient manufactures not listing for privatisation.

The processing industry's decline was accelerated because the big combines – socialist forms of production organisation – lost their power and control prerogatives. Industrial combines had been polyfunctional structures discharging productive activities, social services for the employees, exerting control over the workforce and the local community alike. As major local actors, the combines world impose their view on the decision-making process and on general development trends. In the context of 'transition', the former combines lost first their ideological power and next their role in distributing social assistance. They also lost in part, or in totality, their social functions, some of which were assumed by specialist public institutions (education, health-care) or individual services (sales of consumer goods and foodstuffs, assignment of dwellings). Polyfunction gave way to production activities. The loss of political prerogatives weakened the combines' economic position, with negative effects on subsequent evolutions, as well as their role in influencing the local decision-making process.

The development of the Romanian industry had been designed to meet the demand of the CMEA market, in the main. Therefore, when a new competitional framework was put in place, lots of disadvantages cropped up. After 1975, the idea was to set up new enterprises, with very little being invested in updating the existing ones. So, the period of transition began with an obsolete infrastructure. As obsolete was the national economic structure because past multilateral development strategies and substitution policies had hampered penetration into the Western market. When the market opened to the west, the alimentary, textile and consumer goods industries, sidetracked by socialist development policies, were the hardest hit. Good quality foreign products at advantageous prices invaded the Romanian market, ousting many native producers from the competition. Foreign competition harmed the position of the Romanian industry both at home and abroad. The decrease of industrial production by 50% on the average (1990–1995), poor product quality, and minimum participation in the external market are suggestively mirrored by changes in the foreign-trade structure. The evolution of the latter demonstrates that the consumer goods and machine-building sectors are not competitive, that

the alimentary industry cannot meet the internal demand, and that the oversized heavy industry is tributary to foreign resources. Fewer imports of animal and vegetal oils, fats and waxes are indirect indications of production slowdown in the food industry which uses such items as raw materials (Table 1).

Table 1

Dismantlement of CMEA market and its impact on foreign trade (imports/exports ratio)

	1990	1995	Evolutions 1990–1995(%)
Foods and livestock	27	195	+168
Non-edible raw materials, less the fuels	105	181	+76
Mineral fuels, lubrificants and derived products	140	349	+209
Animal and vegetal oils, fats and waxes	247	22	–225
Chemicals and derived products	47	127	+80
Transport vehicles and equipments	80	245	+165
Manufactured items	15	37	+22
Total	79	129	+50

Sources: processed data, Statistical Yearbooks, 1990, 1995, CNS

The negative impact of 'transition' of recent industrial evolution is also the consequence of unilateral industrial policies. Making privatisation alone the hardcore of the restructuring strategy, limited the capacity of industry to adjust to the new economic context. The transfer of property from the public to the private sector is a necessary yet not sufficient measure to change the industrial structures. The strategy of privatisation moved forward in an 'as we go' approach, being revised step-by-step, and eventually becoming distinctively different from what reform programmes had been initially. The privatisation of small enterprises was a relatively successful operation, although their impact on the production sphere was modest. But when it came to privatising the big industry the reform process was blocked. That 'privatisation-based restructuring' was pretty much a failure has been proved by the frequent substantive changes introduced to legal regulations. Under Law no. 58/1991, trading companies were to be transferred from the property of the state to the private sector, the Romanian citizens receiving a 30% quota of the industrial social capital. Property certificates were distributed free. They represent shares held in financial companies, the so-called Private Property Funds (FPP). The shares or social quotas held by the state are administered and sold through a public institution – the State Property Fund (FPS). The 30% quota of the trading companies' social capital was distributed among five privatet funds by the National Agency for Privatisation.

The slow pace of privatisation, the complicated procedures, the involvement of several government institutions having no clear-cut competences, brought a new law into effect (Law no. 55/1995) stipulating the acceleration of privatisation in a mass. Apart from the issuing of nominal coupons, this law

allows foreign legal or natural persons to take part in the process of privatisation. It stipulates the restructuring of enterprises, ruling that an amount of money should be invested in production. But the privatised enterprises registered modest results because the new owners 'on paper' as it were, had in reality no economic power at all. So, privatisation methods were again diversified by the establishment of secondary capital markets (the stock-exchange and the Rasdaq), investment banks, biddings, direct negotiations, auctions, and fewer ESOP and MEBO sales than in previous years. Quite symptomatic of the incoherent approach to privatisation was the elaboration in 1997, that is seven years after the process had begun, of sectoral privatisation strategies. It is a further indication that, before that moment, privatisation had been an absolutely random operation. The position of privatised enterprises on the industrial scale, and the possible impact of their vertical integration had been altogether ignored. The huge debts accumulated by mammoth industries made the FPS fix a 'dutch auction' whereby shares are sold out by lowering the price until the whole offer is awarded. Paradoxically, in official documents privatisation is equated to technological upgrading, in reality, however, modernisation is a by-component of industrial policies. Only episodic information on investment in retechnologising of the production system has been released, and then it appears to have a punctual character. Apart from the trunkated understanding of the restructuring process, institutional mobility represents yet another drawback. So, the department entrusted with the implementation of the restructuring process was shifted first from the Ministry of Industry to the National Agency for Restructuring, and eventually to the State Property Fund, which would explain the incoherences and deficiencies of the national strategy in this area.

The dissolution of the CMEA market and the loss of some traditional markets represented conjunctural elements, augmented by the slowdown of demand on the home market. The generalisation of industrial dysfunction has two causes: on the one hand, the economic framework within which industrial enterprises used to operate had crumbled and that framework had had a distinct impact on each of them; on the other hand, the imbalances hitting one branch would cascade to the others. A good illustration makes the machine-building industry: it boasted the largest workforce, and was very capable to set up cooperation in the production field. Speaking of distances and transport costs, the space it covered was fairly isotropic, developing in time a vast network of suppliers and users, who occupied various levels in the production and space systems. Another typical case of chain reactions, unleashed not by the drawbacks inherited from a deficitary mode of socialist industrial operation, but by specific shortcomings of the transition period. It is the case of the ready-mades industry. In order to hold out on the western markets already penetrated when Romania had been a socialist country, the ready-mades industry had to abide by the 'lohn'

system, with raw materials, accessories, know-how being supplied by the foreign partner, while cheap high-skilled labour was offered by us and the product exported to other markets. So, the ready-mades sector, formerly the main client of the textile industry, became largely dissociated from it. Domestic demand for textiles dropped considerably, which inevitably led to a sharp decline over 1990–1995 (job losses in the processing industries and the textile sector amounted to 36.5% and 55.3% respectively). As demand in the home and foreign markets decreased, production capacities were no longer utilised to the full. Each branch would respond in its own way to the situation, but all in all, less than 30% of 23% capacities were used and only 29% were used in proportion of over 60 per cent (Table 2).

Table 2
Use of production capacities in 1995

Industrial branch	Capacity utilisation (%)	Industrial branch	Capacity utilisation (%)
Total	**50.3**	Foods and drinks	49.4
Metal ores extraction	83.0	Textile	48.4
Coal extraction	74.3	Electric power	47.9
Furniture output	73.9	Metal constructions	46.2
Tobacco	68.3	Cellulose and paper	44.9
Road transport vehicles	65.2	Other transport means	43.3
Equipments, radio, TV sets	57.4	Medical apparatus	42.6
Other extractive activities	55.3	Rubber and plastics	40.7
Non-metal ore items	49.8	Chemistry, fibres	38.3

Sources: operative statistical data, Industry series, 1, 1996, CNS

A conjunctural element peculiar to the transition period is financial blockage. It is the reflection of the past socialist system, when the production cycle would be followed by an 'accountancy cycle', overdue payments causing a shortage of liquidities which, in its turn, enhanced delays. So, debts among big producers, in particular, kept accumulating. Whenever possible, a system of 'compensation payments' to legalise commercial transactions was used without however improving the enterprises' financial performances. Basically, the purpose of such payments was to maintain the industrial giants going and avoid social unrest. Summated functional imbalances spread to the whole macro-economic structure. The big enterprises forming a network of mutual debtors, up and down the industrial scale units were entrapped in the financial blockage. Shortage of liquidities and increased inefficiency hampered investment and destroyed credibility. The chance to obtain internal or external credits to better product quality was waning. In this situation, the restructuring alternative was dismissed. Another consequence of the by-now-chronic financial blockage within the big industry sector, is depressed cooperation between state-owned and private units. The small private sector, which survives only if profitable, cannot afford operating in a mock financial system in which money does not circulate and

capitalisation opportunities are missing. Therefore, disparities crop up between private firms, which function by the very strict laws of a market economy, and the big state-run units caught in a fetysh system of accountancy 'on paper' that empties the concepts of currency, capital, commodity and transaction of any real substance. These disparities, underlying a dual industrial pattern displaying incompatibilities between the dynamic private sector and the old-style public one, at the core of the post-socialist economic depression. All the elements of the new economic setting that stamped the recent evolution of industry merged, generating distinctive contexts for each enterprise. These and many other specific elements, created by the manufactures' structural and functional particularities, brought about simultaneously divergent processes tracing distinct development trajectories. Although a hierarchy of causes could not as yet be established, it nevertheless appears that insertion in the foreign market and the prerequisites for it are of overriding importance in this period of industrial transition. As it is, the external factors have a far greater impact than was customary in the past.

URBAN INDUSTRIAL DECLINE – A MAJOR EFFECT OF RESTRUCTURING

The urban concentration of industry was a reality frequently pinpointed by geographical studies, which emphasized the dominant role of industry in the economy of towns. The share of industrial activities (number of employees/ total active population) kept increasing steadily from 63.3% in 1966 to 89.7% in 1990. The town was to lose, obviously with local variations, most of its industrial activity and workforce, prefiguring absolute decline, stagnation or recovery. While future development prospects are still hazy, the present situation is pretty clear: 241 towns out of a 262 total registered a negative evolution; a positive record had only 21 urban localities (1990–1995 figures). The industry of small towns (Rupea, Chişineu Criş, Lipova, Negreşti Oaş, Calafat) dependent on the big polarising centres lost over 53% of the 1990 workforce, being severely affected by the functional imbalances experienced by those centres. In this situation are the localities promoted to township in 1989 (Budeşti, Fundulea, Mihăileşti and Bolintin Vale). In general, small and medium/sized towns, featuring by mono-specialist units, registered very negative evolutions (33–53%), the range of industrial branches they belong to being randomly located in the territory (Vlăhiţa- metallurgy; Paşcani, Huşi, Balş, Băileşti and Rădăuţi – machine building; Comarnic and Jimbolia – building-materials; Turnu Măgurele and Făgăraş – chemistry; Feteşti and Urziceni – food industry). Towns of similar rank but deeply specialised in a particular branch, registered mildly negative evolutions or downright stagnation (Baraolt – metallurgy, Oneşti – chemistry, Mioveni, Moreni and Cugir – machine building). There are examples of positive cases, too (Zlatna – metallurgy, Ocna Sibiului – machine-building, Boldeşti-Scăeni – glassware,

Basarabi and Valea lui Mihai – food industry). Therefore, recent evolutions can hardly be generalised. Apparently, large cities with diversified industrial profiles have become more attractive economically (Iaşi, Cluj Napoca, Ploieşti, Braşov, Timişoara). They registered fewer jobs losses, below the national average as a rule. In what concerns recent spatial dynamics of urban industry, again there is no set pattern: on the one hand, despite a generalised decline, local differences do exist; on the other hand, progress is incidental and isolated in space. These two trends are incapable of producing spatial development models (Fig. 1). Studying industrial space dynamics in terms of relative losses alone overlooks the space dimension of decline, and fails to aggregate individual trajectories into development types. Similarly, placing greater emphasis on

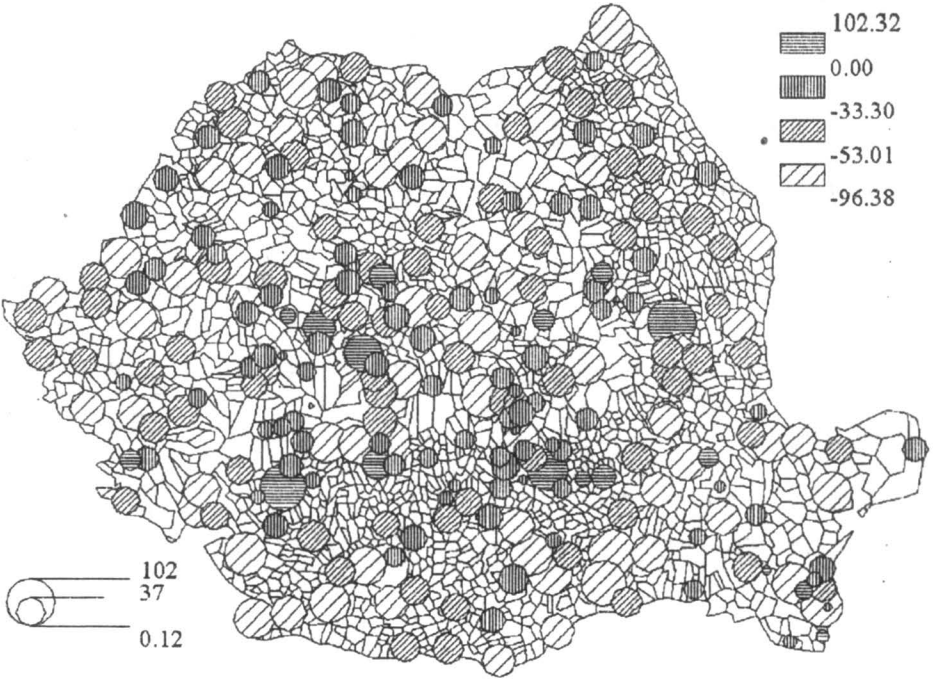

Fig. 1 – Evolution of urban industrial employees (%), 1990–1995.

punctual behaviours engenders disparities in the way correlations show up. In theory, their behaviour might look normal, but they do have a chaotic spread at an empirical approach. This suggests the need for a different approach, more suitable to outlining local particularities within the general trend of their spatial evolution. In this paper, 'local contributions to decline' are assessed in terms of the urban industrial losses suffered by each town. This approach outlines the space distribution of decline, and moreover, sets a hierarchy of urban centres in terms of their loss-coping capacity. The opposition between

industrially declining and growing towns as against the average trend is determined by referring individual decreases to the national average. In this way, some models of space evolution – concentrated, regular or random – are outlined and their contribution to maintaining or altering the space structures of industrial organisation is assessed.

In the 1990–1995 interval, urban industry lost 1.03 million employees, a figure unevenly distributed within the town system. Which are the towns with the highest losses? What are the causes of disparities in their evolution? What structural element – size, or specialisation – has the greatest impact on decline? What about the space distribution of industrial decline? Is the space distribution of decline governed by specific rules?

Once again, the space distribution is governed by two contrary trends: concentration and dispersion. Concentration is highlighted by the 25 towns (*ca.* 10% of total) which registered 54.5% of the national urban industrial loss. Dispersion is revealed by the next 216 towns with 0.01–1.0% loss in the overall decline. It shows that decline is very wide-spread and that urban centres give a fairly similar response to industrial restructuring. Equality in the face of crisis indicates a widening of gaps in the evolution of towns, initial differences growing ever deeper. The first 25 towns which assumed the greatest loss are major centres with the largest number of industrial employees and the highest demographic rank (Fig. 2). Percentages over –2% register the cities of Bucharest (–14.4%), Timişoara (–3.3%), Cluj Napoca (2.8%), Craiova (–2.7%), Iaşi (–2.4%), and

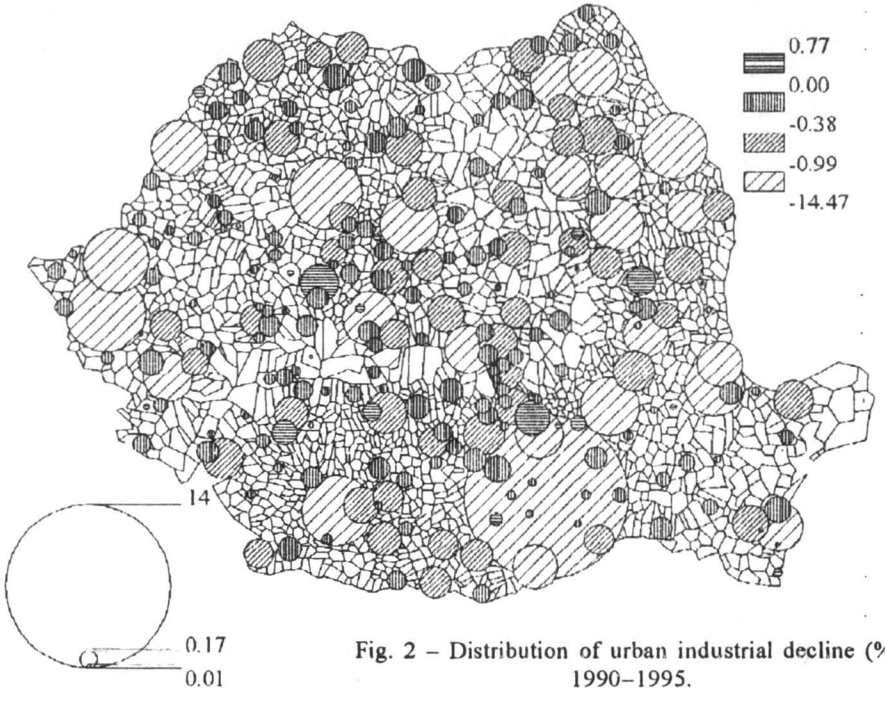

Fig. 2 – Distribution of urban industrial decline (%), 1990–1995.

Arad (–2.2%). The six of them concentrate 27.8% of the total job losses in the urban industry, a very steep decline indeed. Next the 19 towns scoring between –2.0% and –1.0% are polarising centres of regional industrial system (Târgu Mureş, Oradea, Brăila, Sibiu, Bacău, Reşiţa, Ploieşti, Galaţi, Baia Mare, Botoşani, Suceava, Piatra Neamţ, Focşani, Giurgiu, etc.). A first conclusion emerging from this hierarchy: a correct assessment of the space distribution of development trajectories requires a comparative analysis in which individual decline is referred to the whole system. Let us remember that case-studies of relative loss of individual towns bring large cities to the forefront, while small and medium urban localities register a moderate decline, that is they have a better industrial performance. This approach is relevant in localising the space effects of industrial involution on the local economies from a microspace perspective. What the present analysis tries to do is to surmount the absence of a macrospace perspective capable to rank the distribution of decline. A second conclusion: the role of the initial size in estimating decline, results from the direct correlation between the demographic rank and the volume of industrial manpower, a relationship strengthened in the course of time due the synchronism between industrialisation and urbanisation processes. The rank effect has the greatest structural impact on decline in large cities; this impact is only partially attenuated by industrial diversification and the development of services. The question is, why industrial diversification, a feature common to all the large cities topping the list of losses, has not acted towards containing decline? In theory, each branch has its singular development context; conjunctural disparities engendering unequal development opportunities may, if aggregated at town level, stimulate positive evolutions. Even though positive evolution trends did converge, the marked decline of other branches brought about by the national and international context, could not be stopped. It showed up in the general downslide of the processing industry and its ever lower share in the urban economic. So, macrospace imbalances are transmitted at microspace level, and the-other-way-round. The mutual transfer of dysfunctions tells of interdependences among spatial levels, influencing the mechanisms of decline diffusion. At the same time, possible local opportunities are tributary of deficiencies transmitted from higher space levels. By analogy, it is understandable why industrial specialisation is irrelevant in dimensioning decline. The latter is due primarily to sectoral situations. As a matter of fact, differences in the general background against which industrial branches are developing are immaterial at microspace level. Uniformity of evolution is blurred by local particularities. In the case of industrial diversification they were annihilated by the general trends (we mean the newly specialist industries and not those set up when the national industrial system functioned as a unitary whole). Except for hierarchies of industrial centres, recent urban evolutions led to hierarchical rank changes only incidentally;

however, unequal decrease creates uniformity. The consequence is twofold: firstly, regional capitals, which concentrate most of the decline compared to the other towns of the meso-space system change their position, fact that attenuates the gaps between the extremes of the hierarchical spectrum; secondly, small towns, distinct in structure and size, acquire equal development opportunities, and their evolution becomes comparable.

Industrial dynamics is a factor of urban hierarchical stability. The role of industry in maintaining the urban hierarchical structure despite differences in growths, has already been proven. The present analysis shows the same in conditions of decline. The fluctuations of industrial slowdown register time variations, but they do not affect the configuration of the national hierarchy. It is only the relative ranks of towns inside regional sub-ensembles that suffer modifications. The one difference is that in conditions of growth, the large cities with their diversified industry and wider range of services tend to 'short-circuit' the development of small towns; if there is recession, it is the small towns that are the hardest hit by industrial decline, their initial rank becoming the greatest drawback. In view of this conclusion, the general context of growth or decline and its impact on the development trajectories becomes the focus of attention.

CONCLUSIONS

Industrial recession depresses the economic environment, which acquires a closed character and can no longer stimulate other types of activity. This restrictive environment makes functional structures rigid and reduces opportunities for the structural adjustment to crisis. The situation is not improved by the 'rank effect' either, although the latter would be expected to stimulate activities that have a special impact, the tertiary sector, for instance. The rank-effect differentiates development chances. In the case of large cities, it proves incapable of eliminating the consequence of industrial decline, yet attenuates them. There is a shortage of dynamic activities in the economy of large cities liable to changing the slidedown of the total active population in the wake of industrial decline. The expansion of the tertiary sector has no great impact because, generally speaking, services are prospering to compensate for the industrial slowdown. With small towns, rank plays an important role in their overall evolution. They concentrate much of the loss of labour and industrial activities. The impact of rank on the process of deindustrialisation depends on the degree of specialisation. The small towns underdeveloped industrially, register the steepest decline, their economy becoming increasingly less dependent on industry. The small towns, with an overspecialist industrial profile, lose industrial activities, their economy becoming increasingly more dependent on industry. When ranks are comparable, the position at one or the other ends of the industrial

spectrum engenders two opposite processes: rigidisation or relaxation of functional structures. Specialisation is a major structural drawback in the way of adjustment to a fluctuating economic context. The dominance of industrial activities creates singular economic profiles, with a services network incapable to meet social demand. The development of the dynamic industrial activities is hampered by a narrowly specialised workforce and limited local experience, while the development of the tertiary activities is restricted by a low living standard. Industrial specialisation enhances dependence on industry and the inertia of local economic structures. The industrial impact on space organisation was very much attenuated: on the one hand, industrial decline reduced the polarising capacity of big centres due to the partial or total disappearance of intra-regional industrial relations, and on the other hand, it annihilated the cohesion among the small centres isolated from the rural area, due to the general deterioration of the economic and social contexts.

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ON THE GENESIS AND TIME-SPACE DISTRIBUTION OF WATER RESOURCES IN ROMANIA. GEOGRAPHICAL ASPECTS

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Les conditionnements géographiques de la répartition des ressources d'eau en Roumanie. Le volume des ressources d'eau en Roumanie représente 40 milliards m^3 ou 1286 m^3/sec, ce qui signifie 1765 m^3/an/habitant. Les conditionnements géographiques sont liés à la position de la Roumanie au long du parallèle de 45° dans la zone du climat tempéré continental et à la présence de l'arc carpatique. En conséquence, les précipitations augmentent, tant que la température baisse, donc le module d'écoulement est directement lié aux précipitations et inversement à la température. La région montagneuse occupe 27,9% du territoire et assure 65,2% des volumes d'eau. Les collines répresentent 42,4% de la surface totale et contribuent avec 28%, la plaine et le Delta du Danube s'étendent sur 29,7% du territoire mais donnent seulement 6,8% des volumes d'eau. Le module d'écoulement change en fonction de la position géographique des bassins hydrographiques: ceux situés dans la zone montagneuse ont un module élevé (Tisa supérieure – 17 l/sec. km^2; Cerna – Nera –14,5 l/sec. km^2) en comparaison avec ceux localisés dans la zone des collines et de la plaine (Ialomiţa – 4,6 l/sec. km^2; Vedea 2,3 l/sec. km^2). En rapportant le volume total d'eau au nombre d'habitants, on remarque les bassins hydrographiques aux ressources excédentaires (Tisa supérieure, Nera – Cerna), équilibrées (Mureş, Olt) et déficitaires (Argeş, Ialomiţa, Siret).
La surveillance de la qualité des eaux est assurée par 275 stations qui font des observations sur 27% de la longueur totale des rivières. Le degré de la qualité est le suivant: 53,5% la première catégorie, 30% de la deuxième catégorie, 5,7% la troisième catégorie et 10% dégradés.

The water pattern and the values of the main hydrological variables are conditioned primarily by Romania's geographical location on the 45th parallel N lat. marked by a temperate continental climate. A second conditioning is the presence of the Carpathian Mountains in the very heart of the country.

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Apart from geographical location, another element involved in shaping the current pattern and distribution of water resources – underground, rivers and lakes, is the palaeogeographical evolution of Romania's territory in geological times, when two major stages can be outlined: pre-Quaternary and Quaternary. The first stage witnessed the development of the principal watershed centred on the Carpathians. The second stage, much shorter, was featured by neotectonic movements, glaciation and the retreat of marine waters inside the present Black Sea area; it was also the time when a great variety of water bodies (inland rivers, natural lakes, underground waters and partially the Danube and the Black Sea) came into being.

Rivers represent the major water resource. Most streams spring from the Carpathians and the Subcarpathians, which explains their divergent radial pattern. They are drained mainly by the Danube River, which collects them from 97.8% (232,275 sq.km) of the country's drainage area and network. So, we could argue that Romania's rivers are Carpathian in origin and Danubian-Pontic in drainage.

The data reported in the Atlas of the Water Cadastre in Romania (1992) are based on the codification of 4,864 rivers long of 78,905 km, out of a total of 115,000 km rivers longer than 5 km (basin area over 10 sq.km). The average density at this length is 0.27 km/sq.km. However, if watercourses shorter than 5 km with basin area under 10 sq.km are added, it follows that the total length exceeds 115,000 km, in which case density rises to 0.49 km/sq.km (Ujvári, 1972). In our opinion, even this figure is too small. Since the laws of surface drainage inclusive of all drainage stream channel (temporary, semi-permanent and permanent) are not calculated for the whole country, we shall illustrate our assertion with the case of the Ialomița Basin, where the network density is 0.37 km/sq.km, but real drainage density amounts to 1.89 km/sq.km (Zăvoianu, 1978).

According to measurements and indirect calculations for the 1955–1985 interval, the average water volume discharge/year is of *ca.* 40 billion cu.m, or 1,286 cu.m/sec. Referring this volume to Romania's population of around 22.4 million, each inhabitant benefits from 1,765 cu.m/year.

Together with the water volume of the Danube before reaching the Delta (*ca.* 200 billion cu.m), the figure comes up to 8,700 cu.m/year. But, since the Danube's water resources are shared with other countries, we would suggest using the indicator of inland river water resources, in which case Romania lists among Europe's countries with relatively poor water reserves, yet after the Scandinavian countries, Austria, Switzerland, Turkey, European Russia, Yugoslavia, France, Greece, Italy, Luxembourg, Belgium, Bulgaria, Cyprus, Spain, Poland, Portugal and Germany (Diaconu *et al.*, 1982).

The water volume, appreciated as fairly modest, is due mainly to two factors, themselves a drawback to water management actions, namely, uneven territorial distribution and wide time-related variability (over the year and from one year to the next).

Looking at the relief steps (mountains, hills, and plains), there is obvious disparity between each one's area as against the country's surface, and the quantity of water forming inside each of them. This disparity is, no doubt, the outcome of climatic conditions, and their lawlike scaling with altitude which causes variations of the principal indicators. While precipitation increase as we go up, temperatures decrease, so that the higher the altitude the higher the discharge directly proportional to precipitation and indirectly proportional to temperature. The biggest discharge variation gradients with altitude (5–6 l/sec sq.km/100 m) are recorded in the west and north-west of Romania, more precisely on the western slopes of the Apuseni Mts. and of the Călimani-Gurghiu-Harghita volcanic chain, which stand in the way of pretty moist oceanic masses of air. In the east of Romania, on the eastern slopes of the Eastern Carpathians at equivalent altitudes, the discharge is 2–3 times lower, due both to the continental air masses and their foehn-related effect. So, vertical gradient values/100 m show territorial variations, therefore their impact on all-country global analyses is merely orientative.

In view of the above and of the calculations made for the map of discharge on the scale of 1:500,000 worked out at the National Institute of Meteorology and Hydrology, river water resources in the major relief units look as follows (Table 1):

- the mountain zone (27.9% of Romania's territory) is the source area of 65.2% of the 40.61 billion cu m water volume estimate;
- the hilly zone, including the Subcarpathians, the tablelands and the piedmont hills (42.4% of the country's territory) produces only 28.0% of the water volume;
- the lowlands, encompassing the Danube Delta and its flood plain (29.7% of Romania's surface-area), yield a small volume of water (6.8%), due to the discharge of under 2 l/sec. sq.km in the Crişana and the Banat plains and round about 1 l/sec. sq.km in the Romanian Plain.

An analysis of the distribution of water resources in the first group of geographical units reveals the same latitudinal disparity. In the Carpathians, which overlap the whole mountain step, water resources are indicated by the previously mentioned figures. In the Subcarpathians, with their lower discharge pattern, water resources represent 8.6%, that is a higher percentage referring this area (6.91%) to the country's. In view of this situation, the Subcarpathians fall into the humidity excess zone on the map of hydrogeographical regionalisation (Gâştescu, 1988, 1990). The disproportion between area and volume of water resources is even sharper in the other relief units from tablelands and hills to the lowlands. The sharpest contrast is offered by Dobrogea, which holds 4.35% of the country's surface area, but yields no more than 0.4% of the

water volume. This shows that moisture-deficient units, which also require more water for irrigation and for drinking and industrial supply, have little surface water resources (Table 1).

Table 1

River water resources in the main geographical units of Romania

Name of unit	Area		Type of discharge l/sec.sq.km	Volume of discharge cu.m/s. sq.km	Flow rate (cu.m/sec.)	Total volume	
	sq.km	%				Billion cu. m/year	%
Carpathians	66 513	27.90	12.6	399.4	839.1	26.48	62.2
Subcarpathians	16 448	6.90	6.8	210.0	111.2	3.51	8.6
Transylvanian Depression	25 103	10.53	3.4	107.1	84.9	2.68	6.6
Crişana and Banat Hills	12 229	5.13	4.7	144.1	55.8	1.76	4.3
Mehedinţi Plateau	787	0.33	9.3	293.0	7.3	0.23	0.6
Getic Tableland	12 968	5.44	3.7	116.0	47.5	1.50	3.7
Moldavian Plateau	23 195	9.73	2.1	67.1	49.1	1.55	3.8
Dobrogea Plateau	10 560	4.43	0.3	14.2	4.7	0.15	0.4
Banat and Crişana Plain	16 544	6.94	1.5	49.1	25.7	0.81	2.0
Romanian Plain	46 393	19.46	1.2	39.4	57.7	1.82	4.5
Danube floodplain	3 337	1.40	0.5	18.1	1.9	0.06	0.1
Danube Delta	3 385	1.42	30.5	14.7	1.6	0.05	0.1
Razim – Sinoie Complex	929	0.39	0.4	21.7	0.3	0.01	0.04
Mountains	66 558	27.92	399.4	399.4	839.1	26.48	65.2
Hills	101 150	42.43	112.9	112.9	360.6	11.38	28.0
Plains	70 683	29.65	39.2	39.2	87.4	2.76	6.8
TOTAL ROMANIA	238 391	100.00	5.4	171.0	186.8	40.61	100.00

Looking at the first-order drainage basins, one sees the same quantitative differences of resources. Although the majority of these basins exist in all the three relief steps (mountains, hills and plains), yet most of their area lies in the hills and the plains.

The average discharge value, and hence the water volume, depends both on the extent of the drainage basin area on the three altimetric steps and on the exposition to the circulation of the masses of air. Among the mountain basins, in particular, exposed to the advection of western air masses, is the upper course of the Tisa (17.1 l/sec. sq. km); its tributary, the Vişeu, records 18.7 l/sec. sq.km in the junction area. A similar situation presents the Cerna Basin, with a discharge rate of 17.5 l/sec. sq.km in the mouth area (Orşova). In this case,

however, the high values are due to the karst supply in the upper course of the Cerna River. Although the Lotru River is only partly affected by the circulation of western air masses, yet being exclusively located in the mountain zone, it has a mean specific discharge at the confluence with the Olt at Brezoi of 18.4 l/sec. sq.km.

The analysis shows that the smaller the basins situated in the mountain region, the higher their mean specific discharge (over 20 l/sec.sq.km).

The large drainage basins, extending somehow proportionally on the three altimetric steps, have a specific discharge rate at the outlet or on the border (if their junction area lies outside Romanian territory) of 5–10 l/sec.sq.km (the Jiu, 9.2; Someş, 7.0; Olt, 7.7; the three Criş rivers, 6.3; and the Mureş, 6.3).

Drainage basins extending mostly in the hills and plains, subjected in some cases to the advection of continental air masses, register a mean specific discharge below 6.0 l/sec. sq.km (the underground ones, we projected them to the number of inhabitants in the year 2000. The findings show that the highest quantity of water per capita have the basins of the Cerna-Nera (13,400 cu.m), and the upper course of the Tisa (8,800 cu.m), assumed to have an excedent of resources. Small quantities have the Vedea, the Argeş and the Ialomiţa basins, and not very much either the Prut, the secondary tributaries of the Danube in the Romanian Plain and Dobrogea, as well as those afferent to the Black Sea coast (Fig. 1).

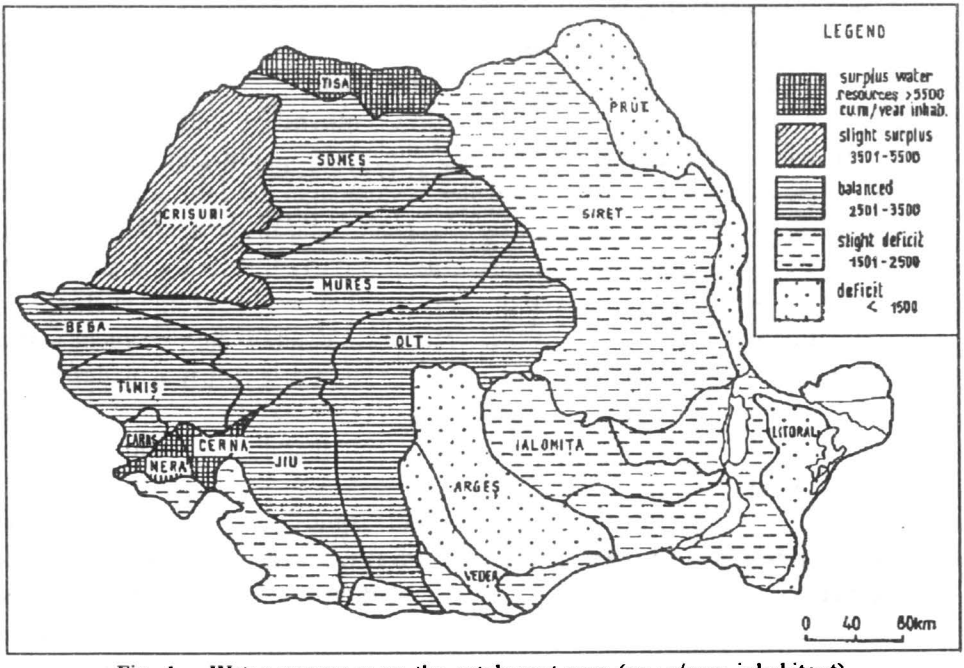

Fig. 1 – Water resources on the catchment area (cu m/year inhabitant).

The secondary tributaries of the Danube and the rivers afferent to the seaside provide small quantities per capita. However, the Danube compensates for it all, because its big water volume is and shall be used for irrigation, for drinking and industrial water supply, etc. (Table 2).

Time-related variability of stream channel water is another hydrogeographical particularity of Romania's rivers and a huge drawback in the management of water resources.

There is great monthly and seasonal variation both over the year and from one year to the next, due to the temperate continental climate and to the fact that the country's inland rivers, except for the Danube, lie in the geographical zone where this type of climate is dominant.

A relevant indicator of the huge amplitudinal variability of discharge is the maximum/minimum flow ratio which shows values of the order of tens with rivers in compensated flow regime and up to tens of thousands in small, torrential streams. Extreme cases are 11.4 on the Danube (Ceatal-Chilia hydrometrical station) and 76,000 on the Bârlad (Bârlad hydrometrical station).

At seasonal level, the biggest water discharge volume/year (35–50%) is registered in spring. As a rule, this is the time (March–May) of high spring waters and of floods, accounting for top discharges especially on the rivers flowing under 200 m altitude. In summer (June–August), water volumes vary between 15–35% of the annual volume with each river or year. Floods have a lower incidence in this season, but when recorded, they yield very big water volumes over a short time lapse. The smallest volumes (8–20%) occur in autumn (September–November), somehow higher in the mountains and very low in the plains. In winter (December–February) values are moderate (10–35%), even smaller in mountain rivers where the water is stocked in the snow and ice layers, but higher in the streams influenced by the oceanic masses of air (the three Criş rivers, the Bega, Timiş, Caraş and the Nera). Similarly for the rivers in the hills and lowlands outside the influence of continental masses from the east.

A rational administration of these resources calls for management works to ensure time-related compensation and a better distribution in deficitary seasons. Like works are stipulated in the National Programme for the Management of Drainage Basins in Romania launched in 1976 and still under way, despite numerous shortcomings.

An important provision of the programme is the construction of reservoirs mainly for water retention in periods of high flow, attenuation of high waves and prevention of overflows which have affected the country's drainage basins.

The multifunction reservoirs built across the country are a very effective means of managing water resources now and in the next few decades.

Table 2

Romania's water resources by drainage basins

No.	Basin name	Surface water				Underground water mill cu m year	Total resources mill cu m year	No. inhabit. (thousand) water vol. cu m year		Observations
		Area sq.km	Mean annual volume (mill cu m)	Mean annual flow (cu m sec)	Mean specific discharge l sec.sq.km					
1	Tisa Upper.	4540	2509	79.5	17.5	132	2641	300	800	excedentary resources
2	Someş - Crasna	17840	3920	124.2	7.0	363	4283	1525	2800	balanced resources
3	Crişuri - Barcău	14860	2957	93.7	6.3	832	3789	1100	3444	slightly excedentary resources
4	Mureş - Aranca	29390	5898	186.9	6.3	776	6674	2450	2720	balanced resources
5	Bega - Timiş - Caraş	13060	2187	69.3	5.3	765	2952	1000	2952	balanced resources
6	Nera - Cerna	2740	1256	39.8	14.5	84	1340	100	13400	excedentary resources
7	Jiu	10080	2944	93.3	9.2	706	3650	1200	3042	slightly excedentary resources
8	Olt	24050	5832	184.8	7.7	1137	6969	2400	2904	balanced resources
9	Vedea	5430	391	12.4	2.3	350	741	500	1482	deficitary resources
10	Argeş	12550	2313	73.3	5.8	1017	3330	3100	1074	deficitary resources
11	Ialomiţa	10990	1515	48.0	4.6	634	2149	1100	1954	slightly deficitary resources
12	Siret	42890	7420	235.1	5.0	1618	9038	4325	2090	slightly deficitary resources
13	Prut*)	10990	577	18.3	1.7	214	791	1100	719	deficitary resources
14	Secondary tributaries Danube sector	33250	789	25.0	0.7	2848	3637	2300	1581	slightly deficitary resources
15	Black Sea coast	5480	63	2.0	0.4	209	272	500	544	deficitary resources
16	Total**)	238391	40571	1285.6	6.3	11685	52256	23000	2272	balanced resources

*) Figures refer to the Prut Basin on Romanian territory.

**) - 5 000 cu m year cap. excedentary resources; 3 000 - 5 000 cu m year cap. slightly excedentary resources 2 000 - 3 000 cu m year cap. balanced resources; 1 000 - 2 000 cu m year cap. slightly deficitary resources; - 1 000cu m year cap. deficitary resources

A 1995 statistics puts the number of reservoirs at 1975, their volume at 12.6 billion cu.m, and their area at 422,950 hectares. Most of these lakes (1,093 with 323,101 ha) having very low volumes are used for fishing. Together with the temporary lakes (136,658 million cu.m, 20,119 ha) built to control the floods, the total number of reservoirs, irrespective of destination, amounts to 2,111, with 13.3 billion cu.m, and 443,069 hectares.

As for water transfer, or interconnection of drainage basins, it is the western, southern and eastern parts of Romania that possess much of the 2,000 km long canals and by-galleries.

The basins recording the highest number of reservoirs are: the Prut *ca.* 300; the Siret, *ca.* 230 and the Argeş *ca.* 220. Basins with biggest useful water volumes in reservoirs: the Siret (1,597 million cu.m) and the Olt (794 million cu.m). The Stânca-Costeşti reservoirs on the Prut has the biggest flood wave control volume (960 million cu.m) capable of protection against overflows.

As some hydrographic sectors are contaminated with range of pollutants, water quality is so very much impaired that they are improper for use, an obvious complication in establishing the resource/demand ratio. Existing inventories indicate that 1,150 units (677 industrial, 140 agrozootechnical and 326 settlements) are deteriorating surface and subsurface water resources. If the 800 purification stations functioned normally, the damage caused by waste waters in rivers and underground streams would be much reduced. As it is, only 263 (22%) of these stations are in good and very good operational conditions (Cluj-Napoca, Satu Mare, Sfântu Gheorghe, Râmnicu Vâlcea, Focşani, Câmpulung Moldovenesc, etc.), while 539 of them (47%) are low – efficient (Piteşti, Constanţa, Botoşani, Timişoara, etc.).

There is a national water quality surveillance network of 275 stations that in 1996 inventoried 20,862 km of river length (27.08% of the total). The findings revealed the following river segment categories: I – 11,162km (53.5%); II – 6,285 km (30%); III – 1,177 km (5.7%) and IV (degraded) – 2,238 km (10,7%). The rivers with the longer degraded segments are: the Ialomiţa (519 km), Mureş (652 km), Prut (411 km), Siret (383 km) and the Olt (188 km) (Fig. 2). It appears that river water quality kept improving since 1989. Thus, the proportion of category I rose from 35% to 53%; category II from 25% to 30%, with degraded segments falling from 22% to 10.7%. This slight improvement is due to the slowdown of industrial activity, retechnologisation of production processes and sanctions imposed on polluting units.

The quality of subterranean waters, of underground ones in particular, in the perimeter of industrial estates suffered heavy pollution enhanced also by the deficient spread of fertilisers and pesticides in the fields. The most heavily affected zones are the Prahova – Teleajen alluvial fan, the drainage basins of Dâmbovnic–Argeş, Săsar–Baia Mare, Jiu downstream Târgu Jiu city, Barcău downstream Suplacu de Barcău, etc.

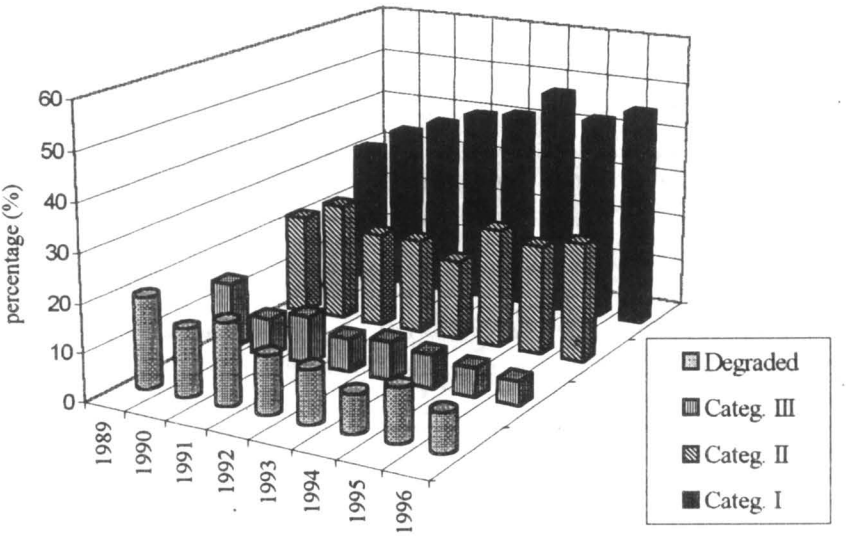

Fig. 2 – Characteristic sectors of the rivers by water quality (1989–1996).

The water demand increased from 1.4 billion cu.m in 1950 to over 20 billion cu.m in 1989, through population growth, industrial development and irrigation. In 1994, as many irrigation systems were disconnected and industrial activity fell, demand dropped at 9.8 billion cu.m. A slight comeback was recorded in 1996 (10.3 billion cu.m). In terms of population numbers, demand is 450 cu.m/capita/year compared to 800–1,000 cu.m/capita/year in Western Europe.

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FRÉQUENCE DES REFROIDISSEMENTS ET DES RÉCHAUFFEMENTS MASSIFS PENDANT LE DERNIER SIÈCLE EN ROUMANIE[1]

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Mots-clés: refroidissements massifs, réchauffements massifs, singularités thermiques, anomalies thermiques, risques climatiques, Roumanie.

Frequence of massive cooling and heating processes in Romania during the 20th century. Among the main climatic risks characteristic of Romania's temperate-continental climate are the episodes of massive cooling and heating considered as thermal singularities by some authors and as thermal anomalies by others. The work focuses on the massive cooling in the cold season of the year (extreme intensity depleting the mean temperature of the coldest month at < –10°C, and at an absolute minimum in the century of < –30°C – station records) and massive heating (leading to a mean temperature of the hottest month of > 25°C, and an absolute maximum in the century of > 40°C – station records). These incidental events are due to the advection of very cold (polar or arctic) and very hot (tropical) masses of air over Romania's territory along distinct trajectories and definite aero-synoptical conditions. Analysis of the statistical records of the National Institute of Meteorology and Hydrology fund has revealed two major geographical aspects: 1) the barrier role of the Carpathian Mts. in the way of these phenomena, diminishing their area and intensity and 2) higher territorial incidence and stronger cooling and heating in the Eastern and South-Eastern regions of Romania subjected to excessive continental climatic influences, as compared to the Western and Central parts of the country which register moderating, oceanic advections. Both phenomena represent climate risks with severe consequences for the environment, the economy and the health condition of the population.

Parmi les principaux risques climatiques caractérisant le climat tempéré-continental de la Roumanie il y a aussi les refroidissements et les réchauffements massifs, considérés souvent par certains auteurs comme des singularités thermiques négatives ou positives (Cristodor, Bucur, 1961; Milea, 1967; Milea *et al.*, 1968, 1971; Militaru, Stoica, 1969, etc.), et par d'autres

[1] Étude soutenue par le grant n° 625/1997 de l'Académie Roumaine.

comme des anomalies thermiques (Rahău *et al.*, 1969; Ţicu, Bordei-Ion, 1969, etc.). De tels phénomènes impliquent un degré accru de péril en déréglant au point de vue functionnel et du comportement les organismes végétaux, animaux et humains (Teleki *et al.*, 1984; Teodoreanu *et al.*, 1984) et même les activités socio-économiques (Bogdan, 1992; Zăvoianu, Dragomirescu, 1994; Ciulache, Ionac, 1995, etc.).

La présente étude prend en considération les refroidissements massifs pendant le semestre froid de l'année, particulièrement intenses, déterminant une température moyenne du plus froid mois de $\leq -10°C$, et celle minimale absolue à la station du dernier siècle de $\leq -30°C$, ainsi que les réchauffements massifs du semestre chaud de l'année, de caractère caniculaire, entraînant une température moyenne du mois le plus chaud de $\geq 25°C$ et la température maximale absolue à la station pendant le dernier siècle de $\geq 40°C$.

De tels phénomènes à caractère accidentel dérivent des advections de l'air très froid (polaire et arctique) et respectivement très chaud (subtropical et tropical) à travers le territoire de la Roumanie, selon diverses trajectoires et en conditions aérosynoptiques bien déterminées.

La présence de l'arc carpatique fait que ces phénomènes ne soient pas toujours simultanés sur l'entier territoire de la Roumanie, ou, s'ils ont lieu, leur intensité ne soit pas toujours la même.

Les calculs de la fréquence des refroidissements et des réchauffements massifs ayant lieu pendant le dernier siècle (1896–1995) sur le territoire de la Roumanie ont révélé le rôle de barrage orographique des Carpates pour divers types d'advections déterminant les phénomènes respectifs, d'ailleurs bien connus dans la littérature spécialisée de Roumaine (*Clima* RPR, I, 1962; Topor, Stăncescu, 1965; Donisă, Davidescu, 1972; Bogdan, 1980, 1996, etc.).

La présente étude est basée sur l'analyse des données statistiques existant dans les archives INMH, concernant les températures extrêmes absolues (et la date respective) enregistrées dans 200 stations météorologiques fonctionnant au cours de ce siècle, dont on a choisi pour l'analyse les cas de refroidissements et de réchauffements massifs selon la conception mentionnée.

Il fait souligner que l'analyse n'a pas porté sur les réchauffements massifs d'hiver et les refroidissements massifs de l'été, lesquels étant non spécifiques à la saison, sont compris dans d'autres limites, mais qui peuvent provoquer de même de nombreuses perturbations à la santé humaine, aux activités économiques, à l'environnement.

De même, il faut souligner que parmi les 200 stations, certaines n'ont pas eu une suite complète de données statistiques pour un siècle, mais si pour la période de fonctionnement elles ont marqué les seuils respectifs considérés par nous, on les a utilisés comme tels.

1. FRÉQUENCE DES REFROIDISSEMENTS MASSIFS

Les plus forts refroidissements massifs ont eu lieu au mois de janvier: 1893, 1907, 1909, 1940, 1942, 1943, 1954, 1963, 1985, etc., ainsi qu'aux mois de février: 1929, 1935 1954, etc. On a consigné aussi deux cas au mois de décembre: 1927, 1961 (*Clima RPR*, II, 1966, *Archives INMH*).

Dans cet intervalle d'un siècle il y a eu 41 phases de refroidissements massifs (donc, à une température minimale absolue de ≤–30°C) pendant 23 ans, ce qui signifie, en général, environ deux refroidissements par an (Tableau 1).

Tableau 1

Fréquence des refroidissements massifs (où la temperature minimale absolue enregistrée dans les stations a été de ≤ – 30°C pendant le dernier siècle en Roumanie)

N° crt.	Année	Mois	Jour							Nombre total de phases de refroidissements	Nombre total des cas ≤ –30°C	%
1	1963	I	2	16	18	23	24	25	29	7	30	26,8
2	1954	I	25	26	27					3	3	2,7
	1954	II	6	20						2	7	6,2
3	1985	I	13	14	19					3	9	8,0
4	1929	II	10	11						2	8	7,1
5	1938	I	8	9						2	2	1,8
6	1940	I	11	12						2	2	1,8
7	1942	I	24	2						2	31	27,6
8	1943	I	13	28						2	2	1,8
9	1950	I	13	24						2	2	1,8
10	1893	I	15							1	1	0,9
11	1907	I	25							1	1	0,9
12	1909	I	2							1	1	0,9
13	1911	II	15							1	1	0,9
14	1927	XII	22							1	1	0,9
15	1933	I	24							1	1	0,9
16	1935	II	13							1	2	1,8
17	1937	I	1							1	2	1,8
18	1947	I	31							1	1	0,9
19	1961	XII	24							1	1	0,9
20	1964	I	17							1	1	0,9
21	1979	I	3							1	1	0,9
22	1987	I	31							1	1	0,9
23	1990	I	5							1	1	0,9
Total phases de réchauffements massifs / total cas									=	41	112	100,0
Dont dans: XII									=	2	2	1,8
		I							=	33	92	82,0
		II							=	6	18	16,2

La fréquence la plus élevée de ces refroidissements massifs révèle le mois de janvier 1963 à 7 phases de refroidissements; ensuite, le mois de janvier 1954 et 1985 à trois phases de refroidissements massifs chacun et ensuite le mois de janvier 1938, 1940, 1942, 1943 et février 1929 et 1954, etc., à deux phases de refroidissements. Plus de 50% (14 ans) du nombre total d'années à refroidissements massifs ont eu un seul refroidissement par an.

Lors des 41 phases de refroidissements massifs, la température minimale absolue enregistrée a été de ≤–30°C aux 103 stations; neuf stations ont marqué une température minimale en deux phases différentes, ce qui signifie 112 cas à températures minimales de ≤–30°C.

Cela nous a permis le calcul de la fréquence des refroidissements dans le territoire selon la température minimale absolue réalisée conformément aux groupes de valeurs.

Le tableau 2 met en évidence que le taux le plus élevé, 47,3% revient aux moindres valeurs, respectivement aux refroidissements massifs où les températures minimales enregistrées ont varié de –30,0°C à –31,9°C, couvrant une superficie plus grande et, le plus réduit, 2,7%, aux valeurs entre –36,0°C et –37,9°C, non pas aux refroidissements massifs à la valeur la plus réduite, inférieure à de ≤–38,0°C.

Tableau 2

Fréquence des températures minimales absolues ≤ – 30°C, selon les groupes de valeurs enregistrées au cours des refroidissements massifs pendant le dernier siècle en Roumanie

N° crt.	Groupe de fréquence (°C)	Nombre des cas	%
1	–30,0...–31,9	52	46,5
2	–32,0...–33,9	37	33,1
3	–34,0...–35,9	16	41,1
4	–36,0...–37,9	3	2,7
5	≥–38,0	4	3,6
Total		112	100,0

Dans le développement territorial des refroidissements massifs, un rôle important revient au barrage orographique.

Comme suite, la fréquence des refroidissements massifs enregistrés d'une part et de l'autre des Carpates (Tableau 3) revèle que le taux le plus élevé, 44,6%, revient aux refroidissements massifs ayant lieu dans les régions situées au Sud, au Sud-Est et à l'Est de la Roumanie, soumises aux influences directes de l'air continental, tandis que, au cas de refroidissements enregistrés à l'Ouest, au Nord-Ouest et au centre de la Roumanie (derrière le barrage orographique des Carpates), le taux est de seulement 28,6%, ce qui signifie environ la moitié des premiers.

Cela est expliqué par le rôle de barrage orographique des Carpates qui limite le déplacement des advections d'air froid continental vers l'Ouest, les régions respectives se trouvant, en règle, sous l'influence de l'air maritime.

Dans le même tableau on remarque aussi un autre aspect intéressant concernant la fréquence des refroidissement massifs, notamment: la moindre fréquence des refroidissements massifs revient aux régions montagneuses, qui sont les plus soumises aux refroidissements. Cet aspect est dû au nombre réduit de stations météorologiques et au fait que du nombre total des stations de montagnes (30) enregistrant des refroidissements massifs au dessous de ≤– 30°C, 19 sont situées dans des dépressions intracarpatiques, où les refroidissements sont, surtout, radiaires, favorisées par la forme négative de relief.

Tableau 3

Fréquence des refroidissements massifs par rapport aux influences climatiques extérieures et le rôle de barrage orographique

Régions au centre, à l'Ouest et au Nord-Ouest de la Roumanie		Régions au Sud, au Sud-Est et à l'Est de la Roumanie		Régions montagneuses	
Nombre des cas	%	Nombre des cas	%	Nombre des cas	%
32	28,6	53	47,3	27	24,1
Nombre total des cas = 112				Total % = 100	

D'ailleurs, les refroidissements à la valeur la plus réduite, inférieure à –38,0°C, ont été enregistrés en totalité dans les régions de montagnes à savoir: trois dans les dépressions (–38,0°C à Joseni, dans la Depression de Giurgiu; –38,4°C à Miercurea Ciuc, dans la Dépression de Ciuc; –38,5°C à Bod, le record des témperatures minimales négatives dans la Dépression de Braşov) et une dans la montagne (–38,0°C à Vârful Omu, à 2504 m altitude).

Pour avoir une image d'ensemble concernant les plus forts refroidissements on présente par la suite la liste des stations météorologiques où l'on donne seulement les températures minimales ≤–34,0°C (Tableau 4).

Il faut remarquer que parmi les 22 cas à températures minimales ≤–34,0°C, enregistrées au cours des refroidissements massifs, 5 ont été consignés à l'Ouest et au centre de la Roumanie (derrière le barage orographique des Carpates), 5 à l'Est, au Sud-Est et au Sud du pays (devant le barrage orographique et 12 dans les régions montagneuses, comme suit: 9 dans les dépressions intracarpatiques (Giurgeu, Ciuc, Braşov, Întorsurii, Vatra Dornei) et trois dans la montagne (Vârful Omu, Ţarcu et Cârlibaba). Cet aspect met en évidence la vraie valeur des dépressions intracarpatiques dans la formation des "lacs de froid" et le processus accentué de refroidissements.

En ce qui concerne les régions derrière le barrage orographique des Carpates, il faut remarquer qu'un nombre de quatre ont été dans la Dépression collinnaire de la Transylvanie, donc toujours une dépression intracarpatique et seulement une dans la Plaine de l'Ouest, à Timişoara.

Tableau 4

Températures minimales absolues ≤ – 34°C, enregistrées pendant les plus forts refroidissements au cours du dernier siècle en Roumanie (selon les archives INMH)

N° crt.	Station	H(m)	Température minimale (°C)	Date
1	Timişoara	91	–35,3	29.I.1963
2	Dej	246	–35,2	18.I.1963
3	Cluj Napoca	363	–34,2	23.I.1963
4	Mediaş	294	–35,0	25.I.1942
5	Dumbrăveni	320	–34,2	24.I.1963
6	Craiova	105	–35,5	25.I.1963
7	Roşiori de Vede	103	–34,6	25.I.1942
8	Alexandria	45	–34,8	24, 25.I.1942
9	Focşani	60	–34,0	15.I.1893
10	Iaşi	100	–36,3	1.II.1937[1]
11	Cârlibaba	1050	–37,2	27.I.1954
12	Vatra Dornei	807	–36,5	13.I.1950
13	Poiana Stampei	850	–34,3	23.I.1963
14	Toplita	687	–34,8	13.II.1935
15	Joseni	750	–38,0	18.I.1963
16	Gheorgheni	815	–35,0	11.II.1929
17	Miercurea Ciuc	661	–38,4	14.I.1985
18	Sfântu Gheorghe	561	–34,9	13.I.1985
19	Bod	508	–38,5	25.I.1942
20	Întorsura Buzăului	707	–35,5	13.I.1985
21	Vârful Omu	2504	–38,0	10.II.1929
22	Vârful Ţarcu	2190	–34,4	3.I.1979

[1] A la même date, le 1er février 1937, à l'aéroport de Iaşi a été enregistrée la valeur de –35,0°C et à Iaşi – Internat celle de –30,0°C (*Archives INMH*).

Pour ce qui est des régions devant les Carpates, on observe que parmi les 5 stations météorologiques à températures de ≤–34,0°C, 4 figurent dans la Plaine Roumaine (Craiova, Alexandria, Roşiori de Vede et Focşani) et une seulement dans la Plate-forme de Moldavie, à Iaşi.

Par conséquent, on déduit que les régions les plus affectées par des refroidissements massifs sont en premier lieu celles de plaine au Sud de la Roumanie, où l'air froid pénètre comme dans «un fond du sac», dans la Plaine Roumaine (et cela étant en fait une grande dépression entre les Carpates et les Balkans), qui facilite le maintien et le superrefroidissement de l'air pendant le semestre froid de l'année (Bogdan, 1969).

2. FRÉQUENCE DES RÉCHAUFFEMENTS MASSIFS

Les plus forts réchauffements massifs du dernier siècle ont eu lieu suivant l'ordre chronologique aux mois de: juin 1983; juillet 1909, 1938, 1916, 1943, 1950, 1965, 1985, 1987, 1988, août: 1922, 1945, 1946, 1951, 1952, 1961, 1963; septembre 1946, etc. (*Clima RPR*, II, 1962; *Archives INMH*).

Dans cet intervalle d'un siècle ont été enregistrées 30 phases de réchauffements massifs (la température de l'air étant de ≥40°C) pendant 16 ans différents, ce qui signifie environ 2 phases par an (Tableau 5).

Ces réchauffements ont affecté seulement les régions de plaine, de basses collines et certains couloirs de vallées des régions des collines et de montagne.

La fréquence la plus grande a été en: août 1946 à quatre phases aux dates de 14, 19, 20, auxquelles on ajoute le mois de septembre, avec une phase de plus à la date de 8 (cette année étant considérée aussi comme l'année à la plus grande sécheresse du siècle); août 1952 et juillet 1957, de même à trois phases de réchauffements massifs chacun. On y ajoute les ans à deux phases de réchauffements massifs: août 1945 et 1951; juillet 1916, 1950, 1985 et 1988. Le reste des années ont eu seulement un réchauffement massif aux mois de juillet ou d'août; en même temps, est consigné aussi un réchauffement massif au mois de juin 1938.

Pendant les 30 phases de réchauffements massifs on a enregistré la température maximale absolue de ≥40°C dans 63 stations météorologiques. Parmi celles-ci, dans quatre stations la même valeur a eu deux phases différentes et dans deux stations trois phases différentes, ce qui signifie 71 de cas de réchauffements caniculaires, à températures maximales absolues de ≥40°C, enregistrées pendant les 30 phases de réchauffements massifs (Tableau 5).

Le même tableau permet de constater que, du total de 71 cas de réchauffements caniculaires, les plus nombreux (39 cas) ont eu lieu au mois d'août quand la persistance du temps anticyclonal est plus grande et donc aussi les processus d'insolation plus intenses, et la sécheresse de l'air est aussi la plus grande et non au mois de juillet (29 cas), le mois le plus torride de l'année. Cela met en évidence la dépendance des réchauffements massifs des advections accidentelles de l'air chaud, des vagues de chaleur; d'autre part, la sécheresse du sol des mois antérieurs favorise les processus de réchauffements.

Le nombre de cas à réchauffements massifs précisés (plus de 40°C, représentant les valeurs de températures maximales enregistrées aux stations) a servi au calcul de leur fréquence dans le territoire selon les groupes de valeurs (Tableau 6).

Le tableau cité révèle le fait que le plus grand taux, 70%, revient aux groupes 1 et 2, aux valeurs les plus basses de 40,0–41,9°C. Celles-ci caractérisent les réchauffements massifs étendus sur la plus grande aire et comme résultat les températures ont été enregistrées dans plusieurs stations. A mesure que les valeurs sont plus élevées, l'aire affectée des réchauffements massifs décroît sensiblement, fait relevé par la fréquence des cas à température de ≥42°C détenant ensemble 24%.

Les plus grandes valeurs, ≥44,4°C, ont occupé l'aire la plus réduite, étant enregistrées au Sud-Est de la Plaine Roumaine seulement, aux trois

Tableau 5

Fréquence des réchauffements massifs (où la température maximale absolue enregistrée aux stations a été de ≥ 40°C) pendant le dernier siècle en Roumanie

No crt.	Année	Mois	Jour				Nombre total des phases des réchauffements	Nombre total des cas ≥ 40°C	%
1	1946	VIII	14	19	20	–	3	5	7,1
2	1946	IX	8	–	–	–	1	2	2,8
	1952	VIII	15	16	17	–	3	14	19,7
3	1987	VII	20	22	25	–	3	8	11,3
4	1916	VII	5	11	–	–	2	6	8,5
5	1945	VIII	15	20	–	–	2	10	14,0
6	1950	VII	4	6	–	–	2	3	4,2
7	1951	VIII	10	19	–	–	2	6	8,5
8	1985	VII	6	31	–	–	2	3	4,2
9	1988	VII	6	31	–	–	2	5	7,1
10	1909	VII	27	–	–	–	1	1	1,4
11	1922	VIII	10	–	–	–	1	1	1,4
12	1938	VI	29	–	–	–	1	1	1,4
	1938	VII	3	–	–	–	1	1	1,4
13	1943	VII	22	–	–	–	1	1	1,4
14	1961	VIII	11	–	–	–	1	1	1,4
15	1963	VIII	16	–	–	–	1	2	2,8
16	1965	VII	26	–	–	–	1	1	1,4
Total phases / cas de réchauffements massifs =							30	71	100,0
Dont: – en juin =							1	1	1,4
– en juillet =							15	29	40,9
– en août =							13	39	54,9
– en septembre =							1	2	2,8

Tableau 6

Fréquence des températurés maximales absolues ≥ 40°C, selon les groupes de valeurs, enregistrées au cours des réchauffements massifs pendant le dernier siècle en Roumanie

N° crt.	Groupe de fréquence (°C)	Nombre des cas	%
1	40,0–40,9	27	38,0
2	41,0–41,9	27	38,0
3	42,0–42,9	11	15,6
4	43,0–43,9	3	4,2
5	> 44,0	3	4,2
Total		71	100

stations connues (Ion Sion – Commune de Râmnicelu, 44,5°C la plus grande valeur; Amara – Slobozia et Valea Argovei sur Mostiştea 44,0°C, toutes le 10 août 1951) qui ont une fréquence de 4,2% seulement. Cela a été la plus puissante phase de réchauffement qui a atteint le record thermique positif en Roumanie.

Pour pouvoir saisir l'apport des vagues de chaleurs caniculaires déterminées par divers types d'advections de l'air tropical, ainsi que le rôle

de barrage orographiques des Carpates, on a calculé la fréquence territoriale des cas à réchauffements massifs (pendant lesquels a été enregistrée la température maximale absolue (≥40°C), d'un côté et de l'autre des Carpates (Tableau 7).

Tableau 7

Fréquence des cas de réchauffements massifs par rapport aux influences climatiques extérieures et le rôle de barrage orographique

Régions au centre, à l'Ouest et au Nord-Ouest de la Roumanie		Régions au Sud, au Sud-Est et à l'Est de la Roumanie		Régions montagneuses	
Nombre de cas	%	Nombre de cas	%	Nombre de cas	%
11	15,5	51	71,8	9	12,7
Nombe total des cas = 71				Total % = 100	

On constate que dans la Dépression collinnaire de la Transylvanie, entourée du barrage carpatique, excepté deux valeurs (celle de Alba Iulia située dans le couloir du Mureş et celle de Sebeş – Alba, à la confluence du Sebeş et du Mureş), on n'a plus enregistré d'autres valeurs de ≥40°C, ce qui signifie que cette région n'est pas affectée par de vagues de chaleurs caniculaires, étant donné le rôle de barrage orographique, les influences océaniques modératrices et la forme de dépression soumise aux influences des montagnes limitrophes.

Ainsi, l'on remarque que les régions extracarpatiques seulement sont affectées de tels réchauffements massifs. Le tableau 7 met en évidence aussi le fait que la plus grande fréquence revient aux réchauffements massifs qui ont porté sur les territoires de l'Est, du Sud-Est et du Sud de la Roumanie, à influences continentales d'aridité, les plus soumises aux vagues de chaleurs caniculaires, pendant lesquelles ont été enregistrées des température maximales absolues de ≥40°C dans 51 cas, ce qui signifie 71,8%.

Dans les territoires à l'Ouest et au Nord-Ouest de la Roumanie, respectivement derrière le barrage orographique des Carpates, caractérisés par des influences océaniques, la fréquence de ces températures est environ 5 fois moindre, 11 cas (c'est-à-dire 15,5% de leur total).

Dans les régions montagneuses, de telles situations apparaissent seulement au long des couloirs larges de vallées, à petites altitudes, au-dessous de 300 m, à travers lesquels l'air chaud moule leur forme, en pénétrant aisément à l'intérieur. Ici, 9 cas (12,7% du total) ont été enregistrés. Il s'agit du Défilé du Danube (stations de Moldova Veche, Berzasca, Orşova et Drobeta Turnu Severin), ainsi que du couloir de Timiş-Cerna (les stations de Băile Herculane et Lugoj), les deux à influences subméditerranéennes; le couloir du Mureş jusqu'à Alba Iulia (secteur Deva-Alba Iulia à effets de fœhn), la Vallée du Geoagiu (station Geoagiu), le Couloir du Crişul Negru et la Dépression de Beiuş (station Beiuş), auxquels on ajoute également le Couloir du Trotuş dans

la Dépression sous-carpatique Tazlău-Caşin (station Târgu Ocna). Excepté le dernier couloir, affecté par des vagues de chaleurs tropicales de l'Est, les autres sont affectés par des vagues de chaleurs tropicales du Sud-Ouest.

Dans ces couloirs, les plus élevées valeurs des températures maximales absolues ont été à Orşova et Alba Iulia, de 42,5°C, le reste étant compris entre 40,0°C et 41,5°C, comme résultat du rôle de modérateur thermique de la montagne.

On conclut, en précisant que la répartition des valeurs maximales absolues de la température de l'air ≥40°C sur le territoire de la Roumanie révèle le rôle de barrage orographique des Carpates, ce qui fait que les territoires les plus affectés par de telles vagues de chaleurs caniculaires soient ceux de l'Est, du Sud-Est et du Sud, situés respectivement devant le barrage orographique, à influences continentales, donc les plus exposés aux advections de l'air tropical continental, tandis que ceux derrière celui-ci, à influences océaniques, sont plus protégés de tels risques; dans les régions montagneuses, de tels cas sont isolés et seulement dans les couloirs bas et larges des vallées, au-dessous de 300 m altitude.

Pour obtenir une image d'ensemble des plus forts réchauffements du siècle on donne dans le tableau 8 les valeurs maximales absolues ≥40°C.

A quelques exceptions près, on constate que la majorité des températures absolues de l'air ≥42,0°C a été réalisée dans les régions de plaine et de basses collines, au-dessous de 260 m altitude absolue, situées devant le barrage orographique, respectivement celles de l'Est du Sud-Est et du Sud du pays, marquant ainsi par la valeur respective (c'est-à-dire par l'intensité des processus de réchauffement) le rôle de barrage orographique des Carpates. Il faut mentionner que, dans ces conditions, au sol les valeurs ont été de 20–25°C plus grandes.

Pour donner une image plus conforme à la realité de ce point de vue, on a déduit par corrélations la valeur de la température maximale absolue au sol, à Griviţa (la plus représentative pour le Sud-Est de la Plaine Roumaine) pendant le record thermique absolu de Ion Sion de 44,5°C, à l'aide de l'équation de la droite de corrélation qui est de la forme:

$$y = -a + bx \pm k \text{ (où } k = \text{l'écart moyen standard)}.$$

Cela a permis d'établir qu'à la surface du sol, la température maximum absolue a été de 74,7°C pendant le moment culminant de 44,5°C de Ion Sion sur les dunes de sable de Buzău, ce qui signifie que le sol brûlait comme un fourneau (Gâştescu *et al.*, 1979[2]).

De tels cas, bien que très rares, ne sont possibles en Roumanie que dans les régions exposées à l'influence continentale excessive mentionnée et ils caractérisent les plus intenses phénomènes de sécheresse et de grande sécheresse ayant de graves répercussions surtout en ce qui concerne l'agriculture et l'alimentation de la population.

[2] Des valeurs de > 70°C nous avons déterminées en Roumanie dans les dunes de sable du côté gauche du Danube (à Manginiţa – Poiana Mare) et du côté droit de Călmăţui (à Zăvoaia).

Tableau 8

Températures maximales absolues ≥ 40°C, enregistrées en Roumanie pendant les plus forts réchauffements au cours du dernier siècle (selon les archives INMH)

N° crt.	Station météo	H(m)	T°C	Date	No crt.	Station météo	H(m)	T°C	Date
1	Săcuieni	124	40,3	11.08.1908	30.	Turnu Măgurele	29	43,2	25.07.1987
2.	Moneasa – Izoi	150	40,2	15.08.1952	31.	Zimnicea	25	42,1	31.07.1985
3.	Beiuş	197	40,0	16.08.1952	32.	Slatina	165	40,5	17.08.1952
4.	Chişineu – Criş	96	40,1	15.08.1952	33.	Strihareţ	165	40,5	17.08.1952
5.	Hălmagiu	250	40,0	04.07.1907	34.	Drăgăşani	182	40,0	05.07.1916
6.	Arad	101	40,4	16.08.1952	35.	Târgovişte	293	40,4	20.08.1946
7.	Miniş	145	41,5	19.08.1946	36.	Goleşti	160	41,0	14.08.1946
8.	Sânnicolau Mare	84	40,5	06.07.1950	37.	Titu	159	40,2	17.08.1952
9.	Diniaş	86	40,6	06.07.1988				40,2	20.07.1987
10.	Timişoara	91	41,0	16.08.1952	38.	Roşiori de Vede	103	42,2	25.07.1987
11.	Lugoj	124	41,5	20.08.1946	39.	Alexandria	45.	42,9	05.07.1916
12.	Oraviţa	308	42,0	29.06.1938	40.	Videle	108	41,0	17.08.1952
13.	Alba Iulia	248	42,5	16.08.1952	41.	Ghimpaţi	85	42,2	11.07.1916
14.	Sebeş – Alba	252	41,5	04.07.1950	42.	Budeşti	39	41,5	20.08.1945
15.	Geoagiu	245	40,0	15.08.1945	43.	Giurgiu	17	42,8	25.07.1987
16.	Moldova Veche	82	40,2	06.07.1985	44.	Bucureşti – Filaret	82	41,1	20.08.1945
			40,2	31.07.1988	45.	Bucureşti – Băneasa	92	41,1	20.08.1945
17.	Berzasca	68	41,5	26.07.1965	46.	Urziceni	55	41,2	20.08.1945
18.	Orşova	53	42,5	17.08.1952	47.	Armăşeşti	58	41,4	20.08.1945
19.	Băile Herculane	70	42,0	10.08.1922	48.	Fundulea	67	41,3	16.08.1963
20.	Drobeta T. Severin	77	40,9	17.08.1952	49.	Valea Argovei	55	44,0	10.08.1951
21.	Strehaia	140	43,5	20.08.1946	50.	Mărculeşti	40	41,5	10.08.1951
			43,5	08.09.1946	51.	Dâlga	56	40,6	16.08.1963
22.	Târgu Jiu	210	40,6	08.09.1946	52.	Slobozia	27	44,0	10.08.1951
23.	Craiova	105	41,5	05.07.1916	53.	Călăraşi	26	41,4	10.08.1951
24.	Băileşti	60	41,0	17.08.1952	54.	Cernavoda	44	42,2	20.08.1945
			41,0	06.07.1988	55.	Basarabi	85	41,0	20.08.1945
25.	Caracal	112	41,6	20.08.1945	56.	Griviţa	50	40,9	19.08.1951
			41,6	17.08.1952	57.	Ion Sion	50	44,5	10.08.1951
			41,6	25.07.1987	58.	Brăila	15	40,5	22.07.1943
26.	Vânju Mare	95	40,4	06.07.1988	59.	Pietroasele	120	40,0	22.07.1987
27.	Calafat	66	41,5	05.07.1916	60.	Râmnicu Sărat	140	41,0	20.07.1987
28.	Corabia	43	42,0	20.08.1945	61.	Târgu Ocna	263	40,8	05.07.1916
29.	Bechet	31	41,0	31.07.1985	62.	Huşi	102	40,2	03.07.1938
					63.	Iaşi – Internat	100	40,0	27.07.1909

On conclut en appréciant qu'en Roumanie sont possibles tant des refroidissements massifs pendant l'hiver que des réchauffements massifs pendant l'été déterminant les plus frappants contrastes thermiques mis en évidence par les températures extrêmes absolues. Cependant, leur répartition territoriale est déterminée tant par la direction d'advection de la masse d'air respective, que par le rôle de barrage orographique des Carpates qui en limite les aires et diminue ou amplifie l'intensité par rapport à l'exposition des versants devant l'advection respective.

Les effets de ces refroidissements et réchauffements massifs sont évidents. Si l'on considère le fait que de telles variations de température, souvent brusques, sont accompagnées de variations de pression atmosphérique, il devient encore plus évident leur caractère dangereux pour la santé de l'homme.

D'autre part, les refroidissements massifs avec le cortège de gelées et brumes intenses qui peuvent perturber le cycle biologique des cultures agricoles, et les réchauffements massifs, accompagnés d'intenses processus d'évapotranspiration et de phénomènes de sécheresse et de grande sécheresse peuvent produire des préjudices d'ordre écologique et économique-social à influence directe sur la qualité de la vie.

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LES EURORÉGIONS

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Mots-clés: Eurorégion, région transfrontalière, intégration européenne, géopolitique.

The Euroregions. The research raises the issue of transfrontier regions, focusing on the fact that, though one may encounter this kind of regions on other continents as well, they characterise Europe, the designation of "Euroregions" being a direct conclusion of the fact.

After the difinition of the "Euroregion" term and a brief history of the European transfrontier regions' emergence and construction, the author reveals, on the one hand, the importance, and on the other hand, the perils – more potential than real – of the Euroregions' formation. The importance of the Euroregions is underlined for the European becoming, because:

a) European integration obviously implies regional co-operation and, consequently, transfrontier regions make their contribution to the preparation of the countries that desire to accomplish their destiny alongside with Europe's future, the European Union respectively;
b) The Euroregions contribute to softening tension and to the maintenance of stability in the area;
c) The Euroregions represent a natural and necessary step in the transition process from geopolitics to geoeconomics.

The research also includes a description of positive and negative Euroregions examples, as well as of transfrontier regions of which Romania is a part.

1. CONSIDÉRATIONS GÉNÉRALES

1.1. UNE DÉFINITION POSSIBLE

Les eurorégions peuvent être définies comme des zones ou des régions d'interférence économique, mais non seulement, dans lesquelles deux ou plusieurs États valorisent, en commun, les ressources humaines et matérielles par l'initiation et le déroulement des activités et des programmes agricoles, industriels, de transport et communication, touristiques, commerciaux, etc. Elles incluent, pratiquement, des territoires en interaction active des deux côtés des

frontières d'État. Comme, généralement normalement, leur rayon d'action concrète ne dépasse pas 40–50 km d'un côté et de l'autre de la frontière; leur longueur peut atteindre même des centaines de km, mais dans la plupart des cas il s'agit d'une chaîne de telles zones (par exemple, «l'espace économique» du Rhin Supérieur et, respectivement, celui de l'Oder).

En dépit du fait qu'elles gravitent vers un certain axe frontalier (soit sur l'eau, soit sur la terre), les eurorégions se caractérisent par l'intégralité administrative et sociale des unités composantes (donc, on ne pose pas le problème de l'autorité de l'État auquel elles appartiennent). Mais, en plus, elles ont un autre trait: la communauté et la complémentarité des principaux problèmes socio-économiques, qu'elles règlent en commun.

1.2. BREF APERÇU HISTORIQUE

Même si elles se trouvent aussi dans d'autres régions du monde, les régions ou les zones transfrontalières sont, en effet, propres au continent européen, d'où provient la dénomination déjà consacrée d'*eurorégions*. Elles sont devenues une réalité concrète premièrement en Europe Occidentale, après la seconde guerre mondiale, donc, assez récemment, mais, ce qui doit être souligné, à la suite d'un long processus d'évolution. Ce processus a circonscrit, entre autres, mais au premier plan, la suppression graduelle des barrières douanières et la libre circulation de la main-d'œuvre.

Jusqu'à présent ont été établies sur notre continent environ 30 régions transfrontalières, dont la plupart en Europe Occidentale (surtout le long des frontières des pays comme l'Allemagne, la France, la Suisse, la Belgique et les Pays-Bas) ou, après les événements des années '89–'90, dans la zone de contact de celle-là avec l'Europe Centrale (principalement le long de la frontière entre l'Allemagne, d'un côté, et la Pologne et la République Tchèque, de l'autre côté) ou avec l'Europe de l'Est (par exemple l'«Eurorégion Baltique», dont font partie le Danemark, la Suède, la Pologne, la Russie, la Lettonie et la Lituanie). On a jeté les bases de certaines régions transfrontalières exclusivement dans l'ancienne «Europe de l'Est», parmi lesquelles la «Région Carpato-Européenne» et les eurorégions auxquelles la Roumanie participe aussi: «Le Bas-Danube», le «Prut Supérieur» et «Danube – Mureş – Tisza».

1.3. IMPORTANCE, DANGERS

En dehors du fait qu'elles entrainent des énergies humaines et des ressources matérielles qui, autrement, ne seraient pas ou pas assez utilisées selon leur valeur, les eurorégions sont importantes du point de vue du développement européen:

a) l'intégration européenne suppose, évidemment, la coopération régionale et, en conséquence, les régions transfrontalières contribuent à preparer les pays en vue de lier leur destinée à l'avenir de l'Europe, respectivement, à l'Union Européenne;
b) les eurorégions contribuent à la diminution des tensions et au maintien de la stabilité dans la zone;
c) les eurorégions représentent l'étape naturelle et nécessaire dans le processus de transition de la géostratégie à la géoéconomie.

Rappelons parmi les périls potentiels de telles associations, mais qui peuvent être contrecarrés:

- les accords par lequels des autorités locales pourraient contrevenir à la politique des pays impliqués;
- la possibilité que certaines communautés locales, voire même des minorités nationales, signent des documents à l'insu de propres gouvernements.

A part de tels dangers, plutôt potentiels que réels, en Roumanie, ainsi que dans d'autre pays ex-socialistes, il y a aussi des réticences en ce qui concerne les eurorégions parce qu'on met le signe d'égalité entre celles-ci et *le modèle Valev*. Ce dernier était un modèle soviétique, lancé dans les années '60 qui n'avait pas comme but la stimulation du développement économique et de la coopération mais, au contraire, «le contrôle» des économies des pays socialistes et leur maintien en état de sous-développement et, surtout, de dépendance de l'Union Soviétique. Bien qu'il n'ait pas été manifeste, le modèle Valev avait, pratiquement, des motivations géopolitiques, poursuivant l'inclusion dans l'Union Soviétique d'autres territoires, conformément au principe de la proximité et, respectivement, de la division du travail.

En Roumanie, par manque d'informations et à cause de la quasi-absence de ce thème dans les mass-média, les eurorégions sont perçues de la manière suivante: «les Hongrois nous enlèvent la Transylvanie». Il n'est pas moins vrai qu'à l'apparition de telles réactions a pleinement contribué aussi la modalité inadéquate de constitution et de présentation de l'eurorégion «L'Europe Carpatique».

2. EXEMPLES D'EURORÉGIONS

2.1. L'ESPACE ÉCONOMIQUE DU RHIN SUPÉRIEUR - L'EXEMPLE LE PLUS FONCTIONNEL ET SIGNIFICATIF D'EURORÉGIONS

Il a été constitué à partir de l'axe représenté par le couloir naturel du Rhin (le deuxième fleuve de l'Europe Occidentale et Centrale selon la taille, après le Danube), et s'étend sur 300 km en longueur et 60 km en largeur moyenne.

Il contient quatre unités (eurorégions):

- *Regio Basiliensis*, la première créée (en 1976) dans cet espace économique, qui a reçu ce nom parce qu'elle a comme nœud la ville suisse de Bâle, port sur le Rhin; dans cette région s'interfèrent la Suisse, l'Allemagne et la France;
- l'extension est de l'agglomération urbaine Bâle (bipartite: la Suisse et l'Allemagne);
- la zone Strasbourg–Karlsruhe (bipartite: la France et l'Allemagne);
- la zone Mannheim–Francfort-sur-le-Main–Mayence–Ludwigshafen, qui, même si elle est entièrement allemande, est fortement liée à la région précédente par sa position géographique et par son activité économique.

L'espace économique du Rhin Supérieur est coordonné par la «Conférence d'Aménagement du Rhin Supérieur» et chacune de ces quatre régions par des commissions intergouvernementales (bipartites ou tripartites, selon chaque cas).

Voici quelques caractéristiques de la zone:

- anciennes traditions artisanales et commerciales;
- une position dominante dans les liens entre la Mer du Nord et la Mer Méditerranée;
- un système vaste de canaux navigables et un potentiel hydro-énergétique valorisé par beaucoup de centrales hydro-électriques);
- une population nombreuse (environ de 8 millions d'habitants) qui vit dans un espace relativement restreint;
- elle inclut une série de villes importantes non seulement pour leur population (Francfort-sur-le-Main a plus de 650 000 habitants, Strasbourg
- près de 400 000, Mannheim et Karlsruhe – environ de 300 000, auxquelles s'ajoutent d'autres villes de plus de 200 000 habitants), mais comme des centres économiques (financiers et bancaires dans beaucoup de cas);
- en totalité, elle représente, aujourd'hui, l'une des régions européennes les plus développées.

2.2. LES EURORÉGIONS CENTRÉES SUR ODER – NEISSE

À la différence de «l'Espace économique de Rhin Supérieur» qui entraîne aussi des territoires allemands de l'ouest du pays, les tentatives de créer un espace pareil à l'est, avec la Pologne et la République Tchèque, n'ont pas été aussi faciles et couronnées de succès.

Une première tentative a eu lieu en 1990, lorsque la ville de Berlin et le land Brandebourg ont proposé, par l'entremise d'un plan élaboré par un bureau spécial d'études (*Förderkonzept Oderraum*), la création d'une région transfrontalière avec les voïevodats de Pologne. Les suspicions des responsables locaux, spéculées pleinement par les mass-média, ont empêché l'accomplissement de ce projet.

L'échec de la première tentative et les difficultés de celles qui ont suivi et qui ont eu du succès, mais qui, en même temps, ont rencontré beaucoup d'obstacles, trouvent leur explication dans une série de facteurs:

- la frontière actuelle entre l'Allemagne, d'un côté (même si les lands de l'est ont appartenu, après la seconde guerre mondiale, au «monde communiste») et la Pologne et la République Tchèque, de l'autre côté, constitue la limite de l'Union Européenne et, implicitement, de deux niveaux différents de développement socio-économique et, respectivement, de vie;
- du point de vue historique, la frontière est récente (suite à la dernière conflagration mondiale) et n'a été reconnue par l'Allemagne comme frontière est qu'à la suite de la Conférence 4 + 2 du 12 septembre 1990;
- la crainte d'une «re-germanisation» des territoires d'au-delà de l'Oder, cette fois par le facteur économique.

En dépit de ces facteurs restrictifs, auxquels on peut ajouter beaucoup d'autres, dans la zone frontalière entre l'Allemagne, d'un côté, et la Pologne et la République Tchèque, d'un autre côté, ayant comme axe la vallée du fleuve Oder et de ses affluents, ont été créées sept eurorégions. Les lands allemands, les voïevodats polonais et les régions (les *kraj*) tchèques se sont engagés dans une coopération destinée à surmonter l'héritage historique négatif et les incertitudes économiques, ayant l'ambition de créer une synergie entre tous ces «acteurs». Pour le début ils ont l'intention d'arrêter les pertes démographiques et d'empêcher le déclin économique, surtout le déclin industriel.

Pratiquement, toutes les trois parties ont des intérêts. Parmi eux on mentionne, en général, le fait que l'Allemagne ne peut plus subir les coûts de sa politique à l'Est, tandis que la République Tchèque et la Pologne mettent, ainsi, les jalons de leur adhésion à l'Union Européenne.

2.3. UN CAS PARTICULIER: LA RÉGION EURO-CARPATIQUE OU L'EURORÉGION CARPATIQUE

L'Eurorégion Carpatique a été officiellement créée la 14 février 1993 à Debrecen en Hongrie, sous le parrainage du Conseil de l'Europe (y a été présente Madame Catherine Lalumière, qui était, à ce moment-là, Secrétaire Général du Conseil). Le document a été paraphé par les ministres des affaires étrangères de la Hongrie, de la Pologne et de l'Ukraine. Ont participé aussi quelques représentants locaux de Slovaquie et de Roumanie.

Caractéristiques:

- selon son étendue, elle est, en effet, une méga-région: 67 000 km^2 et environ 6 millions d'habitants: à la différence d'autres eurorégions, elle a une très grande largeur (la largeur maximale s'approche de 500 km!).

- *Composition:*
  - 4 départements du nord de la Hongrie;
  - 2 voïvodats du sud de la Pologne;
  - la région transcarpatique de l'Ukraine;
  - une moitié de la région slovaque de l'est;
  - deux départements du nord-ouest de la Roumanie (Satu Mare et Maramureş).
- Du point de vue géographique, elle inclut la large plaine de la Tisza, bordée, surtout au nord, par les Carpates (des secteurs des Carpates Slovaques, Ukrainiennes et des Beskides, le nord des Carpates Orientales), qui ont des dépressions intra-montagneuses (dans certains cas assez étendues), bien peuplées, et des défilés de basse altitude, favorisant les liens.
- Elle est traversée par quelques routes importantes, qui assurent des connections vers toutes les directions au niveau du continent:
- Budapest – Miskolc – Košice – Cracovie – Varsovie;
- Debrecen – Ujgorod – Lvov – Kiev;
- Prague – Košice – Ujgorod – Tchernovtsy.
- *L'économie se caractérise par:*
- de grands contrastes territoriaux;
- des espaces agricoles étendus;
- une industrie concentrée surtout en 5 centres, qui sont, en même temps, les plus grandes villes de la région: Miskolc (le deuxième centre industriel de la Hongrie), Debrecen (le deuxième centre urbain de la Hongrie), Košice (la seconde ville et centre industriel de la Slovaquie), Baia Mare et Satu Mare;
- une infrastructure insuffisamment développée et présentant de grandes disparités territoriales.

Les objectifs (conformément aux Statuts adoptés):

- organisation de l'activité de coordination qui favorise la collaboration dans les domaines économique, scientifique, écologique, culturel, etc;
- élaboration de projets concrets d'intérêt réciproque;
- organisation de la collaboration de membres de l'eurorégion avec les organismes internationaux spécialisés.

La structure organisationnelle:

- L'Assemblée Générale;
- Le Secrétariat Général;
- Les Commissions de travail (quatre):
  - pour le developpement économique;
  - pour les problèmes humanitaires;

- pour l'écologie et la santé;
- de révision et de contrôle.

On prévoit aussi l'organisation de centres de formation des spécialistes dans les domaines:

- de l'administration locale (à Užgorod, en Ukraine);
- des petites affaires (à Košice, en Slovaquie);
- bancaire (à Krosno, en Pologne);
- de la protection sanitaire et écologique (à Debrecen, en Hongrie).

On a conçu aussi une publication propre, ayant le titre «L'Europe Carpatique».

Interprétations défavorables à la création de l'Eurorégion Carpatique:

Premièrement, il y a le problème de «l'autoadministration locale», qui peut être et est interprétée comme une forme d'autonomie, favorisant une certaine population. On cite, à cet égard, l'affirmation suivante de la Déclaration adoptée à Debrecen, à l'occasion de l'établissement de la Région Euro-Carpatique: «L'Eurorégion Carpatique se constitue en tant qu'*organe d'autodirection administrative locale* (notre soulignement) et de coordination destinée à affaiblir le rôle de barrière des frontières, dans l'esprit des dispositions de la Convention n° 106 du Parlement Européen, qui vise les principes foundamentaux de la collaboration transfrontalière entre les communautés territoriales ou les organes d'État de la région géographique des Carpates, du bassin de la Tisza et des territoires afférents».

Deuxièmement, il faut souligner le grand intérêt de la Hongrie pour l'établissement de cette eurorégion:

- La population hongroise est la seule qui se trouve, c'est vrai, en poids différents, dans toutes les zones composantes qui, sauf les voïvodats polonais, ont fait partie, à travers le temps, soit de l'Empire autrichien-hongrois, soit, seulement de la Hongrie. C'est d'ici que dérive le rôle actif – à certains avis très actif – des associations et des institutions comme l'Union Mondiale des Hongrois et l'Institut d'Études Européennes Est–Ouest, le dernier créé en 1981, à New York, par J.E. Mroz, un American d'origine hongroise – qui a été, en effet, désigné en tant que président d'honneur de la région.
- Les études des spécialistes hongrois qui abordent le problème des régions transfrontalières ont comme point de départ la théorie selon laquelle le Traité de Trianon a produit une rupture entre les territoires situés, aujourd'hui, dans la proximité extérieure et ceux restés en Hongrie, portant des conséquences négatives pour l'évolution socio-économique de ces régions. À l'appui de cette thèse – la fragmentation

des «unités autrefois entières» – la dénomination de deux départements hongrois est considérée commune à ceux de Roumanie (Hajdu – Bihor et Sabolcs – Szatmar).

- L'appréciation que la Hongrie, «le premier violon» de cette eurorégion, a comme objectif, entre autres, la résolution du problème des disparités socio-économiques; à cause de la macrocéphalie de Budapest, les gouvernants hongrois ont beaucoup investi, pendant les dernières décennies, en quelques villes qui se sont fortement développées, c'est vrai, mais au détriment de vastes régions, surtout rurales, comme celle qui fait partie de la Région Eurocarpatique.
- L'Eurorégion Carpatique est, pratiquement, une méga-région (elle couvre près de trois quarts de la Hongrie et sa population représente trois cinquièmes de celle de Hongrie), sans couverture réelle dans la complémentarité économique et commerciale.
- La modalité dans laquelle la région a été constituée: sans l'invitation et la participation du principal pays carpatique, la Roumanie.

3. LES EURORÉGIONS – UNE ÉTAPE NÉCESSAIRE DANS LA TRANSITION DE LA GÉOSTRATÉGIE À LA GÉOÉCONOMIE

Dans la diversité d'opinions à l'égard de l'avenir de l'humanité et, surtout, concernant le XXI[e] siècle qui est en train de commencer, s'impose, en premier lieu, celle qui se réfère à la réduction de l'importance de la puissance militaire dans les affaires internationales, les moyens militaires étant remplacés par des moyens commerciaux.

Une telle transition n'est pas, bien sûr, et ne peut pas être simple, vu que la scène internationale est occupée par des États et blocs d'États qui réglementent les échanges économiques, encaissent des taxes, offrent des services, produisent des infrastructures, financent le développement des nouvelles technologies, etc. En tant qu'entités territoriales, les États ne peuvent pas poursuivre la logique des affaires – qui ignore l'existence des frontières – et continueront d'agir conformément à la logique des règlements d'État. Ce comportement n'est qu'un aspect de la logique du conflit, parce qu'il soutient la compétitivité de sa propre économie par rapport aux économies d'autres États. Un tel comportement suppose des mesures de protection de l'économie nationale contre les effets de la concurrence sur le plan international.

Les entités d'État et les blocs d'États délimitent leurs propres territoires pour en assurer un contrôle aussi complet que possible, en essayant, en même temps, d'influencer, par des moyens divers, les événements en dehors de ces espaces. Le but de ces mesures est d'obtenir une meilleure position sur la marché mondial. Dans ce contexte, selon certains analystes, parmi lesquels l'Américain

Edward N. Luttwak[1], ancien conseiller du président Ronald Reagan, à présent et en perspective les actions géopolitiques entreprises par les États se transforment en activités géoéconomiques qui joignent la logique du conflit à la logique des méthodes commerciales. En se référant à Klausewitz, l'analyste américain considère que la géoéconomie suppose la transformation de la «logique de la guerre en grammaire du commerce».

Luttwak constate qu'en effet, les États sont réticents devant ces transformations et qu'ils continuent de se rapporter les uns aux autres en termes d'adversité géopolitique. Donc, on peut s'attendre à la continuation des conflits géopolitiques, y compris en formes brutales, bien que ces formes soient des rivalités économiques. En développant cette idée, l'analyste américain croit que les États qui veulent triompher dans leurs rivalités économiques appelleront aux services des géoéconomistes provenus des géopoliticiens qui ont compris, avant les autres, l'évolution de l'histoire et se sont reconvertis professionnellement.

Dans un tel contexte, il est important de se rendre compte et de souligner que, à l'encontre des «guerres géopolitiques», les «guerres géoéconomiques» ne sont pas un jeu à montant nul. Dans une telle compétition géoéconomique, il est important de gagner quelque chose. Ou, comme le dit l'analyste Raymond Vernon[2], dans les conflits économiques il est essentiel de se maintenir dans le monde des rivalités économiques. Il n'est pas moins vrai que, dans les conditions où la vie internationale a été dominée par des priorités stratégiques militaires, ces aspects ont été considérés secondaires. Maintenant ils deviennent prioritaires, on établit des alliances commerciales, on délimite les adversaires commerciaux, etc. Au fur et à mesure que les menaces militaires diminueront leur intensité, les priorités et les modalités géoéconomiques deviendront dominantes. Et cela aussi parce que les menaces économiques sont devenues prioritaires.

Dans de telles conditions, on prévoit que non seulement les causes, mais aussi les modalités de résoudre les conflits seront économiques. Même si des conflits politiques apparaissent dans une région, ce sont les «armes du commerce» auxquelles on va recourir, respectivement des restrictions d'importation, des taxes, etc. Le comportement géoéconomique suppose, donc, une variété beaucoup plus large de moyens que l'action géopolitique, qu'elle appelle soit aux attitudes de *laissez-faire*, soit à l'activisme géoéconomique.

L'idée de la transition de la géopolitique à la géoéconomie ne manque pas d'opposants. Par exemple, l'économiste, toujours américain, Paul Krugman[3], du renommé Massachusetts Institute of Technology, attire l'attention que la «rhétorique de la compétitivité» et les affirmations comme celles du président

[1] Luttwak, Ed., *The Endangered American Dream*, Simon & Schuster Ltd., New York, 1993.
[2] Vernon, Raymond, in "*The National Interest*", no. 34, 1993–1994.
[3] Krugman, Paul, *Competitiveness: A Dangerous Obsession*, "Foreign Affairs", no. 2, 1994

américain Bill Clinton «chaque nation, comme une grande corporation, entre en compétition sur le marché international» sont sans fondement. Les États du monde n'entrent pas en compétition comme le fait «Coca-Cola» avec «Pepsi-Cola». Définir la compétitivité d'une nation – continue Krugman son raisonnement – est quelque chose de plus problématique que dans le cas d'une corporation. Quand une corporation n'est pas compétitive, elle disparaît du marché, ce qui n'est pas le cas des nations. Les États peuvent être contents ou non de leurs performances économiques, mais ils ne cessent pas d'exister.

En revenant à l'hypothèse concernant l'avenir géoéconomique du monde, il faut admettre que, entre autres, celle-ci a le mérite d'attirer notre attention sur le rôle important des intérêts économiques dans l'ensemble des sujets de géopolitique. Au fond, la Géopolitique n'est pas morte en même temps que la fin de la «guerre froide» – si celle-ci est vraiment finie – mais elle a multiplié ses manifestations, surtout sur le plan économique. Il est plus que prévisible que dans la perspective du siècle suivant, les États du monde se rapporteront les uns aux autres toujours en termes de puissance et entreront en rivalité géopolitique sur des plans différents, les intérêts économiques étant plus que présents.

4. LA ROUMANIE ET LES EURORÉGIONS

La Roumanie participe déjà, depuis 1997, à trois eurorégions, comme suit: le Bas-Danube, le Prut Supérieur, Danube-Mureş-Tisza. La création des deux premières a été décidée à la suite de la réunion trilatérale d'Ismaïl (Ukraine) du 3 juillet 1997, respectivement par les présidents de la Roumanie, de la République de Moldova et de l'Ukraine, et la troisième, à la suite du protocole signé à Szeged (Hongrie), le 21 novembre 1997, par les représentants des unités administratives de la zone respective de la Roumanie (les départements/ «*județele*» d'Arad, Caraş-Severin, Hunedoara et Timiş), de Hongrie (les départements de Bacs-Kishkun, Bekes, Jasz-Nagykun-Szolnok et Csongrad) et de Yougoslavie (la province autonome de Vojvodina, de Serbie). Le processus d'organisation dans ce domaine est plus avancé pour les régions transfrontalières «le Bas-Danube» et «Danube-Mureş-Tisza».

Cette coopération régionale se propose comme but d'élargir les relations dans divers domaines: économique, culturel scientifique, touristique, écologique, sportif, etc. En même temps, on espère que, par la création de telles régions transfrontalières, on créera pratiquement des espaces de désamorçage de certaines tensions interethniques, de lutte contre le chauvinisme et l'intolérance. L'initiative de la Roumanie dans cette direction constitue, entre autres, la suite

du fait que notre pays a adhéré, au début de 1996, à Strasbourg, à la Convention-cadre concernant la coopération transfrontalière.

Personnellement, je considère qu'il est possible de créer de nouvelles régions transfrontalières auxquelles la Roumanie participe, parmi lesquelles les Portes de Fer–Ostrov (avec la Serbie/Yougoslavie et la Bulgarie), mettant l'accent sur la valorisation énergétique du Danube, et la Tisza supérieure (avec l'Ukraine et la Hongrie), eurorégions plus faisables et crédibles que l'«Eurorégion Carpatique».

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ASPECTS OF THE HISTORICAL GEOGRAPHY OF THE POPULATION OF BANAT IN THE EIGHTEENTH CENTURY

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Observations géographiques-historiques concernant la population du Banat au XVIII[e] siècle. Au début du XVIII[e] siècle la population du Banat était représentée par les Roumains, les Serbes, par peu de Gitans, de Juifs et de *Caraşoveni*. C'est pendant ce siècle que les Habsourg régnants (Charles VI, Marie-Thérèse et Joseph II) ont essayé la colonisation du Banat avec une population catholique, plutôt allemande, mais aussi française, italienne, espagnole, etc. A la suite de cette colonisation, les Roumains ont été souvent forcés d'abandonner la plaine riche et fertile en faveur des zones plus hautes de l'est de la région ou dans la zone des marais du Sud-Ouest du Banat. En dépit de l'aspect négatif de la colonisation pour la population native, elle a eu aussi un rôle positif dans le développement économique du Banat, dans l'industrie (sidérurgique, de la soie, du bois, etc., l'agriculture (l'élevage du ver à soie, la culture du riz, etc.) et la régularisation, la canalisation des rivières, notamment la Bega.

The eighteenth century meant for the present population of the Romanian Banat region a "black" and "golden" century altogether. It was black because of the way in which the Romanian native population was treated by the Habsburg authorities, especially in the Banat Plain area, but it was considered "golden" because of the economic-social progress of the region in that period. This article treats also important geodemographical aspects connected to the main colonisations made in the Banat of the Timişoara region in two distinct periods: Caroline (under the rule of Carol VI) and Theresian-Josephine (under Maria Theresa and Joseph II). A note is presented for the northern Mureş zone (Arad zone), revealing the main colonisations and showing that the Romanians had lived there before other ethnic groups.

INTRODUCTION

At the beginning of the 18th century, the Romanian population of Banat[1] formed a socially homogeneous mass that depended on agriculture to provide

[1] Most of the historical studies relate to the historical Banat (Carpathians-Mureş-Tisa region) but this article refers to people in today's Romanian Banat, including the area south of

both subsistence and a surplus for trade. After the treaties of Karlowitz (1699) and Passarowitz (1718), the region came under Habsburg administration. Defence of the area, with reliance on a Catholic population, resulted in a massive colonisation involving Germans and other nationalities (including Bulgarians, French people and Italians). In the process of reorganising settlements and exploiting the fertile plain they created a more diverse spatial pattern by the end of the 18th century (Popp, 1942).

In order to justify the scale of colonisation and its organisation, Austrian historiography promoted a theory of depopulation during the Turkish period (Bizerea, 1969). But it is clear from *Konskriptions Daten und Temeswar Einrichtungs Sachen de Anno 1717,* made by the Archives Chamber in Vienna (Feichter, 1943) that this amounted to a gross distortion of demographic realities. The Habsburgs refer to only 150 Romanian settlements in the region, with a total of 5,000 houses, but this is clearly an understatement. The notion of underpopulation after the Turkish withdrawal arises from the low yield of taxation that was attributed to a very sparse population. Also, it was assumed that, because the settlers were initially accommodated in Romanian (or Serbian) villages the latter must have been empty of population, although in fact many of the indigenous inhabitants had been forcedly displaced towards mountains or marshes. So it may be claimed that in 1718 the population of Banat was substantial; comprising a Romanian majority (80% of the total) along with Serbs, some *Caraşoveni* (called Bulgarians at that time) and a few Gypsies and Jews. Even the Hungarian documents of the early 18th century recognise a Romanian majority in the Arad plain (Ciuhandu, 1940).

With his general view of the 18th century colonisation and settlement process, Manciulea (1943) recognised three main periods of colonisation in Banat: a) 1711–1740, b) 1740–1780 and c) 1780–1792. Krauter (1929) also distinguished three periods: a) after 1722, b) before the Austro-Turkish Seven Years War and c) under Joseph II (after 1782). Taking account of the imperial rules and the colonisation trends a simple division into the 'Caroline period' of Carol VI and 'Theresian-Josephine period' of Maria Theresa and the Joseph II will be adopted. Separate reference will also be made to the Arad area (north of the Mureş). There are many source materials including the early documentation already mentioned. The best source materials are available for the later period. There were a number of censuses (*Seelenkonsignationen*, but *Seelenkonskriptionen* after 1779). A 1774 survey for the whole of Banat (Griselini, ed. 1984) showed that the population was 59% Romanian, 24% Serbian, 13% German, Italian and French, 2,5%, Bulgarian, 1.3% Gypsy and 0.9% Jewish. There were *no*

mentions of any Hungarians. J.J. Ehrler (ed. 1982) presented the following absolute rounded figures: 200,000 Romanians, 100,000 Serbs and Germans, 2,400 Bulgarians and 340 Jews. The early survey of the Josephine period in 1774 dealt with geodemographical and economical problems in Banat, but it was not a unitary work and was inspired by military interests (Popp, 1943). Other important sources of the later period include the military map of 1772 (showing the number of families and the area of agricultural land in each village), a topographic map (with information on ethnicity and religion in most of the villages) and the Korabinsky dictionary which confirms the Romanian Orthodox majority (both the map and Korabinsky dictionary were made in the 1770s).

THE BANAT SOUTH OF THE MUREŞ: COLONISATION IN THE 'CAROLINE PERIOD'

Carol VI appointed Florimund C. Mercy as governor (1717–1733) to oversee the Habsburg plan to settle a German/Roman Catholic population that would enhance the security of Banat (occupying a vulnerable position on the Turkish frontier) and secure a measure of economic development. Mercy's plan (approved by the Vienna Court in 1717) involved an administrative system for 13 districts and six zones of the whole Banat, which together would comprise a military borderland subject to the control of the War Council of the Imperial Aulic Chamber and secure from Turkish penetration (Popiţi, 1939). The area was occupied by Romanians and a chain of command was established by the appointment of privileged local leaders who were to be known as *cnezi* and *juzi* (Schultheiss and Shulttz) (Feneşan, 1996).

After the Treaty of Passarowitz (1718), the Ottomans withdrew from the Middle Danube region and the Habsburgs planned the colonisation of the region, since there were many Germans from Prussia who had suffered from the ravages of king Louis XIV during the Thirty Years War.

There was a good response to the search by colonial agents for settlers who were prepared to move to Banat. They sailed down the Danube from Donauworth, Martheim, Ulm and Regensburg as far as Pančevo, Palanca Nouă, Petrovaradin and Szeged; the latter used occasionally Germans destined for Periam (Manciulea, 1932). They then travelled by cart to their final destinations (Simu, 1924). The aim was to interpose a Roman Catholic population between Hungarians (Calvinists and Reformists) and the Muslim Turks, while at the same time opening up the routes towards Lower Danubia and securing taxation revenue from the exploitation of local resources. Northern and southern colonisation zones were to be connected by a line of communication through Pişchia (Bruckenau), Giarmata (Jahrmarkt), Freidorf (now a district of Timişoara), Voiteni (Voiteg), Ciacova and Peciu Nou (Neu Wien). Meanwhile, Mercy attended to the fortification of the military bases in Timişoara, Orşova and Mehadia.

THE COLONISTS

The first settlers arrived during the years 1717–1722, but more systematic colonisation took place during the years 1724–1727 – I.A. Krausseau and I.F. Falk sent six large transports to Banat in 1724–1725. Clearly the best year for colonisation was 1724 (Fig. 1), but the 1720s in general saw good progress maintained whereas the 1730s were less successful because of the Ottoman offensive in 1736–1738 which forced Germans from the plains to move into Timişoara. Germans from the Danube zone moved to Vršac while other transfers occurred from Berecuţa to Deta, Iertof to Oraviţa, Munar to Grădişte (now in Yugoslavia). Some settlements disappeared, like Mullenbach near Orşova which is shown on the military maps of the 1720s and 1730s. According to a rather impressionistic enumeration of 1737, many villages had more than 35 houses, including (in descending order) Peciu Nou (70 houses), Recaş (60), Zăbrani (45), Aradu Nou or Schela (40) and Deta (36), etc. (Manciulea, 1943). As most of the Germans had moved to Timişoara at the time, the population must have been largely Romanian or Serb.

Nevertheless, many colonists settled in *old Romanian villages* (Nemoianu, 1929) and very few localities appeared. The displacement of Romanians is generally unrecorded but there were significant migration from the Mureş zone to Igriş and Comloşu Mare in 1718, to Mănăştur, Satchinez and Recaş in 1727 and to Valcani in 1736. Most of the colonists settled near the Danube in the southernmost part of Banat. Ten villages were populated by Serbs (Divici, Radimna, Pojejena Sârbească, Macoviste, Moldova Veche, Liubcova, Socol, Câmpia or Langenfeld, Liubcova and Petrilova). One locality (Carani) was populated by Italians, with a few others elsewhere; while Czechs arrived in Brădişoru de Jos (Maidan) and Bulgarians in Dudeştii Vechi (Beşenova Veche), Germans also took over some Romanian villages in the mountains and depressions: Potoc, Iertof (Hauerdorf), Rusova, Berecuţa and Oraviţa Montană in the Caraş and Oraviţa Depressions as well as Bocşa Montană and Dognecea in the Dognecea Mountains. They also established themselves in the markets of Orşova and Caransebeş as well as in the villages in the plains: Sânpetru German (previously Romanian), Zădârlac, Periam (in the high plain of Vinga) and Lugojul German (on the opposite side of the Timiş from Lugojul Român). They were also prominent in and around Timişoara at Pişchia (Bruckenau), Giarmata (Jahrmarkt), Zăbrani (Guttenbrunn), Munar, Dudeştii Noi (Beşenova Nouă). Indeed, Timişoara was the most densely populated district after Palanca Nouă (now in Yugoslavia) (Simu, 1924).

Generally, villagers maintained the Romanian names where Romanians remained in the majority, as at Sânpetru, Zădârlac, Denta and Ciacova. But new names were used when Germans settled near a Romanian village: *e.g.*

Fig. 1 – Colonisations in the Banat of the Timişoara region in the XVIIIth century.

Guttenbrun meaning *fântână cu apă bună* or 'good water well' and Freidorf meaning *sat liber* or 'free village', or when they became a majority in an old Romanian village: Schela became Neu Arad (today Aradu Nou), Ciaţa became Csatad (today Lenauheim), Falnic changed to Felnac. German names were often connected with the origins of the colonists or with a particular official: Niţchidorf being 'the village of the officer Nitzky', while Moritsfeld indicated 'the land of Moritz', Mercydorf 'the village of the governor Mercy' and Altringer 'the village of governor Clary of Altringen' (Fig. 2).

Meanwhile, the first *Italians* from Habsburg domains settled in Timişoara, Ciacova, Carani (Mercydorf) and Freidorf during the years 1719–1732, specifically with the intention of developing the silk industry. In 1733 another group arrived with C. Rossi (Mercy's Director of Silk-Worm Breeding), while

in 1735 Joseppe d'all Avo led another group from Trieste which settled in Carani. However, the Italians were assimilated by their German Catholic colleagues during the 19th century.

There was also a short-lived Spanish colony arising out of Carol VI's

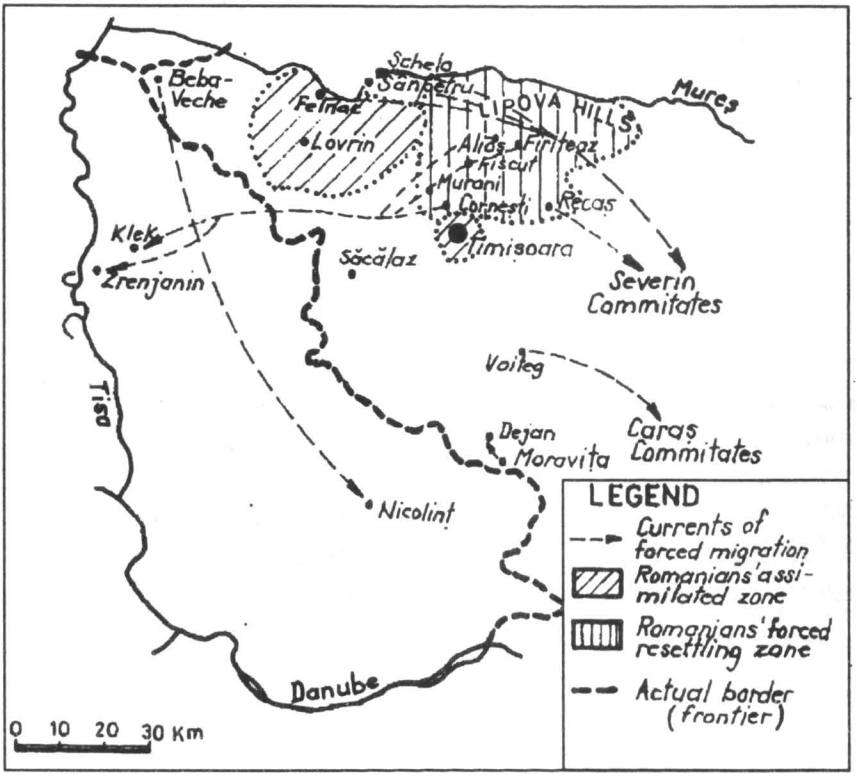

Fig. 2 – New oronyms in Banat in the XVIIIth century.

flight from Spain to Vienna and the permission granted in 1735 for his followers to go and settle in Timişoara and Carani. The largest group settled in Zrenjanin (Becicherecu Mare) in 1736, but their attempts to create a "small Barcelona" (Ţintă, 1972) were undermined by their failure to adapt to the climatic conditions and those who did not retreat to Budapest or Vienna were assimilated by Germans. There were also some Romanian colonists from Oltenia who settled in the Cerna and Timiş valleys (Lugoj, Caransebeş, Oraviţa and Mehadia) in the 1720s and then in the mining settlements (Sasca Montană, Ciclova Montană, Rusca Montană, Bocşa Montană, Cărbunari, Ştinăpari, Moldova Nouă, Oraviţa and Dognecea) in 1730–5 (Molin, 1928, Bizerea, 1970). A few went to the lowland area: Comloşu Mare (Lotreanu, 1935), Sânmihaiu Român and in other villages now in Yugoslavia. In 1750 Romanians moved from Transylvania to Sânandrei, Seceani, Secusigiu, Fiscut.

The first *Bulgarians* settled at the end of Mercy's term of office in Dudeştii Vechi. They arrived from Oltenia where the colony had been first established after the Kiproveț Revolution (1690). Thanks to the help of Constantin Brâncoveanu, they escaped from the Turks and settled in the market centres of Craiova, Târgu Jiu, Râmnic and Brădiceni (Dragomir, 1926), where they were successful tradesmen. They stayed in Oltenia after the Treaty of Passarowitz (1718) when the Habsburgs occupied the province and expanded their activities, but after the Treaty of Belgrade (when the Habsburgs withdrew) the Bulgarians also left because of insecurity (in the context of Turkish suzerainty) and the offer of privileges they would receive as Roman Catholic settlers in Banat. The colonisation commission directed them to Vinița or Vinga (Tulescu, 1943), where the Bulgarians were referred to as *Chiprovniceni* (*i.e.* from Kiproveț) and in Dudeştii Noi (Beşenova Veche), where they were called *Pauliceni* (after the Catholic bishop Paul, who converted them).

DEVELOPMENT ON THE REGION

Because most of the colonists came from mountain areas, they lacked the experience necessary for farming in the Banat plain. They were not very active in draining marshes, canalizing rivers and building roads, but they learnt much from the Romanians during the period of Mercy's governorship and were privileged by exemption from taxation until 1729. Other skills were provided by the settlers. After some craftsmen and manufacturers settled in Timişoara in 1717, many more colonists arrived during the years 1718–1722: we hear of some stone masons from Leibach settling at Oravița in 1718 while miners from Bohemia, Saxony and Styria settled in the mountains in 1721–1722 (Manciulea, 1994 ed.).

A problem arose because the marshlands were prone to disease (according to Austrian sources) and some of the settlers began to ship into Serbia; a practice which called for closer supervision of the Danube frontier. However, this was part of a wider problem of flood hazards along the main rivers (Bega, Timiş, Birda and Bârzava) crossing the plains because these streams were not in any way regulated. There were large marshes associated with the Aranca river and Bega-Kikinda area; also the Mureş as far as Szeged. So the Bega Canal was built (1728–1753): partly for drainage but also to reduce the cost of transporting wood from the Poiana Ruscă Mountains to the Danube (thence for shipment along the Sava towards Ljubljana and Trieste). The channel went from Făget to Răchita, Belinț and Chizătău; then in a straight line as far as Timişoara where locks gave access to four small channels in the [illegible] of the town: one for firewood and the others for timber. The channel [illegible] continued in a straight line

for 16 German miles (121,36 km; one Landesmeile was 7,585 km) to the Tisa near Klek (Griselini, 1984 ed.). Mercy ordered the installation of a pump to lift water to the purification station from which the town could be supplied with clear water through underground pipes.

Gradually agriculture became more commercialized and industries developed.

Rice cultivation was introduced by the Italian colonists at Ghiroda and Ciacova. However, because the ground was too permeable, they moved on in 1770 nearby Roviniţa Mare (Omor), in Topolia place (a topographic name) where a suitable clay soil was found. The breeding of silkworms took place along the Bega and later on at Deta, Ciacova and Zăbrani where mulberry trees were established on dry and permeable lands. Rossi de Montava made special buildings for silk-worm breeding. Good farming was practiced at Carani (Mercydorf), Ghiroda, Giarmata and around Timişoara. The town and its surrounding also became important for manufacturing with a brewery (1718), followed by metal industries (including a wire works), wood processing and paper marking, cloth production and oil pressing. Cloth was also produced in Caransebeş and the village of Borlova ('Aba-fabric') and there was a glass factory at Calina, near Dognecea (which supplied the local Banat market and also exports). The Germans were very strong in industry: they formed trade societies (*Commercien Societät*) and enjoyed privileges which made it difficult for Romanians to compete, although there were few Romanian shops in Timişoara.

THE BANAT SOUTH OF THE MUREŞ: COLONISATION IN THE THERESIAN-JOSEPHINE PERIOD

In 1751 the administration was placed on a commercial rather than a military basis and investment was undertaken over a ten-year period. There was greater sensitivity towards the Romanians as Joseph II noticed how "the Valachi are badly treated, in many times being obliged to move to other parts, which is why they migrate so much". Therefore a greater emphasis was placed on *expanding existing settlements and establishing new villages* rather than *displacing a proportion of the Romanian population* (Manciulea, 1943). Many villages were considered "already full" but sometimes a "surplus of land" (Überland) was deemed to be available for colonists especially in forest settlements (*Waldsiedlungen*) where some Romanian land was taken (sometimes with violent struggles as a result. For example, Wiesenheid was made on the 'Überland' of Firiteaz commune and Cruceni (Kreutsstatten) on that of Fiscut (Feichter, 1942). However, building completely new villages was the preferred solution by Hildebrand, one of the most important Joseph II's agents of colonisations.

Some further pressure did drive the Romanians to revolt, but it was usual for resettlement to take place in an organised fashion. Thus in July 1765 the colonisation commission decided to resettle Romanians from Sânpetru, Felnac, Zădârlac and Schela (Aradu Nou) (Suciu, 1968) in the county of Severin in order to provide more space for German settlement. In 1767, when Count Perlas complained about tension between Germans and Romanians, the latter were obliged to leave Alioş, Fiscut, Firiteaz, Ianova, Murani, Corneşti (Jadani) and Săcălaz and move west to Klek and Torak in what is today Yugoslavia. They also arrived in Klek from Recaş (Fig. 3). As a result most of the Romanians who had earlier been privileged for defending the Mureş frontier were moved out (indeed all privileges were withdrawn when civilian administration was introduced through the counties – *comitates* – of Caraş, Severin, Timiş and Torontal). It is also recorded that Romanians from Beba Veche moved to Nicolinţ in 1773.

Fig. 3 – Forced changes of Romanian settlements in the XVIIIth century.

However, for the most part the Josephine programme aimed at filling those sparsely populated areas that were nevertheless fertile and salubrious

(*i.e.* the high plain, not subjected to the health hazards of the marshy areas or the danger of flooding) and avoiding the areas of Romanian settlement (mainly in the hills and mountains following the displacements of earlier years) unless there were compelling agricultural or mineral resources. Germans were still preferred and in 1766, when a new commission came from Vienna, colonists were brought from Köln, Frankfurt, Ulm and Regensburg (Ilie, 1930).

It is significant that Joseph's great commitment to colonisation earned him the posthumous title "Joseph der Deutsche" (Joseph the German). But other Catholic nationalities were welcome and colonists of other religions were acceptable in special instances (Popp, 1943a). Imperial agents were able to recruit some *French* settlers in Alsace and Lorraine. They arrived after 1752 in Timişoara and Carani, while larger numbers appeared in 1763–65 in Timişoara and Sânandrei and the main wave arrived in Dudeştii Noi, Gottlob and the predominantly French village of Tomnatic in 1769–72. Some French families were still living in Tomnatic (Frécot, 1945) at the end of 19th century but they have now all been assimilated.

In the Theresian years (1740–1764) the colonists were privileged through religious freedom and tax exemptions (Grofşorean, 1946), but they were obliged to live in new villages of some 200 houses. Trees were to be planted in front of the houses and fruit trees in the gardens. Each village had to have its priest and teacher, while doctors were provided for groups of four villages (Manciulea, 1931). The planning of villages was much more effective with grid-iron street layouts and geometrical shapes for the total build-up area: generally square, but circular on the Lipova Hills. The largest villages are associated with the period after Joseph II became Mitregent in 1764. 21 villages were established in Banat (11 in the Romanian Banat) after 1764, 12 of them (six in the Romanian Banat) in 1771 alone. Examples include Jimbolia (Hatsfeld), Grabaţ, Gottlob and Bulgăruş situated to the west of Timişoara but on the same parallel) (Popp, 1943b). Altogether some 50,000 settlers were brought to 64 different villages between 1765 and 1785 (22,000 to 39 villages in the Romanian Banat, some of them being old Romanian or Serb villages or new settlements of the Mercy period).

COLONISATION NORTH OF THE MUREŞ: A NOTE

Colonisation here was generally less thorough and radical since much of the initiative was left to a few noble families. Hence the small number of colonies in the Arad area. Nevertheless, most immigration that has affected this region occurred in the 18th century. *Germans* came from the south of the Mureş to Vladimirescu (Glogovăţ), Horia (Pănadu Nou) and Sânmartin; the latter village was established by Gh. Harukern in 1750. A second current (in 1756) involved

the movement of Germans originating in Lower Austria from the lower Tisa (Torontal) towards Peregu Mare (Peregu German). Settlers in Semlac and Vladimirescu originated in Baden and Lotheringians were present in Horia.

Slovak families who moved into the Hungarian plain at the beginning of the 18th century were transferred again from Bekescsaba, Bekes and Szentes to Nădlac by the nobleman Gh. Haruckern at the end of the century. They had a privileged status because the Hungarians wanted to populate the Tisa region that was only sparsely inhabited at the time. From Nădlac, the Slovaks spread to other places in the Mureş Valley (Seitin, Semlac and Pecica) but without becoming majorities (Manciulea, 1994). Meanwhile, *Hungarians* arrived in waves. Manciulea (1942, 1943) recognized the periods 1699–1751 and 1751–1780, when there were infiltrations along the Mureş Valley towards the Zarand Mountains. They made great efforts to overtake the Romanian element (Demian, 1936) in Arad town, before increasing their presence in the smaller markets of Radna and Lipova. Moving from the Tisa plain, they appeared in Ghioroc in 1743 and in Rovine (now part of Pecica commune) in 1753, while in 1755 they moved from Egyek and Szabolcs to Peregu Mic. By the end of the century they had penetrated other places (once purely Romanian) like Şiria and Galşa. By contrast, *the first colony of Hungarians (Reformists) south of the Mureş zone,* the few made only in 1792, in Tormac (former Vegvar) with 150 families, came to replace the few Germans who had gone to Bacova.

CONCLUSION

Despite a major effort to colonise Banat with a German Catholic population during the Caroline and Theresian-Josephine periods, the Romanian majority (clearly demonstrated in documents for the Arad plain) persisted. However, the colonisation programme accelerated the economic development of the region for the benefit of all nationalities. Banat Romanians participated in innovations in agriculture (such as rice growing, viticulture and the breeding of silk worms) and in manufacturing. But the preference shown for German colonists meant that many Romanian communities lost their land and were obliged to move from the plains to the hilly and mountain zones which remained overwhelmingly Romanian outside the mining centres. The *Romanians* have regained much of their formed dominance in the plains of Banat during the present century, although a complex ethnic quilt remains as a legacy of one of southeastern Europe's most impressive examples of planned settlement in modern times.

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ON THE "ETHNICAL MAP OF TRANSYLVANIA" BY K. KOCSIS

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Key words: ethnical minorities, settlement process, ethnical segregation, Transylvania, Romania, Hungary.

Remarques sur «La carte ethnique de la Transylvanie» de K. Kocsis. Le géographe hongrois K. Kocsis, un spécialiste sur les minorités hongroises des États voisins de la Hongrie, a publié en 1997 une carte ethnique de la Transylvanie à partir des données du recensement roumain de 1992. La carte est accompagnée d'un vaste texte explicatif en hongrois et en anglais contenant des appréciations déformées et tendancieuses sur le processus de peuplement de la Transylvanie et sur les rapports entre les différentes ethnies de cette province historique.

Geography has been playing a fairly important role in 20th-century international relations. Let us remember geographer Emm. de Martonne, an adviser to Prime Minister G. Clémenceau. He made a decisive contribution to tracing the state frontiers in Central Europe at the Paris Peace Conference. Similarly outstanding was Isaiah Bowman, Chairman of the American Geographers' Society and attaché to President Wilson. He was the co-ordinator of the cartographical documentation work. Subsequently, when adviser to President Roosevelt, Bowman elaborated several studies on the issue of post-war territories in Europe.

Cartography was and still is the main geographical tool in matters of international relations. No geopolitical work can do without a map, whether for border or regional matters.

In 1997, Karoly Kocsis of the Institute of Geography of the Hungarian Academy of Sciences, published an *Ethnical Map of Transylvania*, based on the January 7, 1992 population census data. The map, printed on the scale of 1:526,316(!) under excellent graphical conditions, is provided with an explanatory text in Hungarian and English, and as a curiosity, its title is given in Hungarian, English, and Romanian.

Mr. Kocsis'activity goes back to the year 1986. His main concern has been the ethnical and religious problems of the Carpathian-Balkan space with special reference to the Hungarian population. In line with these preoccupations, he put out a *Map of the Distribution of Mother-Tongues in Transylvania*, issued only after 1989 and subsequently included in the *Atlas of Danubian Lands*, published by the Vienna-based Institute of South-Eastern Europe. In 1991, the *Földrajzi Közlemenyek* journal published his comprehensive article on *Ethnical, Religious and Political Changes in the Carpathian-Balkan Region*, afterwards included in the *Studia Hungariae* collection and in the 1994 issue of the GeoJournal. The article appeared also in Romanian (1996) in the collection significantly titled *The Fluctuating Ethnical and Confessional Physiognomy of the Carpathian-Balkan Region and of Transylvania*, put out by the Haaz Rezso Cultural Association from Odorheiu Secuiesc (Transylvania) and the Teleki Foundation – Central European Institute (Budapest).

In collaboration with Eszter Hodosi Kocsis, he published in 1991 an ample work concerning the *Hungarian Minorities from the Carpathian Basin*, republished in Italian (1994) by the Hungarian Embassy's Press Department in Rome, and two years later in English (Toronto – Canada). The book, overviewed by Istvan Bereny, head of the Institute of Geography and by Geza Jeszenszky, Hungary's former foreign minister, deals with the situation of the Hungarian minorities from Slovakia, Subcarpathian Ukraine, Transylvania, Vojvodina and Burgenland, more precisely with the territories once part of the Austro-Hungarian Empire. There is also a comprehensive list of names of mountains, waters and localities, as well as their current denomination used inside each of these states.

Dealing with Transylvania, the author affirms that: "on Romania's CisCarpathian territory, where all ethnical groups from the Centre and South-East Europe are represented (Romanians, Hungarians, Gypsies, Germans, Ukrainians, Slovakians, Serbs, Czechs and Bulgarians), there lives the largest Hungarian minority on Earth: 60% of the Hungarians from the Carpathian Basin and 13.3% of all Hungarians world-wide" (1994, p. 65).

Also in 1991, Kocsis published in English an *Ethnical-Linguistic Map of Central and Eastern Europe*. In 1993, still with focus on the Carpathian-Balkan space, he produced a brochure devoted to the conflictual situation in the former Yugoslavia, illustrated with numerous maps drawn up to match his own views.

The Map which makes the object of this paper presents the province of Transylvania such as it was under the Austro-Hungarian Empire, that is Transylvania proper (Ardeal), Banat, Crişana and Maramureş. Census data are correctly reproduced on the map, which is not the case of the ethnical groups. For example, a bright-red colour is used to designate the Hungarians, a pale yellow stands for the Romanians. The procedure is not new, the Hungarian Government had used it for the Vienna Arbitration (August 30, 1940) to justify

the annexation of Northern Transylvania. That map and the reverse variant are presented in the work *The Romanian Ethnical and Historical Space*, vol. III. Names of settlements are given in Romanian and Hungarian. The map contains 12 diagrams of the urban evolution (%) of the main ethnical group over the 1880–1995 period.

On the back of the map, there are three smaller cartographic representations, provided with two statistical tables and an extended Hungarian and English text, which augment the informational value of the map itself.

The three smaller maps present the main ethnical groups by their absolute or relative majority registered in the years 1495, 1910 and 1992. This kind of representation is misleading because it suggests a compact presence of these groups in the respective areas which contradicts the real distribution as mirrored by the larger map. But what indeed is most objectionable to these maps is the existence of white spots meant to indicate territories uninhabited or without permanent settlements that occupy vast areas in the Carpathian zones. And strange enough, there are precisely the spots where the text tells us that they had formed the nucleus of the Romanian population who left for other zones. As a matter of fact, such "voids" occur also on the *Map of Mother-Tongues Distribution in Transylvania.* The first to use this method of representation was geographer Count Pal Teleki, a former Hungarian Prime Minister. In this *Ethnographical Map of Hungary,* based on population densities registered at the 1910 census, he shifted the population from both low-density regions (under 20 inhabit./sq.km), characteristic of mountain areas, and from high-density ones (mainly towns) towards the lowlands. This yielded an illusory uniform density of 100 inhabit./sq.km. So, the Carpathian Mountains and hills, as well as the Transylvanian Tableland remained white spots on the map. The author's purpose was to outline ethnical voids, as in were, in the very zones inhabited by a homogeneous Romanian population, giving greater expansion to the city population where Hungarian held a relative majority.

The false image conveyed by this map used at the Paris Peace Conference in 1920 was demonstrated by the *Administrative Map of Transylvania* due to General C. Teodorescu, which clearly shows that in the would-be "ethnic voids" there stood nearly 1,300 villages and hamlets, apart from lots of temporary settlements. The *National Atlas of Romania* contains a *Map of Settlements in the Romanian Carpathians* produced by Claudiu Giurcăneanu (1975), also the author of a study on *Population and Settlements in the Romanian Carpathians* (1988), in which he shows that there are 3,245 villages and hamlets at various altitudes up to 1,600 m (Apuseni Mts.), beyond which seasonal settlements are set up.

As objectionable is the comprehensive explanatory text which, besides the detailed description of the territorial distribution of the main ethnical groups, puts forward some arguments that are blatant distortions of the reality on the ground.

What prompted him to elaborate that map, is in his own words, the following: "Transylvania, presently part of Romania, stretches out West of the Carpathians, being populated almost entirely by ethnical groups originating from Central and South-Eastern Europe (Hungarians, Romanians, Germans, Gypsies, Ukrainians, Slovakians, Serbs, Czechs and Bulgarians). It is considered the micro-region with the widest ethnical diversity in Europe.... This territory, which covers more than 100,000 sq.km and is inhabited by large masses of Romanians and Hungarians who live side by side, the specific structure of which is under permanent change, has been witnessing severe conflicts over the past 200 years".

The listing of Transylvania's ethnical groups leaves the reader with the impression that the territory is an ethnical mosaic, when in reality the Romanians, who rank second, represent 73.7% of the total population. This is omitted.

The author's analysis begins from the year 1495, when the tax system was introduced in the Hungarian Kingdom. His estimate of the then population total is 454,000 persons, of which 254,000 Hungarians, and 100,000 Romanians and Germans each. A strange estimate, indeed. The unaware reader might assume that the Hungarians were the autochthons and that both the Romanians and the Germans arrived at a later date. Comparing these figures to the 1992 census, it follows that the Romanians increased by 58 times, while the Hungarians by a mere 6.4 times. Although the author's numerical estimate of Romanian population is obviously far below the real one, it will be used now and again, and in endless variants, to argument the pressure suffered by the Hungarians at the hands of the Romanians. A first assertion to this effect mentions the end of the 15th century when "the Hungarian ethnical uniformity in the Transylvanian Plain and the Mureş Valley was disrupted by the arrival of large masses of Romanians, from the mountains regions".

Kocsis deliberately eschews mention of the Pact – *Unio Trium Nationum* – signed in 1437 by the Transylvania Hungarian, Szeckler and Saxon nobility which was aimed at the national and social oppression of the Transylvanian Romanians.

In line with his outlook, Kocsis says that, "by the end of the mediaeval times, the Transylvanian Basin, a territory in which the ethnical majority were the Hungarians, was disintegreted by the massive inflow of Romanians from the Apuseni Mountains and the Romanian Principalities". And furthermore, as a general conclusion, he contends that "the conflictual situation during the 1599–1711 period, led to a profound and irreversible rift in the ethnical structure of Transylvania in favour of the Romanians who benefited from permanent support from the outer side of the Carpathians. These changes had a decisive effect on the diffusion of population in the 20th century".

These assertions are in consonance with the theses of Hungarian historiography, much vehiculated in late 19th century, whereby the Transylvanian Romanians' numerical increase was due to the massive influx of immigrants from the Romanian Principalities beyond the mountains in the 17th and 18th centuries. The eminent geographer Ion Conea documented to the contrary, demonstrating that a reverse process had been going on, in that numerous villages were set up in time by Transylvanians South and East of the Carpathians, as far as the Bărăgan Plain and Dobrogea province. What had prompted Transylvanian natives to seek refuge over the mountains were the religious persecutions, at their height around the year 1700 and continued throughout the 18th century. Also the French geographer Emm. de Martonne spoke about that reality (1904).

Other of Kocsis' assertions are as groundless. For example, there are turns of the 1880 census that put the Hungarian and the Romanian urban population at 21% and 3.4%, respectively. No word about the severe restrictions to the settlement of Romanians in town. And still another predilect topic: "voluntary linguistic assimilation", better said Magyarisation of other ethnical groups. The author admits to it but only in the case of Jews and Gypsies. However, neither the 1880–1920 censuses, nor the 1941 one carried out in Northern Transylvania occupied by Hungary, lists those two minorities, which are found in the Romanian census of 1930. How "voluntary" the Magyarisation of the allogens was, emerges clearly from former Prime Minister Istvan Bethlen's statement (1907) that, unless the Romanians are forcibly Magyarised, the Hungarians will be drowned in the mass of the population. More conclusive even is what *Nouvelle Revue de Hongrie* wrote in 1934: "Had the Hungarians made systematic use of force in Magyarising all the populations that live on the territory of historical Hungary.... Hungary would not have been dismembered at Trianon.... In politics, lending supported to an originally unjust situation is more often than not enough for it to become in time an indisputable situation, pervaded by truth and justice" (apud J. Ancel, p. 388).

Kocsis obviously brings into the limelight the 1910–1992 period. He proceeds from the idea that "by the annexation of Transylvania to Romania (...) about 2.5 million of non-Romanians (of which 1.7 million Hungarians) turned Romania into a multi-ethnical state". And he goes on saying that the number of Hungarians recorded in Romania statistics was depleted because of listing Jews and Gypsies as distinct ethnical categories, on the one hand, and Graeco-Catholics and Orthodox believers as Romanians, on the other. Noteworthy, the unique criterion of ethnical appurtenance in the Hungarian statistics was language, fact that contributed to oversizing the Hungarian majority. That results were thus distorted became obvious at the 1992 census, when a significant number of Swabians in Satu Mare county, up to then considered Hungarians, declared a different nationality. Neither does the present

number of Hungarians in Romania, put at over 1.6 milion persons (and not two million as stated by the leaders of the Hungarian Democratic Union in Romania), correspond to reality, because many Transylvanian Gypsies declared themselves either Hungarians or Romanians at the census. Moreover, in addition to the "non-Romanians", there existed three million Romanians, so that saying that Romania has become a multi-ethnical state is a very risky affirmation. Kocsis looks in detail at the numerical variation registered by different ethnical groups due to political situations in the course of the last eighty years (emigrations, population changes, deportations, and extermination).

Moreover, he gives a personal interpretation of the main moments of Transylvanian history. When asserting that 16th-century Transylvania became "a symbol of survival of Hungarian state sovereignty", he wilfully forgets to mention that, after the battle of Mohacs (1526), Hungary was turned into a Turkish pashalic and it stayed that way for 150 years, whereas Transylvania was left an autonomous principality under Turkish suzerainty. The integration of this province into Hungary after 1867 is termed "reannexation" by the author although, as known, the Voievodeship of Transylvania had enjoyed a large autonomy throughout, except for the period of Austrian occupation. Likewise, the Vienna 1940 Arbitration, which led to the occupation of Northern Transylvania by Horthy's regime, is presented as Germany's and Italy's endeavour to appease the tension between Hungary and Romania, their allies. And there are many other examples to illustrate our point, but we deam that those given herein are relevant for the author's stance.

In principal, Kocsis upholds that the process of intensive Romanian colonisation of Transylvania, of towns in particular, over the mentioned interval, had disadvantaged the Hungarian population. That process reached its apex during the communist era of socialist industrialisation and urbanisation and "As a result of forcible urbanisation 75.6 of Transylvania's towns are predominantly Romanian today. An absolute majority of Romanians who in the past centuries was found almost in totality in the countryside, is now urbanised. The large cities (Timişoara, Cluj-Napoca and Braşov), which 40–60 years ago were dominantly Hungarian or German, have become preponderantly Romanian (75–90%)". And the author's conclusion goes on the same lines: "a relatively rapid and deep-going change of structure in Transylvania's urban settlements, which mixed together groups of different social, ethnical and religious appurtenance, followed by the ruralisation of towns, has increased the danger of ethnical conflicts".

Now then, it is imperative to elucidate some points. The downsizing of the Hungarian population after the First and the Second World Wars comes

from compromised political, administrative and military personnel fleeing Romania. Kocsis himself acknowledges that a number of 197,000 people left Romania over the years 1918–1924 and 125,000 more in the years 1944–1945. In his view, another cause for the decreasing Hungarian population was the land reform that benefited mostly the Romanians, especially those in the border zones. The fact is, that under Hungarian rule, the big landowners held 40–60% of the Transylvanian lands, a situation clearly shown in the 1918 *Economic Atlas of Hungary* (J. Ancel, p. 391). Their expropriation profited both the Romanian and the Hungary peasants.

Kocsis puts at 800,000 the number of newcomers to Transylvania from the other side of the Carpathians, changing the former ethnical balance. Without challenging the reality of this estimate number, it should be remembered that this industrialisation-triggered migratory process was the consequence of the lower natural increase of Transylvania's population compared to Moldavia's, where birth rates had always been high and there were fewer opportunities to absorb the excedent.

But in the last instance, were it normal for Romanian citizens to be denied free access to any zone in this country?

Hungary experienced a similar process triggered by the socialist industrialisation and urbanisation drive. Budapest's centrality position was challenged by the priority development of regional peripheral towns, which attracted lots of villages. Besides, 34 new towns were created in the 30km-long strip along the country's frontiers (Suli, Zakar, P., 1991).

However, despite the drawbacks highlighted by Kocsis, the number of Hungarians remained the same, which refutes the thesis of the Magyar population having constantly to outstand the pressure of the Romanian element. Unfortunately, the bulk of statistical figures raported by the author cannot be ckecked because he fails to mention their source.

Obviously, our paper does not address all the aspects treated by Kocsis in his *Ethnical Map of Transylvania*, but what emerges clearly is that it is a mere pretext for him to present at large his convictions consistently voiced in all his works, namely that the Hungarian population has been oppressed and that the Carpathian-Balkan zone is a pemanent source of ethnical, religious and cultural conflicts. And he wonders rhetorically: "will the states, the present-day nations of the region, be able to accept the emergence of some autonomous zones, allowed to organise themselves on the basis of own historical, cultural and economic transition, or will they conceive the future only within the boundaries, declared unavailable, of some centralised national states" (K. Kocsis, 1997a, p. 28).

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A GEOGRAPHICAL APPROACH TO THE ELECTORAL BEHAVIOUR OF MINORITIES IN CRIŞANA AND MARAMUREŞ AT THE 1992 AND 1996 MAYOR ELECTIONS

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Key words: electoral behaviour, minorities, nationalities, mayor elections, Crişana, Maramureş.

Le comportement électoral des minorités de Crişana et Maramureş aux élections des maires de 1992 et 1996. La période qui a suivi la Révolution de décembre 1989, marquant la chute du communisme, a créé une situation bien différente pour la population de la Roumanie (à l'exception de celle qui a dépassé la soixantaine). L'idée de la renaissance des minorités nationales a bénéficié de la meilleure position, relevée dans sa majeure partie par un caractère pacifiste, et d'intégration à l'activité économique, sociale et politique du pays. C'est pourquoi, plusieurs unions et associations constituées à base de critères ethniques ont apparu sur la scène politique roumaine. Les plus représentatives sont celles des minorités hongroise, allemande, slovaque, ukrainienne et des tziganes. L'analyse du comportement électoral des minorités aux élections des maires de 1992 et 1996 met en évidence la fidélité des Hongrois pour l'UDMR, la confiance accordée par les Allemands et par d'autres minorités, l'inconstance des Ukrainiens et le rôle d'arbitre des Tziganes.

The years that followed the 1989 Revolution, which marked the end of the communist period, created a special situation for the population of Romania (except the age category over 60). The idea of "rebirth" of national minorities was apparent by non-violence and integration in the economic, social and political life of the country.

Among the large number of political parties (over 100) emerged after 1990, there are also groups constituted on ethnic criteria, meant to represent the political interests of minorities in Romania. In the region of Crişana and Maramureş the following associations and unions can be mentioned: The Democratic Union of Hungarians in Romania (UDMR), The party of Hungarian Householders in Romania (PGMR), The Free Democratic Hungarian Party in Romania (PLMDR), The Union of the Hungarian Youth in Romania (UTMR),

The Democratic German Forum in Romania (FDGR), The Union of Ukrainians in Romania (UUR), The Democratic Union of Slovaks and Czechs in Romania (UDSCR), The Romany Party, The Christian Democratic Party of Roms in Romania (PDCRR), The Democratic Union of Roms in Romania (UDRR), The Free Democratic Union of Roms in Romania (ULDRR). This is to say there are four Hungarian factions, three Romany factions, one Ukrainian faction, one Slovak and Czech faction, one German faction, etc.

In some places these political factions formed alliances, as is the case for UDMR + FDGR. Numerous "independent" candidates also appeared on the electoral list, although from an ethnic point of view they belonged to certain minorities in the corresponding circumscriptions.

METHODS AND CONDITIONS OF ANALYSIS AND STUDY

The situation of the results obtained in the 324 electoral circumscriptions of the region in question put into evidence, through the number of elected mayors, FSN (later PDSR and PD), UDMR, CDR and PUNR. Among the political factions constituted on ethnic criteria, UDMR, UUR, FDGR and UDSCR obtained mayor mandates at the 1992 and 1996 elections.

According to the 1992 census, at the level of this region, 70% of the population belongs to the Romanian majority and the rest to the following ethnic groups: Hungarians (22.8%), Romany (2.6%), Ukrainian (1.9%), German (1.2%), Slovak (0.5%) and others (0.3%). An analysis of the electoral behaviour of each minority would be very difficult due to their territorial dissemination and to the low percentage they represent in some electoral circumscriptions. Therefore, a number of electoral circumscriptions were chosen as work sample on the basis of the following criteria (Fig. 1):

a – circumscriptions where an ethnic minority is largely represented, more than 50.1% (56);

b – circumscriptions with mixed population from the ethnic point of view, in which no nationality represents 50.1%, but the mayor elected belongs to an ethnic party (9);

c – circumscriptions with a Romanian majority but where the elections were won by an ethnic party (2).

A number of 67 electoral circumscriptions, representing 22.2% of the total number of circumscriptions in the region, were taken into account on the basis of the above mentioned criteria. Five of them are towns (Salonta, Marghita and Valea lui Mihai – Bihor, Cehu Silvaniei – Sălaj, and Carei – Satu Mare) and 62 are villages.

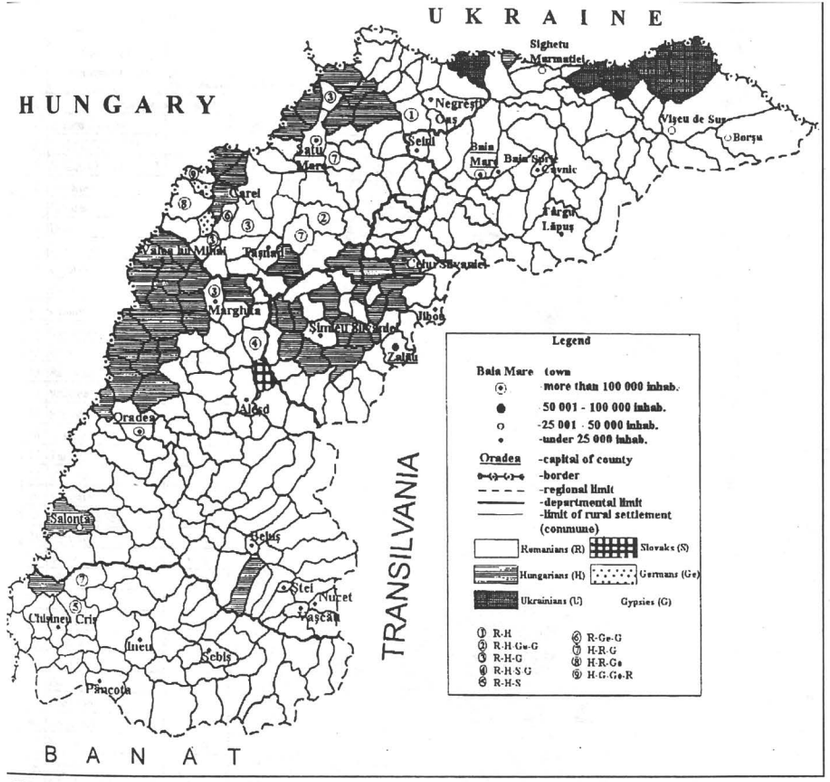

Fig. 1 – Crișana–Maramureș. Geographical distribution of analysed localities (where an ethnic minority is largely represented, more than 50.1%, and mixed).

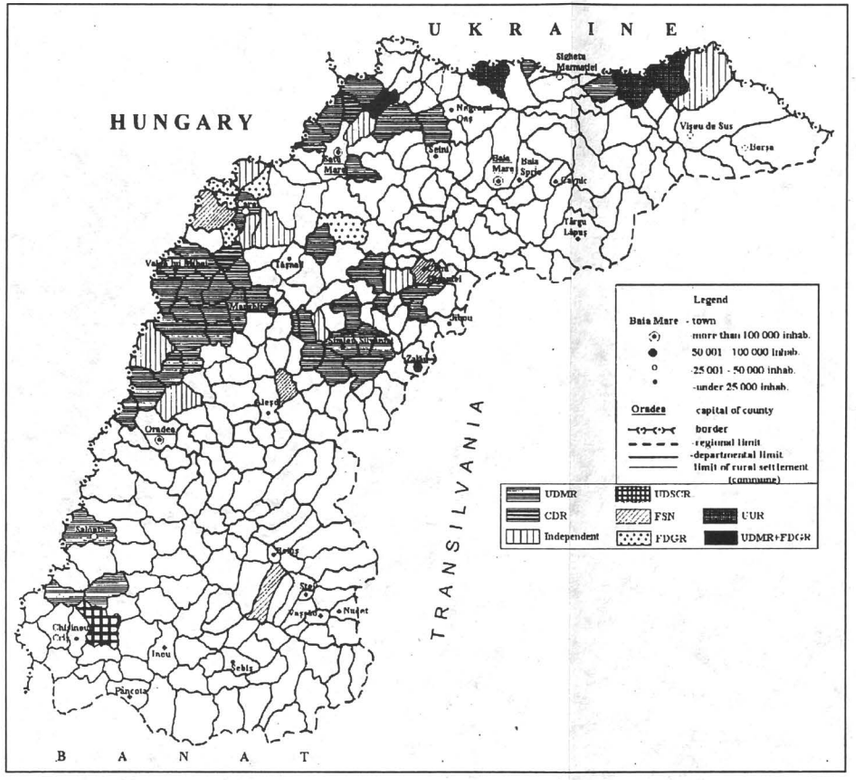

Fig. 2 – Crișana–Maramureș. The political membership of the mayors elected in 1992.

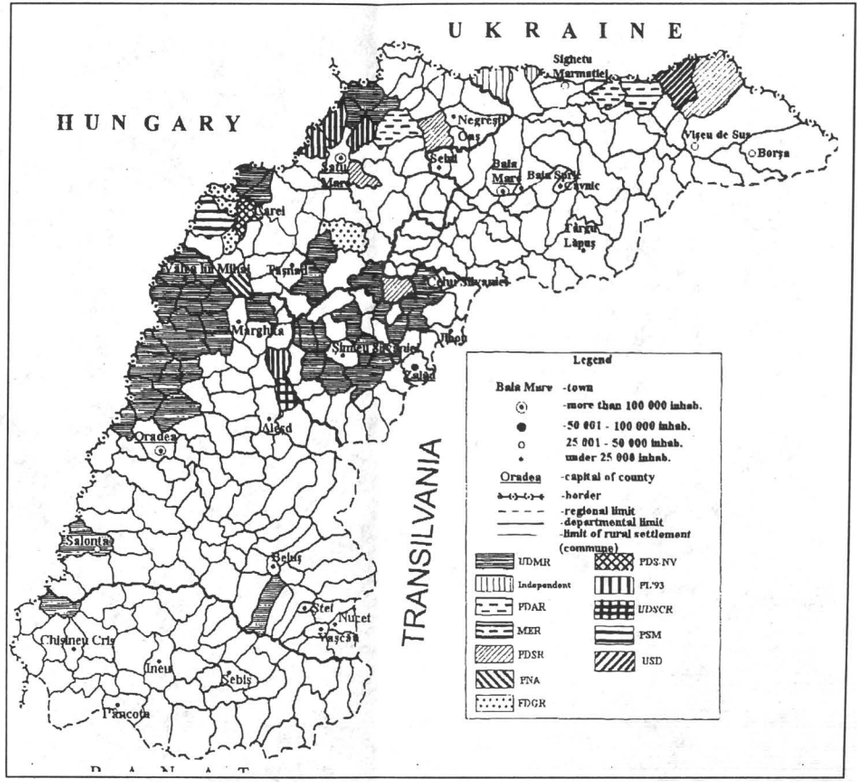

Fig. 3 – Crișana–Maramureș. The political membership of the mayors elected in 1996.

Table 1

Ethnic structure of the electoral circumscriptions analysed and the factions which have mayors in these circumscriptions as a result of the 1992 and 1996 elections

No	Electoral circumscription	Ethnic structure (1992)						Political affiliation of mayors	
		Romanians	Hungarians	Germans	Ukrainians	Gypsies	Slovaks	1992	1996
A	**Hungarian majority**								
1	Zerind (Arad)		90.0					UDMR	UDMR
2	SALONTA (BH)		61.0					UDMR	UDMR
3	VALEA LUI MIHAI		85.0					UDMR	UDMR
4	Abrănuț	35.4	59.7					UDMR	UDMR
5	Biharea		90.0					UDMR	UDMR
6	Borș		90.0					UDMR	UDMR
7	Budușlău		94.0					UDMR	UDMR
8	Cetariu		88.1					**Indep.**	**UDMR**
9	Cherechiu		93.8					UDMR	UDMR
10	Ciuhoi	41.4	52.8					UDMR	UDMR
11	Curtuișeni	30.5	56.0					UDMR	UDMR
12	Diosig	34.0	56.9			10.0		**Indep.**	**UDMR**
13	Săcuieni		84.0					UDMR	UDMR
14	Sălacea		90.0					UDMR	UDMR
15	Sălard		72.0					UDMR	UDMR
16	Șimian		68.9					UDMR	UDMR
17	Tarcea		78.8					UDMR	UDMR
18	Tărcaia	48.0	51.9					**FSN**	**UDMR**
19	Viișoara		73.0					UDMR	UDMR
20	CAREI (SM)	40.8	52.7					**UDMR**	**PDS-NV**
21	Berveni	33.1	63.6					**Indep.**	**UDMR**
22	Botiz	44.6	52.2					**Indep.**	**PL'93**
23	Căpleni	2.9	73.3	21.6				**FDGR**	**UDMR**
24	Dorolț	6.0	83.0					**UDMR**	**PL'93**
25	Halmeu	35.5	58.3					UDMR	UDMR
26	Lazuri	14.7	83.1					**UDMR**	**PL'93**
27	Livada	32.0	64.5					**UDMR**	**PDAR**
28	Pir	33.7	55.8			10.3		**UDMR**	**PNA**
29	Săcășeni	44.0	52.3					**Indep.**	**UDMR**
30	Bogdand	41.3	56.0			2.7		UDMR	UDMR
31	Hodod	28.8	66.0					**Indep.**	**PDSR**
32	Turulung	30.5	52.2					**UDMR+FDG**	**UDMR**
33	CEHU SILVANIEI	46.4	50.2					**FSN**	**UDMR**
34	Carastelec	15.7	80.1			3.1		**Indep.**	**UDMR**
35	Crasna	31.3	63.8					UDMR	UDMR
36	Camăr		97.3					UDMR	UDMR
37	Dobrin	22.0	76.0					UDMR	UDMR
38	Hereclean	36.9	62.3					**PLS**	**UDMR**
39	Ip	38.0	52.0			10.8		UDMR	UDMR

Table 1 (continued)

0	1	2	3	4	5	6	7	8	9
40	Nuşfalău	11.2	77.4					UDMR	UDMR
41	Pericei	43.5	53.4					UDMR	UDMR
42	Samsud	3.3	93.8					UDMR	UDMR
43	Sărmăşag	19.5	75.8					UDMR	UDMR
44	Sălăţig		88.2					UDMR	UDMR
45	Vârşolţ	35.8	62.3					UDMR	UDMR
46	Câmpulung la Tisa	14.4	81.9					**UDMR**	**Indep.**
B.	**Ukrainian majority**								
1	Bistra (MM)	10.0			89.8			**UUR**	**MER**
2	Bocicoiu Mare	28.8	8.2		62.4			**UUR**	**Indep.**
3	Poienile de sub Munte	2.4			97.3			**CDR**	**PDSR**
4	Remeţi	11.5	9.5		78.8			**UUR**	**Indep.**
5	Repedea	1.3			98.1			**UUR**	**USD**
6	Rona de Sus	3.3	9.3		87.3			**UDMR**	**PDAR**
7	Ruscova	3.9			94.8			**CDR**	**PDSR**
C.	**German majority**								
1	Foieni (SM)	2.5	45.7	51.8				FDGR	FDGR
2	Petreşti	7.9	31.8	55.3				FDGR	FDGR
D.	**Slovak majority**								
1	Şinteu						99.0	FSN	UDSCR
E.	**Romanian majority**								
1	Săcălăşeni (MM)	65.8	25.3					**CDR**	**UDMR**
2	Oraşu Nou	62.3	35.6					**UDMR**	**PDSR**
F.	**Mixed**								
1	Mişca (AR)	41.8	45.1			11.5		**UDMR**	**CDR**
2	Şintea Mare	41.0	46.0				8.9	**UDSCR**	**Indep.**
3	MARGHITA (BH)	49.8	46.1			3.2		**UDMR**	**Indep.**
4	Suplacu de Barcău	37.9	33.6			13.6	16.7	**UDMR**	**PL'93**
5	Acâş (SM)	36.5	42.6			20.3		UDMR	UDMR
6	Păuleşti	41.9	48.2			9.1		**UDMR**	**PDSR**
7	Beltiug	37.2	31.3	15.1		8.0		FDGR	FDGR
8	Urziceni	8.4	42.5	19.6		24.6		FDGR	FDGR
9	Micula	40.7	39.6		13.3			UDMR	UDMR

The votes of the ethnic minorities are directed, as expected, first of all towards the corresponding ethnic party, then towards the independent candidates, and finally towards other political parties.

As results from Table 1 and Fig. 1, 56 of the 67 circumscriptions analysed have a majority belonging to an ethnic group, 46 of them Hungarian, 7 Ukrainian, 2 German and 1 Slovak. Besides them there were two circumscriptions with a Romanian majority but with a representative of an ethnic group as mayor and circumscriptions with mixed population and relative majorities: Hungarian in 5 cases and Romanian in 4 cases.

HUNGARIANS

The settlements with Hungarian majorities (Fig. 1) as well as those in which UDMR won the mayor elections are situated mainly in the counties of Bihor (north-western part), Sălaj (northern half), and Satu Mare (west-central part). As shown in Table 1, the 46 circumscriptions with Hungarian majorities are situed in the counties of Bihor (18, including the towns of Salonta and Valea lui Mihai), Sălaj (13, including the town of Cehu Silvanei), Satu Mare (13, including the town of Carei), Arad (1) and Maramureş (1) (Fig. 1).

As a political representative of the Hungarian minority, UDMR won the 1992 mayor elections in 34 circumscriptions with Hungarian majorities, in 6 with mixed population, in 1 with a Ukrainian majority (Rona de Sus) and in another one with a Romanian majority (Oraşu Nou). In 12 other circumscriptions with Hungarian majorities, the population chose to have independent mayors in 7 cases (as a rule, the independent mayor also belongs to the Hungarian majority), FSN mayors in 2 cases, and mayors belonging to FDGR, The Free Changing Party and the UDMR + FDGR alliance in 3 cases.

After four years, at the 1996 elections, UDMR obtained in the 46 electoral circumscriptions 38 (82.6%) mayor mandates (which is more than in 1992) plus two mandates in mixed circumscriptions (Acâş and Micula in Satu Mare county) and one mandate in Săcălăşeni (Maramureş county) – a village with Romanian majority (Fig. 3).

A constant situation as compared to UDMR characterizes 28 Hungarian circumscriptions, that is 60.8% of total number of this kind of circumscriptions. Besides them there are 11 circumscriptions where the first Hungarian mayors were elected only in 1996; six of them had independent mayors, two had FSN mayors and three had FDGR, PL'93 and PLS mayors.

In the village of Turulung, where in 1996 the mayor mandate was won by the UDMR + FDGR alliance, UDMR was favoured. In other two circumscriptions, Botiz and Dorolţ, with Hungarian majorities, UDMR did not obtain the mayor mandate in 1992 and 1996. In 1992 the population preferred independent mayors, whereas in 1996 PL'93 and PDSR won. As shown in Fig. 3, in seven Hungarian circumscriptions the population preferred other political factions such as PL'93 in two cases, and one case for each of the following: PDS-NV, PDAR, PNA and independent.

Regionally, at the county level, the situation resulted after 1992 and 1996 election is as follows:

The county of Bihor has on its territory 18 electoral circumscriptions with Hungarian majorities (between 51–94%), representing 18.9% of the total number in the county, two of them being towns (Salonta and Valea lui Mihai)

and 16 villages (Table 1 and Fig. 1). With the 1992 elections, UDMR won 15 mandates in these circumscriptions plus other two in mixed settlements with Hungarian relative majorities (Marghita and Suplacu de Barcău, Table 1). In three Hungarian circumscriptions two independent mayors of Hungarian nationality were elected at Cetariu and Diosig (mayors who joined the UDMR in 1993) and a FSN mayor at Tărcaia, in the Beiuş area.

The devotion of the Hungarian population to UDMR is emphasized by its behaviour at the 1996 elections, when UDMR mayors were elected in all 18 Hungarian circumscriptions. At the same time, in 1996, at Marghita and Suplacu de Barcău (with mixed populations) independent and PL'93 mayors were chosen instead UDMR mayors.

The county Satu Mare has within its limits 13 circumscriptions predominantly Hungarian (52.0–83.1%): the town of Carei and 12 villages (Table 1, Fig. 1), representing 21.6% of the total number of circumscriptions in the county. UDMR obtained only seven mayor mandates in these circumscriptions at the 1992 elections, plus a FDGR alliance mandate at Turulung and four other mandates obtained in other circumscriptions: two with Romanian relative majorities (Păuleşti and Micula), one predominantly Romanian (Oraşu Nou) and one with Hungarian relative majority (Acâş, Table 1). In Acâş and Oraşu Nou, gypsies played an important role in the "dispute" between Romanians and Hungarians, supporting UDMR in Acâş and PDSR in Oraşu Nou. The same role of "umpires" was played by Ukrainians in Micula, where they represent 13.3% of the population.

At the 1996 elections the circumscriptions situated especially in the south and south-western part of the county manifested their "devotion" to UDMR. In five Hungarian circumscriptions (Berveni, Halmeu, Săcăşeu, Bogdand, and Turulung with 38.4%) UDMR mayors were re-elected as well as in Acâş (with a Hungarian relative majority) and Micula (with a Romanian relative majority). UDMR mayors were elected for the first time in Berveni (independent ex-mayor), Căpleni (FDGR ex-mayor), and Săcăşeni (independent ex-mayor). At the same time in six circumscriptions predominantly Hungarian (61.6%), the people preferred other political factions: PL'93 in Dorolţ and Lazuri, PDAR in Livada, PNA in Pir, PDSR in Hodod and PDS-NV in Carei (Table 1 and Fig. 3).

It is notable that in Botiz and Hodod, settlements with Hungarian majorities (52.5% and 66.0% respectively), UDMR did not obtain the mayor mandates at the 1992 and 1996 elections. For the first mandates, independent mayors (Hungarians) were preferred and for the second mandate PL'93 respectively PDSR mayors, were preferred. A similar situation exists in Păuleşti (with a 48.2% Hungarian relative majority) and Oraşu Nou (with a Romanian majority of 62.3%) where the UDMR mayors were replaced by PDSR mayors.

The county Sălaj has 13 circumscriptions (12 villages and the town of Cehu Silvaniei) with Hungarian majorities (see Table 1, Fig. 1), representing 38.2% of the county population. The proportion of the Hungarian population varies in these circumscriptions between 50.2% in Cehu Silvaniei and 97.3% in Camăr, the largest number being situated in the northern half of the Şimleu Depression.

The 1992 electoral behaviour in these circumscriptions resulted in 10 UDMR mayors (76.9%) at Crasna, Camăr, Dobrin, Ip, Nuşfalău, Pericei, Samsud, Sărmăşag, Sălăţig and Vârşolţ, a FSN mayor at Cehu Silvaniei, a PNL mayor at Hereclean and an independent mayor at Carastelec (Fig. 2).

In 1996, after four years from the first "postdecember" mayor elections, the Hungarian population in the county of Sălaj can be considered as the most devoted to UDMR, the political party representing this minority, as UDMR obtained all the 13 mayor mandates in the Hungarian circumscriptions.

In the county of Arad, UDMR won the 1992 mayor elections in two circumscription: Zerind, with 90.0% Hungarian population, and Mişca, with a 45.1% Hungarian relative majority. In the latter place, gypsies represented 11.5% their vote being decisive for UDMR's victory. In 1996, Zerind remained devoted to UDMR, while in Misca the newly elected mayor belongs to CDR.

In the county of Maramureş, Câmpulung la Tisa is the only circumscription with a Hungarian majority (81.9%), but here UDMR imposed itself in two settlements: Câmpulung la Tisa and Rona de Sus, with a Ukrainian majority (78.3% Ukrainians and 9.3% Hungarians). In 1996 an independent mayor (Hungarian) was elected at Câmpulung, while at Săcălăşeni (65.8% Romanians and 25.3% Hungarians) an UDMR mayor was elected (the ex-mayor belonged to CDR). At Rona de Sus, a PDAR mayor of Ukrainian nationality was elected in 1996.

UKRAINIANS

The population of Ukrainian nationality is situated mainly in the northern part of the Maramureş Depression (Fig. 1). In this area there are seven electoral circumscriptions with Ukrainian majorities (between 62.0–98.1%) (Table 1): Bistra, Bocicoiu Mare, Poienile de sub Munte, Remeţi, Repedea, Ruscova and Rona de Sus. On the occasion of the first elections in 1992, the population in these circumscriptions manifested one of the highest degrees of absenteeism (participation in the elections between 17.0–48.0%) and null votes. As a result of the ballots, UUR – the political party representing this minority, obtained mayor mandates only in four circumscriptions: Bistra, Bocicoiu Mare, Remeţi and Repedea, whereas at Rona de Sus the mayor mandate was won by an UDMR mayor, and at Poienile de sub Munte and Ruscova the elections were won by independent mayors of Ukrainian nationality (Fig. 2).

In the 1996 electoral campaign, UUR could not persuade again the population in these circumscriptions and obtained no mayor mandate. The people in these seven circumscriptions chose mayors belonging to the political left: PDSR at Poienile de sub Munte and Ruscova, PDAR at Rona de Sus, MER at Bistra and USD at Repedea (Fig. 3). In Bocicoiu Mare and Remeţi independent mayors were elected, who, as well as those above mentioned, belong to the Ukrainian minority.

It is remarkable that at Micula, Satu Mare county, where the Ukrainians acted as "umpires" with a 13.3% proportion, they favoured UDMR mayors at both elections.

GERMANS (SWABIANS)

The German population analysed in this study is situated is mainly concentrated in the southern part of county Satu Mare, with absolute majorities only in Foieni (51.8%) and Petreşti (55.3%), county of Satu Mare (Fig. 1).

At the 1992 elections, FDGR won five mandates in the already mentioned circumscriptions with German majorities, as well as in other three circumscriptions, where the German population varies between 8.0 and 37.0%: Căpleni, with a Hungarian majority of 73.3%, Urziceni, with a relative Hungarian majority of 42.5%, and Beltiug, with a Romanian relative majority of 37.2%. We must also mention Turulung (with 52.0% Hungarians and 30.5 Romanians) where the mayors mandate was won by the UDMR – FDGR alliance (Fig. 2).

In the case of the region, a large part of the Hungarian-stated population is represented by Hungarianized Swabians who, consequently, gave their votes to the FDGR representative.

In 1996 FDGR obtained again four mandates in Foieni and Petreşti, both with German majorities, and in Urziceni and Beltiug, with mixed population (Fig. 3). In Căpleni, Hungarian majority gave this time the vote to the UDMR representative. In other settlements with German population such as Tiream (33.6%) and Sanislău (11.3%) an independent mayor, respectively a PSM mayor, were elected.

SLOVAKS

The Slovak population owns a majority at regional level only in the circumscription of Şinteu, Bihor county (Fig. 1). In the 1992, a FSN mayor of Romanian nationaly was elected, while UDSCR obtained a mayor mandate in the circumscription of Şintea Mare, Arad county, where Slovaks represent only 8.9%, Hungarians being the majority here (46.0%). In these circumscriptions, the person and not the political party was elected (Fig. 2).

In 1996, the UDSCR representative was elected mayor in Şinteu, while in Şintea Mare they have an independent mayor of Romanian nationality (Fig. 3).

GYPSIES

At the level of Crişana and Maramureş, there is no circumscription in which gypsies are an absolute or relative majority, but due to their proportion of up to 20.0%, they played instead the role of umpires between Romanians and Hungarians. Their vote was directed to the nationality representing the majority, contributing largely to the success obtained by UDMR, especially in circumscriptions such as Bihor, Satu Mare and Sălaj.

CONCLUSIONS

To a large extent, the population belonging to an ethnic minority offered its vote to its representative party, and the most devoted to this kind of party were the Hungarians, who created a model of Hungarian nationalism. Protestants or catholics, dynamic and very well organised by the catholic or lutheran church and by UDMR, Hungarians came to represent, through UDMR, a very important political force in the Romanian Parliament.

The German minority appears as the most conciliatory one, the victory of FDGR representatives in circumscriptions where they are far from being a majority being a strong argument in this regard.

As far as Ukrainians are concerned, although they are compactly grouped in the Maramureş Depression, due to the high degree of isolation, the lack of cohesion correlated with the lack of interest in political participation (30.0–40.0%) and the lack of electoral information, the number of UUR mayors was diminished to a half in 1992 as compared to the existing possibilities, and in 1996, the involvement of their leaders with different factions made UUR obtain no mandate. It is interesting to remark the preference of this population for the political left, their support for FSN and later for PDSR representatives.

Gypsies spread on the whole territory, in small proportions, played the role of umpires, usually in favour of the strongest political faction.

Generally, as expected, there is an overlap between areas with mayors belonging to ethnic parties and areas where the corresponding populations live.

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SPATIAL VARIATIONS IN THE DEVELOPMENT OF SUSTAINABLE RURAL TOURISM IN THE ROMANIAN CARPATHIANS

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Key words: rural tourism, sustainable development, Romanian Carpathians.

Variations spatiales dans le développement d'un tourisme rurale durable dans les Carpates Roumaines. Sous le communisme, un changement structurel axé vers le développement indusriel et urbain s'est effectué. Suite à la croissance du chômage depuis 1989 cependant, beaucoup de familles rurales se retrouvent dès lors dépendantes des petites exploitations agricoles qu'elles ont reçues en conséquence de la politique de la restitution de la terre. Bien que des exploitations rentables puissent se créer à long terme, il faut maintenant diversifier les activités économiques afin de générer des revenus supplémentaires. Le présent article examine cette question dans le contexte des Carpates Roumaines, où le développement rural est au centre du plan «Montagneology», arrêté par la Commission (maintenant Agence) pour les Régions Montagneuses, créée en 1990. La majeure partie de cette étude se consacre au tourisme rural, qui reçoit depuis quelque temps un important appui du gouvernement central ainsi que de certaines sources d'aides externes. Nous soulignons les facteurs nécessaires à un développement réussi, y compris les subventions fiscales, les politiques environnementales et le développement du cadre institutionnel. On examine la première édition du guide au tourisme rural de l'ANTREC pour identifier les divergences régionales qu'il expose notamment quant à la possibilité de promouvoir de nouveaux marchés ainsi qu'au besoin d'améliorer les infrastructures locales.

INTRODUCTION

Romania has long been an important tourist destination, but rural areas have been relatively neglected with provision in the mountains largely restricted to a few key resorts and chains of chalets, most prominent in the Bucegi and Făgăraş Mountains (Surd, 1988). Now the benefits of rural tourism (embracing all aspects of leisure appropriate in the countryside) are becoming better understood in the context of diversification and sustainability, with the latter concept approached in terms of maintaining communities and conserving environment (Bramwell & Lane, 1994; Roberts, 1996). Modern agriculture

should be developed within ecological limits, but it is essential that other sources of income be exploited in order to raise rural living standards and avoid excessive rural-urban migration; all the more so because farm intensification is discouraged by the high costs of inputs in relation to commodity prices. Although occupational specialisation may normally be the ultimate ideal, there are economic and cultural reasons why this may not be attainable in some areas, at least in the short term. The paper, which is based partially on previous studies (Bordânc & Turnock, 1997; 1998a; 1998b and Turnock, 1999) deals with the background to the current interest in rural tourism and examines the progress made during the 1996–1998 PHARE-assisted programme.

THE ROMANIAN CARPATHIANS AND THE POTENTIAL FOR RURAL TOURISM

The Carpathian Mountains are an integral part of Romania, comprising 40.1 percent of the total area (95,590 sq.km) and 31.8 percent of the population (7.25 mln at the 1992 census) (Oancea *et al.* 1987) (Fig. 1). The mountain landscape is by no means uniform, for it was established many years ago by Emm. de Martonne that genuine alpine scenery coexists with high plateau land (and a succession of erosion surfaces) where forest clearance could make way for permanent settlement (Velcea & Savu, 1982). Lithological variations across a wide spectrum allow massifs comprising igneous rocks to contrast with well-settled limestone where the scenery boasts the classic karstic landforms. Valleys and tectonic intramontane depressions not only diversify the landscape but provide opportunity for dense settlement and easy provision of modern communications. Economic and cultural unity derives continuity of occupation and a strong pastoral tradition allied with mining and processing industries (food and timber) in the small towns and more developed manufacturing profiles in large cities. Such a structured urban network could be helpful for diversification in the context of rural networks with IT and other services for rural tourism based in small towns and key villages (Turnock & Muică, 1997).

THE POTENTIAL FOR RURAL TOURISM

Romania as a whole has good prospects for tourism, but there is particular potential in the mountains, although much of the investment has been directed to a relatively small numbers of resorts and spas (Ielenicz & Dumbrăveanu-Andone, 1997). In future more attention should be directed towards rural tourism and the rebuilding of the countryside. The attractions derive firstly from fine scenery with a diverse flora and fauna (Burford, 1996). In addition to walking

Fig. 1 – The Carpathian region, showing the organisation of the Commission for Mountainous Regions.

and climbing, there are good opportunities for mountain cycling (on such epic routes as Cerna Sat–Câmpu lui Neag and Rânca–Obârşia Lotrului); pony trekking (exemplified in plans to tour the monasteries from the state stud at Rădăuţi); and caving in various areas under the auspices of the Racoviţă Institute. There is also potential for winter sports and for medical treatment linked with mineral waters and climatic stations (Ciangă, 1994). And despite the threat from poaching, hunting tourism has considerable potential which is being exploited through the modernisation of forest chalets and better management of the resources.

Great value also attaches to the cultural landscape of the Carpathian mountains (Apolzan, 1987), with dispersed communities whose ethos is perhaps best reflected in the notion of *spaţiu mioritic* (sheep space) and other traditions in pastoral communities. Historic monuments combine with a live display of rural activity which is remarkable by general European standards today for the diversity of buildings, customs, handicrafts and festivals. Hence the potential for farm-based cultural tourism based on the rural community's pride in place and lifestyle (Florin & Sârbu, 1993). Reference may also be made to ethnic diversity which should enhance tourism's profile, although the negative aspect of contested heritage is all too often projected. While scenic and cultural resources in areas like Maramureş and Mărginimea Sibiului are outstanding, the Carpathians as a whole can sustain the idea of rest and relaxation along with air cure or spa treatment, or instruction and education. Many villages are suitable for rural tourism, providing additional services. While some are outstanding for folklore or handicrafts, others may be attractive for their scenic landscapes, hunting/sporting facilities and choice of fruits and wines.

THE COMMUNIST PHASE

Central planning saw tourism development highly concentrated. This was controversial because it restricted access to employment opportunities and increased the risks of environmental damage in order to gain economies of scale in the more accessible areas with a good infrastructure. But the spread of facilities was all the more limited because local communities were constrained from investing in tourism through cooperative or private enterprise. Commercial development was restricted because the communes had limited autonomy in financial matters while individual peasant entrepreneurship was usually unacceptable to the communist regime. In 1973 the Ministry of Tourism began an experiment in declaring several localities tourist villages (Fig. 2). Research suggested that many more might follow (Popovici *et al.*, 1974). But in the next year foreigners were barred from private accommodation and, unless campsites

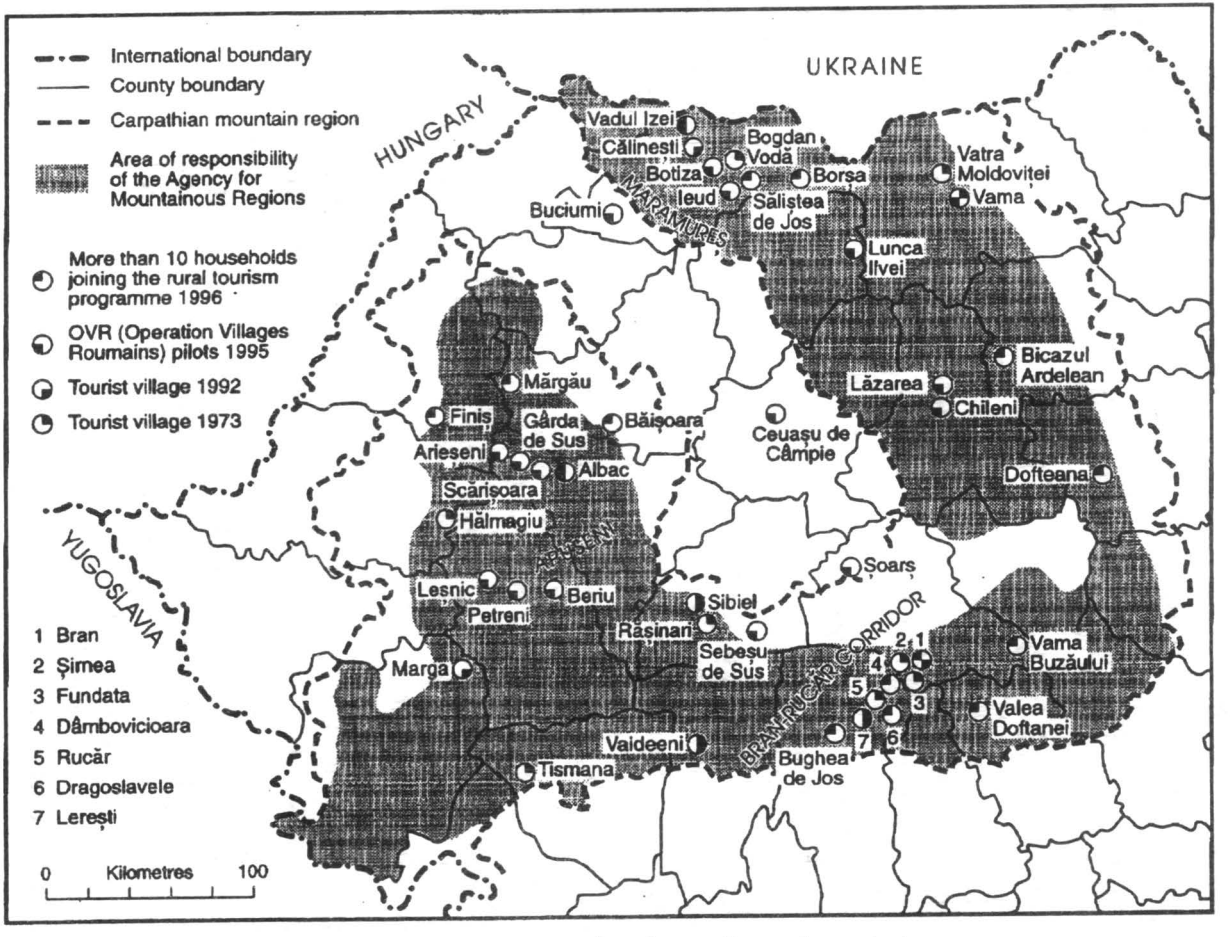

Fig. 2 – Tourist villages selected according to four criteria.

were available, there was little choice but to use hotels (situated overwhelmingly in the towns); a situation that was particularly resented by émigrés and ethnics (Hungarians especially) visiting families, because exemption was allowed only in the case of very close relatives. This seems to have discouraged further designations of tourist villages and subsequent developments in rural tourism were linked largely with hydro schemes and forestry roads. New water-based recreation facilities were created and some accommodation erected during the construction phase was refurbished for permanent use.

THE TRANSITION: THE SMALL FARM CONTEXT

In Romania, land restitution has given rise to some six million small farms and over half of Romania's farmland now comprises units of less than two hectares (Bordânc, 1996). Where villages are situated close to the towns, commuting to urban-based employment is possible. But in the remoter areas more opportunity must be sought within the rural environment. This has become particularly clear since 1989 because large enterprises in the towns began to make economies by cancelling the special transport arrangements which had previously enabled a proportion of their workers to commute from the villages (Beck, 1976). Commuting has therefore declined from some 1.8 million persons in 1989 to approximately 250,000 today (with a higher proportion depending on cars and motorbikes for transport because many buses services have been withdrawn) and many country people living in the remoter communites have been obliged to change their professional status to that of farmer or housewife.

So, to be sure, the present situation of rural demographic stability linked with 'minifundia' is not sustainable and endogenous development should be supported through both national and local government channels (Hirschhausen-Leclerc, 1994). Despite adversity, the rural population remains generally alert with clear ideas about the future that is desired. Returning migrants may offer a corrective to traditional conservatism and spread initiative, while those arriving with substantial pay-offs from jobs in mining (drastically reduced since 1997) have some resources for investment in local projects (Turnock, 1997). This is where rural tourism may find a role, with recreation and second home ownership seen as an important departure from the communist rural planning model (Misiak, 1993). Now that it is legally possible for people to own more than one house, buildings falling empty through the migration of country people to the towns (or abroad in the case of Germans and Hungarians) are being purchased by affluent families from the cities: Bucharest in the case of the Prahova country and Timişoara for the Banat Mountains. But many people will wish to visit the

countryside occasionally rather than commit themselves to second home ownership. In this context, rural tourism has the potential to build on Romania's strengths and the scope has been acknowledged by foreign consultants (Walker *et al.*, 1995, p. 52).

SATISFYING THE PRECONDITIONS FOR THE DEVELOPMENT OF RURAL TOURISM

Rural tourism is greatly assisted through Romania's existing tourist industry that can provide a positive image (especially in the case of visitors from abroad) and a basic infrastructure supplying both information and quality control. More investment is needed to improve the infrastructure which is still very poor in some areas. But privatisation should bring more resources into the industry and the services being overhauled. The network of information centres is now being improved and extended, but it is also important that tourist offices in the smaller towns should be aware of facilities in the rural areas (Ianoş, 1994). Financial help from domestic or external sources is another precondition (in the form of grants, loans and/or tax concessions). And a modern legal framework should be put in place, preferably in harmony with European Union (EU) legislation, so that the Ministry of Tourism can regulate the industry and exercise control through subordinate organisations. The motivation of individual families will need to be reinforced by appropriate training and by local networks to ensure that rural tourism is community-driven, with pluriactivity central to the prevailing concept of modernity (Rain, 1996). Sustainability must also be considered with reference to environment. It is clear that rapid and uncoordinated development of tourism has created problems in mountain areas like the Bucegi, where more effective controls are needed to check the thoughtless actions of walkers and campers (Velcea *et al.*, 1993).

ACTION ON RURAL TOURISM TAKEN SINCE THE REVOLUTION

THE COMMISSION FOR MOUNTAINOUS REGIONS

In trying to explain the speedy adoption of this new approach to rural development reference must first be made to the work of Radu Rey (1979), a veterinary specialist who worked in the Carpathians during the later communist years and became well known for his views on the future of mountain regions. While not explicitly critical of communist policies, his proposals pointed to the need for a modified approach to rural diversification (with less radical

consolidation that was officially envisaged under *'sistematizare'*), based on his knowledge of alpine regions like Switzerland. He advocated 'micro-cooperatives' in areas of dispersed mountain settlement like Vrancea and a growth of mountain tourism. After the revolution his ideas were immediately taken up by the National Salvation Front government, which set up a Commission for the Mountain Zones within the Agriculture Ministry to disseminate the principles of 'mountainology' through education and publicity (Fig. 1). It was closely 'shadowed' by a non-governmental organisation (NGO), the Romanian Federation for Mountain Development, which created a basis for action. The Commission was downgraded in the process of streamlining the bureaucracy in 1992 and was disbanded in 1996; the NGO still exists. A broad strategy in 'mountainology' is still being pursued and agricultural experts continue to support diversification (Otiman, 1994). But Rey's initial success has not yet been crowned with sufficient resources for comprehensive modernisation.

It was fortunate that thinking on rural tourism as a form of rural diversification fitted in with the plans of the Ministry of Tourism, faced with a sharp contraction in tourism immediately after the revolution, especially in the domestic sector (Cocean, 1993). Rural tourism offered an option for growth which not only anticipated a boost to rural incomes but avoided the complications of privatisation and attraction of foreign investment which have plagued the former state sector. Thus the Ministry's desire to rebuild the tourist industry, as a potential growth sector, coincided with the Agency's rural diversification agenda. The initiative is demand-led in the sense that Romanian town dwellers like to visit rural areas but in the past they have been restricted to the farms of friends and relatives. It is also supply-led because more foreign visitors might well be interested in a form of tourism that has proved popular in other parts of Europe.

On the basis of a meeting of minds between the Agency and the Tourism Ministry, the Federation for Mountain Development has encouraged farmers to diversify into rural tourism at a time when the Romanian media have made much of the country's economic problems and the further downsizing in industry. In 1992 the Ministry of Tourism suggested a range of criteria for the identification of tourist villages: picturesque and non-polluted countryside; traditional culture (with regard to costume, handicrafts, literature and music) along with traditional architecture and occupations; varied tourist potentials; good accessibility; adequate local services; and a good general living standard; and qualified people to implement a local tourist programme. Suitable villages were selected, extending the short-lived initiative taken in the communist period, but it became apparent that fiscal concessions were needed to stimulate householders, along with some relief from bureaucratic planning procedures. As a result of legislation enacted in 1994 for the mountain zone, the Danube Delta and the Black Sea coast, there is exemption from the normal planning procedures, while approved

(and graded) farms and guesthouses (the latter having 3–20 rooms) providing quality services receive tax exemptions for ten years (Mitrache *et al.*, 1996). It is intended that there will be facilities in 8,500 rural households by 2000, which could provide Romania with a 'niche' in the tourist market and spread the benefits of the industry more widely throughout the country without the need for heavy investment (Ion-Tudor, 1996a). In 1994, a National Association of Rural Ecological & Cultural Tourism ('Asociația Națională pentru Turism Rural Ecologic și Cultural din România' ANTREC) was formed to promote rural tourism throughout the country and identify barriers to development that might exist.

THE INTERNATIONAL DIMENSION

Through ANTREC's affiliation to the Strasbourg-based European Federation of Rural Economic & Cultural Tourism ('Eurogites'), Romania was able to draw on expertise from the 22 national and regional member associations; especially 'Gites de France' (France's national federation of rural tourism) which has 40 years experience. Romanian entries are now appearing in the Eurogites catalogue. But equally important is the financial support for Romania's rural tourism. This comes from individual countries such as the UK, but most significant is 900,000 ECU of EU PHARE money for advisory support, marketing, regulatory frameworks, training and equipment provided during the period 1996–1998. PHARE collaborates with ANTREC on the 'Promotion of Rural Tourism Programme' through exhibitions and fairs, of both local and international importance, a reservation network and a handbook which lists 750 addresses in a total of 116 villages (ANTREC, 1998). Money is being spent on the small projects to stimulate local handicrafts and to signpost tourist itineraries (Ion-Tudor, 1998).

Foreign expertise is also being introduced through a parallel initiative by 'Opération Villages Roumains' (OVR), which has its origins in a concerted campaign mounted in Western Europe in 1988 to oppose 'sistematizare' by the development of twinning links (Moldovan & Moldovan, 1995). OVR has developed a piloting strategy for tourism covering a group of counties in Transylvania (Fig. 2) where bed and breakfast is available for $10–12 (half board $13–15 and full board $15–17) with guiding services as well in some cases. Each village or group has produced information describing the local facilities and opportunities. In addition, there is a complete pack, covering all the pilot projects which shows a wide diversity of attractions: landscapes, woodlands and other aspects of flora and fauna, agricultural systems, medicinal plants and mineral waters, winter sports, usual transport facilities (forest roads and railways), historic buildings (castles, monasteries), museums and

ethnography: including architecture, handicrafts, dances, festivals and other traditions (Wortthelet, 1997). Annual inspections are made to check different aspects of the tourist product offered by individual households. PHARE works with OVR on this scheme with respect to infrastructure and training for rural tourism in a 'Village Tourism Pilot Project'. 40,000 ECU (each) was allocated to the OVR pilot projects in the Arieş Valley, the Iza Valley and Vama and a similar amount is assisting development in Bran (Ion-Tudor, 1996b).

ENVIRONMENTAL POLICY

Radical environmental action was shelved during the first years of the transition, when immediate survival was the most pressing priority. However, the long-awaited legislation was published only at the end of 1995 and adopted in 1996 (Dragomirescu *et al.*, 1998). It seeks to conserve natural resources and maintain biodiversity by protecting air, soil and water and to safeguard designated protected areas (nature reserves and national parks) and natural monuments as well as settlements. Responsibility for environmental protection, including enforcement of pollution limits, will now rest with the central authority (the Ministry of Water, Forests & Environment) and the environmental agencies in each county, which will record observations on air and water quality and monitor the situation in the nature reserves. There are other responsible institutions subordinated to the Ministry, such as the Institute for Silviculture, while the Romanian Academy and the National Committee of UNESCO help to decide the criteria for the designation of protected areas. But the tourist authorities will need to become more involved in environmental protection so as to ensure that pollution is reduced. Assessments of potential in the mountains are being made in the light of findings in the Bucegi Mountains (already noted), where a strict regime of protection is necessary.

THE RURAL TOURISM NETWORK

Assessment here is based on the ANTREC handbook, although it is not clear just what proportion of the total available accommodation is listed. It is likely that there are many additional addresses where tourist accommodation is available, at least on a casual basis. Discussion will concentrate on 17 Carpathian counties where the handbook lists 105 centres, 717 accommodation units (overwhelmingly private households) and a total of 3,790 beds. ANTREC is however, a nationwide organisation and accommodation is also advertised in Constanţa, Iaşi, Mureş and Tulcea counties although it amounts to only 335 beds in 42 units located in 10 centres and this component is excluded from the

Table 1

Tourist accommodation by counties according to the ANTREC handbook 1998

County	Accommodation						Languages					
	A	B	C		D		A	B		C	D	E
Alba	3	40	235	7.5	19	47.5	35	87.5	34	5	2	7
Argeş	4	18	98	5.4	10	55.5	9	50.0	6	4	2	3
Bacău	2	8	45	5.6	4	50.0	4	50.0	3	2	.	.
Bistriţa-Năsăud	12	241	1209	5.0	94	39.0	129	53.5	92	31	54	4
Braşov	9	50	227	4.5	28	56.0	43	86.0	39	19	10	6
Buzău	2	2	20	10.0	1	50.0	2	100.0	2	2	1	1
Cluj	7	51	196	3.8	11	21.6	12	23.5	5	5	8	3
Covasna	9	14	96	6.9	5	35.7	7	50.0	3	3	7	3
Gorj	5	9	48	5.3	4	44.4	4	80.0	2	1	2	3
Harghita	4	60	248	4.1	38	63.3	28	46.6	22	6	10	.
Hunedoara	5	6	15	2.5	2	33.3	2	33.3	2	.	.	.
Maramureş	10	83	572	6.9	53	63.9	51	61.4	47	16	7	10
Prahova	3	4	37	9.2	3	75.0	3	75.0	2	2	.	1
Sibiu	4	20	82	4.1	.	0.0	10	50.0	10	4	4	.
Suceava	11	59	361	6.1	38	64.4	46	78.0	40	26	14	10
Vâlcea	1	7	26	3.7	4	57.1	3	42.9	2	2	.	.
Vrancea	14	45	285	6.3	8	17.7	34	75.6	25	14	3	8
Carpathians	105	717	3790	5.3	374	52.2	422	58.9	336	142	124	59
Others	10	42	335	8.0	12	28.8	23	54.8	16	9	5	7
Total	115	759	4125	5.4	386	50.9	445	58.6	352	151	129	66

Accommodation: A – Number of centres; B – Number of households; C – Number of beds and average number of beds per household; D – Households with telephones and percentage of the total.

Languages: A – Households where foreign languages are spoken and percentage of the total; B – Households where French is spoken; C – Ditto English; D – Ditto German; E – Ditto Italian, Russian or Spanish.

Source: ANTREC 1998.

calculations (Table 1). The number of beds available at each address averages 5.3, ranging from 10.0 in Buzău to 2.5 in Hunedoara, although 11 of the 17 counties are clustered in the 4.0–7.0 band. However, the total amount of accommodation available in individual centres varies tremendously: 66 locations have 25 beds or less, while 18 have 26–50 beds, seven have 51–75 beds, five have 76–100, five have 101–150 and another four exceed 150. The extremes are even greater when it is noted that 41 locations have 10 beds or less while the largest centres are Bran with 358 and Moeciu (including Moeciu de Sus) with 299. At the moment the networks within individual counties are somewhat restricted: 10 counties have listed accommodation at only 1–5 locations while four have 6–10 centres and only three exceed this figure.

Telephone communication is available at barely half the addresses (52.2 percent) with variations between a high level of access in Prahova (75.0 percent),

Suceava (64.4), Maramureş (63.9) and Harghita (63.3) and much lower rates in Cluj (23.5 percent), Hunedoara (33.3), Vâlcea (42.9) and Harghita (46.6). To some extent this reflects problems in certain villages, but more generally it would appear that in some areas there is a reluctance to become involved in the business if certain facilities are not available. Again, there are wide variations in the availability of foreign languages. At least one foreign language is spoken at 58.9 percent of the addresses. Leaving aside the 100.0 percent level in Buzău (where only two households are involved), there are very high figures in Alba (87.5), Bistriţa-Năsăud (86.0), Gorj (80.0), Suceava (78.0) and Vrancea (75.6); compared with 23.5 percent in Cluj, 33.3 in Hunedoara, 42.9 in Vâlcea and 46.6 in Harghita. Perhaps in some areas there is a greater inhibition than in others regarding the prospect of accommodating foreign visitors without any language skills. Taking availability of foreign languages in individual centres into account, 21 are in the 1–25 percent range, 22 are in the 26–50 percent band, with 15 registering 51–75 percent and 47,76–100 percent. However, the picture is distorted by the smallest centres (with fewer than four addresses) and the numbers are respectively three, 14, 12 and 12 if these are discounted. As the table shows, French is most widely available (spoken at 336 addresses: 48.8 percent of all addresses and 79.6 percent of addresses where foreign languages are spoken) followed by 142 offering English and 124 German.

Table 2 deals with the largest individual centres, with 50 beds or more. Of the total of 3,790 beds, 1,699 (44.8 percent) fall to the 10 centres with 100 or more beds; and a further 804 (21.2 percent) are to be found in 12 centres with 50–99 beds. Thus 21.0 percent of the centres account for 66.0 percent of the beds. Apart from the special case of Ocna Şugatag, where there is one address with 170 beds, the average number of beds per address is identical to the overall Carpathian average; so these centres are large primarilly because of the number of addresses rather than because of the size of each individual unit. The variations in telephone access range from 100 percent in two cases (though Ocna Şugatag involves only one address, as already noted) to zero at Buciumi and Lunca Ilvei and less than ten percent at Fundata, Sâncrai and Şirnea. Clearly this is unsatisfactory and while some visitors may value the isolation, the development of the business in general will be assisted by a better level of provision. Of course this is not down to individual families; rather it requires a massive improvement in capacity in some areas (a matter which is now receiving priority). The availability of foreign languages again brings out interesting variations. Some communities clearly have the confidence to go ahead without significant language skills (Dorna Arini, Sâncrai and Şirnea) whereas other communities show a very high level of competence in this respect: Albac, Arieşeni, Gârda de Sus, Ieud, Lepşa, Lunca Ilvei and Vama in addition to Ocna Şugatag.

Table 2

Rural tourist centres with 50 beds or more according to the ANTREC handbook

Centre	County	A	B		C		D		E	
Bran	Braşov	358	65	5.5	49	75.4	43	66.2	36	83.7
Moeciu	Braşov	299	52	5.7	23	44.2	35	67.3	31	88.6
Ocna Şugatag	Maramureş	170	1	170.0	1	100.0	1	100.0	1	100.0
Buciumi	Maramureş	151	35	4.3	.	0.0	15	42.9	6	40.0
Şirnea	Braşov	149	34	4.4	2	5.9	11	32.4	6	54.5
Vama	Suceava	130	22	5.9	19	86.4	21	95.5	21	100.0
Praid	Harghita	123	29	4.2	20	69.0	11	37.9	8	72.7
Lăzarea	Harghita	114	29	3.9	16	55.2	16	55.2	13	81.2
Albac	Alba	105	16	6.6	13	81.3	14	87.5	11	78.6
Sâncrai	Cluj	100	30	3.3	1	3.3	4	13.3	.	0.0
Botiza	Maramureş	90	17	5.3	13	76.5	9	52.9	9	100.0
Vadu Izei	Maramureş	86	21	4.1	14	66.7	10	47.6	8	80.0
Arieşeni	Alba	79	15	5.3	2	13.3	12	80.0	12	100.0
Lunca Ilvei	Bistriţa-Năsăud	78	18	4.3		0.0	18	100.0	18	100.0
Dorna Arini	Suceava	70	16	4.4	3	18.7	5	31.2	3	60.0
Ieud	Maramureş	68	17	4.0	16	94.1	14	82.4	14	100.0
Tulnici	Vrancea	66	7	9.4	6	85.7	6	85.7	6	100.0
Şoarş	Braşov	59	14	4.2	13	92.9	9	64.3	7	77.8
Lepşa	Vrancea	54	7	7.7	6	85.7	6	85.7	3	50.0
Fundata	Braşov	53	11	4.8	1	9.1	6	54.5	5	83.3
Gârda de Sus	Alba	51	9	5.7	4	44.4	9	100.0	8	88.9
Prundu Bârgăului	Bistriţa-Năsăud	50	8	6.2	8	100.0	4	50.0	3	75.0

A – Beds; B – Households and average number of beds per household; C – With telephone (and percentage of total households); D – Speaking foreign language(s) (and percentage of total households); E – Speaking French (and percentage of all households offering foreign languages).

Source: ANTREC 1998.

Predictably, the potentials for rural tourism are uneven and it is not surprising that some areas are especially prominent. With only 11.4 percent of the Carpathian centres, Braşov alone has 33.6 percent of addresses and 31.8 percent of beds, while Alba, Argeş, Bistriţa, Cluj, Covasna, Harghita, Maramureş, Suceava and Vrancea account for another 67.6 percent of centres, 58.6 percent of addresses and 61.2 percent of beds. This leaves Bacău, Buzău, Gorj, Hunedoara, Prahova, Sibiu and Vâlcea with only 21.8 percent of centres, 7.8 percent of addresses and 7.0 percent of beds. Some of these counties may be expected to expand the available accommodation, along with nine other Carpathian counties with no addresses in the mountain area at present (ANTREC branches exist in five of them: Arad, Dâmboviţa, Mehedinţi and Satu Mare). However, potential does vary according to the attractiveness of the cultural landscape, the scope for recreational activities and the degree of accessibility; also proximity to large cities (Istrate & Buhu, 1990). Thus, it is widely appreciated that the Bran-Rucăr Corridor

is a zone of particular opportunity (Ion-Tudor, 1995). The scenic and cultural resources are impressive while major environmental problems are absent. Moreover, the area includes the internationally famous Bran Castle and there is scope for winter sports, with tourist demand generated by the local conurbation and the intense circulation along the Bran-Rucăr Corridor.

Looking further afield, there are opportunities in the Făgăraş Mountains (especially in the counties of Sibiu and Vâlcea) and in the Eastern Carpathians (Covasna, Harghita and Vrancea) where fine mountain landscapes and other physical resources (including mineral waters) combine with pastoral traditions, historic monuments and a measure of ethnic diversity. The Apuseni Mountains (Surd, 1992) and the northern districts of Oaş, Bistriţa-Năsăud, Maramureş (Iacob, 1994) and Bucovina are two other outstanding areas where rural tourism is seen as having great importance for regional development. In the former case PHARE money for mountain agriculture is being used in part to finance a special programme of 'active employment measures'. Local inhabitants have regained historic woodcutting rights that were annulled by the communists and will also enjoy fiscal concessions in marketing their handicrafts. Newly-weds can buy timber for housebuilding at subsidised rates and there is a government programme encouraging people to settle in the area if they have specialised education (or higher training) and work for public institutions or in a religious capacity. A major infrastructural programme (8,000 billion lei until 2004) is under way (in part to compensate for recent damage through natural calamities) and local handicrafts and other businesses are being encouraged through five-year investment allowances, with the traditional annual Găina fair as a valuable focus for rural tourism and handicrafts. Like Maramureş, the Apuseni region is close to the frontier and tourism should benefit from programmes of cross-border cooperation which are starting to develop.

ASSESSMENT

Results so far appear moderately encouraging, but no detailed evaluation is available yet. At the end of the PHARE pilot programme it was claimed that the four target areas had not only increased their tourist activity substantially but had "succeeded in demonstrating that rural tourism is an instrument in the service of local development" (Dabu & Houliat, 1998, p. 4). However, despite the undoubted attractions it is all too evident that distances from Western Europe are considerable and relatively small numbers of foreign visitors travel by car. So, although rural tourism is relevant to both domestic and international tourism, spread will certainly be greater in the domestic sector and it is here where the greatest promotional efforts should be made in the immediate future. Yet business cannot increase rapidly until the real incomes for Romanians begin to grow; hopefully at the start of the new millennium.

Some centres have done extremely well, especially the cluster in Braşov county which includes Bran, Fundata, Moeciu and Şirnea. In this area of great potential (already referred to) there has been much local enterprise, with the Stoian family a major force in the development of ANTREC. There has also been good cooperation between indigenous and incoming families, leading to the formation of the local tourist company Bran Imex. Accommodation is generally of a high standard and occupancy rates are high. But across the Carpathians, it is doubtful whether the scale of activity can ever be more than a pale shadow of the Alpine equivalent. However, cross-border cooperation could have an important bearing on tourism now that Euroregions are being set up in virtually all border areas (with the Bulgarian frontier the only major exception). In areas like the Apuseni Mountains, Caraş-Severin and Maramureş improved services in border areas with Hungary, Ukraine and Yugoslavia could stimulate business in the future, although at the present time 'small border tourist traffic' is very limited. Of course, these circumstances are favourable in terms of sustainability with regard to both environmental pressure and the impact on communities which are unlikely to suffer significant damage as a consequence of commercial gain for a minority of households.

But even modest growth is dependent on the preconditions being satisfied; not only to assure the necessary transport, communications and information but to stimulate enterprise in the villages at both the community and individual household level. While much of the development can be initiated at the grass roots, there is a need for legislation and encouragement by the authorities while the development of business skills is dependent on substantial support from government and international agencies for economic restructuring in general. Further institutions are needed to coordinate local efforts and ensure that there is some return to communities as well as individuals. Much will depend on the success of pilot projects in the more promising regions. While the 1998 ANTREC handbook (heavily dependent on PHARE support) represents an important milestone, since rural tourism is not very well convered by official statistics, the 750 addresses listed fall a long way short of the 8,500 anticipated for the year 2000.

CONCLUSION

In Romania, as elsewhere in Eastern Europe, the mountain regions show significant variations in human resources, reflecting different stages in the demographic transition. In some areas the human resources remain very substantial and the shift in the rural–urban balance is temporarily 'on hold' because of the limited opportunities in the towns. East European governments have understandably been preoccupied with unemployment 'black spots' and other urban-industrial problems, but while land restitution meets an immediate

political and social need in rural areas it does not address the long-term issues. Developing agricultural skills in the countryside and presenting farming as a worthwhile career for young people would seem to be an economic necessity. But in view of the present social importance of small farms there is obvious relevance in the 'Bavarian approach' through family farms linked with rewarding ancillary employment. So Romania's strategy for the mountain zone gives support for a range of ancillary activities including rural tourism. However, even with rapid growth, which seems unlikely, it will be difficult to hold human resources in the villages in view of the sheer volume of job creation required. Meanwhile, the emergence of additional urban centres, around which commuter movements might develop, will depend on the improvement infrastructure as well as investment in large enterprises. Therefore, it is important that rural projects should continue to attract appropriate funding under the new Romanian Government/EU PHARE strategy for regional development announced in 1998. And there should be some coordination of development across the Carpathians to maintain the vision of the Commission established in 1990 and ensure an appropiate level of priority among the councils of the seven macroregions into which the mountain districts are now divided.

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RESTRUCTURING LIGNITE MINING IN ROMANIA AND ITS ENVIRONMENTAL EFECTS WITH SPECIAL REFERENCE TO LANDFORMS

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Restructuration de l'industrie extractive du lignite en Roumanie, et ses effets sur l'environnement. L'exploitation du lignite, souterraine ou en carrière, a en Roumanie une tradition de plus d'un siècle. Cette activité industrielle a connu une expansion remarquable dans la deuxième partie du XX^{e} siècle, spécialement dans le Sud (les Sous-Carpates et le Piémont Gétique) et le Nord-Ouest (les Collines de Crişana). Dans ces régions collinnaires, à la suite d'un ancien et intense peuplement, se sont produites des modifications irréversibles du paysage. En déclenchant l'exploitation du lignite à la surface, des changements ont eu lieu dans toutes les composantes de l'environnement et spécialement dans le relief. Ensuite, viennent de paraître des modifications dans la composition et la répartition de la végétation, dans le rythme de la dégradation des sols, dans l'utilisation des terrains, dans l'aspect des villages et du réseau des communications. La dégradation violente et rapide de toutes les composantes de l'environnement a imposé, ces dernières décennies, l'adoption de programmes de reconstruction écologique. Les coûts sont assurés, après la réorganisation de la Régie Autonome du Lignite de l'Olténie, par la Compagnie Nationale du Lignite ayant son siège à Târgu Jiu. Maintenant, le plus grand effort financier est destiné à la retechnologisation des exploitations et, en conséquence, les sommes destinées à la reconstruction écologique ont été diminuées. Ainsi, les programmes de reconstruction écologique sont en retard et le rythme de dégradation du relief augmentera dans les régions aux exploitations à la surface. Comme une solution temporaire, à court et moyen terme, les auteurs proposent de canaliser une plus grande quote-part des sommes déjà diminuées pour réduire premièrement l'intensité des processus géomorphologiques qui affectent les carrières et les dépôts de stérile. C'est une condition indispensable pour la reconstruction écologique des terrains affectés, afin de rééquilibrer les facteurs de l'environnement.

INTRODUCTION

Studies carried out over the past two decades focused on industrial development and its impact on the Earth's crust, pointing out the neccessity for interdisciplinary approaches and integration with current international issues

in the field (Wey Hu, Evans, 1997). An outstanding aspect of these vast and complex issues is the relationship between the exploitation of resources (lignite in our case) and local changes in the relief – a major link in the range of factors involved in crustal transformation. Some of the new and most spectacular forms by their size and impact on the landscape are the work of man's extraction of lignite. Underground and surface mining, in particular, have led to the formation of subsidence microdepressions, landslides, and waste dumps. The freshly-developed relief shows a wide diversity of forms.

Until 1997, lignite reserves in Romania, amounting to 2.9 billion tons, were estimated to meet the internal demand (*ca*. 45–47 mill.t/year) for a period of 35 years. Considering that Oltenia province alone holds 92% of that quantity, *viz*. 2.2 billion tons (of which 1.4 billion are exploitable surface reserves) and that the production capacity is 42 mill.t/year, we decided to undertake some relief change case-studies.

Between 1952 and 1997, surface mining (excavation and dumping) and associated works (hydrotechnical installations, roads, transporter bridges, coal and soil storehouses, etc.) affected numerous localities and 15,844 ha of land (12,637 ha agricultural, and 3,207 ha forests). Forecasts tell us that, by the year 2005, after 60 years of mining, a total of 56 Oltenian villages and 25,472 ha of lands (19,035 ha agricultural and 6,437 ha forests) will have been affected. The environmental protection strategic programme for the province's mining basins, elaborated by the Agency for the Development of Mining Zones, for the 1997–2005 interval in line with the present environment legislation and ecological rehabilitation programmes, requires impressive sums of money, *viz*. over 2 mill. USD/year; 95% of this sum is earmarked to the rehabilitation of degraded terrains.

The restructuring of the area's mining industry has been unduely delayed, the Târgu Jiu Lignite National Company being set up only on September 1, 1997. This caused rehabilitation and development projects to be postponed. Works of geological reconstruction (mainly stabilisation of slopes recently formed through excavation and dumping) could have been performed with the help of the remitted labour force. As it is, the funds allocated by the World Bank (8.1 mill. USD) not being used until mid-1998 (as stipulated under the credit agreement), lay-offs were not followed by labour reconversion programmes. This lag in the restructuring process, due primarily to the local administration which failed to elaborate social programmes and ecological reconstruction projects, is likely to enhance the process of environmental degradation, the more so as the hydrometeorological conditions of the past few years were particularly adverse.

In the light of current outputs (4.2 mill. t/year of which only 37 mill. tons were contracted in 1998, and no more than 23 mill. tons are actually needed) the sums earmarked to reconstruction programmes were halved. This overproduction crisis imposed the readjustment of restructuring programmes. So, eight out of the 22 mines (Mătăsari, Cojmăneşti, Drăgoteşti, Armăşeşti-

Centru, Armăşeşti-Vest, Alunu, Huşnicioara, and anthracite mine Schela) belonging to the Lignite Autonomous Company, Târgu Jiu, are scheduled for closure and conservation over the years 1998–2000.

Closure and conservation costs are put at some 8 and 8.5 mill. USD, respectively. The ecological rehabilitation of landforms and soils in these mining sites are estimated at 8.1 mill. USD. It is obvious that the money to cover the region's degraded land programmes is lacking.

This study is also intended to make a hierarchisation of ecological reconstruction priorities (by taking into account the natural regeneration capacity of soils and vegetation) in the conditions of severe funding cuts.

ENVIRONMENTAL PARTICULARITIES OF LIGNITE MINING SITES

Lignite mining has a long-standing tradition in Romania, sometimes over one-century old in the Western Hills (at Budoi since 1891, Sărmăşag) and the Argeş Subcarpathians (Godeni). During the past 40–50 years, this activity has been intensified and extended at a dramatic pace, with new mines being opened mostly in the southern and north-western parts of the country. As a consequence, the natural environment has suffered major changes, especially in lignite mining areas (Fig. 1).

Fig. 1 – Extension of the new coal strip mine at Budoi, affecting agricultural grounds and forests, also requiring the demolition of some households in the north of the village.

Extensive lignite exploitation takes place particularly in the extra-Carpathian hills (Mehedinți Plateau, the Getic Subcarpathians and Piedmont, the Curvature Subcarpathians and the Banat-Crişana Hills). In the Carpathian region, the practice is restricted to some Carpathian depressions only.

The geographical environment of the Mehedinți Plateau, the Getic Subcarpathians and Piedmont, as well as of the Curvature Subcarpathians wherefrom lignite is mined in the Husnicioara, Motru, Jilțu, Tismana, Jiu, Amaradia, Olteț, Luncavăț, Sărata, Bratia, Bughea, Ialomița, Prahova and Ceptura basins, is very similar. Lignite-rich hills (300–700 m high) are underlain by brittle, folded, or monocline sedimentary deposits of a Pliocene age (Preda *et al.*, 1991–1992). Average relief fragmentation values register densities of 2–6 km/sq.km; relief energy is 100–250 m/sq.km. Slope declivity on monocline or anticline structures is of 5–25°, reaching 25–35° on some structure-controlled surfaces of cuesta scarps. Floodplain and terrace surface slopes have a low dip (0–5°). The monocline layout of Pliocene–Quaternary deposits, revealing cuestas and structure-controlled surfaces, as well as folding (Mățău–Schitu Matei anticline) create distinct conditions for the development of the present-day processes modelling the slopes. Precipitations decrease from the west to the east (750–650 mm/year) and have a variable regime, with a peak in the months of May and July. In the first part of this interval they are associated with snow-melt, causing flooding in all these basins. *Quercus cerris*, *Q. frainetto* and *Q. petraea* forests are widely spread on the interfluves (*Geografia României*, 1992).

The Crişana Hills (300–500m), with major exploitations at Budoi, Vărzari, Popeşti, Ip, Varviz, Borumlaca, Chiejd, Cuzap, Sărmăşag in the basins of the Bacău and the Crasna, lie on monocline or largely folded and severely faulted monocline structures. Unlike the Subcarpathian and Piedmont hills from the south, the Crişana Hills, benefiting by greater quantities of precipitation (650–850 mm/year), are covered with rich oak and beech forests. The region's basins are rather frequently affected by catastrophic floods, which in 1997, for example, claimed both property and life.

In the intra-Carpathian depressions, where lignite started being mined at the beginning of the 20th century (Borsec, Bilbor, Vârghiş, Căpeni, Valea Crişului, Arcuş), landforms are developed on colluvial-proluvial deposits (piedmont formations), at the contact between the slopes that border the depressions and its smooth plain.

The thermal inversions, characteristic of the cold season, brought the fir-tree line down to the lower depressionary level. Due to the rich precipitation regime (800–1,000 mm/year) with maximum values over the June–July interval, the mean specific discharge registers significant values.

Even before the lignite started being mined, the slopes had undergone natural processes, *e.g.* mass movements (landslides in particular), sheet wash,

erosion and gullying on structure-controlled surfaces, and rock-and-soil falls, sinking and slides on cuesta scarps. At that time, the land had been covered with pastures, forests, orchards, and small patches of arable land (on mild slopes, glacis, floodplains and terraces), and there was also much fallow ground (floodplains, ravines, scarps, and large active slidings).

The areas in which lignite is mined are also the most favourable ones for human settlement. So, man's pressure on the environment has constantly been higher than elsewhere, but it kept increasing largely over the past few decades as mining was attracting an ever bigger workforce. The steady pressure suffered by the environment over the past hundred years began at a slow pace (the building of settlements and roads), and got momentum when natural resouces (oil, lignite) started being exploited.

LANDSCAPE CHANGES TRIGGERED BY LIGNITE MINING

All the environmental components suffered spectacular changes in the wake of surface mining, excavation and related works. However, these changes were swifter and better visible, occasionally through violent effects, on the relief, soils, waters, vegetation and topoclimate, due to human pressure exerted for several centuries now.

Surface mining sites are located on summits, slopes, terraces and floodplains. Lots of man-made hummocks occur in the source area of some small drainage basins, potentially augmenting the risk for some catastrophic geomorphological processes to set in (Fig. 2). Dumps in the floodplains or on terraces stand a better chance of stabilisation. While most processes triggered by underground mining are down-sagging, sheet-piping, rock-and-soil falls, sinking and gullying, surface-mining sites are at risk from landslides, mudflows, sinking, gullying and sheet-erosion (Fig. 3). Depressions are formed in either case: by sheet piping and down-sagging in underground mining and by excavation in surface mining. They get filled with water from precipitation, or from springs even. This changed the modelling system, from natural to man-made.

Surface mining is also responsible for the shrinking of pastures and hayfields by some 20,000 ha, orchards by *ca*. 6,500 ha, arable lands by about 4,300 ha; at the same time, fallow grounds expanded over some 11,000 hectares. On interfluves and slopes, forests would be cut to make room for surface mining. An easy way to rehabilitate the landscape is just the reafforestation of the man-made mountains, in principal; however, the logged area is seldom covered. Also reconstructed agricultural areas are much smaller than the original ones, and their productivity is far beyond that in natural regime (Popescu, 1993).

Fig. 2 – Down-sagging and gullying affecting the stepe of the outside dump of the old Budoi mine covered now with pasture land.

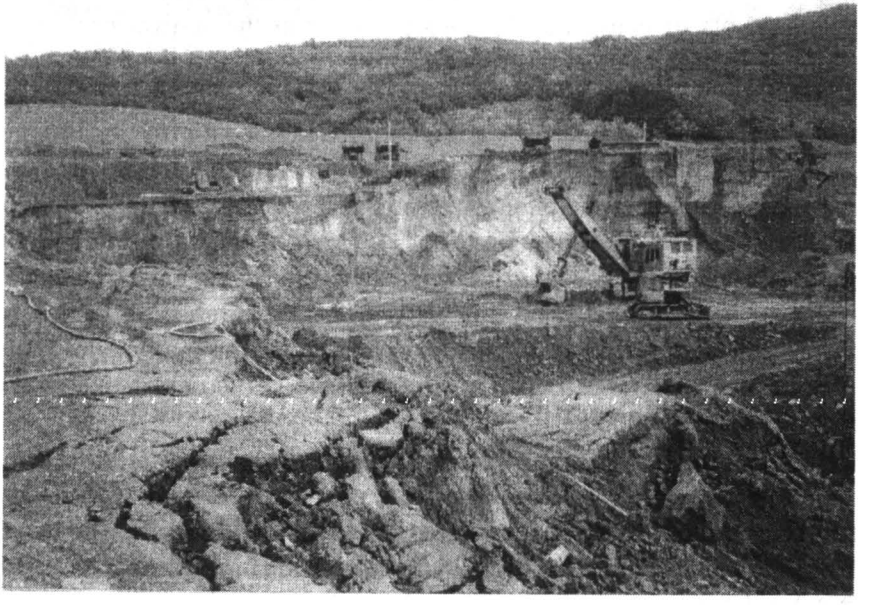

Fig. 3 – Slides, rock-and-soil falls and gullies at the new coal-strip mine at Budoi.

The environment of vast areas has suffered the adverse effects of mining *e.g.* in the counties of Gorj 6.3%, Mehedinţi 2.6%, Vâlcea 1.7%, Bihor 1.4% and nearly 1% in Sălaj. This situation has called for the elaboration and readjustment of some comprehensive programmes of ecological rehabilitation during the past thirty years.

In a first stage, funds used to be provided by the state and the mining enterprises themselves. With the reorganisation of the extractive industry and the establishment of lignite autonomous administrations (1990), the latter's contribution to environmental programmes increased to over 70 per cent. The delay in implementing restructuring schemes (only in 1997 was the Lignite Autonomous Company set up) resulted in much money being lost which could have been usefully earmarked to controlling land degradation processes.

At present, landscape rehabilitation[1] programmes run the risk of being reduced or abandoned altogether, given that the social costs entailed by restructuring measures (slowdown of production and closure of some mines) are very high, having crippled the company's revenues.

Only part of the remitted workforce of surface and underground lignite mines would attend professional requalification courses, and those who did, trained for various jobs, but not for ecological reconstruction. It would be a good opportunity for the recently founded national Agency for the Development of Mining Zones to collaborate with the local administrations in this matter. As it is, programmes are stalemated.

The equilibrium of the mining site relief, which together with the plant cover and the human settlements represents a basic environmental component, appears to have been seriously disrupted. It is necessary, therefore, that this backbone of all the other environmental components, should focus the attention of ecological rehabilitation programmes for the newly emerged environments generated by the extraction of lignite, and for the older ones subjected to natural processes[2] (Badea *et al.*, 1994; Cioacă, Dinu, 1995; 1996; Dinu *et al.*, 1997).

As is known, despite the risk for geomorphological processes to set on, rehabilitation programmes are allocated limited resources, moreover, allocations are spread out over various terms. In this situation, what should be done first is to select the lands capable of natural recovery, or through minimum investment, and then proceed to the hierarchisation and stagewise management of areas that need more costly short-and medium-term technical-economic approaches.

[1] To the effect of bringing the landscape back close to what it originally used to be, and not identical to it.

[2] Badea, L., Cioacă, A., Niculescu, Gh., Bălteanu, D., Sandu, M., Călin, D., Roată, S. (1994), *Studiul de evaluare globală a impactului ecologic produs de extracţia lignitului în bazinul minier al Olteniei*, Report, Institute of Geography, Bucureşti.

Lands capable of natural recovery through minimum investment. This is the category of flat grounds (found in lower or higher floodplains or terraces and interfluves, respectively on which wastes and other lignite sorting products were simply scattered around and not piled up into dumps. These materials are likely to be entrained by washing processes and carried into the drainage net, or to the lower areas through accelerated rill-wash. This is the situation on fairly wide surfaces of the floodplain of the Jiu, Rovinari, Roşia, Peşteana and Urdari exploitations, the Tismana (Găleşoaia), the Motru (upstream Motru town), the Jilţ (downstream Slivileşti at the junction between the Tehomir and the Jilţu Mare), Crasna (the mines at Sărmăşag), the Bratia (between the localities of Berevoieşti and Aninoasa), the Baraolt and the Vârghiş at the junction with the Cormoş close to the confluence with the Olt River, etc.

The lower terraces of the Crasna, Barcău, Motru, Jiu, Olteţ, Bratia, Argeşel and other streams, or the interfluves between Zalău and Maia, Bobota-Crasna, Borumlaca-Bacău, Derna-Bistra, Vârvizel-Cuzap, Jilţul Mare-Jilţul Mic, Olteţ-Tărâia, Cerna-Cernişoara, Râul Doamnei-Bratia, Bratia-Bughea, Valea Crişului-Arcuş, etc. are full of such depositions. On these lands, numerous depressions and mixed foliated forests were formed through down-sagging and heavy transport trucks respectively, lots of overmoist areas favouring the infiltration of water. As a result, on the fringes of the flat surfaces of some terraces, or flattened interfluves, intimate mechamisms are at work setting the terrain for rock and soil falls and landslides even. This evolution calls for deposited materials to be compacted, grasses to be planted and ditches made to drain moisture in excess.

Here and there, areas could be rehabilitated for agricultural use: fodder plants, fruit-tree nurseries, or orchards even (where scattered wastes are not so very thick).

Lands with consolidated man-made relief requiring moderate short-term investment for the upkeep of stabilisation works in place and the reduction of present-day geomorphological processes. This would help preserve fruit and vine plantations, already planted fodders and the expansion of the forest.

This category of grounds, formed largely of inside and outside man-made dumps have been managed for the past 20–30 years (underground drainage systems used inside the strip-mines), with dumps being created inside and outside at the base level, followed by such structures on every dumping step. In order to reinforce dump talus and rehabilitate the landscape, they planted fruit-trees and vine (at Cicani, Gârla and Rovinari in the Jiu Basin; at Drăgana and Aninoasa on the interfluves between the Slănic, Bratia and Bughea) and forest species (at Armăşeşti). Like works undertaken by the Târgu Jiu Forest District

are underway on over 10 ha in the southern part of the inside dump Rovinari Est; lucerne cultures cover the dumps at Budoi, Popeşti and Voievozi in the Barcău Basin, the inside dump at Berbeşti, or the outside one at Olteţ.

The former strip-mine at Armăşeşti, in the Cernişoara Basin, is a successful attempt at rehabilitating the relief through dumping and levelling inside the mine and achieving stability through drainage, cultivation of crops, or forest plantations on steeper slopes (Badea, Cioacă, 1995)[3]. So at present, the only necessary works are clearing the drains and maintaining the crops. This exemple should be followed by finishing and maintenance works on the other old dumps (*e.g.* in the basins of the Crasna, Barcău, Jilţ, Olteţ or Arcuş rivers).

Turning some excavations from floodplain mines (where excavation wastes are not equivalent to the dislodged volume) into recreational lakes may add a new element to landscape rehabilitation schemes. These lakes shall favour the growth of a hydrophile vegetation, which in turn could become a good biotope for bird nestling over the summer. Gârla Lake and the future Roşia de Jiu Lake could become an ideal halting-place for migratory birds, given that the Jiu Valley, more precisely the Strei-Jiu passegeway, is a link between Central Europe and the Mediterranean zone (Drugescu, 1999)[4].

Lands with recently man-built relief, or with landforms under formation that require a huge financial effort to secure short-or medium-term management in order to prevent the onset of ample geomorphological precesses likely to cause the irreversible degradation of the local environments.

This category of grounds is subjected to the severest present-day geomorphological processes associated with the degradation of all the local environmental components: soil, vegetation, fauna, waters, croplands, settlements, and roads. Therefore, it is imperative that landscape rehabilitation works, liable to returning the area to acceptable levels, should be carried out simultaneously with lignite mining. The ideal situation would be for inside dumps to be built in the space already cleared, shortly after excavation works inside the mine had begun. Hydrogeological conditions in the floodplains, or structural-tectonic conditions and thickness of lignite deposits in the Subcarpathian or Piedmont hills made rehabilitation works financially inefficient (13 USD/lignite ton).

In what follows we shall present a synthetic picture of the problems involved by medium- and long-term rehabilitation programmes requiring significant financial effort:

– Filling-in definitively the floodplain strip-pits squeezed of efficient resources, with wastes coming from local surface or underground exploitations,

[3] Badea, L., Cioacă, A. (1995), *Concluzii la studiul de evaluare globală a impactului ecologic produs de extracţia lignitului în bazinul minier al Olteniei*, Report, Institute of Geography, Bucureşti.

[4] *Zoogeographical Map of Romania* (in print).

even though this operation may require long-distance transport. At present, most mines in the Jiu, Motru and Covasna valleys are covered with man-made mountains that occupy the fertile lands of the floodplain terrace. Perhaps the most representative case is the Sărmăşag dump built on the 2 m-high Crasna terrace, between Sărmăşag settlement and the railway, on the site of an old mine. The southern part, elevated by over 8 m as against the terrace surface, is used in part for grazing, but cropland is being extended now. In the northern part, where the old strip-mine had stood, there is now a lake supplied by the rich underground waters of the floodplain (Fig. 4). The present mine operates beyond the railway, in the Crasna floodplain. Its excavation front is 500 m

Fig. 4 – Lake formed in the old, southern, mine of Sărmăşag exploitation.

wide and 18–22 m high in the northern and western sides. The front itself advanced from the north to the south along 500 m (June 1997), its southern and eastern parts being gradually filled with waste (Fig. 5). Lest the above situation should recur, the dumped volume must be equal to the dislodged volumes, so that additional quantities of waste should be fetched from the mine at Sărmăşag and Chiejd. It is important that dumps do not overtop too much the level of the floodplain, in order to dry and have the soil fit for tilling after a lapse of 5–6 years.

– Another prerequisite for the ecological rehabilitation programme is the reinforcement of dumps under construction on slopes, or in the source areas of

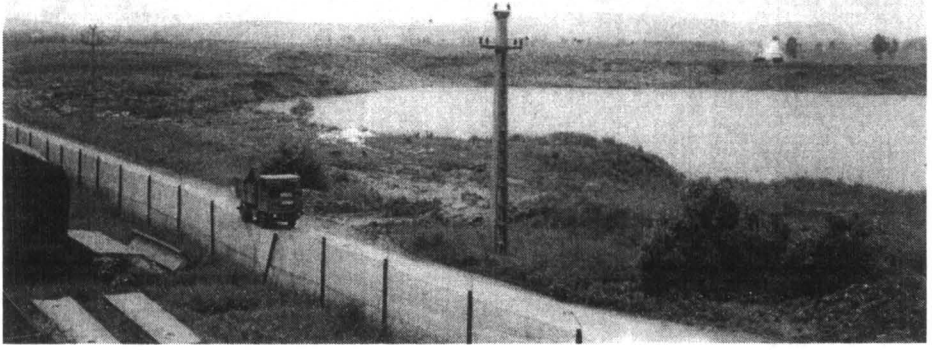

Fig. 5 – Wastes deposited in the inside dump of the mine (eastern part of Sărmăşag-Silvania Hills) to reconstruct part of the floodplain's cropland and reinforce the neighbouring railroad.

some small catchments. To illustrate, we shall recall the case of the Aninoasa dump on the Bughea-Bratia interfluve, which expanded on the two slopes, but is kept under control only in its northern part by a fruit-tree plantation (Fig. 6) that fixed it. The huge quantities of wastes deposited southwards by the excavated material from the Rovinari mine have raised the number of dump steps to seven. Their talus is affected by numerous forms of rill-wash, gullies and ravines even, carrying appreciable quantities of material towards the lower section of the slope. Other dumps at risk of sliding are: on the Mătăsaru slope (which in 1996 damaged a few households in Mătăsaru settlement) and in the Olteţu-Tărâia junction area (where in April 1994, a volume of 18,000 cu.m of dumped waste slided down to the talus base) (Cioacă, Dinu, 1995). But the greatest risk of sliding or ample mudflowing stand the dumps erected in the source areas of some small catchments; *e.g.* the outer dump in the source area of the Drăcoaia, a lefthandside tributary of the Olteţ. The report on field research in the north of Oltenia (Badea *et al.*, 1994) mentions that dumping practiced on the terrain ready for deforestation, formed of brittle rocks, mainly marls and clays, is permanently at risk of mudflowing. In the case of very heavy rainfalls, the dumped waste could turn into a mass of clay, with a small viscosity coefficient that may slide more swiftly downslope, and farther on in the valley, up to

Fig. 6 – Apple-tree plantation on the outside dump of Aninoasa mine (Muşcelele Argeşului).

Alunu, putting in jeopardy both the dumping platform and the 16 households standing close to the confluence. Reducing that risk imposes vigorous embankment works in the Drăcoaia Valley and even on the slope, together with the reconstruction of the forest stock.

CONCLUSIONS

The hilly zones wherefrom lignite is mined are fragile ecosystems, vulnerable to factors of environmental change. Mining-induced degradation of the relief, one of the basic environmental components, has lasting effects on the other elements, too: water, air vegetation, soil and settlements. With a view to sustainable development, any policy dealing with programmes of global reconstruction of the environment should make relief rehabilitation a priority target.

Nowadays, economic decision-making bodies in Romania have placed environmental issues high on the agenda. In this light, the present study could become a guideline to reform and restructuring programmes in the extractive industry which has a great impact on environmental issues. The damage caused to the environment, and the corresponding rehabilitation

endeavours involve appreciable financial resources which ought to be provided (on an installment basis) by the Lignite National Company in keeping with the recommendation of the UNDP-assisted National Council for Sustainable Development. In our view, the spreading out of investments is the duty of polluting agents all the line down to the bodies charged with ecosystem rehabilitation programmes. And it is so, because the greater the lag between the moment of mining-triggered environmental degradation and the beginning of rehabilitation, the higher the costs.

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DAEWOO AUTOMOBILE ROMANIA – ECONOMIC GEOGRAPHICAL IMPACT OF A BIG FOREIGN INVESTMENT IN ROMANIA

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Key words: foreign investments, joint venture, horizontal industry, employees structure.

Daewoo Automobile Romania – l'impact économique géographique d'un grand investisement étranger en Roumanie. Les investissements étrangers directs existants en Roumanie représentent, au moment actuel, un élément important du développement présent et futur du pays sur le plan économique. Afin de connaître l'impact de ces investissements sur l'industrie, et en dernier, mais non par ordre d'importance, sur la société roumaine, il est nécessaire de réaliser des études non seulement au niveau national et régional mais aussi à celui local. Une telle étude de cas est celle effectuée sur l'entreprise DAEWOO Automobile SA de Craiova. Suite d'une collaboration roumano-coréenne, cette société mixte fut fondée en 1994. Jusqu'à la fin de l'année 1997 elle fut le plus grand investissement étranger en Roumanie.

Le but final de l'étude est la détermination des modifications subies par un des éléments du système géographique, placé en directe relation avec les autres éléments composants, c'est-à-dire l'entreprise roumaine préexistante à l'afflux de capital. L'étude désire surprendre les modifications intervenues dans le processus de fabrication, dans les relations de l'entreprise avec différentes unités industrielles et de services, dans la structure et l'évolution du personnel. Les résultats obtenus témoignent de la compréhension et de la meilleure connaissance de l'évolution du système géographique dans son ensemble, tant au niveau microterritorial qu'à celui macroterritorial.

THE DAEWOO AUTOMOBILE ROMANIA – JOINT STOCK COMPANY. BACKGROUND

The automobile industry is one of the most dynamic branches of the economy. Fierce competition obliges it to renew the range of its product every 6–7 years. It employs a large workforce and has a considerable influence on the national economies. It is therefore viewed as the "motive power" behind any modern industry, and any strong economy. Specialists say that it is a stabilizing element, because it can easily overcome the cyclic periods of crisis or depression that hit the capitalist economy, being the first to recover.

Apart from it the car manufacturing sector can develop strong and complex relations with horizontal branches – metallurgy, chemistry, electrotechnics, textiles, etc. At the same time, it is a high consumer of oil products and of items produced by many processing industries, creating in its turn a wide range of services.

Given these big advantages, a few car manufacturing units were set up in post-war Romania, simultaneously with the development of this branch in Central and Eastern Europe: 1957, the ARO plant in Câmpulung Muscel, 1968, the automobile factory at Colibaşi, Piteşti and in 1982 the Craiova-based plant.

The OLTCIT company is the outcome of a joint venture between the Romanian state and the French company CITROËN. It was one of the very few undertakings in the communist period, the economic policy of the regime excluding the possibility for foreign capital to penetrate the Romanian market. This would account for an only 30% French share in the plant, fact that weakened its position in the process of production and decision-making.

The unit's output capacity was of 90,000 cars/year, but that performance was never attained by this plant, or by any other one in the branch, because of the many production problems, or of the incapacity to integrate and develop relations with horizontal industries.

After 1989, these problems became even more acute. With a deepening economic crisis, the political instability and the financial difficulties, in 1991 CITROËN pulled out. The plant, newly-baptised "Automobile Craiova" was left only with autochthonous capital and had to cope with many hardships. It continued to put out OLTCIT cars, spare parts and sub-ensembles, but the slidedown of production continued, from over 30,000 pieces in 1989 to no more than 6,500 in 1994, that is from nearly two billion Lei to a mere four million in the conditions of a steady upsurge of inflation (Table 1).

Table 1

OLTCIT Company outputs

Production	1989	1990	1991	1992	1993	1994
Thousand pieces	30311	21671	14666	12468	10594	6500
Mill. Lei	1863	1359	911	713	603	400
Export mill. $	35.0	27.8	22.1	29.8	7.6	6.0
Profit mill. Lei	35	16	11	–67	–56	–188

Source: Ministry of Industry and Trade

The main causes behind these decreases were: the steep fall in export and domestic demand, export figures dropping as the CMEA community fell apart, and the respective markets were lost to other producers who could supply better quality and more competitive items. The domestic demand decreased as the population's incomes thinned and imported cars invaded the market; deficient supply of raw materials, spare parts and ensembles; shorter effective working hours; obsolescence of equipment.

Such was the situation of this car plant when, on the basis of reliability studies, the Korean firm decided to make a substantial investment in it. In November 1994, they set up a mixt Romanian-Korean Company named RODAE Automobile Ltd. The Romanian state held 49% of the capital ($ 150 million) in technology, equipment and constructions, the Koreans (DAEWOO) becoming the main shareholder (51%–$ 156.12 million). In the fall of 1995, the production line was mounted, and in a few months' time a pilot section began operating. Production proper started in March 1996. That same year, in October, the company's name was changed to DAEWOO Automobile Ltd., by which it goes at present. This change was aimed at boosting the company's image abroad and ensuring competitiveness in the world market.

The reasons behind the foreign investor's decision to join this venture were the following: to conquer a market liable to absorb DAEWOO cars, cheap qualified and well trained available labour force, an advantageous economic policy promoted by the Romanian state, particularly in matters of investment and commercial strategies, the promising conditions offered in the OLTCIT plant, especially its production precincts, supply and marketing relations, and little domestic competition.

IMPACT OF THE INVESTMENT ON THE ROMANIAN MANUFACTURING UNIT

With the setting up of the mixt Romanian–Korean company, a number of changes took place at the level of production process and relations, as well as in the workforce structure.

OLTCIT cars were no longer manufactured. However, a few sections continued operating and producing spare parts for this type of cars still in circulation.

The firm's intention is to manufacture the following models: CIELO, ESPERO, TICO, DAMAS and lorries (of one and three tons), already produced by the Korean company. This new venture provided the opportunity to market them in Europe. Up to the time this study was being conducted (May, 1997), the activity of assembling CIELO parts and sub-ensembles produced by the Korean parent firm had been decreasing, because the first of the then two-year-old partneship had been devoted to organising the process of production. The data supplied by DAEWOO company show that manufacturing proper began in 1996 with an output of 22,000 CIELO cars. Perspective 1997 figures indicate a 400% rise as against the preceding year, with new models (ESPERO and TICO), formerly imported and sold on the Romanian market, being put out.

In conclusion, production volumes, expressed in number of cars, did not increase spectacularly because the company was engaged in an organisational overhaul.

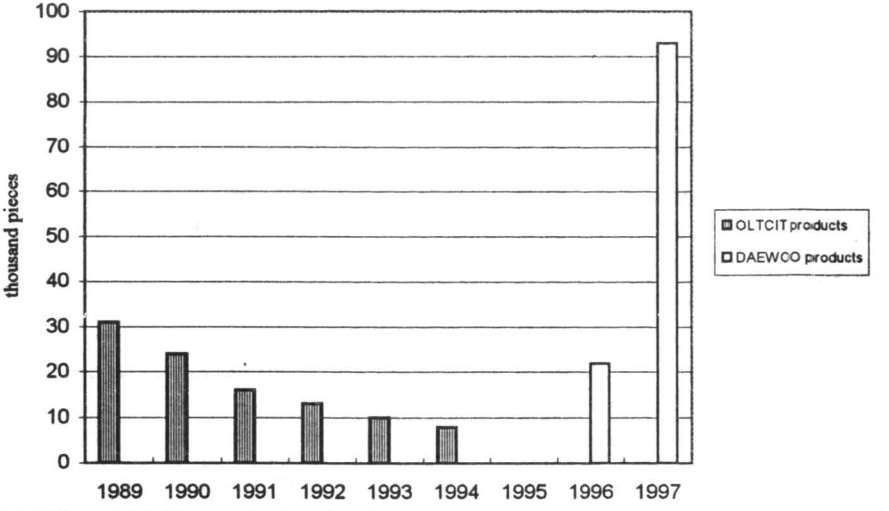
The 1989 outputs – when the factory had a profitable contract with CITROËN, were quite significant, but the political and economic changes that ended that joint venture, led to a considerable slowdown of production (1990–1994). The new investment deal and the reorganisation of the enterprise boosted it, among others by restructuring the workforce (Fig. 1).

Unlike the major changes registered by structure and production volume, relations remained very much the same. The Korean investor would rather stick to the pattern inherited from the old firm, simply improving and enlarging it. In order to make the investment have a sustainable impact on the market, the contract stipulated that DAEWOO was to promote relations with supply industries up to the end of this millennium.

In this way the Romanian car industry and all its suppliers could prosper, costs brought down, the quality preserved and perhaps improved.

The extent of integration was set at 60% up to the year 2000 (Law 21/1994). This percentage will cover the manufacturing of components and sub-ensembles integrated within the plant itself, as well as the supply industries. So far now, the achievement is 35% for cars and only 17% for component parts (Dumitru Cârstea, 1997).

DAEWOO Automobile România (DWAR) has three categories of suppliers: primary, secondary or sub-suppliers, and potential suppliers. The first category provides spare parts, ensembles or sub-ensembles (SUBEX Bacău, FELAM Mediaş, UASA Braşov, PRODINVEST Piteşti), plastic components



1997 data yielded by production planning.

Fig. 1– Production structure and volumes over 1989–1997.

(ROLAST Piteşti, CHIMICA Orăştie, ARTEGO Târgu Jiu, PLASTOR Oradea, VICTORIA Floreşti) and other items (IUS Braşov, SATURN Alba Iulia, POLISEA Craiova, UAMT Oradea, etc.).

Some of the secondary suppliers are ARO Câmpulung, ROMACOST Timişoara, ELECTROAPARATAJ Bucureşti, ARPECHIM Piteşti, FIBREX Săvineşti, etc.

Most of the primary suppliers were taken over from the former OLTCIT firm, with little if any change. In the beginning, the new company used them to profit by already established relations, without any additional investments. This would explain why the proportion of integrated component parts is more than 17 per cent.

The industries supplying the Craiova-based car plant are located all over the country (Fig. 2). It is a space structure specific to past economic relations. Things should be changed, but present economic difficulties prevent it. The major goal set by the communist regime had been to achieve a balanced economic development of all of Romania's zones. But locating industry across the country means huge distances between manufacturing units, higher transport costs, and longer transport time, all of which hamper ideal relations between them. As detrimental in this respect are the small number of units strictly specialised in the manufacturing of certain items.

The company entertains closer relations with the enterprises lying at variable distances north, north-east and east of Craiova city, which together with several others in the same area, represent a high-developed machine-building zone in the centre of the country. Apart from other considerations, this was a major reason for developing the Romanian car industry in the Piteşti–Câmpulung–Craiova area.

In terms of distance from the Craiova-based firm, three semicircular areas, powerfully developed along the above directions, can be distinguished: a semicircular one of between 100 and 250 km (Fig. 2) in which 58% of its supply and sub-supply units are located, *i.e.* the cities of Braşov, Bucharest and Piteşti. Although not an ideal one, this area may be considered, for the time being at least, as offering fairly good opportunities for establishing relations with horizontal industries.

A second area beyond the half-circle with a 250 km radius, with lots of producers (30%) of sub-ensembles and parts the Craiova firm is dealing with. But in this case the company is disadvantaged by very long distances (400 km to Oradea and 500 km to Iaşi), which rise transport costs, and implicitly the price of its products. What should be done is to reduce the number of long-distance suppliers in favour of those sited at shorter distances.

A third area is represented by the half-circle of up to 100 km, an ideal distance between the plant and its suppliers. Paradoxically, however, this is the

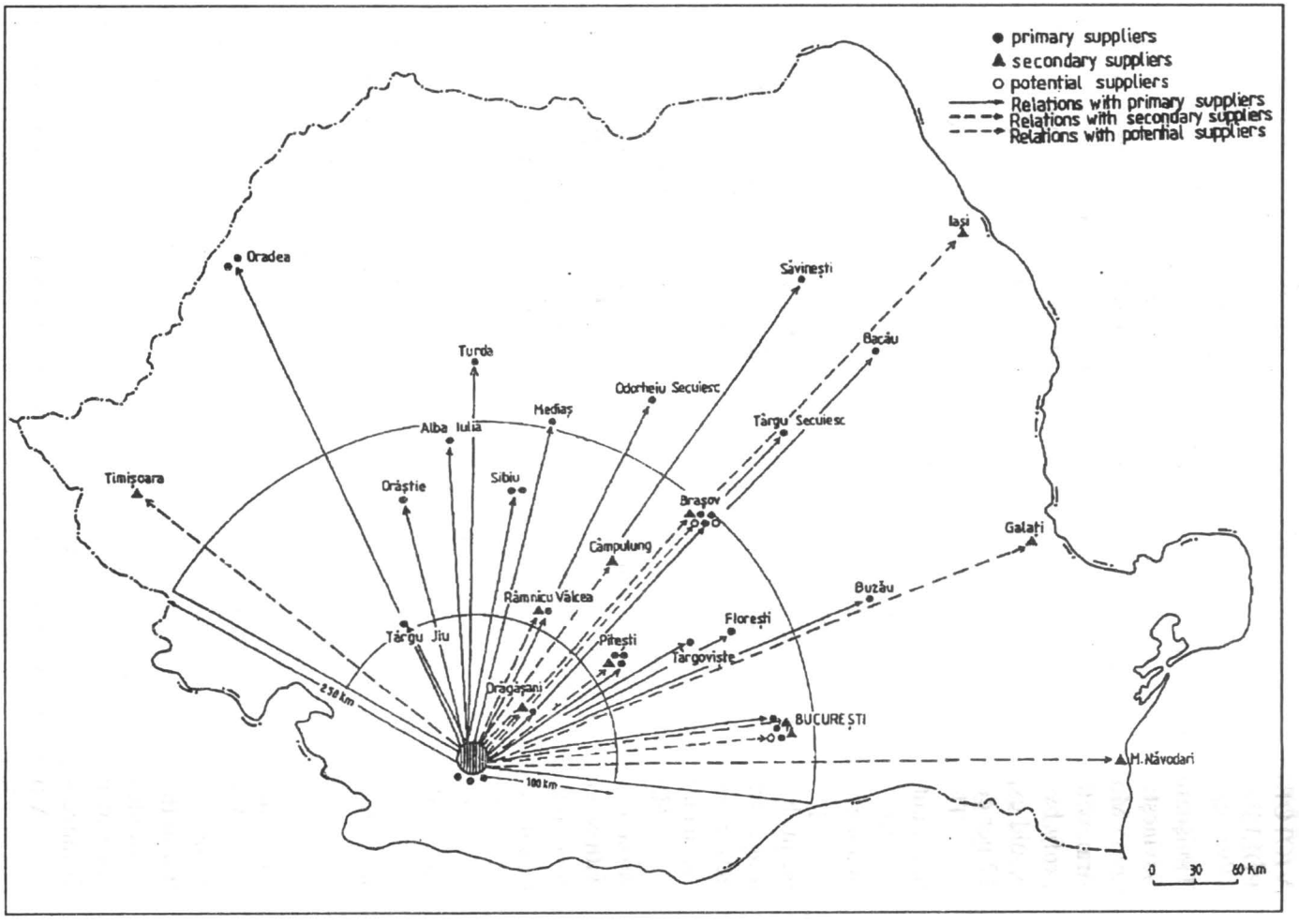


Fig. 2 – DWAR's potential relations with supplier units.

perimeter of weakest relations (12%), because the industry of car components in the S–W of Romania is itself very weak. Prospectively, the situation will improve by allocations of capital to the building on the precincts of the plant of a motor gear boxes factory, and a foundry to produce the raw material for it. DWAR has the capacity to attract new investments: from Romanian firms already operating in the area (SPUMOFLEX Craiova, POLISEA Craiova), from small private procedures interested in this co-operation (GELU PROD Craiova), from firms located in other regions, but willing to open sections in the neighbourhood (SUBANSAMBLE Piteşti), and from foreign firms (PELZER and AUTOLIV from Germany).

DAEWOO's domestic and external trade relations are carried out through its Bucharest branch – DAEWOO Auto Trading Ltd.

Sales on the domestic market cover the whole country. Which means the employment of numerous dealers (64) in various localities, beside the personnel working within the company itself. Dealers are operating not only in sales, but also in servicing for DAEWOO-made cars. With a view to better monitoring commercial activities in Romania, the country's territory was divided into seven regions with a zonal centre co-ordinating the dealers' activity and supplying them with the firm's products (Fig. 3). The organisation of these zonal centres is underway. A number of warehouses are being built on purchased land to store the cars presently standing on hired land.

The biggest turnover comes from the Bucharest market, because this city has the largest population, and a greater purchasing power (Table 2), and also from Craiova, the site of the entreprise itself. Although that region's economic development is fairly moderate, reduced competition is an advantage. Which is not the case in the central and Western parts of the country, where DAEWOO cars have to withstand the serious competition of second-hand automobiles brought from Western Europe (RENAULT) and from Central and Eastern regions (ŠKODA, LADA). In this situation sales are low.

Table 2

Situation of domestic sales

Region	Domestic sales (No. cars)	
	1995	1996
Bucureşti	4824	6823
Craiova	3461	5016
Constanţa	1401	3413
Iaşi	1055	2452
Timişoara	1521	1714
Cluj	976	1237
Braşov	1268	1616

Source: DAEWOO Auto Trading SRL.

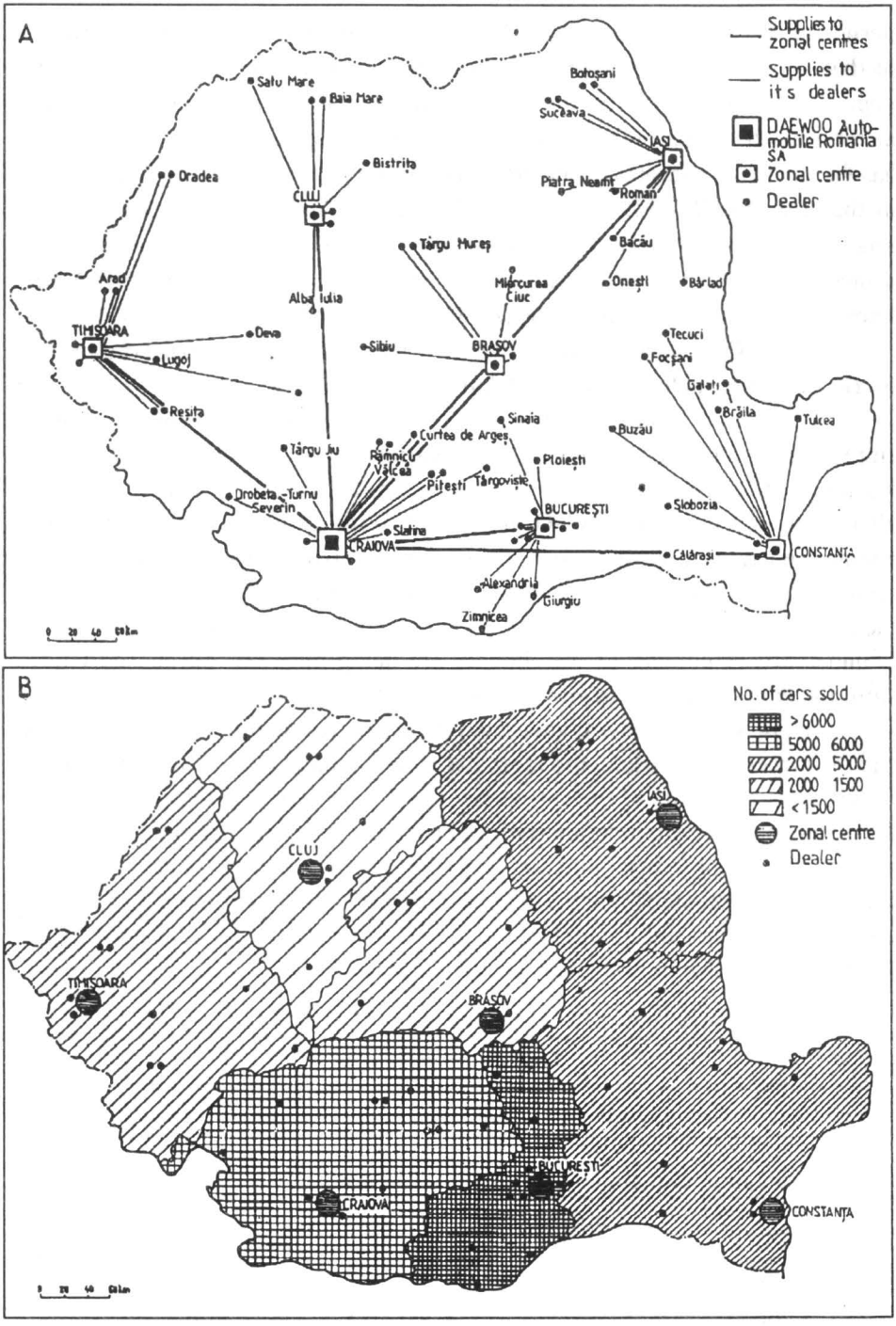


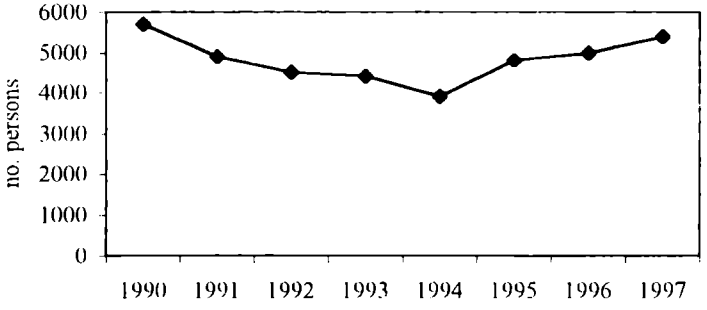
Fig. 3 – DWAR's market in Romania: **A**, supply relations; **B**, sales market.

External markets are the Central and East-European countries. These markets are shared together with Polish (Lublin), Czech (Prague), Uzbek and Russian (Rostov) producers (representing DAEWOO in these countries).

DAEWOO company's intense trading relations have beneficial effects on the activity of road, rail (CFR) and air (TAROM) transport firms.

As far as the workforce is concerned, investment may have either a positive impact by creating more jobs, or a negative one, by changing the age and sex structure, diminishing or not the living standard.

Such an experience had the OLTCIT employees when falling under DAEWOO administration. Before 1990, when the plant was associated with the French firm CITROËN, the workforce was very numerous. It appears that the mammoth size of the plant was the Romanian state's policy of industrial development at all costs, despite low productivity rates. As economic difficulties kept piling up and the joint venture dismantled, the number of employees dropped steadily until 1994, when the contract signed with the DAEWOO Concern offered new employmemt opportunities (Fig. 4), the new company intending to employ up to 6,000 people in 1997, and even more in time.



1997 estimates.

Fig. 4 – Employment of labour.

The total number of employees is fluctuating as the company's policy is to offer a temporary, three-month-test employment that may be extended or made permanent, depending on the workers' capacity of adaptation and behaviour, or on the dynamics of production.

Like in any manufacturing unit, workers are in the majority. However, the tendency of DWAR was to reverse the ratio (Table 3) and increase the number of technical and administrative staff in the departments of management, of planning and control, finances, maintenance and acquisition and moreover in the technical and investment direction. The personnel with higher qualification

tends to dominate the technical and administrative structure (59%) especially in the Computer Centre, a section of overriding importance for the entreprise. Trained workers represent 97.5%, which means the DWAR employs highly qualified personnel. Qualification was further improved by training and specialisation terms at the "parent" company in Korea.

Table 3

Professional structure of employees

	1994	1995	1996	1997*	1998*
Workers	3.036	3.202	3.555	5.325	6.080
%	82	71	72	75	80
Technical and administrative	747	1.279	1.351	1.775	1.520
%	18	29	28	25	20
Total	3.783	4.481	4.906	7.100	7.700

Source: Activity report of DWAR Company.
* Estimates.

Looking at the sex structure of DWAR employees, it is clear that the decision-making Korean investor prefers male workers. On the one hand, because they are deemed to be better suited to work in the plant and, on the other hand, decision-makers, in general, tend to underestimate female adaptability to a certain type of work. In our case there is a larger proportion of women in the technical and administrative structures, and a certain reticence in admitting them among the decision-making staff (one woman director and three women heads of department).

The new company is keen on eliminating shuttle service from its structures. The system, specific to town industry under communism, was a practice of the OLTCIT plant too. The problem was that absence and late-coming caused by transport difficulties disturbed the process of production. Therefore, commuters were the first to be laid off. At present, there are very few employees residing in other localities, and even they do not commute, but have a temporary domicile in Craiova.

The wages practised by the company are by some 15–20 per cent higher than the average salary in the economy. This increase is due also to extra work hours which are paid twice the scheduled ones. The firm grants more leisure days than the standard ones set by the Romanian state.

In conclusion, we would say that the Craiova investment is indeed very important both as regards volume and local regional and national impact. The former OLTCIT firm, one of the very few joint ventures before 1989, offered significant advantages to investors in car manufacturing; the DAEWCO Concern is a well-known transnational corporation that has the capacity to get even more involved in boosting a strong car industry in the Craiova area; it may contribute to revitalising this branch in Romania, at the same time facilitating

the development of other economic activities. The rationale behind choosing to invest in this area is twofold: 1) the vast local (national) and zonal market (Central and Eastern Europe and the countries of the former Soviet Union) and 2) a cheap, highly qualified and trained labour force ready to accept foreign investors. The capital put by DAEWOO in the OLTCIT plant in 1994 helped it overcome its period of crisis, restructure and resume production. At the same time, relations with supply branches were taken up again and developed, which means the Romanian car industry regained its complex character. The company's sales met the domestic market demand of buyers who could afford acquiring a special automobile instead of the ordinary Dacia model produced by the national industry. The Craiova investment attracts to the area other Romanian and even foreign investors, fact that has a major impact on the local industry. The company's employees and local population at large have only to profit by the creation of the jobs, advantageous working and living conditions (good wages), with positive bearing on the population's perception of foreign investments. At the same time the activity in this company determines an adequate behaviour on the part of the personnel to the market requirements, sharing a new attitude both towards work and the employer-employee relations.

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CONSIDERATIONS CONCERNING SOME LANDSLIDES IN LINNÉEDALEN, SVALBARD ARCHIPELAGO

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Key-words: cryogenic landslides, active layer, slope processes, Svalbard.

Considérations concernant quelques glissements de terrain de Linnéedalen (Svalbard). On prend en étude quelques glissements de terrain cryogéniques de la partie inférieure de la Vallée Linnée compris dans la catégorie des glissements de la couche active. La manifestation de ces processus de pente est corrélée avec les conditions du milieu, spécifiques, par exemple: le température de l'air, les précipitations, l'humidité de l'air ainsi que l'évolution des températures de la couche active. Les éléments micro-morphologiques caractéristiques: fissures, marches et vagues de glissement, blocs renversés, langues de matériel coulant, ainsi que les caractéristiques dynamiques, sont justifiés dans la corrélation avec l'humidité du substratum avec la limite de plasticité et celle de liquidité. Dans la Vallée Linnée sont présents deux types de mouvements de terrain: des glissements de la couche active et des coulées de boue.

INTRODUCTION

In permafrost areas, forms and periglacial slope processes, such as mass-movements, have a wide spreading. Landslides, shallow landslides, or better-said cryogenic landslides (Leibman, 1995), which develop in permafrost areas are active layer detachment failures (Lewkowicz, 1992; Harris, Lewkowicz, 1993), limited by the depth of seasonal thaw. High air temperatures, rapid melting of snowpatches upslope, summer rainfalls, high air humidity, favour these geomorphological processes. Svalbard is the continuous zone of permafrost, which underlies the entire archipelago, and is between 100 m and 450 m thick.

The aim of the present paper is to describe some active layer failures in the Linnée Valley. The study was undertaken during the summer of 1990 *(The Romanian Research Polar Expedition – Svalbard 1990)*.

GEOGRAPHICAL SETTING

The Linnée Valley is situated in western Svalbard – in the north-eastern part of Nordenskjőld Kyste (Coast) – between the steep mountain slopes of Linnéefjella in the west and Starostinaksla in the east. Our research area is situated between the Linnée Lake in the south and Isfjorden in the north, in the zone named Vardeborgsletta, at 78°04' N and 13°38' E (Fig. 1).

The Vardeborgsletta zone consisted largely of sediments, partly fine-grained marine materials, specific to a well-formed system of raised marine terraces and beach ridges, indicative of the subsequent land rising after the last Ice Age. However, horizons (strata) differentiated granulometrically (Fig. 2), can be noticed. Some of them are built of stones and gravels, others of clays and silts, there are some dark horizons, maybe fossil soils which are richer in fine fractions.

The area is covered by fragmentary tundra, forming a thick vegetal mat of moss and low growing plants.

Svalbard has an arctic maritime climate due to the moderating temperature effects of the surrounding Greenland and the Barents Sea. The mean annual air temperature at Isfjord Radio is –4.7°C, the absolute maximum reaching 17°C, and the absolute minimum –33°C. In January–March, the coldest month, long-term average temperature is –11.9°C; in July, the mean temperature is 4.7°C. A mean number of freezing days temperature is 261 and freezing occurs every month, except for July. The mean annual precipitation at Isfjord Radio is 435 mm, most of which falls in the winter in the form of snow (Hisdal, 1985).

In order to better show the background against which the analysed landslides occurred, I shall present some meteorological data registered in our research area between July 11 and August 26, 1990. This period was characterized by a mean temperature of 6.1°C, a maximum of 14.5°C (23 July) and a minimum of 1.2°C (August 11 and 12); rainfall amounted to 5.41 mm, and the mean value of relative air humidity was 80.5%. The mean daily temperatures varied between 2.6 and 9.9°C, with maxima of 3.6°C and 14.5°C, and minima of 1.2...7.1°C (Fig. 3). Maximum and minimum day temperature throughout the period was of 8°C and 4.5°C, respectively. The relative air humidity varied between 54 and 92%, the strongest wind reaching 13.5m/sec (August 11).

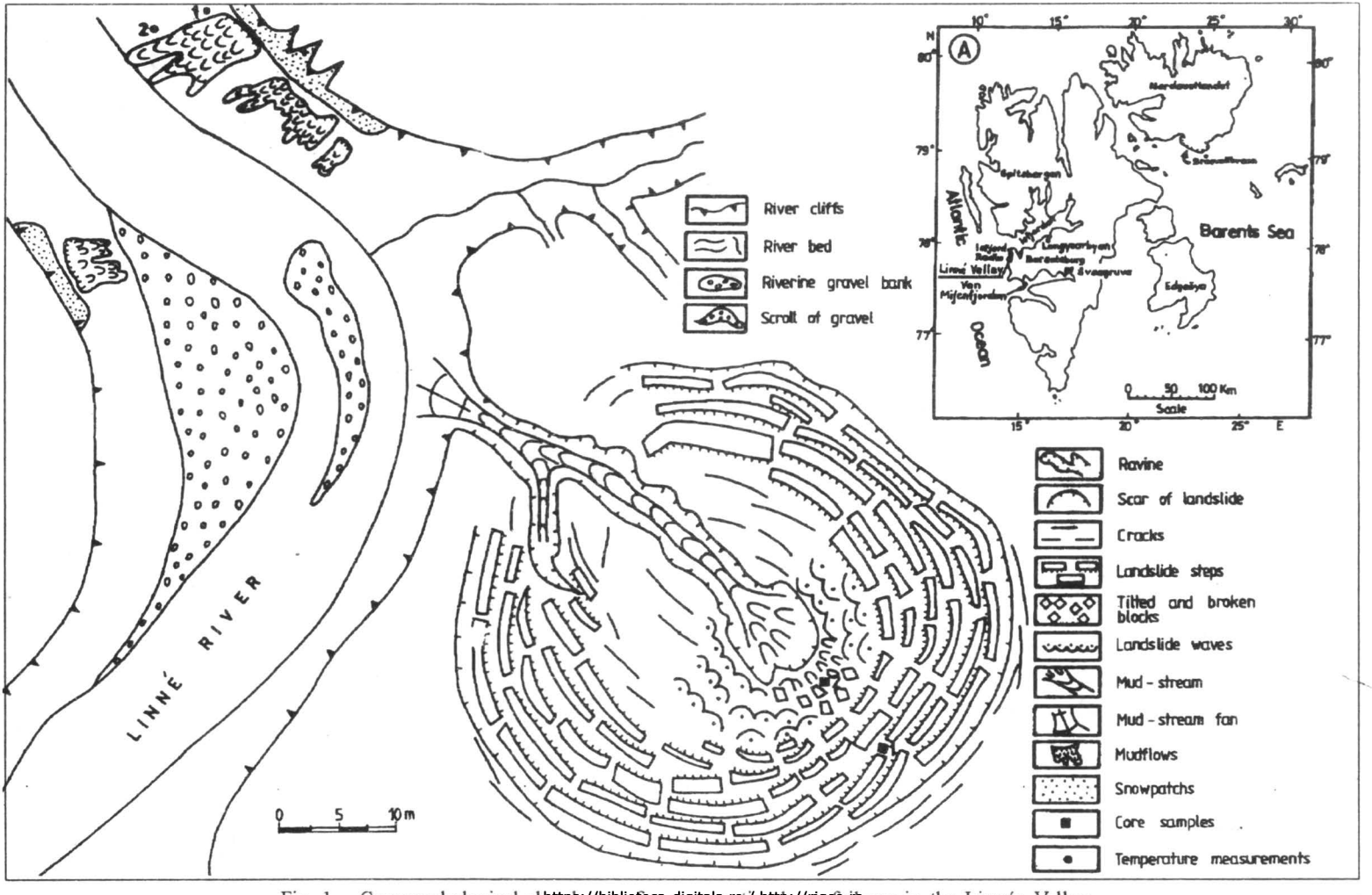

Fig. 1 – Geomorphological sketch map of some landslide features in the Linnée Valley.

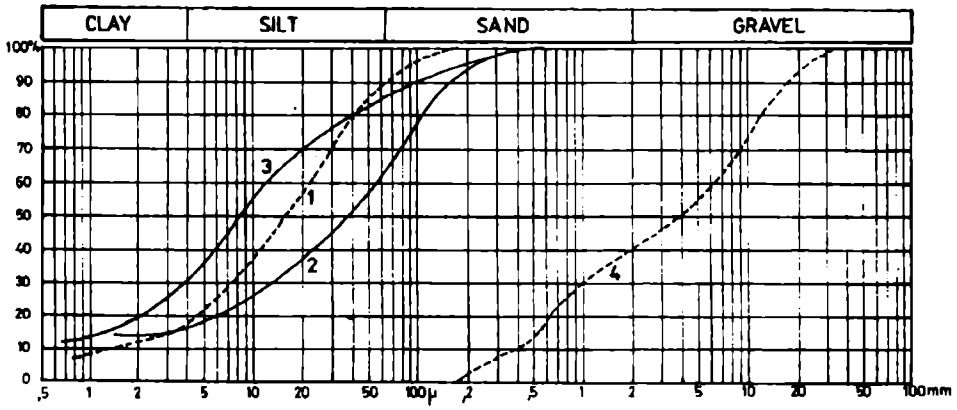

Fig. 2 – Cumulative grain-size distribution curves for marine sediments at Vardeborgsletta.

FIELD DATA AND DISCUSSION

The analyzed landslides were studied in the lower sector of the Linnée Valley, at altitudes between 4 and 25 m.

The first cryogenic landslides, more precisely shallow landslides turning into mudflows, studied here are situated on either side of the Linnée River. These superficial landslides occur in the junction areas between the surface of marine terraces and the Linnée channel bed. Slope declivity is 16–22° and the affected area is fairly small (8–48 sq.m). The detached front has a linear development, a little bit concave, 8–34 cm high and is characterized by marked instability, due to the detaching line advancing towards the upper part of the slope.

On the 3rd of August, when the phenomenon started, the moving material looked like it had the character of a superficial landslide affecting only the soil layer, growing into a typical mudflow, on the 18th August, with tongues that reached the Linnée River. In the first days the slide speeded at only 10–21 cm/day, to reach 55–76 cm/day between August 18–23. Rainfall, high air humidity, together with temperatures of 9.5–10.5°C determined both the rapid melting of the snow from the upper snowpatches, the rising of the soil temperature and thickening of the active layer (Fig. 4), all of which explain the peculiar evolution of the phenomenon. For example on the 3rd of August, the active layer was 30 cm deep in point 1 and 82 cm deep in point 2, reaching 67 cm, and 92 cm respectively on the 25th of August (Fig. 4).

In the conditions of some granulometrical and mineralogical homogeneity of the downside moving material, the mudflow developed uniformly by as "sheet mudflow".

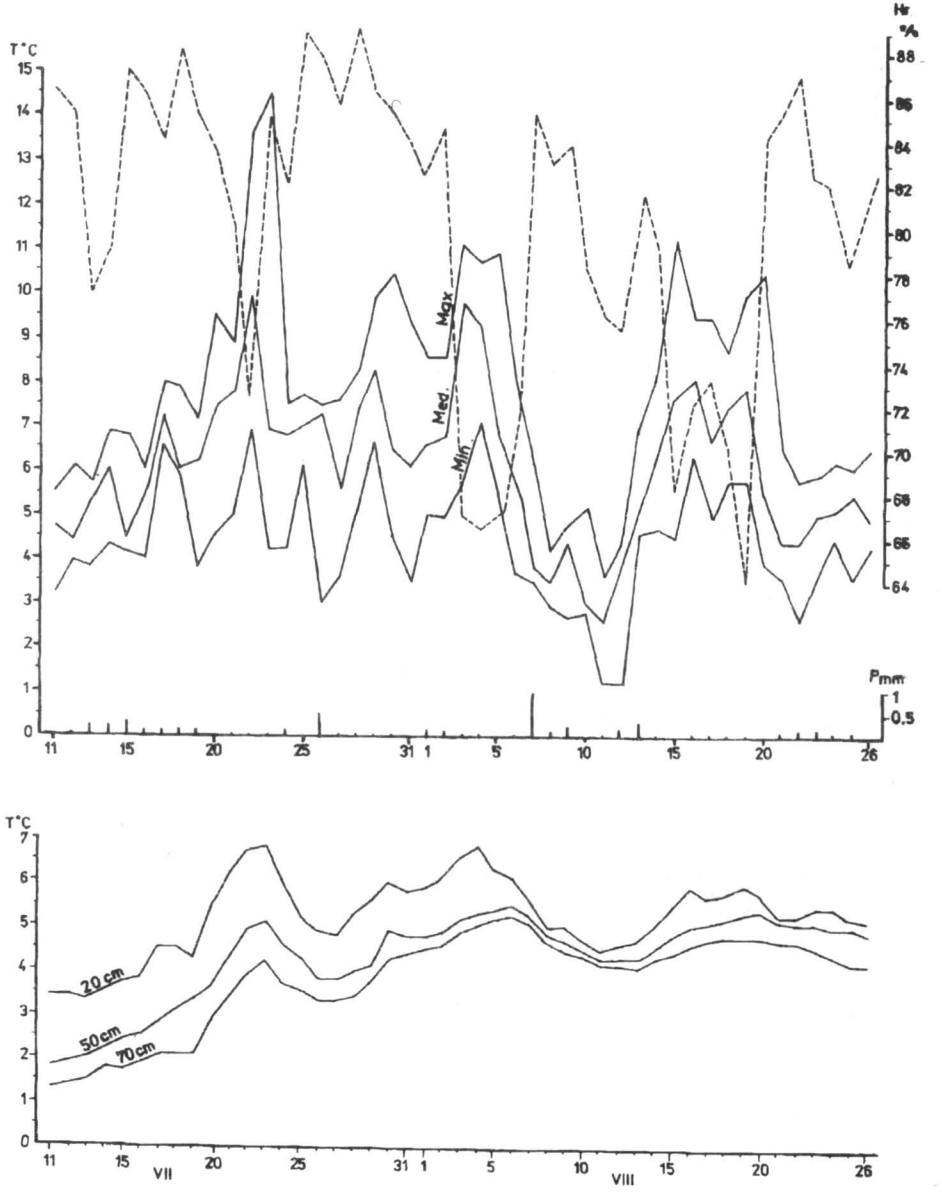

Fig. 3 – Air temperatures, precipitation, air humidity and soil temperatures – at different depths – Vardeborgsletta area (11.07–26.08.1990).

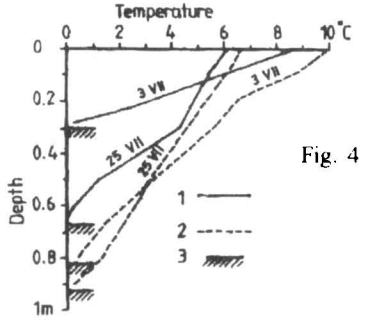

Fig. 4 Evolution of soil temperatures in points 1 and 2 and thickening of the active layer (3).

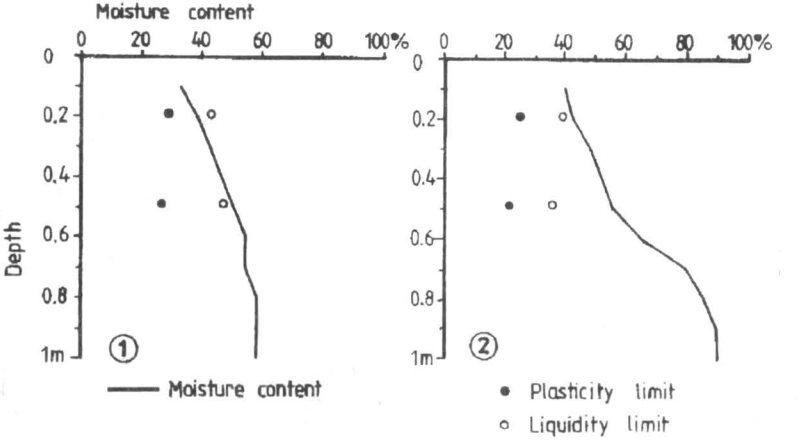

Fig. 5 Moisture contents, plasticity limit and liquidity limit for core samples 1 and 2.

Another analysed case is the landslide affecting the area towards the Linnée Valley, that of the 22–25 m marine terrace, dissected by a 30 m long ravine.

When our team arrived in the Linnée Valley – on the 11th July 1990 – the respective area was a slightly concaved area, with a rather rippled surface. The first cracks nearby the ravine edge appeared after on the 18th August, the surface presented the characteristics of a step-like landslide, covering about 6.000 sq.m in a semicircular layout. The steps long of 2–8 m and 0.5–1.2 m wide were separated by ditches deep of 0.3–0.8 m, usually filled with water. Nearby the ravine edge step size decreased, being replaced by shorter tilted blocks formed of soil and substrate. On the 22nd August near these block areas, were individualized little waves of slides and also tongues along which the materials flowed towards the ravine, the process of flowing carrying on also at its bottom. At the mouth of the ravine, the front of a mud fan, washed by the Linnée waters, could be seen.

The micromorphological and dynamical characteristics of this landslide are explained both by the "stimulation" of the movement through a backward (regressive) advance of the banks of the ravine, and also through the geotechnical characteristics of the sliding material. In this way, in the marginal zone of the landslide, substratum humidity ranged between 32 and 58%, the limit of plasticity being of 30% at a depth of 0.2 m and 27% at a depth of 0.5 m, liquidity was 43% at 0.2 depth and 47% at 0.5m depth. In point 2, near the ravine edge, substrate humidity was 40–90%, the limit of plasticity 25% at 0.2 m depth and 56% at 0.5 m depth, the liquidity was 39% at 0.2 m depth and 35% at 0.5 m depth. The differences are due to the fact that the second sample was richer in fine fraction, especially through the presence of a fossil soil horizon, with a greater wealth of clay minerals, which favoured both the slide and the flow processes. In such situation, characteristic of all cryogenic landslides, the sliding surface coincides with the base of the thaw layer when the active layer is rock-related, or may occur within the active layer itself (cf. Lewkowicz, 1992).

On the 21st and 22nd of August, the movements speed was between 11 and 15 cm/day in the axial zone and 6–12 cm/day in the lateral zones; between August 22 and 26 it was 33–37 cm/day in the axial zone, the values being higher near the ravine, in the area of the waves and flow tongues, and 13–41 cm/day in the lateral areas. The mudflow of the ravine had the mean values of 38–185 cm/day.

In the Linnée Valley two types of cryogenic landscapes can be distinguished: the shearing of earth blocks or active layer detachments slides and mudflows of water-saturated soil, as well as transmision forms, which are in different stages of evolution. Because the analyzed movements began in their lower part, they would correspond to what is termed as "delapsive lanslides" in the Romanian geomorphological literature.

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LE CONCEPT DE DISCONTINUITÉ EN GÉOGRAPHIE

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Mots clés: système géographique, continuité-discontinuité, milieu géographique, hasard, seuil.

The concept of discontinuity in geography. Discontinuities are manifestations of the contact between units and subunits in a geographical system. They are expressed in terms of space and time. Some dicontinuities were born all of a sudden, early in the evolution of a contact between two units, others are transitory, mirrored in the 'passage stripes' between units, developed over time. The threshold represents a sequence in the evolution of a discontinuity, while hazards and their different forms of manifestation stand for particular cases of discontinuity. Discontinuity types are characterized by size, evolution stage, time-interval of functioning, and type of the geographical system they occur in. Discontinuity analyses are useful for working out geographical regionalisations.

LA CONCEPTION SYSTÉMIQUE EN TANT QUE PREMISSE DE CONCEPT DU DISCONTINUITÉ

L'apparition des concepts systémiques, leurs méthodes et leur application dans les sciences géographiques ont dynamisé l'élaboration des théories et principes modernes sur l'évolution et la dynamique des phénomènes (Scheidegger, 1994). Dans ce contexte, une analyse scientifique sur le contenu de quelques concepts et notamment sur le concept de **discontinuité**, semble bien justifiée.

Il est connu que chaque unité géographique représente un système caractérisé par la taille, la structure, son organisation et son fonctionnement. Une structure à plusieurs sous-unités (sous-systèmes) plus petites et une intégration dans un système plus grand permet une hiérarchisation des unités géographiques en fonction de leur complexité dans le cadre du macrosystème planétaire.

Le système géographique d'un rang quelconque possède plusieurs composantes. Elles sont liées dans un ensemble de relations, constitué au long de son évolution, qui définissent l'homogénéité, les conditionnements réciproques des composantes, les possibilités d'échange de matière, d'énergie et d'information à l'intérieur et à l'extérieur et finalement l'évolution proprement dite.

Chaque système géographique (largement connu aussi sous la dénomination de géosystème) se trouve en contact avec d'autres systèmes similaires ou différents (par rapport à la taille, à la nature, à l'évolution). Par conséquent, la modalité de contact est différente. Au delà des éléments particuliers, on peut généraliser deux situations à plusieurs variables: des contacts brusques ou transitoires. Il n'est pas facile de dresser cette classification, car l'extension ou la limitation des systèmes par rapport aux limites correctes influencent l'unité, la structure et la fonctionnalité des systèmes géographiques. Il est certain que les limites sont faciles à établir plus la taille et la complexité des systèmes sont plus petites (plateau karstique, marécage, lac, l'espace d'un village) et plus le système se trouve au début de son évolution (la dépression de Transylvanie à la fin de la période pontienne). Dans ce genre de situations il y a un contact brusque entre les unités (systèmes), alors qu'entre les systèmes de grande taille et de grande complexité on observe des bandes de transition. Les bandes de transition permettent le traçage de la ligne (continuité spatiale), d'un système (unité) à l'autre. Celles-ci représentent également l'origine d'une future unité (système) qui se développe à partir de deux systèmes ou à partir d'un d'entre eux. Il s'avère qu'uniquement le contact brusque permet de mettre en évidence une rupture ou une discontinuité entre les systèmes qui s'expriment par superficies, lignes, changements rapides de taille, etc.

LA NOTION DE DISCONTINUITÉ

Le concept de discontinuité, selon les définitions des dictionnaires, est perçu comme étant le terme opposé à la continuité et relève des interruptions de la succession et du déroulement des éléments et processus qui structurent les systèmes et interruptions dans la dynamique (évolution) temporelle et spatiale. Ce concept est spécifique soit pour les systèmes opposés qui sont en contact à un moment donné (pour un volcan apparu à la suite des effusions intenses ou pour un lac artificiel), soit pour l'apparition d'une rupture dans l'évolution d'un système (par exemple le creusement d'une rivière dans son lit majeur). Le contact brusque (la discontinuité) peut durer un certain temps en fonction de l'amplitude de la rupture et de la taille de deux systèmes (par exemple, la discontinuité entre les Carpates et le Plateau de la Moldavie par rapport à la discontinuité entre un lac artificiel et ses versants).

Les discontinuités surgies durant l'évolution d'un système sont aussi nettes, mais leur disparition a lieu dans un intervalle plus long qui diffère en fonction de l'extension du système et de la période d'action des causes génératrices (une crue est une discontinuité dans l'évolution des débits d'une

rivière; de même le changement brusque du temps à intervalles courts; une guerre ou une maladie peuvent créer une discontinuité démographique au sein d'une communauté, etc.).

Le contact brusque entre les unités géographiques ne demeure pas perpétuel, étant donné que les systèmes géographiques sont ouverts. Au cours du temps beaucoup de relations se tissent entre les éléments de deux systèmes, notamment dans la proximité des contacts brusques. Les relations assurent les échanges de matière, d'énergie, d'information et finalement l'établissement de «ponts de liaison» plus ou moins larges – embryons des aires de contact transitoire (bandes de transition, bandes de passage) qui apportent une modification progressive du caractère du contact. Au fur et à mesure que les bandes de transition s'élargissent, la discontinuité se réduit et disparaît même au moment où le nouveau système englobe les anciens. Plusieurs combinaisons apparaissent au cours du processus évolutif, ceci influant sur le rythme et déterminant la taille de la bande de transition et la durée de la discontinuité.

L'aire de passage (transition) demeure plus ou moins grande en fonction de la nature des systèmes en contact et en fonction du type d'évolution du contact initial. Le contact entre les systèmes initiaux va disparaître au moment de l'agrandissement du contact. Deux nouveaux contacts apparaîtront entre les «bandes de passage» et les unités voisines qui ne gardent que rarement le caractère de discontinuité brusque (évolution d'un abrupt structural près duquel il se forme un piémont ou un pédiment, etc.).

Toutefois, le contact entre les unités géographiques (systèmes), indépendamment de leur taille et âge, implique l'existence des discontinuités spatiales et temporelles qui auront des particularités propres, traduites sous différentes formes. La dicontinuité disparaîtra uniquement lorsque les systèmes initiaux disparaîtront eux-mêmes après la naissance d'un nouveau système au contact des deux précédents. Néanmoins la continuité réalisée ne demeure pas éternellement puisque le rythme différent d'évolution des éléments du système et notamment les relations entre les éléments peuvent provoquer de nouvelles ruptures plus ou moins accentuées qui vont produire de nouvelles discontinuités à une échelle différente.

On entend ici que la discontinuité se présente comme un prélude de la continuité, mais aussi comme un possible successeur. Entre les deux il existe une unité basée sur le temps, le mouvement et la transformation continue de la matière.

LES RAPPORTS ENTRE CONTINUITÉ, DISCONTINUITÉ ET SEUIL

La discontinuité et le seuil semblent être deux notions différentes. Le seuil ne s'identifie pas à la discontinuité, mais en représente un reflet.

Le seuil peut être envisagé aussi dans une double perspective: temporelle et spatiale. Dans la première situation on observe plusieurs variantes. L'une d'entre elles consiste dans un intervalle de temps (de quelques heures à quelques jours ou années) dans lequel l'évolution du système peut avoir certaines déviations par rapport à l'évolution normale de ses propres éléments (la crue ou le sèchement d'une rivière); on peut alors parler d'un début, d'un apogée et d'une fin du changement. Par conséquent, dans une évolution continue et normale, il se passe une discontinuité et le seuil en est le sommet (l'apogée). Alors, la délimitation de la discontinuité temporelle facilite la séparation des phases évolutives du système (dans le régime hydrologique d'une rivière on peut séparer les intervalles-phases à débits liquides très grands de ceux à débits normaux et réduits). Le seuil marquera chaque fois l'apogée des discontinuités.

Un autre sens du seuil est le moment de la réalisation d'accumulations qualitatives dues aux modifications quantitatives nettes, apportant une diversification du système initial et l'apparition de nouveaux systèmes (le refroidissement du climat dans la période quaternaire a déterminé l'extension progressive des calottes glaciaires jusqu'aux latitudes de 40–45° et l'installation d'un nouveau système morphoclimatique; l'émergence d'une nouvelle chaîne montagneuse détermine l'individualisation de nouveaux étages naturels et la diversification des systèmes géographiques – les seuils correspondent aux intervalles de temps; dans l'évolution d'un géosynclinal vers la phase d'orogenèse, le seuil marque le changement général du sens du mouvement d'abaissement vers le soulèvement, à la fin de la discontinuité commencée depuis une dizaine de milliers d'années; le défrichement progressif de la forêt, la mise en culture de la steppe et de la sylvosteppe, l'extension de l'espace habité et de la valorisation des ressources du sous-sol dans la Plaine Roumaine (discontinuité étirée sur deux ou trois siècles) ont déterminé l'émergence des paysages nouveaux d'une grande diversité, qui ont remplacé les paysages naturels (le seuil représente l'ordre de quelques milliers d'anneés). Dans ces situations, le seuil marque un intervalle long, pendant lequel on passe d'une étape (phase d'évolution, système) à l'autre.

Du point de vue spatial, le seuil doit être perçu comme une rupture apparue entre différentes parties du système ou entre deux systèmes (chaque versant est une rupture, une discontinuité par rapport à la superficie d'un interfluve et par rapport au lit majeur de la rivière; de même les abrupts de nature tectonique, etc.). Dans ces cas, le seuil coïncide parfaitement avec la discontinuité et permet la séparation des systèmes (unités géographiques) dans les régionalisations. Les discontinuités relevées par des seuils nets indiquent des limites précises, faciles à tracer. En revanche, les discontinuités transitoires (sans seuils) marquées par des «bandes de transition» ne permettent pas de dresser une limite nette entre les unités voisines et ceci impose des compromis. Ceux-ci sont établis

uniquement par une analyse détaillée de l'ensemble des relations existant entre les éléments des systèmes (unités) en contact (par exemple la limite entre le Plateau Gétique et la Plaine Roumaine entre le Jiu et Piteşti).

Des termes comme risque, hasard, désastre, etc. sont de plus en plus utilisés dans la littérature géographique roumaine dans les dernières décennies, par rapport à l'évolution des systèmes naturels ou sociaux, contenant la fréquence des dégâts et de pertes de vies importantes. Quel est le rapport de ces termes avec la discontinuité? Parmi ces termes, uniquement le hasard exprime partiellement certaines formes de discontinuité. Des différences apparaissent entre ce qui constitue un «accident» en tant que fluctuation dans une évolution normale d'un système (une crue plus importante; deux à trois jours à température très basse pendant l'été, etc.) ou une discontinuité à court terme qui n'affecte pas l'ensemble du système et qui n'a pas de conséquences négatives importantes et une «rupture fonctionnelle» ou une «catastrophe» qui indique des ruptures importantes du système qui peuvent être assimilées par des discontinuités d'envergure du point de vue spatial ou temporel.

LES SYSTÈMES NATURELS ET LA DISCONTINUITÉ GÉOGRAPHIQUE

La plupart des aspects signalés sont faciles à suivre par l'intermédiaire de quelques systèmes géographiques.

Le macrosystème géographique (l'enveloppe géographique ou le milieu géographique) représente une couche ayant sa limite supérieure dans la stratosphère inférieure et sa base à divers profondeurs de l'écorce terrestre (les profondeurs majeures correspondent aux rifts et aux aires de subduction). Chaque composante du macrosystème (la sphère du relief, la sphère du climat, l'hydrosphère, la biosphère, la pédosphère, l'anthroposphère) constitue un système complexe. Le contact entre ces sphères et les macrosystèmes limitrophes est net sous la forme de discontinuités évidentes entre les milieux aérien, aquatique, biotique et le relief.

La longue évolution sur des milliards d'années de l'enveloppe géographique a déterminé l'apparition d'espaces tridimensionnels à extension plus ou moins régionale, détachés par les relations entre les éléments. Par exemple, l'air qui pénètre l'écorce terrestre très en profondeur stimule les processus d'altération, alors que les particules solides du sol sont soulevées par le vent ou par le volcanisme. Ces situations ont comme effet la modification de la radiation solaire directe et la modification de certains phénomènes météorologiques. Ainsi, on distingue une nouvelle unité ayant de nouvelles dimensions spatiales (régionales) et temporelles, à partir des deux systèmes différents à contact tranchant. Une situation similaire se produit à la limite entre l'eau et le relief ou entre l'eau et l'air. Les unités de transition entre ces

géosphères forment la plus active partie du milieu géographique, c'est-à-dire la partie où se déroulent les plus complexes relations, grâce aux changements de matière et d'énergie. Ce contexte explique l'apparition de la vie, des sols et dans ce cadre se déroule l'activité des hommes, composante qui ajoute une contribution essentielle à la diversification des relations.

Au sein de chaque composante géographique à plus petite échelle, il existe des sous-systèmes d'ordre différent et des discontinuités plus diversifiées. Il est important de présenter quelques exemples.

Une rupture de pente relève les contacts évidents entre les formes de relief (abrupt de terrasse, contact des versants, lit majeur, terrasse, une aire dépressionnaire, le contact entre les collines et la plaine dans la région Istrița-Sărata, entre le Plateau de la Dobroudja et la vallée du Danube). Dès sa création, le contact est brusque, identifié par des surfaces et lignes de contact. Ensuite, les traits principaux des contact se modifient (les versants, les pentes nivelées et reculées parallèlement à la base du versant couvert de débris). Il en résulte des bandes de transition – glacis, piémonts, plaines de piémont, etc. dont les extrémités se trouvent éloignées de l'ancienne discontinuité. Les extrémités représentent ensuite des limites (discontinuités) développées entre trois systèmes, mais celles-ci vont disparaître dans une phase postérieure correspondante à un équilibre morphodynamique généralisé.

Une situation particulière est liée aux discontinuités de nature tectonique. Par exemple, un abrupt de faille peut largement reculer après une évolution à long terme. Sur l'ancienne ligne de contact avec une unité basse il se forme un glacis de débris, représentant une bande de transition. A la fin de la phase évolutive on aboutit à l'annulation de l'abrupt. Par conséquent, la discontinuité morphologique a disparu, mais celle structurelle demeure (le plan de fracture entre les blocs). Sa réactivation va déterminer l'apparition d'un nouveau contact morphologique brusque (une discontinuité ayant sa propre évolution).

Dans l'atmosphère, les fronts d'air chaud comprennent des discontinuités entre les masses d'air ayant des propriétés différentes. Les fronts ont une évolution rapide et disparaissent une fois que la masse dynamiquement passive disparaît. Si l'apparition est marquée par le développement de la nébulosité spécifique, par la formation des précipitations et l'intensification du vent, la disparition sera concrétisée par la stabilisation du temps.

La limite supérieure de la forêt dans un massif montagneux indique un contact brusque (une discontinuité) entre deux paysages qui relèvent de deux systèmes naturels différents. Les conditions de vie spécifiques pour ce contact déterminent, au cours du temps, l'émergence d'un système de transit (le sous-étage alpin) qui aura localement une extension différente en fonction d'une série de facteurs comme la pente (plus douce sur les abrupts), l'exposition (aux altitudes plus basses sur les versants du nord), les processus géomorphologiques

(les avalanches, les coulées de pierres). A la suite des activités anthropiques (un pâturage abusif, défrichement, incendies, aménagements touristiques, etc.) la limite peut être abaissée artificiellement et la bande de transition peut être enlevée.

La ligne de côte correspond à une discontinuité entre deux milieux différents. Sa modification est liée à l'eustatisme, à l'épirogenèse et, localement, aux mouvements de flux et reflux, vagues, courants. La création des plate-formes d'abrasion et de la plaine littorale à travers une morphodynamique spécifique sont les résultats de la dynamique de ces procédures. De nouvelles formes de vie, de sol et un certain mode de construire et d'aménager vont apparaître par la suite. Localement l'apparition de cordons littoraux fait obstruer les golfes et les bouches des rivières. Il en résulte des lagunes et des limans. De cette manière, les levées de sable vont constituer les nouveaux éléments de discontinuité entre deux nouveaux systèmes (mer et lac). L'évolution ultérieure peut se poursuivre vers l'extension des levées de sable et vers l'interruption complète des liaisons entre les lacs et la mer. Cette situation favorise soit le colmatage progressif des lacs (par le passage des étapes: du lac à l'eau salée, lac saumâtre, du lac à l'eau douce, marécage, terre sèche), soit la destruction des levées de sable après un certain temps (à cause des courants des vagues, etc.) et la réformation approximative de l'ancien golfe. Ce processus apporte plusieurs modifications au niveau des autres composantes et éléments.

Pour conclure, l'analyse de diverses situations permet de dresser la typologie suivante des discontinuités, selon ces critères:

- la taille: discontinuités locales (abruptes), régionales (les contacts entre la montagne et la plaine) et globales (au niveau des géosphères; les aires de subduction);
- le stade évolutif: présentes (en fonction) et hors fonction ou fossiles (la discontinuité stratigraphique; le contact tectonique entre deux blocs nivelés; la base d'un abrupt couverte par les débris, etc.);
- l'intervalle de temps du fonctionnement: de très courte durée (heures, jours), de courte durée (plusieurs années), durée moyenne (décennies), très longue durée (centaines, milliers d'années);
- le type de systèmes géographiques entre lesquels se produit la discontinuité: entre les composantes, entre les éléments, etc.

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LA PRÉVISION MÉTÉO-MÉDICALE[1]

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Mots clés: bioclimatologie, stress climatique, variations périodiques et non périodiques, effets météoropathologiques.

Weather medical forecasts. This is a little studied domain in Romania, therefore pointing out some of its basic aspects might be a useful thing *e.g.* the morbidity threshold, a factor of individual response to climate-induced stress, grouping weather- sensitive patients by their reactivity characteristic traits of periodical and non-periodical weather variation liable to trigger morbid effects; general response to cold- and heat-induced stress and alteration of the physical and chemical properties of the blood and of some physiological functions. Other topics discussed herein focus on the particularities of the dominant atmospheric circulation in Romania and on some prophilactic and therapeutical measures to reduce the value of mortality indexes produced by high and rapid variations of the weather.

L'utilité d'une bonne prévision météorologique a été prouvée dans divers domaines de l'activité humaine: agriculture, transports, industrie du bâtiment et aussi dans la surveillance de la santé de la population.

La relation entre le temps et l'homme est une ancienne préoccupation de l'humanité. Hippocrate écrivait dans ses *Aphorismes*: «Quand le vent vient du nord, surviennent la toux, les pharyngites, la constipation, la miction douloureuse avec frissons, élancements avec maux de la poitrine» ou «les périodes avec sécheresse sont en général plus salubres que celles humides, et avec une moindre mortalité» (Bart, 1974, p. 88).

Dès les premiers siècles après J.-C. des personnalités médicales s'intéressent aux relations entre le climat et la santé de l'homme. Par exemple, Galien recommande aux malades phtisiques de suivre le traitement à la montagne, Antyllus savait que les diarrhées des enfants sont plus fréquentes en été qu'en hiver, etc.

[1] Communication présentée à la Session scientifique annuelle de l'Institut de Géographie, le 19 juin 1997.

Au Moyen Âge on cultivait les relations entre l'astrologie (y compris l'évolution du temps) et la médecine, par les connaissances accumulées à l'Orient. On admettait, par exemple, presque 400 signes déterminants dans la santé de l'homme (parmi lesquels on étudiait les phases de la lune ou les aspects du vent). Au XVII[e] siècle on cherchait les relations entre les facteurs cosmiques et climatiques (y compris le champ magnétique, l'influence de la lune et du soleil, de la pression atmosphérique, etc.) (Licht, 1964).

Aux XVIII[e] et XIX[e] siècles paraît un grand nombre de livres de géographie médicale, mais ce n'est qu'au XX[e] siècle qu'on peut parler d'études spécialisés de bioclimatologie, biométéorologie et climatothérapie.

En Roumanie, comme partout, le folklore a gardé beaucoup d'observations sur la relation climat-temps-homme, consignées par les chercheurs Tudor Pamfile, Traian German, Simeon Florea Marian, etc. Voilà un exemple qui surprend, dans un langage populaire, l'approche d'un front chaud avec les symptômes pathologiques qui l'accompagnent: «Si tes pieds commencent à brûler de chaleur, si tu bailles sans cesse, sans avoir sommeil, ou te sens fatigué sans savoir pourquoi, bref, quand l'homme se sent amolli, c'est signe de pluie, parce que l'homme s'amollit comme la terre sous la pluie, car l'homme aussi est fait de poussière» (Tr. German, 1928, p. 6).

C'est le Docteur Marius Sturza qui a écrit le premier ouvrage de météoropathologie en Roumanie, *Les maladies météorotropes*, en français (1939).

Dans la seconde moitié du XX[e] siècle furent publiés des articles de ce profil dans les ouvrages de l'Institut Météorologique et de l'Institut de Balnéologie, et quelques livres aussi, comme, par exemple, *Eléments de biométéorologie médicale* (en roumain). Quelques thèses de doctorat sur des sujets de météoropathologie ont été soutenues.

Dommage que dans la littérature roumaine spécialisée il n'y ait rien sur la prévision météo-médicale à court ou à moyen terme, comme il y a, par exemple en Hongrie, où on a commencé un expériment de ce type en 1958, qui a entraîné 15 cliniques médicales, quelques instituts de recherche de météorologie, géophysique, psychologie, des transports, sportive, etc., avec des résultats notables après 10–20 ans de travail, dans les domaines de la chirurgie, congés médicaux, préjudices dans les accidents routiers (Orményi, 1981).

Pour une prévision médicale plus exacte on doit avoir en vue quelques aspects généraux.

On commence avec le facteur personnel compris dans la *limite de morbidité*, donc le niveau général de l'équilibre physiologique et la résistance générale du corps jusqu'au moment où se produit le déclenchement du processus pathologique.

C'est assez bien connu que les patients les plus météorosensibles sont les personnes âgées, qui ont une faible réactivité vasculaire, les enfants auxquels le réglage de la chaleur interne est encore déficitaire et les malades souffrant de

diverses affections, avec une adaptation au stress climatique perturbée par l'âge ou la maladie – par exemple un rhumatisant ou un asthmatique, malades avec une capacité thermorégulatrice inadéquate.

Les chercheurs ont partagé les patients en 3 jusqu'à 7 types, en fonction de la réponse du système nerveux central et périphérique, des glandes à sécrétion interne, de l'appareil cardio-vasculaire et respiratoire, de la composition du sang, etc.

En général, il y a un type C, vagotonique, sensible aux fronts et masses d'air froid, un type W, sympathicotonique, sensible aux fronts et masses d'air chaud et un type G – amphotone, sensible à tous les deux. On peut ajouter aussi un type insensible aux excitations météorologiques (Curry, cf. Magyarossi, 1972).

La prévision météo-médicale doit avoir en vue les variations périodiques et non-périodiques du temps.

1. Les variations périodiques des principales impulsions cosmiques et météorologiques. Les plus importantes sont:

a) La période moyenne de 11 ans de l'activité solaire, qui se manifeste par des effets ionosphériques, géo-magnétiques et atmosphériques, avec des résultats directs ou indirects sur la santé de l'homme.

Dans les années avec une activité solaire maximale, avec un nombre maximum de taches solaires, on remarque l'intensification des protubérances cromosphériques et de la radiation corpusculaire et électromagnétique, surtout UV et X. A la surface de la Terre se déclenchent des orages magnétiques, augmentent l'ionisation atmosphérique et la circulation des masses d'air, s'intensifie l'activité cyclonique. Tous ces phénomènes influencent à leur tour l'organisme humain. Ainsi s'accroissent la morbidité et la mortalité dues aux maladies cardiovasculaires (une étude sur les décès dus aux infarctus du myocarde à Bucarest, dans la période 1976–1982, montre un pic en 1980 au moment même où le nombre Wolf de tache solaire fut maximum (Teodoreanu, 1988).

Le nombre des épidémies est grand, à cause de l'augmentation du nombre des bactéries saprophytes et spécialement pathogènes pendant la croissance de l'intensité du vent solaire. Lors de période du soleil calme, la fréquence de tous ces phénomènes est réduite.

b) La variation annuelle des principaux éléments climatiques, notamment de la radiation solaire directe, de la température de l'air, de la nébulosité et de la durée d'ensoleillement, de l'humidité relative et absolue, des quantités de précipitations, de la pression atmosphérique, de la radiation radioactive de l'atmosphère, du champ électrique atmosphérique, du champ magnétique terrestre, etc.

On sait que la morbidité et la mortalité maxima (par les maladies de cœur suite aux pneumonies et aux bronchites, à la grippe, aux accidents vasculaires-cérébraux, aux cancers, néphrites, à la sénilité) s'enregistrent pendant la période

froide de l'année, en hiver et dans les mois froids de printemps (mars et avril), plus rarement l'automne, quand les variations des éléments météorologiques au changement du type de circulation atmosphérique sont très grandes (Tromp, 1974).

Les crises d'ulcère se produisent fréquemment au printemps et en automne, mais dans ce cas on accuse aussi le changement du type d'alimentation. En été, la fréquence de la morbidité à cause des maladies météorotropes est minime, mais on enregistre une augmentation statistique des maladies de l'estomac –gastrites, entérites –, des maladies infectieuses et des maladies du système nerveux.

Il est évident que les dimensions des phénomènes de météorosensibilité sont différentes en fonction de latitude, altitude et de la position géographique par rapport aux principaux centres bariques continentaux.

On connaît qu'en conditions de **stress froid** se déclenche le mécanisme de croissance de la quantité de chaleur produite dans l'organisme, par l'intensification des combustions métaboliques (contractions involuntaires des muscles striés – frisson), par l'utilisation des protéines alimentaires nécessaires pour le thermoréglage chimique, par vasoconstriction et concentration du sang, qui diminuent la perte de chaleur.

En conditions de **stress chaud**, la chaleur se perd par radiation, convection, conduction et par évaporation à la surface de la peau. S'y déclenche la vasodilatation cutanée, s'accroît le volume du sang du corps par le passage dans les vaisseaux, des liquides des tissus des divers organes, se produit la transpiration qui entraîne un déséquilibre hydro-minéral et l'amplification des mouvements respiratoires.

En général les influences saisonnières sur les éléments constitutifs et sur les propriétés physiques-chimiques du sang se manifestent ainsi: dans les **périodes** (saisons, jours) **froides** baissent: la vitesse de sédimentation des hématies (VSH), le pourcentage de la hémoglobine, l'albumine sérique, le fibrinogène plasmatique, les sels de calcium, magnésium, l'iode, l'acide ascorbique, et augmentent: le nombre de leucocytes et gamma globulines sériques, le temps de saignée après le traitement coagulant (Tromp, 1980). Aussi quelques fonctions physiologiques sont sensibles à la variation du temps. Dans la saison froide augmentent: l'excrétion urinaire de 17-cétostéroïdes, la diurèse, l'activité de la thyroïde, la pression artérielle diastolique, la résistance des capilaires, l'acidité gastrique, et baissent: le métabolisme, la perméabilité des membranes, le poids du nouveau-né. Dans la saison chaude tous ces éléments se modifient en sens contraire.

c) La variation mensuelle individuelle, exprimée par le rythme physique de 23 jours, emotionnel de 28 jours, et psychique de 33 jours, est encore contestée par quelques chercheurs, mais on admet en général qu'ils peuvent amplifier ou réduire quelques manifestations, spécialement dans les performances ou les insuccès sportifs, ou dans l'activité professionnelle en corrélation avec le temps.

d) Les variations périodiques diurnes sont moins importantes du point de vue de la prévision météomédicale, mais on doit prendre en considération, par exemple, les températures minimales très réduites qui peuvent déclencher des crises d'angine ou d'asthme, ou les températures maximales très élevées à même de provoquer insolation, le choc calorique, etc. dans certaines conditions géographiques.

2. Les variations non-périodiques des éléments climatiques notamment de la température, de la pression, de l'humidité, du vent, qui dépendent de la circulation générale atmosphérique. Dans ce sens sont importantes les masses d'air chaud ou froid, continentales sèches ou océaniques humides, stables ou instables, les fronts atmosphériques: chaud, froid, occlus, les formations bariques: cyclones et anticyclones.

La météoropathologie, liée à la circulation générale atmosphérique, sépare les phénomènes météorologiques et leurs effets sur l'organisme humain dans quelques catégories:

– **La masse d'air froid et sec,** déterminée par un anticyclone, entraîne la baisse de la température de l'air, la croissance de la pression atmosphérique, du potentiel électrique et du nombre d'ions et conduit à une réaction de l'organisme manifestée par hypertension artérielle, l'augmentation du pH, des douleurs angineux, hyperglycémie, hypercholestérolémie, modification dans le contenu en potassium, phosphore, calcium et chlore, l'augmentation du raport K/Ca – donc une amplification de la réactivité du système nerveux et du système musculaire. Les substances oxydantes apportées par les masses froides déterminent un état de calme de l'organisme, sommeil profond, quelquefois apathie.

– **Les masses d'air chaudes** déterminent des phénomènes de vasodilatation, pH réduit, rétention d'eau dans les tissus, la baisse de la glycémie, la prolifération des microorganismes et des infections. Du point de vue psychique on constate un état de nervosité, fatigue, insomnie.

– **Les fronts chauds** ont des effets antéro-frontaux sur le système nerveux central (la tension nerveuse et l'irritabilité évoluent, l'attention et la capacité de concentration diminuent), aussi sur le système cardiovasculaire (tachycardie, tension artérielle grande, dyspnée) et sur la composition du sang. La résistance aux agents pathogènes diminue.

Les fronts froids ont des effets post-frontaux, ils produisent la baisse de la tension artérielle, des crises angineuses, prédisposition aux tromboses veineuses, affections respiratoires, crises d'asthme, états allergiques, douleurs rhumatismales, la VSH, la glycémie, le nombre des leucocytes baissent.

On dit en général, que les fronts chauds, les masses tropicales, l'aéroionisation positive, la baisse du contenu des substances oxydantes déterminent des réactions ergotropes (catabolisantes, destructives, accélération des processus d'oxydation, la croissance de la consommation énergétique, acidité, donc prédomine le tonus sympathique).

Les fronts froids, les masses polaires, l'aéroionisation négative ont une action trophotrope (anabolisante – de redressement, la baisse du métabolisme, des processus oxydatifs, de la consommation énergétique, tendance à l'alcalose, spasmes, donc prédomine le tonus parasympathique) (Kerdo, cf. Magyarossi, 1972).

En Roumanie, en hiver sont fréquentes et apportent de grands refroidissements, les masses du nord, la dépression islandaise et l'anticyclone est-européen, avec une circulation de nord-est et est, tandis que le temps chaud est déterminé par le retrait de cet anticyclone et aussi par la descente du cyclone islandais par l'ouest de l'Europe, et après, par une circulation de l'ouest et du sud-ouest, jusqu'à la mer Méditerranée.

Au printemps et en automne les refroidissements proviennent de l'anticyclone scandinave ou groenlandais, rarement est-européen, ou de l'anticyclone des Açores qui vient vers les latitudes nordiques et puis il descend de nouveau sur l'Europe. Les réchauffements proviennent de l'anticyclone des Açores qui avance du sud-ouest ou par les vagues d'air chaud du nord de l'Afrique (Milea *et al.*, 1971). Les vagues de froid ou de chaleur persistent deux à quatre jours et elles sont importantes dans l'établissement d'une bonne prévision météomédicale.

Les fronts atmosphériques et, en général, l'instabilité atmosphérique attirent l'attention sur de possibles effets pathogènes, spécialement dans les périodes froides ou intermédiaires de l'année.

En été, les phénomènes sont atténués, les variations thermiques hydriques, barométriques sont moins grandes et les effets pathogènes sont diminués. À cette époque sont utiles les indications de climatothérapie pour les pratiques d'une cure naturiste: hélio-, hydro-, aéro- thérapie dans les régions d'origine ou dans des stations balnéoclimatiques, spécialement de littoral ou de montagne et de collines pour bénéficier des effets de la radiation atmosphérique ou de la diminution de la pression partielle de l'oxygène, avec des conséquences prophylactiques évidentes.

Dans la prévision météomédicale on peut englober quelques phénomènes de risque, qui peuvent affecter indirectement l'état de santé ou l'activité humaine. Par exemple, la possibilité d'une pollution atmosphérique en conditions d'inversions thermiques intenses, tempêtes de neige qui perturbent le trafic et l'activité en plein air, inondations ou sécheresses, grêles – qui influencent la production agricole et la vie des hommes, vents secs à grande intensité, froids ou chauds, avec des effets pathogènes connus, tempêtes, orages qui influencent le système nerveux central ou les affections respiratoires et cardio-vasculaires.

Les données présentées ont un caractère général, avec référence au climat de l'Europe ou des régions plus lointaines (Japon, Etats-Units). Dans les conditions de la Roumanie, en général ces observations restent valables. Mais

la présence de la chaîne carpatique, la position des plaines exposées au masses d'air d'origine et caractères différents, la présence de la mer Noire, peuvent modifier quelques relations entre les variations de temps et les organismes humains. On discute, soit de patients avec des affections influencées par le temps, soit de personnes en bonne santé, mais météorosensibles (en fonction d'âge, facteurs héréditaires, alimentation ou débilités suite aux diverses maladies) et quand les facteurs météorologiques jouiront seulement un rôle déclenchateur.

Les mesures de prophylaxie doivent créer un microclimat anti-stress, elles poursuivront de développer la capacité de réaction de l'organisme, fortifier le corps par culture physique, entraînement, balnéophysiothérapie. Elles consistent aussi dans un traitement pour prévenir des diverses crises, par des médicaments antialgiques, antinévralgiques, antihypertensifs, antiangineux, antiallergiques, antiasthmatiques.

Quand les météorologues prévoient des modifications intenses et rapides des principaux éléments météorologiques, on doit recommander aux malades et aux personnes âgées d'éviter des activités épuisantes et les nouveaux médicaments avec des réactions adverses et contraindications multiples et de s'exposer aux opérations qui peuvent être retardées, jusqu'à la stabilisation du temps.

Un programme permanent de surveillance du temps et d'alerte au moment des grandes modifications de ses éléments peut éviter quelquefois des conséquences défavorables pour la santé de la population.

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SYMPOSIUM ON "VEGETATION, LAND USE AND EROSION PROCESSES"

Bucharest, September 28–30, 1998

The event was organised by the Romanian Academy's Institute of Geography, the Romanian National Committee for the UNESCO International Hydrological Programme and the Romanian National Commission for UNESCO, together with the "Romanian Waters" Autonomous Company and the National Institute of Meteorology and Hydrology. The symposium represented an important Romanian contribution to major UNESCO-sponsored programmes. This scientific gathering was attended by 50 specialists from the Bucharest Institute of Geography, the Bratislava Institute of Geography (Slovakia), the Bucharest Institute of Soil and Agrochemical Research, the National Institute of Meteorology and Hydrology, from several Environmental Precision Agencies, from the Focşani-based Forest Research Station, the Perieni-based Soil Erosion Control Research Station, etc. Discussions focused on highly topical issues with impact on future sustainable development.

Noteworthy is the participation of the Head of UNESCO's International Hydrological Programme, Project 2.1, Phase V, Prof. D.E. Walling of Exeter University, Great Britain.

Opening addresses were given by Prof. Dr. Ion Zăvoianu, the Director of the Institute of Geography, Prof. Dr. Victor Iancu, Secretary General of the Romanian National Commission for UNESCO, Prof. D.E. Walling, Head of UNESCO's 2.1 Project, PHI-V, Acad. Mircea Săndulescu, Chairman of the Romanian Academy's Geonomic Sciences Section, Petru Şerban, the Director of the "Romanian Waters" Company, and Dr. Ion Sandu, the Director of the National Institute of Meteorology and Hydrology. All the speakers were unanimous in the appreciation of this interdisciplinary event, which, bringing together researchers from three major fields of activity, enabled exchanges of opinion and results concerning current preoccupations with serious land erosion issues and impacts.

The thirty-two papers presented on that occasion showed that Romania possesses the necessary information and expertise to deal with such issues. What is actually needed is a better communication among specialists from various fields with highlight on interdisciplinary approaches. Several modern research methods were presented (137 Caesium – Walling, and Lehotsky as well as the regime of suspended sediment load – Diaconu and land erosion measurements – Ioniţă). The two-day proceedings, continued with a field trip to the Soil Erosion Research Station Aldeni (Buzău county), were an opportunity for interesting discussions and ideas on furthering research. There was general agreement that suspended load transport, which reflects the state of land degradation, puts in jeopardy not only soil fertility but also enhances the risk of reservoir silting, depleting useful water volumes.

Therefore, it is imperative to take requisite steps to reduce erosion processes in drainage basins.

The vegetation diminishes rain kinetic energy, at the same time stopping erosion-induced degradation of soil. Therefore, ignoring the regeneration capacity of forests, irrational deforestation, though profitable for the moment, have severe negative effects in the long run, by leaving large areas degraded.

At the same time, inadequate farming practices in individual holdings increase the risk of soil erodibility. Therefore, agriculturers should be taught rational farming methods to

prevent soil productivity decreases over the time and integrity losses. Taking preventive measures is necessary, because methods of forest renaturation, or ecological rehabilitation, though unquestionably positive, take a long time and huge financial effort to prove their benefits.

It is also recommendable that statistical information on land erosion by category of use be judiciously analysed and processed within an interdisciplinary framework. Traditional and modern erosion assessment techniques and procedures to estimate soil degradation are now associated with recent development *e.g.* GIS systems, the use of radioactive caesium isotopes, detailed field studies, etc. all supplying a lot of more relevant information.

Using these methods to obtain mathematical data and elaborate models based on them, calls for a close cooperation among specialists to verify the results and make accurate forecasts.

New approaches and in-depth investigation ought to be undertaken on such issues as hydrological and erosional risks, and the development of sediment input and output scenarios for small drainage basins.

Symposium papers showed that Romanian scientific research is capable to elaborate world-level studies.

What emerged clearly was the need for interdisciplinary cooperation in order to shed light on the interrelationships among vegetation, land use and erosion processes. More frequent meeting among specialists are necessary to decide on a common terminology, on the working methods, and on the validity of mathematical models.

The papers will be published in English to highlight the Romanian contribution to this UNESCO project of great scientific and practical relevance for sustainable development, in the general effort to reclaim erosion-affected or destroyed land.

Ion Zăvoianu

CARPATHO-BALKANIC CONFERENCE ON GEOMORPHOLOGY

Băile Herculane–Orşova–Drobeta Turnu Severin, October 11–17, 1998

The Conference was organised by the Institute of Geography of the Romanian Academy and the Faculty of Geography, Bucharest University, on the occasion of the 35th anniversary of the Carpatho-Balkanic Association of Geomorphology. Twenty-six specialists from Armenia, Croatia, Hungary, Italy, Poland, Slovakia and Turkey and 80 more from Romania met at the Conference.

Among the participants we would mention Prof. M. Panizza (University of Modena), Prof. Vl. Boynagryan (University of Erevan), Prof. A. Bognar (University of Zagreb), Prof. L. Starkel (Academy of Sciences, Poland), Prof. I. Atalay (University of Izmir), M. Stancoviansky, Ph. D. (Institute of Geography of the Slovakian Academy), Prof. Z. Pinczes ("Kossuth Lajos" University, Debrecen).

Also specialists in geomorphology from most of the geography faculties and research institutes of Romania were present: Bucharest University, "Babeş-Bolyai" University (Cluj Napoca), West University (Timişoara), Oradea University, Craiova University, Suceava University, "Spiru Haret" University (Bucharest) and the Romanian Academy's Institutes of Geography and of Speleology "E. Racovitza", and "Prospecţiuni" S.A. Trading Company.

The opening addresses were given by Prof. M. Săndulescu, the Chairman of the Geonomic Sciences Section of the Romanian Academy, and the International Association of Geomorphology represented by its Vice-president, Prof. M. Panizza (Italy).

On the first day proceedings developed in two oral paper sessions, presented in four sections: "Neogene Evolution of the Carpatho-Balkanic Region", "Present-day Geomorphological Processes and the Environment", "Structural Geomorphology" and "Fluvial Processes and Valley Evolution". The second day was devoted to more than 60 poster papers presented in four sections: "Structural Geomorphology and Paleogeography", "Glacial and Periglacial Geomorphology", "Present-day Geomorphological Processes and Natural Hazards" and "Geomorphology and Environment in Mountain Areas". In the afternoon, in the town of Orşova a round table was held on "Geomorphological Hazards and Environment in Mountain Areas".

Other three days were assigned to field trips in the surrounding zones (the western part of the Southern Carpathians and the southern part of the Banat Mountains). The first route included the Cerna Valley, the Mehedinţi and the Vâlcan Mountains and the Mehedinţi Plateau (relief evolution, karst morphology and applied geomorphology). The second and the third routes focused on the Danube Defile (evolution and present-day processes on slopes) and Porţile de Fier Reservoir, a boat trip (abrasion processes and geoecological problems in the lake region).

During the Conference, the national delegations of the participating countries, elected the new chairman of the Carpatho-Balkanic Association of Geomorphology in the person of Prof. Dr. Dan Bălteanu, Corresponding Member of the Romanian Academy and at the same time estabilished the programme of the Association for the next period.

On the occasion of the Conference, a volume of Abstracts and a Field Guidebook were edited. A volume of proceedings is in print.

Sorin Roată

IONIȚĂ ICHIM, MARIA RĂDOANE, NICOLAE RĂDOANE, CONSTANTIN GRASU, CRINA MICLĂUȘ, *Dinamica sedimentelor. Aplicație la râul Putna – Vrancea* (On sediment dynamics. The case study of the Putna River), Ed. Tehnică, București, 1988, 192 pages, 67 figures, abstracts in English and Romanian.

This work, elaborated by a team from the Piatra Neamț-based "Stejarul" Research Station, represents a valuable contribution to the study of river channel sediments.

The four chapters of the book deal mainly with the space distribution, sediment movement and budget in the Putna Basin. The authors opted for this case-study because the basin lies in a seismic region (Vrancea), shows lithological differentiations mirrored in its morphology, and registers the active erosion rate in all of Europe's temperate zone.

The factors controlling the basin's geology, relief and climate are discussed in respect of its critical location in a zone where positive neotectonic movements lead to relief uplift by 2–4 mm/year. The lithological mossaic (lower flysch and molasse) is analysed by various types of rock in terms of altitude, relief energy and hierarchy of the drainage basin network. A number of 22 variables of the third, fourth, and fifth-order basins (Horton-Strahler's system) are distinguished, building a matrix of correlation coefficients with significant values in many cases. Major morphometrical variables are seen to be controlled by basin area and geological make-up. Speaking of climatic conditions, the authors depict precipitation, and particularly heavy falls, as the most important form of matter on the surface of the basin.

The greatest part of the work (65 pages) is devoted to sediment sources and transport, channel deposits, grain-size distribution and variability of channel deposits. The results yielded by an impressive number of data show that river banks and slopes supply the biggest sediment volumes to small basins. The results are referred to other studies, carried out under similar conditions, and in all cases mass movements and rocks are seen to play the major role in this process.

Sediment transport and channel dynamics are related to discharge, the basic factor incriminated in the variable regime of channel sediment transport. River channels have a different behaviour in regard of alluvia dynamics. Several sectors are outlined: aggradation, stability, and degradation the last being the most common one. In point of sediment deposition, aspects of grain-size distribution variability of channel deposits (longitudinal river profile), with highlight on the morphometry of gravels and the variability of shape and roundness indicators are considered, and the "optimal shape" of sandstone gravels in the channel of the Putna River is defined. Finally, a description of the river gravels photographic spectrum is given, silica rocks appearing to prevail over sandstone, limestone and marls.

The ratio between the alluvia volume in the end-section and the volume of effectively eroded material gives the percent of evacuated sediment load in the analysed system. The results suggest that rock is the main factor controlling erosion and alluvia transport in the basin.

Summaries in Romanian and in English, an extended bibliography, 28 tables of variables covering 461 third and fourth-order basins, a series of morphometrical indicators of the analysed samples collected from 15 sites, as well as three plates of sediment sources along the Putna Valley, mapped in detail, make this work a valuble research tool.

The results obtained by repeated field investigation and the huge amount of processed cartographic information will prove their utility not only to geomorphologists, but also to specialists in geology and hydrology, and no less so to practitioners dealing with the management of water resources.

Ion Zăvoianu

MARIA SANDU, *Culoarul depresionar Sibiu – Apold. Studiu geomorfologic* (The Sibiu – Apold Depressionary Passageway. A Geomorphological Study). Ed. Academiei Române, Bucureşti, 1998, 176 pages, 85 figures including colour photos, 3 colour plates, 12 tables, abstract in English.

This work, by Maria Sandu, a senior scientific researcher within the Romanian Academy's Institute of Geography, is a remarkable scientific achievement, at the same time adding to the geomorphological knowledge of the Transylvanian Depression – the most complex tableland depressionary area of Europe's orogenic system.

The study is primarily the fruit of field research and of mapping work conducted over a long period of time. This enabled the author to verify and assess some working hypotheses.

The geomorphological complexity is the outcome of the geomorphological logic, carefully applied to the contact zone between the Southern Carpathian Mountains and the Transylvanian Tableland. This basic idea lies at the root of a ten-chapter scientific approach. Boasting a good knowledge of the speciality literature and establishing correlations among phenomena over broader areas, as research method, Maria Sandu was able to distinguish a relationship between the genesis and evolution of the Sibiu–Apold depressionary passageway and of the other subunits of the Transylvanian Tableland, in particular.

This approach to regional geomorphology, but no less so to quantitative and applied geomorphology, is quite outstanding for all of the problems broached, and more especially for the following:

– the accurate outline, sustained by geological and geomorphological arguments, of the boundaries of the Sibiu – Apold depressionary passageway, and its geomorphic individuality;

– the quantitative relief analysis by classical and recent methods (of energy, density, slopes, and of drainage basin network – Horton-Strahler system –, hypsometric curves, respectively, etc.);

– the separate mapping and assessment of the age of genetic relief types in the Sibiu Depression and the Apold Depression;

– the formation and evolution of the drainage net of the two big basins: the Olt and the Mureş, the Prequaternary and the Quaternary stages in the evolution of the river network, and its inherent changes;

– the present-day relief modelling, particularly well-presented, with highlights on the factors influencing it, and the landforms shaped by slope and channel processes. The combination of these processes accounts for the geomorphological risk which, together with the man-induced changes, make up a dynamic and prognostic map of potential relief in the light of sustainable development.

Written in a sober scientific, fluent and convincing style and suggestively completed by a high-level graphic and cartographic material, the work is certain to occupy a well-ceserved place in the Romanian geomorphological literature.

The access of the foreign reader is eased by the English translation of the figure caption, contents and summary.

A valuable substance and excellent printing recommend the book to all specialists and particularly to those interested in Transylvania's geography.

Florina Grecu

MIRON FLOREA. *Munţii Făgăraşului. Studiu geomorfologic* (The Făgăraş Mountains. A geomorphological Study). Ed. Foton, Braşov 1998, 234 × 168, 114 pages, (51 photos, 11 figures, 5 maps).

The Făgăraş Mountains, a sub-unit of the Southern Carpathians (named by Emm. de Martonne "The Transylvanian Alps"), are the highest mountains in Romania (the Moldoveanu Peak 2,544 m). The remarkable extension of the glacial and periglacial relief, the highest values of the relief energy in the country, confer the landscape not only a unique character, but also make the access difficult. These characteristics have drawn the attention of researchers who tackled some aspects of the relief (especially of the glacial one), they probably accounting also for the absence of the global approach to the Făgăraş Mountains relief. Starting from the existing geological and geomorphological works, as well as from the author's own investigations, the study provides an original synthesis of the problems connected with the whole relief of the Făgăraş Mountains.

The study is divided into six chapters of different extension. The first two chapters – Geographical Individuality and Geological Peculiarities of the Făgăraş Mountains – expound on geographical location, limits of the unit and general geomorphological features, petrographical constitution (crystalline schists), stratigraphy and geological structure.

The third chapter The Relief of the Făgăraş Mountains – represents the central part of the study (covering half of its content, with focus on orography, morphometry and the sculptural complexes of this relief. This mountain chain consists of a main E–W oriented ridge extending along 68 km, from which secondary ridges derive either northwards (the shorter ones) or the southwards (the longer). The central part of the main ridge has the aspect of a sharp alpine ridge (almost 50 km long), with pyramidal peaks of over 2,200 m (six above 2,500 m), in a rhythmical alternation with saddles. This sharp ridge is mainly the outcome of the glacial erosion between neighbouring glacial cirques. The development of glacial cirques (in the Quaternary) was favoured by the existence of a sculptural complex (levelled surface), located today at heights of 2,100–2,300 m and 1,900–2,100 m (two levels of the same complex, representing the peneplain of the Carpathians; its age is post-Upper Cretaceous–end of the Oligocene). Glacial erosion landforms have different aspects, being influenced by geological structure, types of rock and the asymmetry of this mountain chain. The author admits that these glacial complexes were formed during the Riss and the Würm phases (each one with its own stage). The valleys, oriented south-north on the northern slope of the mountains and the other way round on the southern slope, have a "U"-shaped profile at the upper lever (of a glacial modelling) and a sharp "V" profile at the lower (of fluvial modelling).

"Present-day Geomorphological Processes" and "Geomorphological Risk Factors" are described in the fourth chapter. On the alpine level (over 1,600–1,800 m), the disintegration process is very active together with pluviodenudation, solifluxion and creep. The fluvio-torrential processes are dominant on the forest-covered mountain level proper.

"Geomorphological Regionalization" (the fifth chapter) uses the sector as basic unit. Seven sectors are briefly outlined (each one with sub-sectors and microsectors): 1. extreme

wets; 2. wets; 3. Negoiu-Călţun; 4. Bâlea-Capra; 5. Podragu-Moldoveanu; 6. Sâmbăta-Urlea and 7. Berivoiu-Văcăria. Each of these sectors have a typical landscape and make specific use of its natural potential.

The last chapter (the sixth) deals with "The Use of Natural Potential and the Protection of the Environment" (the use of the forest stock, of pastures, hydraulic potential). Emphasis is placed on the need to put exceptional tourist availabilities to good account. The preservation of the alpine landscapes, of the flora and fauna with rare species and of interesting geological formations calls for the establishment of some protected areas: Bâlea-Capra, Podragu. Negoiu, Sâmbăta.

The study ends with a large list of references (156 titles), maps, colour photographs (of a remarkable quality), and other graphical materials complete adequately the text of a solid elaboration study. As dr. L. Badea shows in the preface "through content and structure it could be considered as a regional geomorphological monograph which joins the systematic analyses of the phenomena with detailed characterization succeeding in the insertion of the most important aspects and problems specific to the Făgăraş Mountains units".

Nicolae Băcăinţan

ION BOJOI, MIHAI APETRI, MARCEL VÂRLAN, *Geomorfometria luncilor. Model de analiză în bazinul superior al Jijiei* (La géomorphométrie des lits majeurs. Modèle d'analyse dans le bassin supérieur de la Jijia). Editura Academiei Române, 1998, Bucureşti, 260 p., figures, tableaux, annexes, rés. anglais et français.

Le monde scientifique géomorphologique de Roumanie s'est enrichi d'un nouvel ouvrage, une contribution importante de l'école géomorphologique de Iaşi, selon l'opinion du professeur Bălteanu dans la préface de l'ouvrage.

Après les assimilations des dernières décennies on reconnaît l'émancipation radicale de la géomorphologie de l'incidence des méthodes rigoureuses d'évolution des phénomènes (Ichim, 1993). On peut donc affirmer, en intérprétant Kuhn (1970), que la géomorphologie aussi est préparée pour une nouvelle option dans l'interprétation du relief.

Pendant cette étape de développement de la géomorphologie à niveau mondial, analysée si remarquablement par le professeur Ichim dans l'article *La géomorphologie avant le début du troisième millénaire* (1993), un modèle de «recherche intensive» d'un segment de la réalité géomorphologique, les lits majeurs, paraît à la prestigieuse Maison d'Édition de l'Académie Roumaine.

L'ouvrage est le résultat des efforts faits pendant plusieurs années par le professeur Ion Bojoi et ses jeunes collaborateurs Mihai Apetrei et Marcel Vârlan. Nous soulignons l'idée de mettre en évidence «l'effet de seuil» que cet ouvrage déclenche dans le développement de la géomorphologie en Roumanie. On peut affirmer qu'il y a un véritable changement de conception et de méthode dans la recherche géomorphologique: des recherches extensives à profond caractère historiste, qui se localisaient au niveau d'une région précisée, on passe à des recherches intensives, à caractère fonctionnaliste. Le but fondamental de ces dernieres recherches est l'explication du relief et la réalisation de la prévision géomorphologique.

Le livre nous dévoile dès le début, en «Introduction» et en «Argument», les principes et les hypothèses qui sont à la base de ces recherches:

– le principe de l'actualisme, selon lequel la connaissance du présent permet le dévoilement du passé;

– l'hypothèse ergodique, selon laquelle les segments de relief d'ordre hiérarchique inférieur sont plus jeunes que ceux d'ordre hiérarchique supérieur; la connaissance de leurs propriétés physiques (géomorphométriques) peut nous conduire à l'identification et à la connaissance des transformations que les formes de relief subissent à travers leurs étapes d'évolution.

Les éléments géomorphométriques sont appréciés comme de véritables «banques de données» qui se trouvent dans la mémoire du système géomorphologique et qui conservent fidèlement les modifications qu'une forme de relief a subies pendant son évolution d'érosion. C'est l'idée fondamentale de l'ouvrage, exprimée très clairement et suivie tout au long de l'argumentation. Le problème est constitué par la mise en pratique de cette idée. Les auteurs reconnaissent que leur chemin a été très difficile parce qu'il a exigé la réalisation d'un grand nombre de mesurages de terrain et de laboratoire à l'aide de moyens parfois assez périmés et peu performants, mais le résultat a mérité l'effort: il s'agit d'une banque de données formée de 38 variables géomorphométriques (24 caractérisent les lits majeurs du système de réseau Jijia, les 14 autres caractérisent les bassins hydrographiques afférents), chacun ayant un nombre immense de variantes.

Evidemment, le maniement d'un tel paquet de données ne pouvait se faire qu'à l'aide des méthodes de la statistique mathématique et par l'intermédiaire de la technique moderne de calcul électronique. Les résultats d'une telle étude ont mis en évidence les conclusions suivantes concernant *le lit majeur*:

– son évolution est contrôlée par l'interaction lits mineurs–bassin hydrographique, sous l'effet de la modification dans le temps de la position des niveaux de base. Le mécanisme est abordé selon les principes d'action du feedback négatif, au sens que toute action envers le développement du lit en profil longitudinal déclenche une réponse capable d'annihiler l'action du stimulant. On doit noter que cette relation compliquée est quantifiée, exprimée en termes concrets, pour l'étude des lits du bassin de la Jijia;

– les secteurs les plus actifs des lits sont les «surfaces de confluence» – de vrais nœuds de concentration maximale des flux de masse et d'énergie du tracé des lits;

– l'explication des «phases de fonctionnement» du système dynamique des lits: 1 – l'impulsion dans la surface de confluence en amont et 2 – le relâchement du système en aval de la surface de confluence;

– le «caractère exponentiel» de la variation des paramètres géomorphométriques en fonction de l'ordre de la dimension, ce qui confirme que les lois du développement du réseau hydrographique se reflètent sur les lits aussi;

– la «variation non-linéaire de l'épaisseur des dépôts de lit» en profil longitudinal se trouve sous le contrôle des mêmes nœuds énergétiques, les confluences de vallées; un phénomène très intéressant qui ouvre une nouvelle perspective pour l'interprétation des structures des dépôts de terrasses fluviales. La tendance observée a aussi une importance économique parce qu'on peut évaluer plus précisément les régions d'accumulation des métaux lourds dans les dépôts de lit majeur;

– enfin, l'ouverture que l'accumulation d'une banque de données aussi grande et complexe que la nôtre représente pour la «finalisation d'un modèle quantitatif d'évolution des lits majeurs», une mission attractive et captivante mais aussi noble et obligeante pour Mihai Apetrei, qui est, selon mon opinion, autorisé à continuer le travail de son maître.

Maria Rădoane

CONSTANTIN ŞTEFĂNESCU, *Blocul carpatic românesc* (The Romanian Carpathian Block). Editura Hardiscum, Piteşti, 318 pages, 17 plates.

Constantin Ştefănescu has published extensively during his long career as a school teacher and inspector. Much attention has been given to the geography of towns, particularly in the Argeş region, but Romanian landscapes (from the Făgăraş Mountains to the Danube) have also been examined, and this latest work is based in geopolitics to commemorate the 80th anniversary of the unification of Romania achieved in 1918. A review of geopolitics in general is the preamble to an impressive and wide-ranging historical review referring to Romania's territory and its position in Europe. This is not really a book about the Carpathians. Following Vintilă Mihăilescu who used the title in an article in 1942, Romania's central core of mountain terrain ("*Ţara Carpatică Românească* / the Romanian Carpathian country") is taken as the foundation for a truly national study; recalling the remarks of both Victor Tufescu ("*Cetate naturală şi de apărare* / natural defense city walls") and Ion Conea ("*Coloana vertebrală a pământului şi poporului românesc* / the Romanian land and people's spine"). The review of geopolitical factors also refers to the Danube Valley, the Nistru and the Black Sea to summarise Romania's territorial base as "Carpathian-Danube-Nistru-Pontian Space".

The author evaluates Romania's present position somewhat unfavorably with negative remarks concerning the treaties signed with Hungary and Ukraine and the economic policy of reorganisation with encouragement of foreign investment. The lack of unity across the prescribed geopolitical framework, the poor state of the welfare services and the country's inability to achieve immediate membership of all European and Atlantic institutions are matters of regret. However it must be a matter of personal opinion what constitutes the optimum form of territorial organisation: there cannot be any firm judgement deriving from the physical geography of the territory inhabited by Romanians. And it seems curious that at a time when resources are insufficient to modernise the economy without external assistance that the author should conclude with a breathtaking romantic gesture for "a reparatory historical act" to follow Brazil, Ivory Coast, Kazakhstan, Nigeria and Tanzania and create a new capital: between Sâmbăta and Voila in Transylvania, supported by a major programme of investment in infrastructure including new railway links. The book shows a remarkable grasp of the history and regional geography of Romania, with useful maps and references, but it also shows why geopolitics is sometimes seen as one of the most problematic branches of the discipline.

David Turnock (University of Leicester, U.K.)

GAVRIL PANDI, *Concepţia energetică a formării şi transportului aluviunilor în suspensie. Aplicaţie în NV României* (An energy view of suspended sediment load formation and transport. Test-area in Northwestern Romania, Presa Universitară Clujană, 1997, 229 pages, 64 figures, 16 tables, abstract in English.

This is a new systems theory-based approach to energy problems connected with solid discharge. It offers the possibility of expressing the phenomena related to the formation and transport of suspended sediment load in terms of energy units, thereby facilitating the study of erosion in comparison and correlation with water system and other systems phenomena.

The book is divided into two main parts and ten chapters. Part One, *Theoretical Aspects*, deals with the need for a systems-energy approach to studying the geographical cover, with

highlight on the water system (Chap. I.1) and the water-borne energies: overland discharge, concentrated energy discharge, pluvial discharge, and energy variations in terms of slope-basin shape (Chap. I.2).

Furthermore, the work discusses the energy of suspended sediment flow, the polyphase fluid character of water in nature, as well as the way of expressing erodability or resistance to erosion (Chap. I.3, I.4). A number of new or seldom used terms are also inserted, ex. "hydromorphogenesis", describing the complex action of water on the lithosphere, or "erosional ecopotential", defining the erosional potential of the environment.

These theoretical considerations are applied in Part Two to the sediment load discharge in the rivers from the NW of Romania. The test area covers 2,200 sq.km (Vişeu, Iza, Tur, Someş and Crasna basins). The hydrological parameters for the 1960–1990 period were supplied by 48 gauging stations.

Some of the problems tackled involve the physico-geographical features of this territory (Chap. II.1), suspended sediment load discharge (Chap. II.2), erodability indicator (Chap. II.3), determination and regionalisation of erosion-resistance indicator (Chap. II.4), energy potential of sediment formation (Chap. II.5) and the role of sediment load in the energy of erosion and of discharge (Chap. II.6).

The variability of suspended sediment load is analysed in terms of space and time with the help of module coefficients and variation coefficients, correlated with basin size and river length.

The erodability indicator, established in terms of the proportion of erodable rocks, forest-free areas and average basin slope, was used to draw up the distribution map of erosion-resistant forces. The erosion resistance indicator was determined based on the erosion-resistance of lithological formation and the protection exerted by the vegetal cover.

The energy potential of alluvia formation is followed at the level of rain/earth interception and of slope basin and watercourse.

The last chapter focuses on the results presented in the second part of the book and on the author's calculations of the energy of suspended sediment load of the rivers from the North-western part of Romania, based on which we worked out the map of sediment transport energy in the area.

Summing up, we would say that this sound theoretical study of erosion applied to the reality on the ground could become a model worth being promoted by Romanian geography.

Alexandru Hogaş

POMPILIU COCEAN, *Peşterile României – Potenţialul turistic* (Les grottes de la Roumanie – Le potentiel touristique), Ed. Dacia, Cluj-Napoca, 1995, 259 p., bibliogr., rés. français, 144 fig., 12 photos en couleurs.

La Roumanie détient un riche patrimoine spéléologique d'une remarquable valeur, tant scientifique que touristique. Le travail du professeur Pompei Cocean, de l'Université «Babeş-Bolyai» de Cluj Napoca, chercheur consacré du karst des Monts Apuseni, porte sur la vocation touristique de 144 grottes sélectionnées parmi les plus de 11 000 grottes connues de Roumanie. Sa démarche fut précédée par deux livres coordonnés par des autorités en la matière: Marcian Bleahu (1976) et Traian Orghidan (1984). Les nouvelles découvertes spéléologiques ainsi que l'exemple de la mise en valeur touristique, de niveau international, de la Grotte des Ours des Monts Apuseni, ont justifié une réévaluation du potentiel spéléotouristique de la Roumanie.

Le but manifeste de la démarche de l'auteur est non seulement de mettre en relief les dimensions réelles de ce potentiel, d'ailleurs peu connu encore, main aussi de définir les critères variés dont on doit tenir compte dans son estimation.

Pour y aboutir, l'auteur utilise trois critères principaux: *le potentiel d'attractivité*, basé sur l'estimation du cavernement, sur la présence des spéléothèmes, des lacs, des cascades, de la glace fossile, des vestiges archéologiques et paléontologiques, ensuite *le potentiel de position*, chacun à trois degrés de valeur et, enfin, *le potentiel d'aménagement*, à quatre degrés de difficulté. En les adoptant, l'auteur tend à réduire le degré de subjectivité dans l'appréciation de l'attractivité, qui, indubitablement, est perçue d'une manière différente d'un individu à l'autre.

Les chapitres d'introduction du livre sont consacrés à un abord théorique du sujet, fort utile.

La partie la plus consistante du volume est affectée à l'évaluation – suivant les critères énoncés – des 144 grottes, qui, selon l'auteur, se prêtent à un aménagement touristique. On offre des données caractéristiques de spéléologie physique, accompagnées d'esquisses cartographiques, provenant de sources primaires, on invoque les éléments spécifiques d'attractivité de chaque grotte.

Le volume fut couronné, à juste titre, par le prix "Simion Mehedinţi" de l'Académie Roumaine pour l'année 1995.

Une seule question persiste après la lecture du livre, écrit d'ailleurs en parfaite connaissance des faits, dans un style claire, accessible aussi aux non-spécialistes. L'identification des vertues touristiques comporte aussi de déconspirer la localisation, l'accès vers ces grottes, qui – en maints cas – ont un régime de protection, sont déclarées des réserves scientifiques. Leur protection semble incompatible à leur inclusion dans un circuit touristique. Le dernier chapitre (*Les grottes entre protection et mise en valeur*) insiste surtout sur cet aspect. L'auteur argumente un fait incontestable dans les conditions concrètes existantes en Roumanie à présent: l'aménagement touristique des grottes reste la modalité la plus efficace d'éviter la destruction du patrimoine spéléologique si riche, si varié du pays.

Şerban Dragomirescu

GH. IANOŞ, I. PUŞCĂ, M. GOIAN, *Solurile Banatului*, II. *Condiţii naturale şi fertilitate* (The soils of Banat, II. Natural background and fertility), Editura Mirton, Timişoara, 1997, 392 pages, 108 figures, 51 tables, contents and abstract in English.

The second volume of the monographic series *The soils of Banat* is a made up of three parts. In the first part, *Natural conditions of Banat*, the authors present the paleogeographical evolution of the region, its geological, geomorphological, climatic and hydrological conditions and its vegetation. Even if the region is not very wide (about 18,800 sq.km), it is characterized by a great variety of geographical conditions, from low plains (80–100 m) with forest steppe zonal vegetation to high mountains (more than 2200 m) with alpine vegetation.

The second part, *Soils – conditions of solification; properties; genesis; pedogeographical considerations; fertility*, has the largest extent of all. The soils from the agricultural land (occupying almost 64% from the total surface of Banat) are presented at the level of class, type and subtype, in accordance with the Romanian System of Soil Classification, 1980. For types (and sometimes for subtypes too) there are drafts with their spreading area and there are tables with analytic data.

The quality form of agricultural soils of Banat is the title of the third part. Here the authors analyse the limitative and restrictive factors of the agricultural production and the

pollution of the land. Several measures of protection and soil fertility remaking are proposed. Finally the authors evaluate the soils and group the agricultural land according to different suitabilities and capabilities.

The work impresses through its richness and complexity of pedological information carefully picked up by detailed soils surverys by the authors and other pedologists for more than four decades.

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