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## THE CONCENTRATION AND THE POTENTIAL OF INDUSTRY. A CASE OF SAAR-LOR-LUX REGION

The boundary area of the three states: France, Federal Republic of Germany and Luxembourg is placed near the heartland of industrial Europe. This "dead heart of integrated Europe" (Burtenshaw 1979) involves West-Pfalz, Trier, Saarland, Lorraine and Luxembourg. But the periphery location has not to be the barrier for their economic development. The boundary areas are often isolated from the rest of the territory of the states, whereas the frontiers in Europe often cross homogeneous areas (Leimgruber 1981). The described area is the zone between the Palatinate forest, Hercynian Vosges and Ardennes mountains and the scarplands of eastern France. Physically it is not a unity because it belongs partly to Paleozoic, Mesozoic as well as to the Tertiary Europe and the contrastive morphological boundaries create the heterogeneity of the region.

Saar-Lor-Lux is the region of rich coal and iron ore fields. Both in Saarland and in Lorraine there are industrial agglomerations (Saarbrücken and Nancy play the important role in the economy of the states). The natural resources conditioned their significance in the past. The network of well-canalized rivers was the second factor of development and industrial activities related to it.

The contemporary history of the first half of the 20th century of this region is connected with the changes of political boundaries. In the second half of the century the cooperation in coal-mining, iron-foundry and energy production and the rivalry in the domain of new position of job have begun. For the past decade the region is stricken by the crisis of coal-mining and steel industry, without respect to the frontier.

This process is connected with the more broad one in the whole of Europe which is characterized by the set of qualitative and structural changes in industry (Zimmerman et al, 1983). These problems have not omitted Saar-Lor-Lux region either. The process of passing from the traditional coal-mining and iron-foundry to chemical industry, car industry, electronic equipment production and machine construction (Walczak 1973) is surely connected with the changes in the number of workers. After all, the concentration of employees related to the number of inhabitants is changing.

It has to be linked with the process of significant changes of industrial places and their accessibility. Despite the cooperation, the development of industry in some parts of Saar-Lor-Lux is hampered by the differences of economic situation of the states mainly in domains of taxes, investment aid and the boundary politics. The development of Lorraine or Saarland from the point of view of Paris or Bonn may be different than that from the point of view of the development of Saar-Lor-Lux as a whole.

The location quotients make it possible to find the areas of the concentration of employees related to the number of inhabitants (Isard 1965). But the significance and the accessibility of the industrial places may be shown by using the potential model, particularly taking into account the real distance in space. The model of potential seems to be the useful tool to find the industrial regions (Klaasen 1981, Richardson, 1976)<sup>1</sup>.

The changes of location quotients in relation to the potential of the spatial units will show the spatial concentration of labour force and its significance. For each spatial unit i.e. the *cantons* of Lorraine, the districts of Luxembourg and the *Gemeinden* of Saarland, West-Pfalz and Trier the two location quotients were accounted. One of them defines the concentration of employment in industry related to the whole population of Saar-Lor-Lux ( $I_a$ ), the second is related to the state in which the spatial unit is placed ( $I_b$ ).

$$I = \frac{R_i M_j}{M_i R_j}$$

where:  $R$  — the employment in industry,  $M$  — the population of spatial unit,  $i, j$  — the indices of spatial units.

Simultaneously the potential of industrial employment was accounted for each spatial unit.

$$V_i = \sum \frac{R_j}{f(d_{ij})}$$

where:  $V_i$  — the potential of employment in industry,  $R_j$  — the number of employees in  $j$ th spatial unit,  $f(d_{ij})$  — the function of distance.

The distance in each case was defined as the Euclidean distance between the greatest centres of spatial units.

The picture of the concentration of employment in industry in Saar-Lor-Lux has not much changed during the research period (1962—1981). The main tendency was the growth of small places like Sarrebourg, Coussey, Chatenois in Lorraine or small towns around Saarbrücken (Mettlach, Saarlouis) and simultaneously the decline of the great concentration

<sup>1</sup> Klaasen writes about the model of potential as a tool of measuring accessibility, Richardson treats it as a tool defining nodal regions.

of industry (Colombèy-les-bas, Mont-Sant-Martine, Saarburg). The process of scattering has been marked only since 1977. But the coal fields areas close to German-French boundary and the areas of iron-foundry in south-east Lorraine have had constant share and the concentration of industry along the road linking Nancy, Metz, and Luxembourg has been marked.

The comparison of the location quotients permits the evaluation of significance given to industrial place for the state and for the region at the same time. There prevailed rather the regional scale places in 1962. The intrinsic differences of the location quotients to Saar-Lor-Lux advantage were observed both in Lorraine and in Saarland for the set of greater centres. In Luxembourg, the capital and Diekirch are rather places of regional scale than the state scale. The situation has not changed in Lorraine and in Luxembourg up to 1981. But in FRG the differences disappeared. It seems, that the significance of this boundary area in the whole economy of West Germany has increased.

The picture of potential of employment in industry did not change much either. The sense of this measure may be expressed by the concepts "accessibility" or "connection" of industrial places. The potential taking into account the real distance would define the spatial concentration of places, the extent of industrial areas. The method of potential creates the specific boundaries of the industrial region according to the concept of boundary in geography as the zone of discontinuity where the sudden quantitative change happens. The picture of potential in the shape of isolines permits to get the boundary of the concentration of industrial places where the lines in Figure 1 close themselves. The changes of potential during the research period evidence the diversity of Saar-Lor-Lux region (see Figs. 1, 2). While in 1962 the most important areas were the regions around Nancy and near French-German boundary, involving Luxembourg to north-west, there was no such homogeneity in 1981. The part of the French area close to political boundary gravitates to Nancy. French town Farbach develops separately. It could be said that the spatial industrial changes appear in connection with the economy of the states. The political boundary is not the attractive element.

The results of comparison of the location quotients and the potentials, i.e. the significance and the spatial concentrations of industrial places, evidence that they are not related. The size of coefficients of correlation declines during the whole research period (see Fig. 3).

It is clear if one will take two facts: the rivalry among the places of Saar-Lor-Lux to expand the growth point (Clout 1976) and the restructuring of industry in this area. The accessibility does not play the role for the newly established branches of industry. In other words, there appears the group of places of the relative weak concentration of employees but these places make together the area of the concentration of industry.

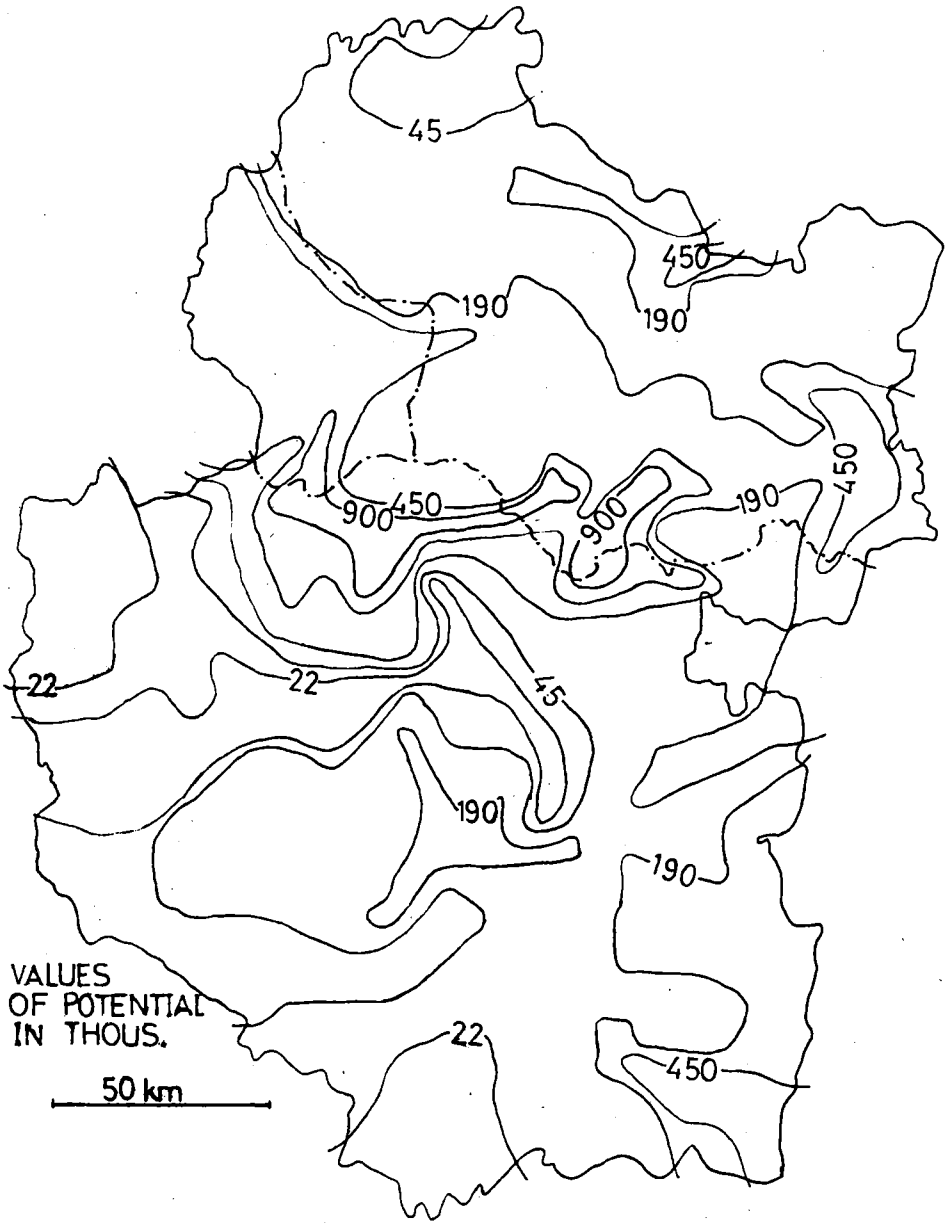


Fig. 1. The potential of employment in industry in Sar-Lor-Lux, 1962

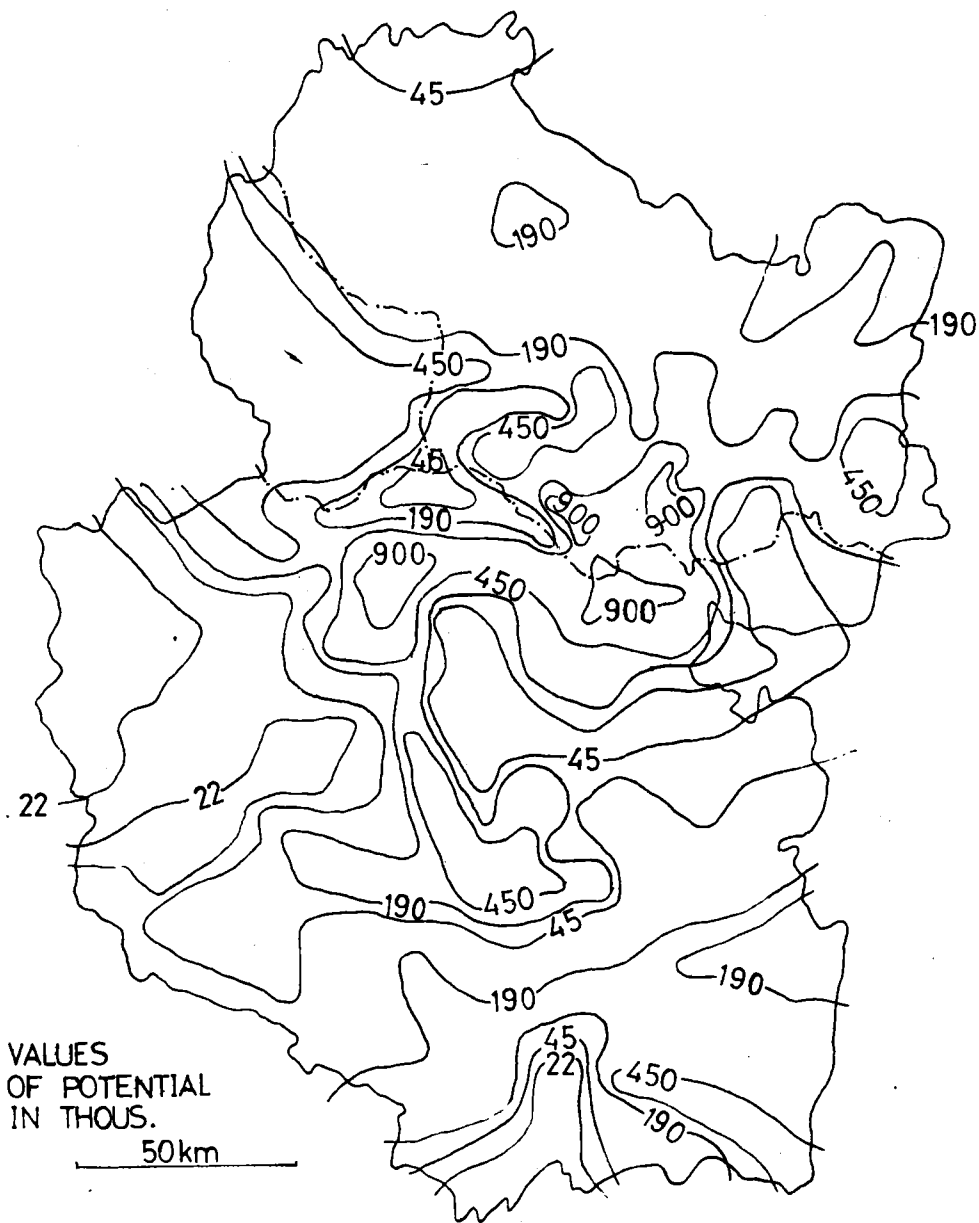


Fig. 2. The potential of employment in industry in Saar-Lor-Lux, 1981

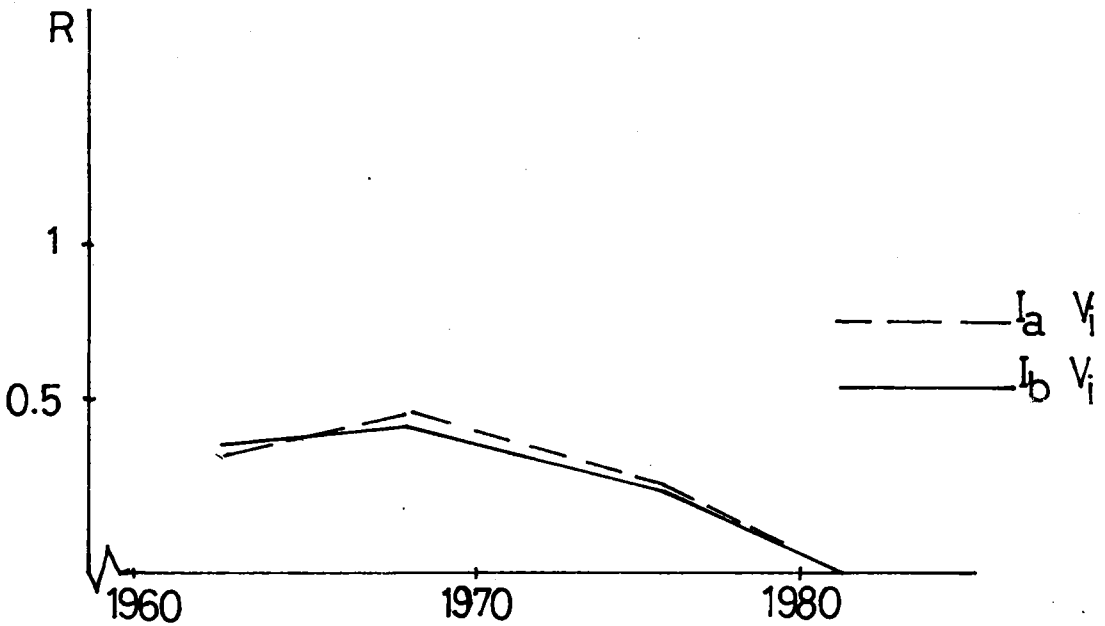


Fig. 3. The size of coefficients of correlation among the potential and the location quotients in Saar-Lor-Lux

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