The tectonic style of the Wurm Syncline is that of an intensively special-folded monocline forming the northern flank of the Aachen Anticlinorium. The Inde Syncline, however, has the shape of a northward tilted box-fold. The tectonic situation of the Inde Syncline in general is determined by its position between the two mentioned thrust belts.

Due to seismic results a nappe interpretation for the Aachen Thrust System has been favoured during the last years. An intensive seismic reflector in about 4 km depth has been interpreted as a detachment horizon, which outcrops at the surface to the north in the Aachen Thrust.

However, connected to this nappe interpretation for the Aachen Thrust is a number of problems not solved until today. First of all, the question about the origin or root zone of the nappe is highly problematic. Likewise, there is no determination of the eastern border of the Dinant nappes in the hanging wall of the Aachen Thrust which has to be expected in the Rhenanian Uplands south of the Lower Rhine Embayment. The sedimentary basins of the Siegerland continue towards west right into the Dinant nappe.

On the other hand there is no indication of an allochthonous position of the eastern Rhenish Massif in relation to the Ruhr Carboniferous for instance.

Thus a more detailed investigation of the eastward and downward extensions of the Aachen Thrust is necessary. It can be observed that the amount of throw of the Venn Thrust System as well as of the Aachen Thrust diminishes work depth. Within the axis culmination of the Venn Massif, where deeper tectonic stockwerks are exposed, the Venn Thrust disappears within Revinian strata. analogous the throw of the Aachen Thrust is much smaller in the exposures in the Geul Valley on the Belgian-Dutch border than in the Aachen area. Finally a deep boring at Grand Halleux in the Belgian Ardenne exposed a structural style that in a smaller scale is well known from the Ruhr Carboniferous too. Following this point of view the root zone of the Aachen Thrust and its transition into folds has to be expected still on the northern flank of the Venn Anticlinorium.

The most eastward hints to the existence of the Aachen Thrust come from a number of borings situated within the Jackerath Horst in the center of the Lower Rhine Embayment. These borings revealed a tectonic setting which is quite similar to that of the Aachen area : intensively folded strata of Lower Westphalian and Namurian age bordering Upper Devonian strata in the hanging wall of the Aachen Thrust. According to these borings and other exploration results within the basement of the Lower Rhine Embayment the Velbert Anticline east of the Rhine is the continuation of the Aachen Anticline and the Remscheid-Altena Anticline that of the Venn Anticline. Within the Devonian strata of the Velbert Anticline no significant overthrusts are known; likewise the thrust tectonics within the Remscheid-Altena Anticline are of small importance, too. So in the direction of strike the same substitution of thrusts by folding is to be observed as it has been towards depth. This confirms the conception that folds and overthrusts have been formed syngenetically and in close mechanic relation to each other.

This concept of the development of thrusts is reflected by the stratigraphc development of the Aachen area, too. Based on palaeogeographic investigations and a comparison of the stratigraphic sequences within the Wurm and Inde areas it is evident that the sedimentary conditions of these basins during the Namurian and Lower Westphalian A have been similar. Within the Upper Westphalian A, however, a progressive differentiation of the facial development of Wurm and Inde syncline becomes remarkable.

Finally, in the upper part of the Westphalian A a conclusive comparison between the strata of both synclines is no longer possible. So it is conclusive that during the Namurian and the Lower Westphalian A there was only one sedimentary basin for both the Wurm and Inde Synclines. During the Upper Westphalian A the approaching Variscan front created a barrier between these areas, that later, during the orogenic development, has been transformed in the Aachen Anticline. Under the specific tectonic conditions at the southern border of the Brabant Massif which restrained folding, and depending on stockwerk tectonic conditions this anticline simultaneously has been the nucleus for the development of the Aachen Thrust. So, although there are the above mentioned relations to the nappe-like thrusts of the Ardenne the Aachen Thrust seems to be more likely a fault of the «folded overthrust» type.

According to this interpretation it is possible to project the tectonic section through Wurm and Inde Syncline towards top and depth applying rules which have been developed for this type of faults within the Ruhr Carboniferous. From this model an orogenic shortening of the area can be deduced which reaches an amount of about 60 %. Thus the areas of Wurm and Inde Syncline, which today are about 10 km apart, originally had a distance of about 25 km during time of sedimentation.

STRATIGRAPHICAL AND SEDIMENTOLOGICAL COMPARISON BETWEEN INDE- AND WURM AREA

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CONCLUSIONS

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The recognition of tools for the assessment of paleogeographic distances formed the theme of this meeting, that was attended not only by students and staff of the geological institutes of Aachen and Liège, but also by geologists from Brussels, Ghent, Bonn, Hannover, Krefeld and Maastricht. Several approaches have been discussed, vayring from the comparison of structural styles or tectono-sedimentary evolution in nearby or distant areas to the use of purely paleontological methods.

An interpretation of the structural relationship between the Inde Syncline (south of the Aachen Thrust) and the Wurm Syncline (north of the Aachen Thrust) was presented by V. Wrede. This author argued that the root of the Aachen Thrust is to be found north of the Venn Anticline, and he concluded that the present-day distance between Wurm and Inde synclines is only slightly less than the original one. However, in the discussion it was pointed out that analysis of seismic profiles through these areas has yielded a completely different interpretation. Thus the study of structural styles does not necessarily result in an irrefutable answer as far as palinspatic relationships are concerned.

Various authors have focussed their attention on the tectono-sedimentary evolution of different (nearby or distant) areas. Comparable trends in the Devono-Dinantian of the Visé/Booze-Val Dieu/Bolland regions (NE of Liège) are used as an argument for the original proximity of these geological structures north and south of the Aachen-Midi Thrust (E. Poty).

However, the example of the Ordovician in Britanny and Portugal (M.J.M. Bless) shows that an almost identical tectono-sedimentary evolution (matched by an identical qualitative and quantitative paleontological record) may occur at relatively large distances, even if the paleogeographic reconstructions for the original position of Portugal and Britanny are accepted. This means that comparable or even identical trends in tectono-sedimentary settings cannot yield an irreversible argument for the assessment of paleogeographical distances.

Differential warping of neighbouring blocks may result in sometimes dramatic changes in the thickness of deposits, their lithofacies and/or paleontological contents, as demonstrated for the Upper Carboniferous of the Campine mining area by M. Dusar and for the Upper Cretaceous between Aachen and Antwerp by M.J.M. Bless.

Maybe the most spectacular example of an extremely rapid lateral change in the sedimentary environment has been presented by L. Kreutzer for the Middle Devonian in the Kellerwand area (Carnic Alps), where a facies change from reff-nearshore to pelagic basin could be established within a few thousand metres !

Comparison of sedimentary sequences always presupposes a reliable (bio-)stratigraphical correlation (cf. B. Reissner for the Upper Devonian «Grenzschichten» in the Inde Syncline). If the stratigraphical framework may be disputed (discussions after the presentation on the Upper Carboniferous strata in the Wurm and Inde Synclines by. B. Steingrobe & A. Müller, and by M. Zeller) any conclusions on lithofacies trends or on paleogeographic distances may be disputed as well.

Qualitative and quantitative paleontological approaches may support in an excellent way paleogeographic reconstructions. This has been shown for reworked palynomorphs in the Lower Devonian of Belgium by Ph. Steemans (paper presented by Ph. Gerrienne), and for miospore distribution near the Devonian-Carboniferous boundary in Belgium and the Federal Republic of Germany by M. Streel. However, these data only get their special supporting value within a broader context. These are meaningless without it.

Summarizing the above experience we must conclude that the presented evidence has not yielded the badly needed tools for palinspastic reconstructions. The various approaches may help in understanding the structural-sedimentary setting or support the assessment of relative paleogeographic distances. However, these only have a meaning in a broader context. Their interpretation is frequently ambiguous and the figures never give absolute information on the original distance to, for example, a source or a shoreline.