to cut diachronically through this structure. The spacial distribution of coalification data is currently studied into much greater detail. After the Permian no significant thermal events influenced the deeply eroded, relatively shallow Carboniferous in the area.

CONCLUSIONS

In summary, the most important conclusions of this investigation are:

1. Hydrocarbon generation took place at the end of the Carboniferous.

2. Thermal maturation is related to two events, *i.e.* one directly to the Variscan orogeny, the other to a magmatic (?) body in the north-east.

3. The coals and shales acted as gas-source rocks.

4. Reservoirs and scals are removed during (post-)Permian erosion.

5. No secundary gas-generation occurred after the Permian.

6. The residual potention for oil is extremely low.

7. The coalification data indicate an extreme overburden, related to the Variscan orogeny. Two models are proposed: One model postulates a northern extension of the Variscan nappe structures. The second model postulates a molasse-deposit north of the Variscan belt.

SPINES IN LOWER DEVONIAN PLANTS, AN EXPLANATION ?

Ph. GERRIENNE[1] & M.J.M. BLESS[1]

(3 figures)

ABSTRACT.- Many Lower Devonian plants bear epidermic protuberances known as «spines» or «emergences». Typical examples are *Sawdonia* (fig.1), *Crenaticaulis* (fig.2) and some species assigned to *Psilophyton* (fig.3), as well as at least three new taxa recently discovered in Belgium (Gerrienne, 1990).

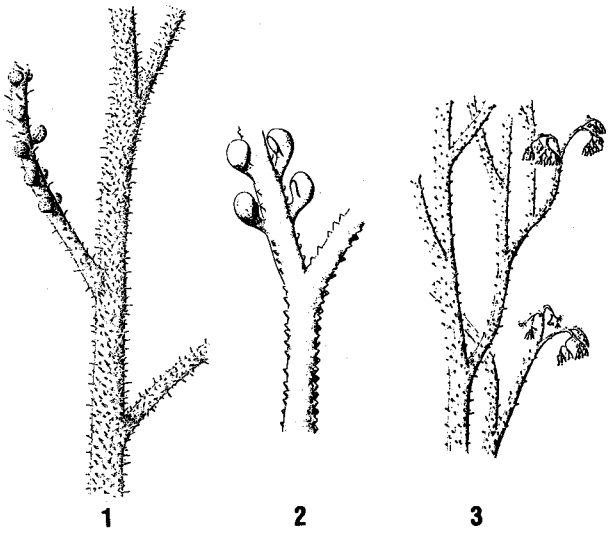

Fig. 1.- *Sawdonia acanthotheca* Gensel, Andrews & Forbes
Fig. 2.- *Crenaticaulis verruculosus* Banks & Davis
Fig. 3.- *Psilophyton princeps* Dawson

Several explanations have been forwarded for the occurrence of theses spines:

- They increase the epidermal surface and allow a better respiration (photosynthesis). Thus they may represent the onset of an evolutionary process leading to the microphyllous leaf.
- The spines were meant as a self-defence system against predators (Molluscs, Acaridans, etc.).

The three following observations form the basis for an alternative hypothesis:

- The stability of mine galleries can be improved considerably by slim boreholes perpendicular to the direction of the main gallery. Also roof bolts consisting of the same material as the roof support enhance the stability of these galleries.
- When trees break down in a storm, the fracture is usually located in that part of the trunk which is devoid of branches. Apparently, branches deflect and lessen the force of the wind.
- Along numerous beaches and riversides, sticks are driven into the ground in order to deflect the strength of waves and currents and to diminish erosion.

We suggest that the first vascular plants used spines in a similar way, i.e. to moderate the pressures of (alternating) winds, waves and

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currents. This implies that spiny Lower Devonian plants may represent a special adaptation to frequently (or seasonally ?) flooded river sides and banks. If this suggestion is correct, the relative abundance of spiny plants can reflect a repeatedly high energy paleoenvironment in a fluvial/deltaic system.

ABOUT THE USE OF GIS FOR GEOLOGICAL PURPOSES

I. HALLEUX[1]

ABSTRACT.- The geologist has to solve spatially distributed problems (logs description, cross-section, correlation, ore estimation, etc.), and thus requires elaborate software possibilities. He needs topological and attribute databases, for an accurate digital description of the data, but also procedures and techniques for data management and spatial analysis as well as elaborate display facilities.

The database structure, beyond the usual functionalities of structure flexibility, friendly coding, correcting and editing, etc. must be 3D architectured and must offer large text facilities. Besides algorithms for data classification and selection, networking and overlay, the system has to be able to integrate soft information, to take into account the spatial reference (through geostatistics, for instance) and to propose typical geological procedures (stereographic projections, fence-diagrams, 3D models, ...).

Using Geographic Information Systems (GIS) for geological purposes is a realist solution. The young and expanding market offers global and dedicated versions, running on PC or workstations. However, for very pointed problems like the geological ones, a unique solution is uncommon, even non-existant. The softwares are fortunately open and the geologist, through the combination of well choosen programs, can find directly and fully operational systems.

At the Natural Resources Department of INIEX, GIS are commonly used for practical purposes. The example of an actual research will be given, which show the interest but also the software requirements of GIS; it concerns the thematic mapping of the exploitation potentialities of the «Petit Granit» in Belgium.

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STRIKE SLIP DEFORMATION IN THE STAVELOT MASSIF

F. GEUKENS[1]

ABSTRACT.- The Stavelot Massif can be divided into a northern part with a NE-SW (hercynian) direction and a southern part characterised by a E-W (caledonian) tectonic style.

These two parts are separated by a left hand (N50-60°E) strike slip fault system just south to the Malmedy Graben.

The movements along this fault system can be seen in the tectonic structure of the southern part, viz: a window structure at Falize-Ligneuville, a very complicated structure at Trois Ponts, and the typical bending of the dipping Rv5 anticline at He de Hierlot.

This strike slip fault may also be responsible for the extension of the Lower Devonian near Jevigné.

The north east prolongation of this strike slip fault passes through the seismic centre of Robertville.

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RECENT CONTRIBUTION TO TEPHROSTRATIGRAPHY BETWEEN THE EIFEL AND THE FRENCH MASSIF CENTRAL

E. JUVIGNE[1]

ABSTRACT.- Using microprobe analyses of minerals, creteria have been established for the identification of tephras which occur in Middle and High Belgium, and also in the Vosges/France: the Laacher See Tephra (11.000BP), the Eltville Tephra (16.000BP), and the Rocourt Tephra (between 62.000 and 106.000BP).

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