

LINEAMENT TRENDS IN FRANCE¹

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ABSTRACT

A study of lineaments on geographic, geologic and metallogenic maps and on aerial photos has established the existence of four main trend directions to lineaments in France and neighboring regions.

The Pyrenees, as a range, have a trend direction of N59°W. Ore bodies, salt structures, thermal springs, gaseous hydrocarbon deposits and elements of the hydrographic network associated with the Pyrenees show alignments along the same trend direction. A second prominent structural trend direction of N55°E is found in the region and is identified by similar occurrences. This pairset of lineament trends is found also over most of Spain and Portugal.

The two lineament trends mapped in the Pyrenees are found again expressed by the fault systems of the Vosges and Lorraine some 1,000 km distant. Two additional systems of faults (and lineaments) having directions of N35°W and N20°E are also recognized. The four trends can be considered as constituting two orthogonal pairsets.

In studying the Pyrenees region anew, it was found that, although the principle of orthogonal "pairsets" is honored, the relative importance of different directions is unequal. In addition, a third more regional "pairset" was identified.

The same two fundamental pairsets are found again reflected in the distribution of the magmatic and volcanic rocks of the Massif Central as well as in the alignments of various ore bodies and Permo-Triassic outcrops.

In areas of low topographic relief, the same basic trend directions are found reflected in the stream patterns, in the distinctive alignments of thermal springs and by linear faults.

It is concluded that in France, as everywhere else, there exist paired orthogonal systems (pairsets) of fractures and lineaments and that minerals and other substances of value are found to lie preferentially along them. Using this reasoning alone, the author has discovered mineral veins of tennantite and smaltite (Cu, Ni, Co, As, Ag) in the crystalline Alps. Therefore, an understanding of the relationships between orthogonal fracture systems and mineral deposits should aid considerably in the discovery of new sources of metals and hydrocarbons.

¹Verbal Presentation by Jacques B. Wertz