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INTRODUCTION

BY

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Prof. J. Alexandre of the State University of Liège planned the present seminar on "Stone-lines". We thank our colleague for this initiative. Looking at the programme we see that very diverse point of views will be treated.

What concerns the origin of the stone-lines, the sedimentation processes will be compared with the possible influence of the biological factors. Even one has suggested a possible vertical movement of coarse material. For datation, the importance of prehistoric implements will be considered, as well as palynological analysis. These facts indicate that those gravel layers were exposed at the surface for some time. Finally, the economical aspect associated with the stone-lines will be considered.

An important part of the tropical belt and particularly of Central Africa consists of old peneplain landscapes. The main level is characterized by the group of End-Tertiary peneplains, dissected in successive stages during the Pleistocene.

The origin of the most common reworked soils is a deeply weathered saprolite. The erosion products of the deep ferrallitic weathering zones, of a residual upper peneplain profile have been reworked and spread out over the younger Pleistocene erosion surfaces. In many landscapes three successive levels can be recognized between the End-Tertiary peneplain and the present-day river valleys.

The attention was drawn to the fact that the original profile, situated at the upper level, is a very deep saprolite, sometimes capped with a ferruginous duricrust. This saprolite represents a zone of ferrallitic alteration characterized by an intense leaching of basic cations and silica and consequently by a relative accumulation of aluminium and iron. Associated with this process,

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one notes the formation of secondary minerals : kaolinite, gibbsite, goethite and haematite.

From fresh rock at the bottom, over a shallow layer of rotten rock, one proceeds to a very thick saprolite. From the lower to the upper part of the saprolite, one notes an increase of clay content, a decrease of silt content and a more important concentration of Fe-individualizations as soft concretions (plinthite) with locally as final phase the formation of a hard-crust (petroplinthite) due to desiccation of these accumulation zones.

Simultaneously one notes in the lower part of the profile a great mobility of the clays ; towards the surface, the clay minerals are trapped by the iron oxides and become immobile. The final phase is a mineral material with very stable microaggregation and the loose flowery consistency of the Oxisol.

To this stage, it is a residual original profile in the saprolite. If one examines the reworked profile of peneplains and erosion surfaces of the Pleistocene, one observes a differentiation in well-individualized layers :

- the superficial layer of loose materials ;
- the stone-line ;
- the saprolite.

This succession reveals a geological profile each layer of which was formed at a well-defined moment.

The superficial layer of loose materials and the stone-layer represent, in most cases, reworked products of the saprolite.

According to their situation in the landscape, such reworked profiles present a different stage of weathering. From the lower to the upper landforms one marks with progressive weathering a differentiation from an argillic towards an oxic horizon. According to our experience, the origin of the stone-line is not a real problem. With the exception of some alluvial terrace gravels, most stone-lines consist of coarse material from the saprolite : vein quartz, hardened iron oxide nodules, reworked iron crust fragments, iron impregnated rock fragments. The fine material of the saprolite being transported by erosion, one notes a concentration and very local transportation of the coarse fragments. The presence of stone-age implements, pollen and even seeds in these stone-lines supports the idea that they were exposed at the surface at a certain time.

If the origin of the gravel layers does not represent a major problem, we feel that the processes which led to their formation as well as the accumulation of the superficial loose materials above the gravel layer are not

always clearly understood. A literature review suggests diverse origins such as eolian or colluvial transport and finally leads to the term of pediment. Other researchers even attributed them a biological origin.

This seminar will give us the opportunity to compare those different views. Hoping that the discussion will bring us nearer to the reality, I wish you all a fruitful and stimulating day.