REPORTS

UNIVERSITY OF MICHIGAN GEOLOGICAL EXPEDITIONS TO MEXICO

FOR the past six years the University of Michigan has sponsored a program of cooperative geological investigations in northern Mexico. The purpose of the project is to pursue studies on the interrelation of paleogeography, structure, igneous activity and ore deposition in northern Mexico along the southern margin of the North American continent as it existed during most of the Mesozoic era. Geologists from the faculties of seven American universities and colleges have taken part, including Chicago, Johns Hopkins, Michigan, Michigan State, Rochester, Rutgers and Texas Technological College. The project has been supported by the National Research Council, the Geological Society of America and the University of Michigan. With the completion of reports resulting from last season's field studies the project will be concluded. Twenty papers have been prepared on the results of these cooperative studies. They are being published by the Geological Society of America and the University of Michigan. The following geologists have been on one or more of the expeditions and have prepared reports dealing with various phases of the project: E. S. Bastin, R. W. Imlay, T. S. Jones, L. B. Kellum (director), W. A. Kelly, W. I. Robinson, Q. D. Singewald and E. H. Watson. Some of the principles of continental development established and regional conclusions reached as a result of the cooperative project are summarized below.

I. The margin of the Coahuila Peninsula of Jurassic and Neocomian time has determined the strike of the folding which took place in post-Neocomian sediments, giving rise to a prominent zone of cross-folding which extends east-west across the Rocky Mountain Cordillera for a known distance of 200 miles.

II. The peninsula, which was gradually submerged in post-Neocomian time, controlled the type of structures which developed during the Tertiary in the overlying sediments. There is a marked contrast between the relatively simple, open folding of Lower Cretaceous rocks above the early Mesozoic peninsula and the tight, asymmetrical folding and overthrusting in the area of the geosyncline to the east, west and south of the peninsula.

III. Slow submergence of the Coahuila Peninsula during the latter part of the Lower Cretaceous caused the formation of lagoons to become wide-spread over the flats of the subsiding land. Thick gypsum deposits in the Cuchillo formation were deposited in these lagoons, and the distribution of the gypsum facies is therefore limited approximately to the area earlier occupied by the peninsula.

IV. Thick wedges of clastic sediments occur adjacent to the continental margin of Neocomian time and become rapidly thinner offshore; limestone wedges appear in the section and become thicker seaward from the ancient continental margin.

V. Five periods of igneous activity have been recognized in the marginal zone of the Coahuila Peninsula. The magmas were alternately intrusive and extrusive. Observations made up to the present time indicate that in the two earlier periods (Permian and Pre-Cretaceous) the igneous phenomena developed in the area of the Coahuila Peninsula; while in the three later periods (Tertiary) the igneous activity was entirely outside the margins of the peninsula and within the geosyncline.

VI. Three periods of major diastrophism are recognized in northern Mexico. The first is correlated with the Appalachian revolution and can be seen in the basement rocks of the Coahuila Peninsula; the second is correlated with the Laramide revolution and can be seen in the intensely folded Cretaceous rocks on most of the highland plateau of Mexico; the third was a period of contraction in the earth's crust that gave rise to normal faulting in the mid-Tertiary and probably continued into Quaternary time.

VII. It has been demonstrated that Laramide orogeny in northern Mexico began in early or mid Upper Cretaceous time with the broad warping and slow uplift of certain large blocks of the continent. One of these positive blocks lay north and another south of the Parras Basin, while this basin occupied a negative block which subsided many thousands of feet during the Upper Cretaceous. At the close of the Upper Cretaceous (Maestrichtian) the sea withdrew entirely from the Parras Basin trough and the entire Cordilleran province was elevated above sea level. Intense folding then took place during the Eocene. The geosyncline of pre-Aptian time was plicated into sharp anticlines and synclines, local isoclines, fan-folds and overthrust faults.

VIII. Continuous marine deposition during late Lower and early Upper Cretaceous occurred over an extensive area in northern Mexico, forming the Indidura formation. This formation has now been recognized in many scattered localities. Its large fauna has been described and figured and the faunal zones determined.

IX. The recognition and clear delineation of many facies of deposition and their interpretation in terms of paleogeographic development have cleared up many heretofore doubtful relations in the stratigraphy of Mexico. These studies, based on marine invertebrate faunas as well as on well-defined lithologic units, remove the controversies from the realm of speculation.

X. Data obtained from scattered outcrops of the

basement rocks comprising the Coahuila Peninsula have been brought together; their lithology and structure have been summarized; the size and position of the peninsula have been revised; the probable source of much of the coarse agglomeratic material in the neritic facies of the Neocomian and Upper Jurassic of northern Mexico has been found in the basement rocks of the Coahuila Peninsula.

XI. The similarity of certain faunal elements in the Upper Jurassic and Neocomian sediments of California and Northern Mexico suggests that seas which occupied these geosynclines were at times connected across northern Mexico. The scattered faunal evidence bearing on this paleographic problem has been assembled.

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SPECIAL ARTICLES

THE BIOLOGIC EFFECTS OF PINEAL EXTRACT (HANSON)[1]

IN a previous communication on September 21, 1934, attention was called to the biological effects of thymus extract (Hanson) on accruing acceleration in growth and development in each successive generation of young born to succeeding generations of parents under treatment. At that time it was stated that similar studies had been undertaken with other hormones and glandular products. The results to date with pineal extract (Hanson) are, in our opinion, of such interest as to warrant publication.

The extract employed most frequently (PB_{22}) was one of several prepared by Hanson. It represents an aqueous acid derivative, probably in the form of a picrate, and containing 0.21 per cent. free picric acid. It is relatively non-toxic but somewhat irritating locally. One can not, however, escape the impression that it is somewhat of a deterrent to the general good health of the rats in the experiments herein described. To date more refined extracts seem to lack the activity apparent in PB_{22}. Further studies in this field are in progress.

To date five successive generations of the pineal strain of rats have been under observation. An analysis of the biological data of each of these generations reveals significant facts. In the first generation no effect is apparent other than moderate loss of weight and phenomena suggestive of sex excitation and early breeding. In the second generation there is definite retardation in growth, with mild precocity in gonadal development. In subsequent generations, the third to the fifth, there is accruing retardation in growth with accruing acceleration in gonadal and bodily development. Precocious "dwarfism" with relative macrogenitalism are the outstanding result. In addition eye anomalies, ocular diseases and blindness are extremely common.

[1] From the Philadelphia Institute for Medical Research, from the Samuel Bell, Jr., Laboratory in the Philadelphia General Hospital, the Laboratories of the Philadelphia General Hospital, Philadelphia, Pennsylvania, and the Hanson Research Laboratory, Faribault, Minnesota. We wish to acknowledge with gratitude the financial assistance given one of us, Dr. Hanson, by the Josiah Macy, Jr., Foundation.

The effects of pineal extract on growth is revealed in Fig. 1, which represents the growth curve of the

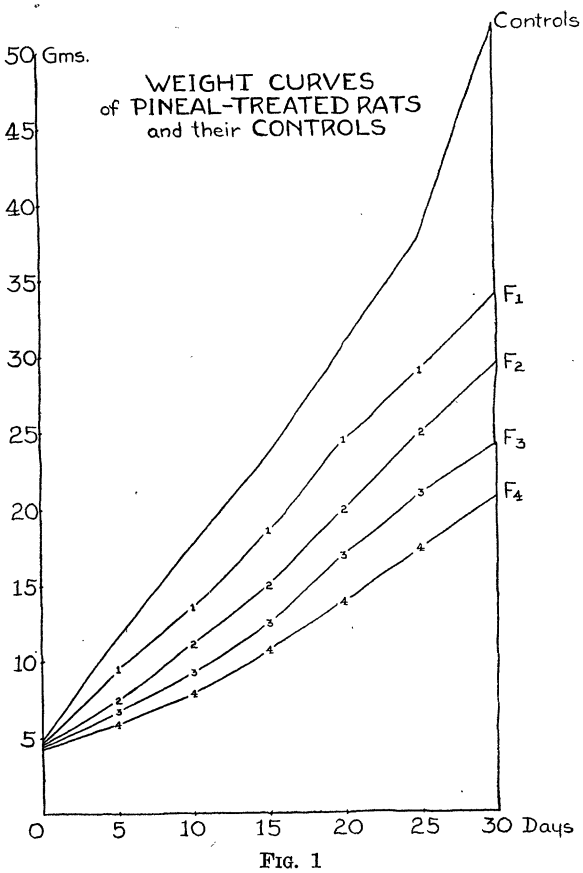

FIG. 1

young of five successive generations of rats treated with pineal extract. The "dwarfism" resulting from pineal extract (Hanson) is usually permanent, though less striking as the animals age. In rats of the second or later generations, perhaps less than 10 per cent. attained normal weight or growth. The early employment of potent extract in the young almost always insures more striking and more permanent "dwarfism."

Though small in size, the resulting animals are precocious in development. The acceleration in differentiation is shown in Table 1. Lack of uniformity in