RECENT WORK IN PALEOBOTANY

As chairman of the Committee on Paleobotany in the Division of Geology and Geography of the National Research Council, David White has recently submitted a brief preliminary report which should interest some who are not students of paleobotany. This subject which is sometimes thought to come perilously near to "pure science" is seen to have more points of contact than has been casually assumed. Some of these contacts are with business and industry.

A most interesting feature of recent paleobotanical research is the extended application of the microscope to the study of carbonaceous deposits, including carbonized plant fragments. Consequent on the development of this technique, Dr. Reinhardt Thiessen has made special studies not only of the spores in oil shales, but of spores found in bituminous coals. It would appear that some of the coal beds of the Appalachian Paleozoic are characterized, and may be identified, by some of the types of megaspores entering into the coal composition. Incidentally, the improved technique developed by Thiessen, by Professor E. C. Jeffrey and Miss T. Stadnichenko, who for a time assisted David White in the Geological Survey, assures great progress in the better understanding of the plant debris and products entering into the composition of coals and oil shales, affecting their initial character, and, subject to metamorphic modification, determining their uses and possibilities. Jeffrey has achieved new successes in making transparent sections of anthracite as well as of high rank bituminous coals, so as to reveal in marvelous detail the structure and present condition of the organic matter. In fact Jeffrey's accomplishments in the histological and morphological demonstration of carbonized plant fragments has opened an essentially new field of the greatest importance in paleobotany. In view of the abundance of carbonized plant debris as compared with the regrettable rarity of petrified material, the ability to study the former successfully marks a greater advance in paleobotany.

The study of fossil diatoms which has been greatly stimulated by the work of Dr. Albert Mann of the Carnegie Institution on the deposits in the Pacific Coast Tertiary, as well as in other areas, is arousing considerable interest. A number of paleontologists have thereby been encouraged to examine some of the Tertiary shales of California under the microscope, with consequent discoveries which may aid materially in revising the stratigraphic classification and also in locating new oil pools in southern California. This means that new investigators are entering upon studies along the lines of research to which Dr. Mann has given a large part of his life.

Much of the study here mentioned lies in the field of what might be called *organic geochemistry* and bears on the general question of the origin and classification of coal and oil shales. Investigation may be stimulated by economic interests but does not depend on these for its justification. But even if both the search for and the classification of coal and oil shale should for the present ignore the microscopic remains of life, it is probably safe to forecast that the laws of origin when properly known will shed light on the distribution just as has been the case with ore deposits.

A considerable increase is observed in the amount of university instruction in paleobotany in the last year or two, notably at Chicago, Michigan and the New York Botanical Garden. In the last named institution Dr. Arthur Hollick occupies a new position carrying the title of paleobotanist and will conduct graduate work in connection with Columbia University.

The report calls attention to certain parts of the field of paleobotany, supposedly fertile and promising, yet remaining almost uncultivated. Little attention has yet been given to the microchemistry of the plant residues, meaning the chemical composition of the different structural particles and plant products found under the microscope in oil shales and coals, with deductions as to the original composition of this debris at time of deposition. Micro-chemistry also gives attention to the effects of regulated heat on the different organic components of the rock, noting their changes and the products generated. It is hoped that experimentation

along these lines will be expanded, for it should contribute much to our knowledge not only of the origin of coals and oil shales, but of petroleum. Such studies have an important bearing, also, on the rôle of these components in the production of artificial petroleums of different types. Similar or analogous studies should be made of peats and richly organic mud deposits now forming. "A pitifully small number are engaged in the study of the paleontology and conditions of origin of peats, and still less interest is taken in the paleontology of the bituminous muds now depositing to form the mother substance of petroleum in a future epoch." No one can guarantee that money given for such researches would be the means of bringing to light new principles of practical value to the oil man, but in the light of past advances in science and industry it would be safer to believe that than the opposite.

It is with peculiar timeliness that Dr. Slosson now reminds us that Bacon, after giving other and more evident reasons for investigation, commends experiments without other provocation or justification than that they have never been tried before. The shock comes when we note the concrete thing he suggests, to illustrate such otherwise purposeless adventures or "experiments of a madman." "But of what I may call close distillation no man has yet made trial. Yet it seems probable that the force of heat, if it can perform its exploits of alteration within the enclosures of the body, where there is neither loss of the body nor yet means of escape, will succeed at last in handcuffing this Proteus of matter and driving it to many transformations." Little did Bacon know what this proposed adventure in *destructive distillation* would some day give to the world in coke and gas and coal-tar products and the cracking process and gasoline and dividends. So much for what Bacon called experiments of *Light*. "And it must ever be kept in mind (as I am continually urging) that experiments of Light are even more to be sought after than experiments of Fruit."

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SCIENTIFIC EVENTS

THE OLD ASHMOLEAN MUSEUM AT OXFORD

R. F. GUNTHER, of Magdalen College, Oxford, writes to the London *Times* under date of November 25, as follows:

What is to be done with the Old Ashmolean?

After the Bodleian, the Ashmolean is more widely known than any other university institution. And justly so, for Elias Ashmole, by bringing the contents of Tradescant's London Museum to Oxford, became the founder of the first public museum of natural history in Great Britain. That the scientific collections of Ashmole might be shown in a manner worthy of them, the university erected what is now known as the Old Ashmolean Building, which included a chemical laboratory. It was opened with great ceremony in 1683. For a hundred and fifty years the specimens were to be seen there, and became historic; but when, in the Victorian period, they were scattered among the new museums, many disappeared, and their seventeenth-century association with the old museum was lost.

The building is a fine one, built in the time, and perhaps under the supervision, of Wren. The well-proportioned rooms designed for a public museum are not now much visited by the public. For a number of years they have been used as offices for a succession of praiseworthy undertakings. Some are now empty, and the tenure of the last of the temporary tenants, the staff of the New English Dictionary, is approaching an end. The question arises, What is to be done with the Old Ashmolean?

One proposal is to fill it with books, and to use it as an adjunct to the Bodleian, which is casting covetous eyes on the Divinity School, the Old Clarendon Building, the Sheldonian Theater, the Convocation House, even on Exeter College, and on all adjacent buildings—without doubt it could fill them all.

But, according to another view, the answer is clear. The Ashmolean Museum was built for the collections of Ashmole and Tradescant. These collections should be restored to their ancient home; and to her great public library and the oldest Botanic Garden in Great Britain, Oxford would add the oldest public museum of this country in its original building. Visitors from overseas would find here one more link with the past.

At the present moment a compact and exceedingly valuable collection of ancient scientific instruments of great rarity, and of greater intrinsic worth than the contents of Tradescant's Ark, is