tern slides, on the natural history of Bermuda. A number of zoological and botanical exhibits were shown in the library, including a series of manuscripts and printed documents, from the society's archives, relating to the younger Linnæus, and to his visit to England in 1781–82.

THE *Journal* of the American Medical Association states that a number of internships will be available on July 1, 1935, to medical students graduating in that year. There will be first-year internships, the salary of which is $79 per month plus quarters, subsistence and laundry, second-year positions with a salary of $93.25 per month plus quarters, subsistence and laundry. Applications should be addressed to the U. S. Public Health Service, Washington, D. C.

THE U. S. Civil Service Commission announces an open competitive examination for the position of junior parasitologist for the Bureau of Animal Industry, Department of Agriculture. At present there is a vacancy with headquarters at Beltsville, Md., in which the department wishes to place a woman. Both men and women will be admitted to the examination, however. The duties are to conduct research in animal parasitology, and the salary will be $2,000 a year, subject to the usual deductions. Applications must be on file with the commission at Washington before November 26.

AN expedition for the Academy of Natural Sciences of Philadelphia, under the direction of Brooke Dolan, of Philadelphia, has left Yachow, Sze-chwan Province, China, for a year's survey of zoological areas and boundaries in eastern Tibet, and the collection of birds and mammals for the Academy's Free Natural History Museum at 19th and the Parkway. Particular efforts will be exerted toward obtaining material for habitat group displays of such characteristic Tibetan animals as wild yak, wild horse, Tibetan grizzly, Ammon sheep, white-lipped stag and snow leopard. Motion picture photography of the wild game is also planned for aiding in erecting the groups, and to record wild animal behavior. Topographical surveys of several high mountain chains will also be carried on. In eastern Kuku-nor, within the great southeast bend of the Upper Yellow River, stands Amneh-ma-chin, a dazzling snow peak of unsurveyed altitude. It is the hope of the expedition to survey this peak, thought to be over 27,000 feet high. The party includes Ernst Schaefer, of the University of Göttingen, who was with Mr. Dolan on the first West China Expedition of the academy in 1931. Marion H. Duncan is with the party as adviser and caravan leader. The route planned is *via* Ts-tsien-lu to Li-tang and Batang, where the expedition will winter and establish a permanent base. The return trip is projected across country to Sung-pan, Chengtu, Chungking and down the Yangtsze River to Shanghai in the autumn of 1935. As in 1931, Mr. Dolan's party is working in conjunction with the Metropolitan Museum of the Academia Sinica in Nanking, and is receiving the cooperation of Dr. Tsai Yaen Pei, its president, and of Dr. Chi Ping, of the Science Society of China.

Nature states that the opening of the Maison de la Chimie on October 20 in Paris marks the completion of the first step towards a comprehensive scheme of centralization of chemical bibliography and other scientific activities. The Maison de la Chimie had its origin in the celebration of the centenary of Marcellin Berthelot in 1927, when a sum of twenty-five million francs was collected by international subscription. The French Government presented a historic building—the house of La Rochefoucauld—d'Estissac, rue St. Dominique, near the Chamber of Deputies. This has been reconstructed and extended to house a library equipped with the latest facilities. Large halls for meetings of scientific societies and congresses have also been provided. Indeed, this is a special feature of the project, and the opening of the building by M. Lebrun, President of the Republic, was followed by the holding therein of the fourteenth Congress of Industrial Chemistry (October 21–27). M. Jean Gérard, administrator of the Maison de la Chimie and secretary of the International Union of Pure and Applied Chemistry, hopes to develop the present center into a "Maison de la Science" where international congresses in all scientific fields can meet and be assured of the services of a staff accustomed to the organization of congresses. All those who have attended international gatherings know that the standard of efficiency with which they are run varies considerably, and that a little more attention paid to the purely technical part of their organization would often add considerably to their scientific value. We may therefore wish M. Gérard all the success that his plans deserve.

DISCUSSION

GEOLOGY AND ARCHEOLOGY AS BORDER SCIENCES

WHEN Professor R. A. Daly delivered the Silliman lectures at Yale University last winter he reminded his audience of the fact that there is a field of study which lies between the realms of the geological and archeological sciences. Professor Daly pointed out that much is to be expected in the near future from

an application of the concerted research methods of these two historic sciences and that such cooperation would prove very fruitful in helping us to decipher the story of ancient man. Probably few could appreciate Professor Daly's words as well as I could, for as a geologist I had recently experienced the disadvantages of ignorance on archeological subjects.

I had been working in Northern India and in the Kashmir Valley, sites renowned for their historic romance, when one day luck placed a most fortunate find into my hands. I had found an artifact, a stone fragment shaped by man in prehistoric times, lying *in situ,* embedded in an ancient swamp deposit. I was fully aware of the fact that I was on the trail of primitive man in the Himalayas, but being a geologist I asked myself how this find could help me to determine the age of the formation from which I had extracted the tool. To what period of prehistoric culture did it belong? To the Neolithic or Paleolithic? Quite obviously my find belonged to the latter group, for not only was it a primitive, still unfinished tool, but some stone flakes subsequently found in association with the tool indicated the existence in former times of a primitive human industry of a type which could only have flourished during the older Stone Age. Was the implement Chellean or did it belong to a younger culture, was it perhaps even late Mousterian which in Europe occurs in the interglacial strata which preceded the last ice advance? At that time I had as yet not located in Kashmir any fossil or glacial deposits which would have furnished proof of the Pleistocene age of the formation. As the find was made in the uppermost portion of a thick freshwater deposit I provisionally assumed a young Pleistocene age for the clays. I had found a guide fossil in the Pleistocene, but due to my ignorance of prehistoric cultures I was unable, temporarily, to use it for my stratigraphic work. I consoled myself with the thought that it was up to the prehistorian to determine the relative age which the tool represented within the type sequence of human industries. For the time being I decided to search for fossils and other geologic evidences which might be contained in this lake formation, and although I was more successful than my predecessors in this respect, the finds which I made were too fragmentary to reveal a complete record of the history of this lake basin. Had I known then, as I do now, that the tool belonged to an early Levalloisian type of industry which in both Europe and Africa is associated with Middle Pleistocene strata, I would have had a definite lead to guide my work in Pleistocene stratigraphy. Besides, had I been made conscious of the geological value of archeological finds I would in all likelihood have found more sites of Pleistocene man in the Himalayas.

It is the geologist's ignorance in archeological matters which causes him to miss many opportunities of contributing to one of the least known, yet most fascinating chapters of human history. A man may be an excellent field geologist and yet fail to recognize the buried traces of the human past. There are a good many incidents in geological exploration which illustrate this point. Before the war, while Professor Hans Reck was making a geological survey in East Africa, he collected some fossil bones of human origin in Pleistocene deposits. Apparently there were no artifacts in these strata and this was used as an argument against the fossil nature of the hardly mineralized skeletal remains. In 1926, Dr. L. S. B. Leakey began an organized search for Stone Age cultures in Kenya and he unearthed a complete sequence of Stone Age industries which yielded thousands of artifacts from Pleistocene beds. It was this archeological search which in 1931 culminated in the discovery of what now appears to be the oldest direct ancestor of *Homo sapiens.* The well-organized work of this expedition led eventually to a thorough study of the Pleistocene in Kenya and this in turn solved many important geological problems. Evidence was found of pluvial and interpluvial periods within the glaciated tract of East Africa and the surveying of the Pleistocene lead to new conceptions of Rift Valley structures and their connection with more recent volcanism. The prehistoric finds in themselves provide new food for thought for the archeologist in Europe, and already it appears very possible that the English Pleistocene geologist will benefit from this work in distant lands.

Without the close cooperation of archeologist, geologist and paleontologist, the discovery of these oldest remains of *Homo sapiens* in the old Pleistocene of Kenya would have been impossible. In the same way it is unlikely that Peking man would have been found had it not been for the late Dr. Davidson Black's ingenious linking of the physiographer's research methods with those of the paleontologist, geologist and prehistorian. Dr. George E. Barbour's studies on the loess problem and the physiographic cycles through which the Hoang-Ho drainage system passed, must be considered as fundamental to the coming researches on ancient man in Asia. It is in this type of work that the principles of physiography can be successfully applied to prehistoric studies.

For the sake of insuring a better control of prehistoric researches, there has recently been founded a "Committee on study of early man in North America," which is under the auspices of the Carnegie Institution of Washington.

From these examples the reader may gain the impression that already everything has been done to insure greater emphasis in the geologist's field work

on prehistoric problems and to make the archeologist more geologically minded. But the cases cited are exceptions rather than the general rule. In reality we are far from taking this cooperation very seriously. How often does it not occur that an archeologist returns from South America, Alaska or India without even troubling to call on a geologist for help in clearing up problems of stratification, paleoclimatology or paleogeography? If one takes a brief look at the histories of the more important archeological excavations, such as those at Ur and Babylon, Yukatan or Mohenjo Daro in India, one is struck by the lack of accurate geological information concerning these sites which is in our possession. It would have been a matter of small expense to have a geologist study the physiographic and stratigraphic records from which the archeologist could have obtained information of a paleogeographical nature. Such neglect has already caused great opportunities to be lost, particularly in Central Asia and Asia Minor, where the sedimentary records of climatic oscillations and of physiographic changes are frequently in a very complete state of preservation. In a very recent case of cave excavations in Asia Minor where unrivalled prehistoric treasures were brought to light with the greatest skill, no geologist was at hand to keep a detailed record of the Pleistocene sediments. And yet here was a great opportunity to link the culture sequences of the older Stone Age with eustatic changes of the Mediterranean sea level which seem to have left clear traces along the coastal plain. In this case much emphasis was placed on the paleontological record, but very frequently the paleontological record in an implementiferous deposit is too incomplete to enable us to reconstruct climatic or geographic changes. Sediments very often prove to be more reliable indicators. In any case more attention should be given to the possibilities of complementing the paleontological records by detailed geological observations. How stimulating such multiple approaches can be may be learned from the work on the history of Lake Lahonton in Nevada.

Judging from my own experience it seems to me that the neglected state of this border science is in large part to blame for the very slow progress which we have made in bringing about a clearer understanding of the involved history of the Pleistocene period and of its hominid records. I even venture to say that the present dearth of knowledge concerning Paleolithic man in North America may be due in no small part to inadequate information regarding primitive human cultures on the part of the geologist. The obvious remedy for this state of affairs appears to be to place greater emphasis on the knowledge of prehistoric artifacts, particularly of the more primitive cultures. These latter, which may be conveniently grouped together as pre-Chellean industries, are rather difficult to identify as human tools, when, as so frequently happens, they occur in a gravel deposit, and it requires some acquaintance with type examples before one can identify the unmistakable marks of human manufacture. Should opportunity to study artifacts be lacking, despite the fact that all our larger museums of natural history are provided with standard sets from Europe, there is always the literary approach, either through G. G. MacCurdy's textbook or through a more recent, very stimulating book by L. S. B. Leakey, "Adam's Ancestors" (London, 1934). The latter gives a fascinating review of the geology of ancient man and serves as a vivid introduction into the various techniques of stone manufacture. So much for the geologist. If he does his part a great advance in the study of primitive man will have been made, and one can only hope that the digging archeologist will meet him half way and will no longer be satisfied to bring a few inadequate rock specimens from his site but will become conscious of the value of geology as a border science to archeology.

H. DE TERRA

PEABODY MUSEUM
YALE UNIVERSITY

PERFORATED FIBER-TRACHEIDS IN THE PASSION FLOWERS

THE stem anatomy of *Passiflora vitifolia* H.B.K. from the Canal Zone has proved to be as interesting as its scarlet flowers are striking. This plant may run as a small vine through the undershrubs or on occasion it may become a liana reaching far up into the top of the forest.

As is the usual case in such plants the vessel elements are large, measuring up to 0.5 mm in diameter. Other cells in the xylem are fiber-tracheids, septate fiber-tracheids, libriform fibers and ray cells. The fiber-tracheids vary in length from 1 mm to 2 mm, the average width being 0.03 mm. The pointed ends are long and tapering, occasionally forked at one end or at both ends. The walls have numerous bordered pits with lenticular apertures. A large proportion of these cells have perforations. In most cases they are two in number, situated near the ends. Fiber-tracheids ending in extreme points, wherein the lumen is almost non-existent, have the perforations in the wider parts of the cell from one fifth to one third of the cell length from the end. The perforations establish unobstructed passages from one fiber-tracheid to another, never apparently to a vessel element nor to a ray cell. A small percentage of these perforated fiber-tracheids have but one perforation. Probably they are the end cells in the