cytology. For the benefit of any one who wishes to study the paper in Minkowski's Gesammelte Abhandlungen, Vol. II, pp. 3 ff., it may be noted, as proved by Dr. Paul Pepper, that a tetrahedron, reflected through the origin, which is an interior point of the tetrahedron, does not produce the octahedron that Minkowski believed. The locus of mid-points of all line segments which begin in one tetrahedron and end in the reflected tetrahedron is the cubo-octahedron. In particular, the vertices of the cubo-octahedron occur as the mid-points of line segments joining a vertex of the first tetrahedron to a vertex of the second tetrahedron not the reflected vertex of the first-mentioned vertex (for in that case the origin would be obtained). Thus there are 12 vertices.

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THE DISCOVERY OF THE FEMUR OF SINANTHROPUS PEKINENSIS

AMONG the extensive material recovered from Locality 1 at Choukoutein during the excavations of 1936–37 and subsequently prepared in the laboratory, Dr. W. C. Pei discovered two fragments of femora. The general appearance of these specimens led Pei to believe that they were of human origin and probably belonged to *Sinanthropus*. A careful study and comparison with human and anthropoid thigh-bones resulted in the conclusion that the femora undoubtedly belong to *Sinanthropus*.

One of these fragments, femur J, represents a portion of the middle of the shaft and measures 58 mm. The bone is completely fossilized and burnt, as is evident by the marked blackening of the entire anterior and medial surface and on the part where it was broken off. That we are actually dealing with a human femur is demonstrated by the form and size, but particularly by the existence of a rather distinct pilaster (Broca) which occupied the middle of the posterior surface and bears a well-developed linea aspera dividing into characteristic medial and lateral lips toward the end of the fragment.

The other fragment, femur M, embraces almost the entire diaphysis. Its length is 312 mm. This femur is also strongly fossilized. Like femur J this piece also shows a distinct pilaster running along the middle of the posterior surface and bears a linea aspera consisting of two lips. Estimated on the basis of the length of the preserved portion of the femur, the total length may have been 400 mm.

The femur of *Sinanthropus* has, in common with that of recent man, the general shape and the formation of a pilaster with a two-lipped linea aspera. In addition, there is a distinct suprapatellar fossa. On the other hand, the femur differs from that of recent man by its stoutness and the following specific features: (1) a very pronounced platymery of the entire length of the femur combined with the formation of a distinct pilaster; (2) a very faint curvature, the greatest height of which is located near the lower end of the diaphysis; (3) the transversal diameter of the shaft is narrowest near the lower end and gradually increases toward the upper portion; (4) there is a distinct but only faintly developed crista lateralis superior; (5) sections show that the cavity is narrow with rather thick walls, especially the anterior and posterior ones.

Femora of the Neanderthal group differ from the femur of *Sinanthropus* by their greater stoutness, the transversal diameter being narrowest in the middle of the shaft, by a much more pronounced curvature the greatest height of which is also located near the middle of the shaft, and finally by the development of a very strong crista lateral is superior. To what extent these differences are due to sexual characters is difficult to define. It seems that all the femora available of the Neanderthal group belong to male individuals, whereas I consider the two femora of *Sinanthropus* as belonging to females on account of the smallness of the two main diameters of the shaft.

When compared with the femora of great apes, those of *Sinanthropus* represent quite a different type. The general character of the shaft does not conform to any of them.

These discoveries of the *Sinanthropus* femora may also serve to shed some new light upon the problem connected with the *Pithecanthropus* femur.

Femur M of *Sinanthropus* differs from the *Pithecanthropus* femur by exactly those features by which it differs also from that of recent man. With reference to its popliteal surface the pronounced convexity of which Dubois considered typical for *Pithecanthropus,* the femur of *Sinanthropus* merely shows a slight convexity, as is common in recent man, the platymeric index of this region being 76.4 in *Sinanthropus* against 100.0 in *Pithecanthropus*.

It results from these facts that the *Pithecanthropus* femur is either one of recent man and with no close relationship to the skull-cap or it really belongs to the latter and thereby testifies that *Pithecanthropus* represents a much more advanced hominid type than *Sinanthropus*. I consider the first alternative to be the correct one.

My recently stated conclusion that *Sinanthropus* must have already adopted a completely upright posture has now been confirmed by the discovery of the femur. Since the total length of the femur (female) may have been about 400 mm, the stature of the woman can be estimated to have been circa 5 feet

(152 cm), a height which would correspond to 5 feet 4½ inches for male individuals. With such a height *Sinanthropus* ranges within the group composed of medium-size people of to-day. At any rate, it is certain that *Sinanthropus* was not a pygmy.

The three facts, namely, that the two femora were found as isolated pieces without any other human bones, furthermore that they represent only more or less complete specimens and finally that the fragment of femur J was burnt, point in the same direction as the finds of skull and jaws. All the *Sinanthropus* bones recovered from Locality 1 of Choukoutien had received the same treatment as the game which *Sinanthropus* hunted. This hominid, therefore, was a cannibal.

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INDUSTRIAL RESEARCH LABORATORIES

THE increase in the number of research laboratories maintained by industrial concerns in the United States during the last few years has made it seem desirable to issue a new edition of the National Research Council's Bulletin, "Industrial Research Laboratories of the United States," fifth edition.

On March 25 questionnaires were mailed to the 1,562 concerns which were included in the last edition of 1933, and to a large number of new concerns which are thought to maintain laboratories.

If the reader of this note is a member of a firm which maintains a laboratory where research looking towards the development and improvement of products is carried on, it is hoped that he will ascertain whether a questionnaire has been received by his company, and if not that he will request one from the Library, National Research Council, 2101 Constitution Avenue, Washington, D. C.

There is no charge for the entry in the bulletin, the only requirement being that the laboratory is undertaking research.

It is desirable to have the information for the bulletin in hand as soon as possible so that the publication may appear within the current year.

CALLIE HULL,
Librarian

THE CYCLOPEDIC VALUE OF BIOLOGICAL ABSTRACTS

THE value to the research worker of an up-to-date synthesizing abstract service covering the world's progress in the broad field of biology has been stressed from many view-points and by many individuals. This was the primary aim in launching *Biological Abstracts*. What has not been sufficiently emphasized is the fact that outside his own field the specialist immediately becomes a layman, who, if he is an intelligent layman, is constantly seeking information on a wide range of subjects cropping up in his daily life at every turn and about which he knows little or nothing.

Even without an adequate abstracting service, I in my own field of phytopathology am not irrevocably lost, because I have at least some idea as to where I must look to find out what I want to know. The task may be exceedingly laborious, but it at least is not entirely insurmountable. However, the further I go from my own field the more I am reminded of the babes lost in the woods. The information in textbooks is often ten years old before it is out, the indexes are rarely if ever adequate, and unless I am fortunate enough to have a large library at my elbow even such sources are not available to me.

I am reading an interesting article on *Arbacia*. My early zoological training not having sunk entirely beyond recall, I remember it to be an animal of some kind, but where does it belong? I reach for my *Biological Abstracts* index. Under *Arbacia* I am referred to the taxonomic index, and, presto, I know that it is an echinoderm, and if I wish to go further the detailed analytical index refers me to specific and diverse information on many species of the group. Examples might be multiplied indefinitely: I am in doubt about the spelling of an insect name. Knowing the infinite care with which Dr. Mary Jones Fisher has checked over the spelling of zoological names in *Biological Abstracts* I am as confident as though I had gone to the original source. I want to learn quickly some specific point about diet, this or that vitamin, the effects of sodium chloride on the system, what does the electrocardiagram mean in terms of life processes or expectancy, what human diseases are spread by insects, what are the effects of light on plants and animals, etc., etc. The taxonomic, geographical, geological and fully cross-referenced, detailed analytical subject indexes of *Biological Abstracts* lead me quickly to most of what I want to locate in the daily routine of work and general reading.

I am not suggesting here the potential usability of *Biological Abstracts* as it might sometime become, but rather am presenting my own actual personal experience with it as it was yesterday and is to-day. I shall continue to use it in such a capacity for years to come, even though no further issue should ever appear.

What does all this boil down to, but that the value of *Biological Abstracts* can scarcely be overestimated, even when viewed solely as an up-to-date encyclopedia of information on all matters pertaining to living things, for the daily use of intelligent, inquiring minds, old and young. The educational value in high schools, colleges, industries and homes of such an encyclopedia