(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

of biology brought up to date year by year and provided with the thoroughly adequate types of indexes so carefully worked out by Dr. J. R. Schramm is a matter which can not be lightly turned aside.

For the sake not only of its value to science, but also of its educational and reference value to students and intelligent citizens generally, it is to be hoped that the future of *Biological Abstracts* may be assured.

FREDERICK V. RAND

WASHINGTON, D. C.

SOCIETIES AND MEETINGS

A SYMPOSIUM ON THE ALGEBRA OF GEOMETRY AND RELATED SUBJECTS

A SYMPOSIUM on the algebra of geometry and related subjects was held at the University of Notre Dame on February 11 and 12. Algebra of geometry, not to be confused with algebraic geometry in the classical sense, is a foundation of geometry starting with one class of elements (points, lines, planes, etc.) and two undefined operations called joining and intersecting of elements. It is based on a few simple formulas about these operations, similar to and partly identical with the formulas about addition and multiplication on which the ordinary abstract algebra is founded. That is why mathematicians in Vienna called the calculus which they developed from these assumptions algebra of geometry. In an algebraic way, one can define when an element is part of another element, and then make precise the famous initial words of Euclid "point is that which has no parts." Lines, planes and n-dimensional elements can be defined and the ordinary axioms of geometry be deduced.

In the first of the four meetings, Dr. Marshall H. Stone, of Harvard University, presented a paper on the applications of Boolean algebra to topology. Boole's algebra of logic can be obtained as a special case of the more general algebra of geometry. Mr. Garrett Birkhoff, of Harvard, who, in this country, discovered and developed the algebra of geometry under the name of theory of lattices, presented new applications of his theory to partly ordered function spaces. Dr. E. W. Chittenden, of the University of Iowa, conducted the discussion.

The second meeting, under the direction of Dr. R. T. Hildebrandt, of the University of Michigan, dealt with applications to the theory of groups. Dr. O. Ore, of Yale University, spoke about what he calls structures of groups, *i.e.*, systems of subgroups of a group, which may be joined and intersected like points, lines and planes in geometry. Dr. Saunders MacLane, of the University of Chicago, presented an application of lattice theory to the structure of fields of numbers. Dr. James K. Senior, of the University of Chicago, mentioned some unsolved problems concerning structures of groups, whose solution would be of importance to organic chemistry.

The following morning, Dr. John von Neumann, of the Institute for Advanced Study, Princeton, presented his continuous geometry, in which there are no points and the dimension of the different objects assumes all values between zero and one. Dr. Karl Menger, of the University of Notre Dame, spoke about the algebra of affine geometry developed by F. Alt and himself. Pointing out the desirability of similar algebraic foundations for non-Euclidean and other geometries. The discussion was directed by Dr. I. A. Barnett of the University of Cincinnati.

The last meeting, conducted by Rev. H. Kenna, C.S.C., of the University of Notre Dame, dealt with algebraic questions. Dr. A. A. Albert, of the University of Chicago, spoke about applications of division algebras to geometry. Canon Lemaître, of Notre Dame and Louvain, presented a paper applying hyper-complex numbers to Eddington's interpretation of the equation of Dirac. Dr. Emil Artin, of Notre Dame, gave new proofs of algebraic theorems containing as a special case the theorem of Wedderburn which, applied to geometry, shows that in a space consisting of a finite number of points the law of Pascal is a consequence of the law of Desargues.

On the first evening, Dr. Edward V. Huntington, of Harvard University, gave a general lecture on the method of postulates, entitled "The Duplicity of Logic."

The meeting was attended by a group of more than fifty visitors from various parts of the country.

KARL MENGER

UNIVERSITY OF NOTRE DAME

REPORTS

INDUSTRIAL RESEARCH INSTITUTE

FOR sometime now the research executives of middle-sized industrial corporations, well known for their advanced position in research in their respective fields of industry, have felt the need of an organization in which they could discuss common problems principally concerned with organization and administration of research laboratories.