A complete presentation of any physical theory involves two parts: first, a statement of the general laws governing the phenomena, and second, an application of the laws to some specific problems of interest to us. Thus in the time of Newton, the scientific thought of the day agitated itself concerning the consequences to be expected from the supposition that the heavenly bodies attracted each other with forces which varied as the inverse square of the distances between them. This constituted the general law, but it remained for Newton to show that one of the consequences of this law was that a planet would travel around the sun in an ellipse with the sun at one focus. This constituted the solution of a particular problem based on the general law.

Again when in 1915 Professor Einstein brought out his general theory of relativity some of the most interesting consequences resulted from his success in applying it to the motion of a planet around the sun, to the motion of a beam of light past the sun and to some of the peculiar motions of the heavenly bodies which were not readily understandable in the Newtonian theory.

It now appears that Einstein has succeeded in working out the consequences of his general law of gravity and electromagnetism for two special cases just as Newton succeeded in working out the consequences of his law for several special cases. It is frequently very difficult to solve special problems illustrating the application of a general law, yet the practical value of a law is enhanced in proportion to the extent to which it is capable of being applied to practical problems. When some actual problem arising in a general theory has been solved, we are in a position to formulate experiments on the basis of that problem with a view to testing the general theory underlying it. It is hoped that the present solutions obtained by Einstein, or if not these, then others which may later evolve, will suggest some experiments by which the theory may be tested.

W. F. G. SWANN
BARTOL RESEARCH FOUNDATION OF THE FRANKLIN INSTITUTE,
SWARTHMORE, PENNSYLVANIA

CONFERENCE AT CHICHEN ITZA

DURING the third week of January there was held at the archeological field station of the Carnegie Institution of Washington at the ruins of Chichen Itza an informal conference of persons interested in development of researches bearing upon the history of man in the Yucatan peninsula. The following were present: Sr. Eduardo Martinez Canton, inspector of archeological monuments for the State of Yucatan, representing the Mexican government; Dr. F. M. Gaige, biologist, of the University of Michigan; Dr. Robert Redfield, social anthropologist, of the University of Chicago; Mr. C. L. Hay and Dr. George C. Vaillant, archeologists, of the American Museum of Natural History; Dr. George C. Shattuck, of the Department of Tropical Medicine, School of Public Health, Harvard University; Dr. A. M. Tozzer, chairman of the department of anthropology, Harvard University; Dr. Eyler N. Simpson, of the Institute for Current World Affairs, and Dr. S. G. Morley, Mr. Karl Ruppert, Mr. H. B. Roberts and Dr. A. V. Kidder, archeologists, of the Carnegie Institution.

The purpose of the gathering was to discuss, without agenda and in a purely preliminary way, the desirability of bringing to bear upon the historical problems of the area the resources of various disciplines and to consider methods for the prosecution of cooperative research. It was accepted as a premise that historical evaluation of the archeological facts derived from the excavations of Dr. Morley and his staff would be rendered immeasurably more precise by the accurate knowledge of environmental conditions which could be supplied by specialists in biology, geology, meteorology, etc.; and of information as to human factors, past and present, which could be collected by workers in documentary history, medicine, comparative linguistics and the several social sciences. It was taken for granted that the findings of such non-archeological specialists would not only be of intrinsic value to the sciences represented by them, but that they would gain cumulative importance because geographical concentration would permit pooling of data, interchange of ideas, as well as formulation of combined attack upon problems of common interest. It was felt by the majority of those present that precise statement of objectives and rigid organization would be unwise; that research should be allowed to flow in such channels as the shifting contours of individual investigations might throw open; and that propinquity and the mutual interest stimulated by simultaneous attack upon related problems would lead naturally to a more effective type of cooperation than could, in the present embryonic state of most methodologies, possibly be planned in advance.

The conclusion, therefore, was that all studies should be independent, intensive and highly specialized, and that limited and definite goals within each science should be aimed for. A historical view-point, in the broadest sense (in other words a consciousness of the implications of the time element in the recording and interpretation of phenomena), should, however, be adhered to; and close but informal touch should be maintained among all workers in order that they should keep cognizance of the methods, the general trends and the bearing upon their own fields of each other's activities.

The above more or less theoretical aspects of the

matter having been considered, attention was turned to specific investigations and stock was taken of researches in progress or in contemplation. At present under way are the following: Archeological work at Chichen Itza, under direction of Dr. Morley, now in its seventh year; excavations at Uaxactun, Department of the Peten, Guatemala, under direction of Mr. O. G. Ricketson, Jr., fifth year; heiroglyphic research by Dr. Morley; ceramic survey of the Maya area by Carnegie Institution, being inaugurated during the present year by Mr. Roberts (all the foregoing are projects of Carnegie Institution); medical survey of the Yucatan peninsula by Harvard University and Carnegie Institution, now in its second year; records of Chichen Itza clinic administered by Miss MacKay, third year; biological reconnaissance (1930) by University of Michigan, Dr. Gaige; ethnological reconnaissance (1930) for Carnegie Institution by Dr. Redfield, of the University of Chicago; studies of Maya linguistics at Chichen Itza by University of Chicago, Dr. Andrade (1930).[1]

Proposed activities of the Carnegie Institution are: historical work on the Conquest and the Colonial Period; retranslation and collation of the books of Chilam Balam; investigation in physical anthropology by Department of Genetics; air-survey of Maya area. All the above were discussed, and consideration was given to the relation to various aspects of the project of climatology, geology, sociology, psychology, etc. Advantage was taken of the presence of Messrs. Tozzer, Hay and Vaillant to review in detail the local archeological investigations of the institution, to consider its wider implications and to solicit their advice as to future activities.

A. V. KIDDER
CHAIRMAN, DIVISION OF HISTORICAL RESEARCH, CARNEGIE INSTITUTION OF WASHINGTON

SCIENTIFIC APPARATUS AND LABORATORY METHODS

LABORATORY AND TEACHING DEVICES MADE FROM PLASTER OF PARIS

OCCASIONS in the teaching and research laboratory often arise when an irregularly shaped vessel or chamber is desired or when one wishes to construct a teaching model which will greatly resemble the original. For this purpose plaster of Paris has long been used. Several decades ago A. Edmunds[1] used it for the construction of kidney and intestinal oncometers. More recently the writer has had occasion to employ it for both teaching and research apparatus.

Some time ago while teaching a general course in hygiene and public health at the summer session of a normal school, the writer discussed the utility and necessity of septic tanks in rural or semi-rural communities. The difficulties in explaining the various features of septic and Imhoff tanks were well-nigh unsurmountable. This led to the idea of constructing small models of these tanks.

Using the proportions given in the standard text and reference books, but greatly reducing the dimensions, foundations were made from wire cloth such as is used in screen doors; the corners were either bound with fine wire or soldered. It was found best to use small wooden strips as stretchers inside of the frame until after the first, external, coat of plaster had hardened. These stretchers were then removed and a coat of plaster was applied to the internal surface of the wire. After this coat had hardened, irregularities were removed by scraping with a knife, rubbing with coarse sandpaper or by the application of a thin mixture of plaster of Paris rubbed down with the fingers. Small brass pipes were used at the points where the inflow and outflow pipes are regularly found.

When constructing Imhoff tanks, it was found best to make the floor and side walls of the settling or upper chamber of glass plates in order to render the interior of the sludge chamber visible. The sludge pipe was made from a piece of $\frac{3}{8}$-inch brass pipe to which was soldered a short length of the same sized pipe at a 15° angle. This latter short piece of pipe was passed through a hole made in the side wall of the model after which repairs to the wall were made with plaster.

Recently during an investigation of the circulation of the liver,[2] the writer found it necessary to construct an air-tight chamber suitable for receiving the livers of cats, dogs and rabbits in their natural position while fluid was being perfused through them. In this case a V-shaped box was made from $\frac{1}{4}$-inch wire netting, the corners soldered, and this box was covered with plaster of Paris in the manner described above. Here, however, the open edge was built up well above the wire frame and nearly an inch wide. When the plaster was well hardened, the box was held in the obverse position and the edges about the open end were ground smooth with sand paper so that a piece of glass would form a closely fitting cover. A beeswax-vaseline mixture of proper melting-point was

[1] A. Edmunds, *Journal of Physiology*, 22: 380, 1898.

[1] Summaries of the results of these units of work will appear in the Year Book of the Carnegie Institution in December, 1930.

[2] A. R. McLaughlin, *Journal of Pharmacology and Experimental Therapeutics*, 34: 147, 1928.