For one thing, the window-dressers in the better department stores long since discovered the fundamental importance of unity, emphasis and coherence, and they have also hit upon the high value of the rest, or interval of empty space, for the bewildered eye.

Ineffective public instruction is exemplified when great crowds of people merely drift by an exhibit and never think of it again. Effective public instruction is achieved when people stop, look, read, mark, learn and inwardly digest, the exhibit, so that it adds permanently to their stock of useful knowledge. But in order to maintain public instruction in a state of vitality there must be a constant stream of new discoveries, new scientific material, new exhibits, and there must be a perfect cooperation between the producers of scientific values and the teachers thereof.

Fortunately the trustees and staff of the Academy of Natural Sciences of Philadelphia some years ago discovered that something very radical must be done to an old-fashioned museum in order to preserve and harmonize its functions as a treasury of scientific material and as a center of research, with its function as an active teacher of scientific principles. Already great progress has been made, as any one can see by visiting the beautiful galleries of mammals, or the striking individual exhibits already installed in the hall of geology and minerals. Moreover, the academy has never failed to realize that its primary function is that of an active research and publication center, so that even in the worst days of the depression it continued to publish the results of investigations by the preeminent scientists who are the real fount of its power and prestige.

The plans set forth in the brochure entitled *"Frontiers"* would, if means could be found to carry them out, place the Academy of Natural Sciences of Philadelphia in the forefront of those institutions which are opening up and exploring the vast fields of science and education. The academy can be enabled to carry out this splendid program of public instruction in the principles of science only if the citizens of Philadelphia realize its great value to them and help to bear the cost of transforming a Museum of Things into a Museum of Ideas.

THE PHYSICIAN AS ANTHROPOLOGIST

By Professor T. WINGATE TODD

WESTERN RESERVE UNIVERSITY AND BRUSH FOUNDATION

THE sudden and untimely death of my distinguished colleague, Dr. Roger Griswold Perkins, floods my mind with memories of significant accomplishments and fills my heart with gratefulness for creative insight and the enthusiastic promotion of an ideal which bids fair ultimately to rank among the most practical of dreams which ever took shape within the fertile brain of man.

To the American familiarized even to the point of commonplace with the rapid growth of cities those basically constructive measures which make congested areas fit for habitation are too often taken for granted. But to one like myself, born and bred in the Old World, the miracle of health in such a neighborhood must always stand as the most striking of the gifts to mankind by men whose ambition is fulfilled in service without the mead of praise. Here was the man who took the typhoid out of Cleveland water; built up the city's division of health; insisted on the proper inspection of food; the man behind the Cleveland Health Council. Yet on his retirement this metropolitan area of three million souls, each one of whom owes to Dr. Perkins security of health, could let him slip quietly away without a word of acknowledgment to his homestead in Rhode Island, so sated are our people with service and security.

This present testimony, however, draws attention to a still more fundamental contribution to human welfare than making life safe for a legion of fellowmen. It happened that, by the inscrutable working of destiny I, who had found my greatest thrill, under the guidance of Sir Grafton Elliot Smith, in delving into the mortality statistics of the ancient Egyptians, while this was still possible pending completion of the Assouan Dam, was thrown into professional association with Dr. Perkins, who, like myself, had been too busy with the daily round to formulate the principle which was the mainspring of endeavor. It was obvious, however, from these studies on the imperishable remains of an early people that no adequate time-table of the impact of life upon humanity could be constructed except in a center where official enlightenment makes possible the serial study of human beings in life and death. Cleveland was the one community where this was possible and Perkins the one man who could make that study effective. His accession, in 1911, to the chair of hygiene and preventive medicine the year before my arrival and his growing prestige in municipal and county management made possible the study which we both had planned. His guidance and diplomatic tact made possible the substitution of a Permanent Morgue for the Potter's Field, and that permanent morgue to-day comprises 3,000 of our fellow townsmen, most of whom, recruited from our local hospitals, brought with them the essential records for analysis

of that human biology without which the skeleton and brain are no more than the sealed casket of the lost secrets of life. The influence of the late dean of medicine, Dr. C. A. Hamann, ensured university approval and support. And thus developed the greatest research collection of documented human and anthropoid skeletons available for study to-day.

Many industrious workers from this continent, Europe and the far East have demonstrated that the material records housed in the Hamann Museum are but the end results of the human growth pattern warped, interrupted or inhibited by those disabilities which, in their varying intensity, scar the human frame. For though the internal organs recover their functional integrity it is the framework of the body which bears the scars of misadventure.

By 1924 it was apparent that the impassable barrier encountered by physical anthropology is this unsolved problem of the growth pattern and its vicissitudes. Sheering off from this closed approach physical anthropology has spent its energy in an attack upon race for the practical consideration of which one anthropologist alone, Dr. Franz Boas, has clearly seen the clue. Race has been magnified through national prejudice and this one voice calls us to clear thinking on the tangle of human relationships. Any local race or type living in cultural or social isolation among the surrounding population will inevitably persist as an unassimilated minority. But in so far as cultural or social barriers are removed, that local race must inevitably merge with the surrounding population and eventually become indistinguishable in culture, customs and psychological reactions, maintaining only those hereditary characteristics inherent in the family strain.

The institution in 1925 of the Cleveland Health Council gave Dr. Perkins his chance, and he took the second step in the synthesis of which I write. This required the serial observation of growing children, while those influences which modify and twist the growth pattern are still in active operation. It meant the breaking down of traditional barriers in medical study and resulted in the Anatomical Laboratory being transformed from a charnel house into a well-children's clinic. Through the active help of the Cleveland Board of Education this was done and the first financial aid was secured for the purpose by the Health Council itself. Slowly there emerged the evidence that the living child is a very different individual from the dead. Hitherto all our known records of developmental growth had been obtained from the bodies of dead children, retarded and contorted in their growth patterns by the slow insidious poison of disease. But now, in contrast, the patterns of the living children revealed fulfilment of latent potentialities, both structural and functional, denied to those who had fallen before the onslaught of disaster. This theme became the topic of the White House Conference: it finds expression in the volumes published under the leadership of Dr. Kenneth D. Blackfan and is reflected in the Children's Charter.

It was this theme, so amply demonstrated by the comparison of records on the living and the dead which gave Dr. Perkins his crowning inspiration. By the accident of fate he had become the son-in-law of the late Dr. Charles Francis Brush, the inventor of the arc lamp and the storage battery. It was Dr. Brush's ambition to see mankind helped toward a fuller realization of potentialities, since in man himself, not his environment, lies the secret of adjustment and content. Dr. Perkins, aided by his indefatigable wife and staunch friends, showed Dr. Brush that the surest way to this goal was by a long and toilsome route, the safeguarding of the well-born child. Thus the Brush Foundation came into active operation in 1929. Its object is to explore and define the latent potentialities of humanity with the aim of ultimately attaining their fulfilment. This movement, started in Cleveland, has developed to large proportions in the past seven years. Dr. Brush clearly saw that his foundation, generous as it was, could never accomplish unaided the program which Dr. Perkins spread before him. It must be seconded by other farseeing philanthropic efforts. Cleveland has been quick to realize human welfare in the broadest sense. The passing years have seen this movement grow. In 1930 Charles Bingham Bolton and his mother, Mrs. Chester C. Bolton, set up the fund which bears their name, so that, under my able colleague, Dr. B. Holly Broadbent, there might be provided, in facial and dental developmental growth, the counterpart of Dr. Brush's study of bodily developmental pattern. In 1930 national funds extended the study to a record of the developing mind. In 1933 began the Edna Perkins study of adolescent girls for the purpose of mitigating if possible the ravages of tuberculosis. In 1934 the Cleveland Foundation took up the investigation of constitution as part of its Coulby Fund endeavor on behalf of sick, needy and crippled children. In 1934 also the Richman Fund for the study of personality was established by Mr. Charles Richman, whose recent death cut off one whose sympathies recognized neither race nor creed but not before the leaven of his humanity had permeated this grateful city. In 1935 the Allergy Foundation joined the group to provide a clinical background for the Cleveland Foundation study.

The result of these united efforts is the Developmental Health Inquiry of the Associated Foundations. In the program serial longitudinal studies are made of growing children accepted originally by lustra of five

years to ensure inclusion of all stages in development from conception to parenthood. Preconceptional parents, expectant mothers, children at every age level are methodically studied from the point of view of constitutional fitness and developmental health. It is not a clinical examination but one of human biology in which, however, physician-in-charge as well as parents and educators join with the foundations, each participator supplying his special information to the common stock. Studies are made of progress, not of status, and cover the following themes: Growth increments and proportions, physical maturity progress, weight gain and analysis, dento-facial development, brain potentials and muscle action currents, mental expansion, psychomotor development, hand-eye coordination, motor development, skills, steadiness, dexterity, emotional stability, intellectual and social adjustment, interests and talents, personality ratings, vocational leanings and choices. It is obviously as nearly complete a study of the preparation of human beings for entry into full citizenship as a practical scheme will permit. It is, moreover, facilitated by the essential services of instrument-making, chart-making, statistics, photography and motion picture studies, the resources of the Hamann Museum, of the experimental laboratory for constitutional chemistry and of the animal farm maintained by the Anatomical Department and its Associated Foundations.

Here, then, is the answer to the appeal made by my brilliant and vigorous colleague, Dr. E. A. Hooton, in the pages of SCIENCE for March 20, 1936; an answer originating indeed in the casual scratchings of medical leisure but now a truly cooperative effort covering the disciplines pertaining to body, mind and constitution; an answer in which medical science, far from myopic, works forward from the cradle, not backward from the morgue, except in so far as death is but the stepping-stone to a larger more abundant life; an answer for which we are indebted in its inception to the man who took the typhoid out of Cleveland water.

SCIENTIFIC EVENTS

THE BRITISH INSTITUTE OF PHYSICS

Nature reports that the annual general meeting of the Institute of Physics was held on May 19. After election of the officers and completion of the panel of the board, it was announced that the following would take office on October 1, 1936: *President,* Professor A. Fowler; *Vice-president,* F. Twyman; *Honorary Treasurer,* Major C. E. S. Phillips; *Honorary Secretary,* Professor J. A. Crowther; *New Members of the Board,* Colonel K. W. E. Edgcumbe and Professor R. Whiddington.

The annual report for the year 1935 which was adopted at the meeting shows that membership has continued to increase and that the high standard required for corporate membership has been maintained. The total membership at the end of the year was 822.

The first Industrial Physics Conference to be held in Great Britain took place in Manchester in March, 1935, and the attendance was nearly 550. The subject of the conference was "Vacuum Devices in Research and Industry" and an exhibition of instruments, apparatus and books cognate to the subject was arranged and was open to the public. Some 3,500 people visited the exhibition.

A Midland Local Section was inaugurated in November, the towns covered being Birmingham, Leicester, Nottingham and Rugby.

The report shows that the scheme for the training and certificating of laboratory assistants has developed satisfactorily and 21 certificates were issued during the year. The institute's services in placing employers in touch with physicists seeking permanent posts and with consultants were in constant demand throughout the year. The circulation of the *Journal of Scientific Instruments* increased during the year, both on account of the commencement of its distribution to "associates" without extra payment and on account of sales to non-members.

THE BRITISH INSTITUTE FOR THE STUDY OF ANIMAL BEHAVIOR

THE British Institute for the Study of Animal Behavior has been formed by a number of zoologists, naturalists, physiologists and psychologists with the object of promoting and encouraging research into animal behavior. The institute intends to act as a clearing-house for information regarding work that is being done upon animal behavior in all its aspects and to bring together for the discussion of their problems field and laboratory workers. It is hoped to issue to members a quarterly bulletin in which will be provided summaries of and references to the chief work being done in the various branches of the subject. Meetings for the transactions of scientific business will be held at intervals.

The institute hopes eventually to obtain the means of supporting research and, possibly, of maintaining its own research station.

Those whose work is concerned with animal behavior will materially assist the task of the institute if they will send offprints of their papers to the Honorable Secretary, R. C. Oldfield, The Psychological Laboratory, Cambridge.

Officers of the society have been elected as follows: