SCIENCE

VOL. LXIX FRIDAY, JUNE 7, 1929 No. 1797

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SCIENCE: A Weekly Journal devoted to the Advancement of Science, edited by J. McKeen Cattell and published every Friday by

THE SCIENCE PRESS

New York City: Grand Central Terminal.
Lancaster, Pa. Garrison, N. Y.
Annual Subscription, $6.00. Single Copies, 15 Cts.

SCIENCE is the official organ of the American Association for the Advancement of Science. Information regarding membership in the Association may be secured from the office of the permanent secretary, in the Smithsonian Institution Building, Washington, D. C.

THE TWENTY-FIFTH ANNIVERSARY OF INITIATION OF RESEARCH IN THE CARNEGIE INSTITUTION OF WASHINGTON[1]

THE founding of the Carnegie Institution of Washington was of peculiar significance as an influence turning attention toward advancement of knowledge, as contrasted with its restatement or transmission. The establishing of an agency for this specific purpose did not indicate that such activities were considered either more or less important than educational work. It presented rather a coordinate or supplementary program, which would naturally gear itself closely to that of institutions designed initially for the work of education, or for other special applications of knowledge.

A group of the principal departments originated in 1904. Among them were Terrestrial Magnetism, Mount Wilson Observatory and Experimental Evolution. The last of these formed the basis for development of the present department of genetics. In the history of the institution many types of organization have been used, and there have been numerous changes in statement of program. So the contribution of Mrs. Harriman, through gift of the Eugenics Record Office with its generous endowment, led in 1921 to union of eugenics and experimental evolution in the Department of Genetics.

In somewhat similar manner the Division of Plant Biology, established in 1928, shaped itself to embrace the work of six sections, including physiology of growth, photosynthesis or the utilization of solar energy by the plant, classification and its relation to heredity and environment, studies on the influence of aridity, the section concerned with relationships to environment, and one devoted to the history of plants.

Development of the institution illustrates what have seemed to be the needs of organization in attempting to secure the largest measure of return in investigation. Recognition of research as in itself an essential human activity had not attained the wide acceptance of the present decade, and much of the effort of the institution was given to support of investigation wherever opportunity might be found. The interest of Mr. Carnegie in discovery of genius or the exceptional man found expression in numerous spe-

[1] Addresses given at Cold Spring Harbor, May 31, 1929, Dr. Henry S. Pritchett, vice-president of the board of trustees, presiding.

cial grants, designed generally for personal work in specified fields.

With continuing study of opportunities for constructive work it was apparent that, in addition to the discovery of genius, advance of knowledge depends in some measure upon the possibility of bringing into research a degree of cooperation comparable to that which has been broadly characteristic of human relations in the advance of civilization. Out of this idea arose a type of department making possible concentration of effort upon a major problem, and opening the way also to effective advance of genius working in relation to other coordinate interests.

From the earlier trend of the institution toward extreme, and sometimes isolated specialization, the more fully appreciated unity of knowledge in present-day thinking has brought once more a recognition of the interdependence of all scientific groups. Cooperative researches, including the most widely separated departments and investigators, have developed a unity of interest and operation within the institution. They have brought into close relationship many elements which seemed only remotely related in objectives, and were widely separated geographically. In general the community of interest developed is at least as intimate as that which obtains within the spatially narrow limits of a campus. So we see the geophysicist and astronomer make plans for joint spectroscopic study of gases flaming from the inner earth; we find the physicist, chemist and astronomer turning their concentrated interest upon the crucible of the sunspot or the spectra of remote nebulae; in biology the physicist and geneticist unite to wrest the secrets from the chromosome; in another region the plant physiologist, the mathematical astronomer, the paleobotanist, the archeologist, and the meteorologist enter together upon study of varying patterns in the rings of a fossil tree, in order to learn the habits of the sun in radiation of its energy in a remote geological period.

To-day we find the institution utilizing all the major types of activity that have arisen in the quarter century experiment of its organization. There are still widely ranging special grants. Great departmental activities still represent concentrated effort in specific fields. The increasing mutual interest among research groups has not diminished the initiative of the individual. With the passing of time the element of broader cooperation within the institution has made more effective both the special concentration on particular projects and the development of that wider view so essential in long-continued research operations.

As the institution developed and research production attained considerable volume, it became clear that one of the greatest responsibilities relates to the making of results available for others. Whether this concern the investigator, the general student, or the intelligent citizen, there is increasing realization that if the treasures obtained are hidden in labyrinths bounded by unmeasured walls of printed pages, they may bring relatively small contribution to the community which makes possible the joy of this work.

In activities concerned with the field of the unknown, it will always be difficult to devise arrangements by which the information secured can be disseminated directly to those for whom they have largest use. But it is at least true that in the work of the institution, each year sees real increase in effectiveness of statement, interpretation and distribution of materials. This applies not only to means used in reaching other specialists of the same field. It concerns as well the extremely important opportunity for communicating the results to students of related subjects, as also to the engineer or applier of knowledge, and to those with interest in knowledge for its own sake.

There has not appeared in these developments a tendency to direct institution activities into the field of education as it is generally known. There *is* expressed the recognition of a responsibility for transmitting information regarding researches in progress in such manner as to attain as nearly as possible full value for the work as it proceeds.

The exhibits presented here to-day for the inspection of our friends illustrate one aspect of our view with relation to interpretation of research. They are the materials used in significant investigations now under way, and are planned to make a simple statement of the problems attacked. They are naturally in the main obtained from the laboratory at which we meet. They have special value because of the opportunity to see them through the eyes of those who have conducted the investigations. In addition to indicating the character of the questions asked of nature they show the mode of approach in attempting to obtain answers. If the story could always be told as effectively as it is developed here, we should have advanced far in bringing research to a point at which the statement of its results would be at once an extremely effective form of education.

Concrete illustrations of the tendency to relationship among investigating groups of the institution are furnished through several groups of exhibits. In the first building there is illustrated a research on the development of the mouse, and the influences which may affect these changes. It is interesting to note that the early growth stages, showing division of the mouse egg into complex cell-structure, have been furnished by cooperation with our department of embryology in Baltimore.

In the second building the exhibit, expressing the extremely important relation between the thyroid glands and the process of metabolism or energy production, is a joint investigation carried on by Dr. Riddle, of the department of genetics, and Dr. Benedict, of the department of nutrition in Boston. It contributes on the one hand to interpretation of metabolism, and, on the other, concerns that extremely important influence of the endocrine glands which plays so large a part in the later stages of development. By way of the department of nutrition, this investigation has also close relationship to still other researches in the field of nutrition which are conducted under support of this institution by a distinguished group of investigators led by Dr. Mendel at Yale University.

The exhibit by Dr. Blakeslee, in the first or main building, representing through use of the jimson-weed one of the outstanding studies of the mechanism of heredity and mode of development in plants has its intimate relation to much of the research furthered by the institution's division of plant biology. Especially closely does it touch the genetical researches of Dr. Belling, of that group, and the cooperative investigations of Dr. Babcock in the University of California.

The exhibit of Dr. Banta, in the first building, illustrating influence of various external conditions upon sex and other features in development, is one of the outstanding studies concerning relation between hereditary tendencies and environmental influences. Another institution research of comparable type is that of Dr. Clements, of our division of plant biology. Dr. Banta's investigations are limited to study of a small group of organisms, water fleas, examined by a wide variety of methods, and over a long period. The studies of Dr. Clements concern more especially the relationships of great masses of individuals in relation to their environment under conditions as they are found in nature.

In the Eugenics Record Office on the hill above us, Dr. Laughlin's unique genetical researches in inheritance of physical and psychological characters of the thoroughbred horse make direct contribution toward the study of inheritance of physical and mental characteristics in man.

But the background against which these interesting accumulations of experience in observation of the horse must be projected, is formed by such researches as those on the fruit fly under the hand of Morgan, Metz and many others, on the larkspur as examined by Demerec, on the study of variation in maize, on the chromosomes of the jimson-weed, and through a whole new world of knowledge developing in many institutions engaged in research.

The special studies on human inheritance and development, constituting Dr. Davenport's culminating problem of the Eugenics Record Office, depend not only upon the broad foundation of researches extending from genetics through all biological and physical sciences, but connect us in other directions with a great field of inquiry on specifically human questions, presumably not to be solved solely by study of plants or lower animals.

One of the interesting illustrations showing relationship of this work to that of another institutional activity is found in the cooperation between genetics and early American history in a study of race mixture. On the biological side there are involved the elements of inheritance through the chromosome, and the influence of the ductless glands upon development. The biological researches lead into investigations of mental traits and the consideration of human thinking and emotion, in which science has done little more than to lay out a region where it expects to make progress by the scientific method.

On the historical side of the work we see another group of students slowly but surely bringing together the kaleidoscopic picture of human experience. Essentially it seems an expression of the potentiality of man in nature with respect to change in accordance with law.

While genealogy, as sometimes interpreted, appears to look to the past as a justification for what exists, history tends to see its much longer record not merely as justifying what is, but as the evidence of a great becoming.

History would admit the absence of value in consideration of a past from which there comes no lesson, or of things for which there is no remedy. It is good philosophy, as well as good psychology, to turn away from that which can not be corrected. It is also true that, taking human experience in the large, the joy of living and of being will not depend alone upon the manner in which what lies before us functions at a given moment. Two of the greatest truths in science concern, on the one hand, the unity of nature in the operation of its laws, and, on the other, the evidence that what we call stability of form or function is found only by those who see the universe, or any part of it, as an illumination of experience corresponding to the vision of a wind-swept forest under a lightning flash.

With what we know of nature and of man, it might appear that one who learns to know not only the form and functions at a given moment, but sees also the controlling modes of change, might well become master in the universe.

And finally, as wide as may be the range of these researches and the relationships which I have attempted to sketch—chromosome, mouse, thyroid of dove, horse, man—we find them balanced against each other as complementary elements in method and in point of view. It is through this kind of breadth of vision and mutual support that combined efforts of the many and varied institutions, such as are represented here to-day, may hope ultimately to obtain a clear and verifiable picture of the world about us, and of the place which man has in it.

JOHN C. MERRIAM,
President

ANNIVERSARIES like this are occasions of retrospect as well as of prospect. The marvelous progress in all fields of science during the past twenty-five years is probably greater than in any other century in the world's history. In large part this is the result of the general recognition of the importance of research and the munificent support which it has received during the past quarter century. The research spirit has been present in man from time immemorial; indeed it is as old as the race of thinking men. It is mentioned in the book of Proverbs where it is said: "It is the glory of God to conceal a thing, but the honor of kings is to search out a matter." But until recently opportunities for detailed, minute and continuous researches have been very limited.

Many colleges and universities that are now important centers of research made little provision for it twenty-five years ago. They were glad to say that their professors were conducting original work since this was good advertising, but those professors in general conducted their studies in the tag ends of their time and largely at their own expense. Most of us remember how professors used to talk about their research as "my own work," whereas teaching and administration was the university's work. It is only within recent times that this has changed and universities in this country have come to recognize that research is as important a part of the work of a university as teaching, and that both must go forward together in order that education and information may properly advance.

The Smithsonian Institution, founded in 1846, was probably one of the first institutions in America that was organized for the purpose expressed in the fine words of its founder, "For the increase and diffusion of knowledge among men." Other institutions more or less concerned with research were the learned societies, academies and museums. But they also had other functions and research as we now understand it was a relatively minor part of their programs. But at the end of the last century and the beginning of the present one there came a great impetus for research work for its own sake, and at this auspicious time the Carnegie Institution of Washington was established.

During the past twenty-five years research institutions and opportunities have multiplied abundantly, and they have introduced what may truly be described as a new era in human history. There is now universal recognition of the importance of research, not only for the increase of knowledge for its own sake, but also for the preservation and promotion of national welfare. This spirit of the new age puts upon those who are engaged in research and upon its promotion a tremendous responsibility. We have educated the public to recognize the supreme importance of scientific investigation; it remains to be seen whether we can convince the public that all the effort and expenditure which has gone into such study is justified. When I read in the newspapers some of the lurid representations of what has been accomplished by research, and more particularly of what we may expect in the near future, I confess to the feeling that there is bound to be some disappointment when these extravagant expectations fail to be realized; when the public is informed, as it sometimes is, that scientists have reached the conclusion of the whole matter, that their knowledge is fixed and final, I know that they are being misled, for the scientist knows, better than any other perhaps, that his knowledge is tentative and that he never reaches the goal toward which he travels. Like the El Dorado of the early conquistadors that goal ever lies beyond the next range of mountains. But to the real scientist this is a challenge rather than a discouragement, for, as Robert Louis Stevenson so beautifully said, "To travel hopefully is a better thing than to arrive, and the true success is to labor." Science travels hopefully and will continue to do so as long as civilization survives.

A retrospect over the field of biology shows three great eras past and one in progress at the present time, though, of course, these eras are not sharply divided and there is a large amount of overlapping: First of all, there was the era of exploration and of classification, and during this period emphasis was placed on the differences that exist among species, phyla, kingdoms. Botany, zoology and physiology were treated as distinct and independent sciences.

Then came the era of comparison, of comparative anatomy, embryology and physiology. During this period emphasis was placed on homologies and resemblances rather than differences. Morphology and physiology still remained as independent sciences, but botany and zoology were seen to have very much in common.

The third era of biological progress was one of generalization and speculation regarding evolution, heredity and variation. It was characterized by the marshalling of known facts regarding these subjects by Darwin (1859), Galton (1869), Weismann (1885). Speculation regarding these subjects flourished mightily. Phylogenetic trees for every group of the animal and plant kingdoms were constructed largely out of the imagination. Discussions were rife concerning the ancestry of vertebrates or of arthropods, or of many other groups of animals or plants. Hypotheses were invented to explain supposed facts of heredity or variation which had no real existence, and in general speculation was inversely proportional to evidence. Inevitably there was a growing dissatisfaction among men with scientific instincts against these mere speculations—dissatisfaction which was expressed emphatically by Bateson and Whitman, and many others. I well recall a statement of the late Professor Watase, of the Imperial University of Tokyo, which expressed the opinion of many other workers with whom he was associated at the Marine Biological Laboratory at Woods Hole, "I am through with this whole phylogeny business."

The present era is one of experiment, of both analysis and synthesis, of a union of morphology and physiology. It began in the last decade of the nineteenth century with the rise of "Entwicklungsmechanik" under Roux (1890), the "Experimental Morphology" of Davenport (1897), and the "Experimental Evolution" of DeVarigny (1892). Biology was no longer a mere collection of facts nor of speculations about those facts, but rather an analysis of causes. The genesis of individuals and of species was then and is still the great problem upon which biologists are engaged, but continually it is being attacked by new and more accurate methods.

In 1900 came the rediscovery of Mendel's great work on heredity, and in 1902 came Bateson's translation and additions to this work, and the new era was in full swing. At this auspicious time came the establishment of the Carnegie Institution of Washington, "to encourage in the broadest and most liberal manner, investigation, research and discovery, and the application of knowledge to the improvement of mankind."

Professor Osborn had said in 1890, "When we have reached a heredity theory that will explain the phenomena of inheritance, the method of evolution will itself be a problem of the past." The principles of Mendel furnished such a theory, and in May, 1902, Dr. C. B. Davenport, then associate professor of zoology at the University of Chicago, submitted plans to the trustees of the Carnegie Institution for the establishment of a "Station for Experimental Evolution." At nearly the same time, the late Dr. A. G. Mayer proposed plans for a "Department of Marine Biology," and shortly after, Dr. D. T. MacDougal proposed the establishment of the "Desert Botanical Laboratory." All of these projects were approved by the trustees, and later they established the "Nutrition Laboratory" under the direction of Dr. F. G. Benedict, and the "Department of Embryology" under the direction of the late Dr. Mall. Thus the Carnegie Institution has established five departments in different branches of biology, and in addition it has supported the research work of many biological investigators not connected with any of these departments. It is probably true that the work of these departments and investigators has done more to develop this new era in biology than has that of any other institution in the world.

It would be impossible in the time at my disposal to comment upon even the most important investigations which have been carried on under the auspices of the Carnegie Institution, and it would be invidious in me to attempt to estimate the value of these different lines of work. Coming down on the train this morning it seemed to me, as I talked with many members of our party, that almost all of them, who are now scattered over the length and breadth of the land, had at one time or another been workers at this station. But without attempting any complete statement regarding the work of the station, it is fitting that I should mention a few of the outstanding workers and their investigations.

Dr. George H. Shull informed me this morning that he was the first member of the staff of the Station for Experimental Evolution to arrive on the ground in May, 1904, and very soon thereafter he began his extensive work on heredity and mutation in the evening primrose and other plants, and also on the increased vigor of hybrids. Associated with this work was the really epoch-making discovery of Miss Lutz that different numbers of chromosomes are found in various mutants of the evening primrose. It was thus established that mutations may be due to changes in the number of chromosomes as well as to intrachromosomal mutations.

Dr. Davenport's extensive studies on the inheritance in man of feeble-mindedness, epilepsy, color of eyes and hair, skin color in negro-white crosses, twins and many important human traits have contributed greatly to our knowledge of these subjects.

Dr. Laughlin's studies of the racial stocks in our population and among the inmates of custodial institutions, and on the eugenical aspects of sterilization have formed the basis of important reports to Congress. They were at first conducted in the Eugenics Record Office, established by the generous cooperation of Mrs. E. H. Harriman. In 1920 the Record Office was combined with the Station for Experimental Evolution under the title of the "Department of Genetics," and the work of the office has been expanded so as to include important studies on heredity in certain domestic animals, particularly the race-horse.

I must mention also Dr. MacDowell's important investigations of the transmitted effects of alcohol on rats as well as on the rate of growth in mice; Dr. Little's studies on the inheritance of cancer in mice; Dr. Riddle's demonstration of a chemical basis for sex differences in pigeons as well as a study of the effects of endocrines upon sex and metabolism; Dr. Metz's discoveries regarding the cellular basis of heredity in different species of flies, a real comparative study of chromosomes and genes in different species and genera; Dr. Banta's studies of sex intergrades in the water flea; Dr. Blakeslee's investigations of sex in moulds; and last, but not least, the remarkable discoveries of Blakeslee and Belling on the many mutants of jimson-weed, and the cellular basis of these mutations.

This is a very incomplete list of some of the remarkable accomplishments of this department. These studies are spread over the living world from moulds to man, and yet all form an integral part of the original program proposed by Dr. Davenport, namely: "the study of variation, inheritance, adjustment, as factors of evolution." The experience of this station demonstrates the great value of prolonged and continuous work on well-selected forms. It fulfils the purpose of the Carnegie Institution "To encourage in the broadest and most liberal manner investigation, research and discovery, and the application of knowledge to the improvement of mankind."

EDWIN G. CONKLIN

PRINCETON UNIVERSITY

TO-DAY we are meeting to celebrate the twenty-fifth anniversary of the inauguration of the research activities of the Carnegie Institution, and it is my privilege to address to the members of its department of genetics a few words of appreciation of the great work which the department has undertaken, and to congratulate its members upon the distinguished results which they have already achieved.

Among the many beneficent foundations established by Mr. Andrew Carnegie, the Carnegie Institution of Washington must always hold a foremost place. Founded by him "to encourage in the broadest and most liberal manner investigation, research and discovery, and the application of knowledge to the improvement of mankind," it has always been guided by the fundamental purpose of the founder—the conduct of scientific research for the improvement of mankind, and the achievement of the higher welfare of the individual.

It is fortunate for the carrying out of the great object for which our institution was created that we have as its president and guiding spirit that distinguished scientist and philosopher, Dr. John C. Merriam, who is devoting his life to the improvement of human affairs and the establishment of the ways of peace, for which our great founder so earnestly labored and which he so fervently desired.

It has been my good fortune to be associated with Dr. Merriam as one of the trustees of this institution, and like all who have the privilege of working with him I have marveled at his comprehensive knowledge of the sciences, and have felt the influence of his great wisdom and scholarship. While by the nature of his duties he is constantly active in the prosecution and coordination of scientific research in all of its branches, he never loses sight of the fact that the ultimate integration of scientific discovery and research will achieve its greatest purpose when applied to the problem of the human individual.

To this problem, under the leadership of Dr. Charles B. Davenport, those distinguished scientists who constitute the staff of the department of genetics are directing their energies. I will not undertake to describe their work, for these master scientists are soon to take us through their laboratories where, in their own way and far better than I could do, they will explain the nature of their problems, their method of attack, and exhibit—all too modestly, let me warn you—some of their latest achievements.

It is difficult at first sight to understand what good is to come from growing jimson-weeds in clay pipes and thimbles; from studying the color of the eyes of insects, and the size of the wings of different species of flies, and noting the behavior of doves, and the form of the head of water fleas. But these and many other experiments which might at first seem trivial and of no practical value are all undertaken because they are calculated to throw light on the unsolved problems of heredity and environment, and because they may yield scientific knowledge of profound importance in solving the problem of man himself.

The awful spectacle of the increasing numbers of the mentally sick, the prevalence of nervous diseases, and the generally disturbed condition of the nations, have caused many to believe that we are headed in the wrong direction, and that our ideals should be those of the so-called simple life, or that we should seek to attain to the static condition of ancient China. Were it not for my faith in the ultimate success of such researches as you are conducting in this institution, I believe that I too would share these views and be inclined to the opinion that in merely material progress we had gone far enough—perhaps too far, or too fast.

While I have frequently asserted that human behavior presents the most important and the most formidable problem of all the ages, I believe that its solution can be achieved. While in this problem we should not ignore the claims of religion and philosophy, it would be a mistake to conclude that we have gone too far and too fast, and that we must restrict the progress of science in material things. On the contrary, we must accelerate our progress in all the sciences, for the knowledge thus to be gained will be required in preparing the individual man to function as a sane and peaceful unit in the ultimate social organism. I believe that the problem of human behavior can be solved, but not without profound and prolonged researches which shall bring to bear upon every phase of the subject all of the resources of science.

In order to solve the problem of the human personality we must push forward the advances of pure science in all directions without exception. This is the great mission of the Carnegie Institution which it is carrying out with the highest distinction. The pure scientist in whatever field he may be working is an explorer who is constantly extending our knowledge of the realities of our environment. The applied scientist is providing agencies so that we may adjust ourselves to these realities. By the aid of that unified knowledge which should be the aim of philosophy, education must expound the principles by which the individual shall make this adjustment.

In carrying out this campaign of research directed at the human problem, we must not confine ourselves to the operations of the biologists and others engaged solely in biological or medical research. We must encourage and utilize the work of the chemist and the physicist which is perhaps often conducted without any conscious regard to the human problem. The work of the physical scientist has already been of priceless importance in forwarding the work of medical research. Numberless examples of this are to be found. The microscope, the spectroscope and the X-rays are but a few of those that I may mention, to say nothing of those recent contributions of the chemist in analyzing the wonderful substances produced by the ductless glands, the functions of which affect so profoundly the health of the human body. This list could be extended indefinitely.

Even the astronomers are contributing towards the solution of the problem of the human personality. At the Mount Wilson station of the Carnegie Institution in California, and at the California Institute at the base of the mountain, a distinguished group of scientists endowed by the Carnegie Institution is conducting a systematic attack on the problem of the ultimate constitution of matter. On the mountain, the astronomers are observing in the sun and in the stars and in the nebulae not only worlds in process of evolution, but what is most astonishing, the evolution of the elements themselves. At the base of the mountain, the chemists and physicists are reproducing upon the earth, with increasing success, conditions which have been discovered in the depths of the universe. They are doing a marvelous work, and are achieving results which in the years to come will be of the utmost value in solving the problem of the human individual.

When these and other scientists working in different parts of the world have progressed in the mastery of the knowledge of the structure of the atom, when consequently perhaps some physicist devises a superoptical method which may enable us to view on the largest desirable scale the details of the animal cell, we shall then have a contribution of incalculable importance to the human problem.

To me, this celebration to-day is an event of the deepest significance, for it indicates the beginning of a new era of social development. As Trotter so well puts it:

> The method of leaving the development of society to the confused welter of forces which prevail within it is now at last reduced to absurdity by the unmistakable teaching of events. The conscious direction of man's destiny is plainly indicated by Nature as the only mechanism by which the social life of so complex an animal can be guaranteed against disaster and brought to yield its full possibilities.
>
> A gregarious unit informed by conscious direction represents a biological mechanism of a wholly new type, a stage of advance in the evolutionary process capable of consolidating the supremacy of man and carrying to its full extent the development of his social instincts.

Human progress need no longer be left solely to chance. By the aid of science it can be brought under our conscious control.

So vast are the problems of this control which lie ahead of us and which can be solved only by the aid of science that the total activities of the Carnegie Institution, great as they now are, should be increased a hundredfold. Scientific research in our universities and elsewhere, conducted solely for the advancement of knowledge, should be increased in like measure. If this is done, I believe that in the fulness of time by further scientific discoveries the physical development of man will be improved, that many diseases will be entirely eliminated, and that immunity to the others will be achieved, and that feeble-bodiedness and feeble-mindedness will disappear.

In concluding, let me say that if we rightly interpret the work of these scientists which we are briefly to examine to-day, we shall find that it is directed ultimately to the overcoming of the defects both of body and mind which are found in the individual man, and which now prevent him from properly performing his function as a member of society. We shall also I think be made to feel that in the great plan of creation, the highest part has been assigned to man; for he must direct the development of that social organism which has been foreshadowed "with its million-minded knowledge and power, to which no barrier will be insurmountable, no gulf impassable and no task too great."

JOHN J. CARTY

EARLE MELVIN TERRY—1879–1929

EARLE MELVIN TERRY, professor of physics and a member of the department of physics at the University of Wisconsin since 1902, died of acute heart failure at his home on the night of May 1.

He was born on a farm near Battle Creek, Michigan, on January 16, 1879. Entering the University of Michigan in 1898, he largely worked his way through, specializing in physics, although he kept up throughout his work in the classics. This gave him a broad and balanced education, all too unusual in the specialist, and it may be of interest to recall that a quarter of a century later he was still able to tutor his son in Latin. After getting his A.B. degree in 1902 he came to Wisconsin as an assistant in physics and two years later was made an instructor, getting his doctorate in 1910 and advancing eventually to a professorship.

Terry was a rather unusual combination of a keen research worker and first-class teacher. His investigations were all characterized by a highly developed and skilful technique, whether along the magnetic lines which first engaged his attention, or vacuum tube design, quartz crystal frequency control and other radio problems which occupied him latterly. He also published theoretical investigations on oscillating circuits and was one of the collaborators on the National Research Council bulletin on "Magnetism." On the day of his death he had just finished the last page of the revision of his well-known laboratory manual of electrical measurements.

He was a pioneer in the radio field. Somewhat before 1910 came the first practical development of wireless telegraphy in this country, and Terry at once turned his attention in this direction. With the advent of radio telephony, interest was centered on this much more practical and interesting application of wireless waves. He wanted to have a local broadcasting station, but the patent situation regarding the tubes was such that they could not be obtained on the market. Nothing daunted, he at once set about making the tubes himself. He developed in a remarkably short time the difficult glassblowing technique and when station WHA was opened, as the first university station and, so far as is known, the second broadcasting station in the country, it was operated entirely with these tubes. Many students in the laboratory will recall having seen a set of these old tubes with in-seals colored red. Some one asked Terry about them once, and he explained:

"You see I started making those particular tubes on Christmas day and I used red sealing-in glass by way of celebrating a little."

When this country entered the war in 1917, Terry was one of the small group of Wisconsin physicists chosen to carry on submarine detector research at New London, Connecticut. One of the most successful types of detector was developed largely by this group, and at the close of the war it was installed on a number of destroyers and had already been primarily responsible for the destruction of several of the under-sea craft.

It is perhaps as a teacher, however, that Terry will be longest remembered. His personality, which won students from the start, and the interest in physics which he aroused in them, combined to make the experience in his classes one not to be forgotten. He especially liked to teach engineering students, and his relationships with this group were always particularly happy. His method of conducting classes was direct and simple. He scorned all special devices for getting the student to work, or "nursing" him along. The student either worked hard—or took his medicine. Students came to talk over their problems with him to such an extent that he was forced at times to shut himself in to be able to accomplish his own investigations.

The University of Wisconsin has recently suffered an unparalleled series of losses by death of men who can not be replaced, and Terry is one of the foremost of these. His influence as an outstanding teacher, tireless investigator and loyal friend will long be felt by all who have come in contact with him.

L. R. INGERSOLL

SCIENTIFIC EVENTS

PUBLIC HEALTH UNDER THE FEDERAL GOVERNMENT

Two bills relating to the public health service have been introduced by Representative Parker (Rep.), of Salem, N. Y., chairman of the House Committee on Interstate Commerce. Both bills have been referred to the House Committee on Interstate and Foreign Commerce.

They are as follows: H. R. 3143 proposes to establish and operate a National Institute of Health, to create a system of fellowships in the institute and to authorize the government to accept donations for use