ered may play a role, so we are interested in these also.

Aside from the development of methods and the study of the vitamin content of tissues, my associates, Drs. Pollack and Taylor, are carrying forward a more systematic study than has ever yet been attempted of the effect of vitamins in the diet on the incidence and development of various types of malignant growth.

In a book from the Bar Harbor Laboratories, published late in 1941, appears the following statement:

> Various experimental, unbalanced and defective diets have been reported as influencing the number of "takes" and the rates of growth of transplanted tumors. There is no doubt that diet may play a part in determining the reaction of the animal. On the other hand, the fact that the investigators have not used inbred strains to reduce and control the genetic variables, leaves it uncertain as to the cause and effect relationship between diet and changes in percentage of growth. This fact, coupled with an almost complete disregard of criteria of mathematical significance between the groups that are being compared, seems to have left the problem of diet in a most unsatisfactory condition. For this reason no attempt is made in this volume to cover the extensive but non-critical bibliography. The whole problem will have to be approached "from the ground up" by investigators who understand and utilize genetics, biochemistry and mathematics.

We were pleased when we read this because it coincided with our ideas and we had in fact just planned extensive experiments along exactly the lines suggested. These experiments are now under way and the results will be reported in due time. There are various groups of workers interested in essentially the same problem. It has been demonstrated many times that diet and specific vitamins affect the incidence and development of cancers induced by feeding butter-yellow. Our work as well as that of others indicates that the vitamins in the diet make a difference in cancers other than those induced by butter-yellow. We can not say yet just what the total results of our rather comprehensive experiments will be, but we can already be sure of one thing. They will be interesting.

A pet thought of mine which it seems appropriate to mention on this occasion is that one of the most important borderline fields in the future will be that existing between biochemistry and psychology. In this particular field vitamins will probably play an interesting role.

We have noted in our laboratories "personality differences" developed in experimental animals apparently as a result of diet. I presume similar observations have been made elsewhere. It is well recognized that good health and good dispositions tend to go together, and in so far as an abundant supply of vitamins may foster good health it will also promote good psychological adjustments. The current view with regard to psychological disturbances is that they are essentially pathological and amenable to treatment just as other ills are. It is a truism that mental health is based upon bodily health, and there are some good reasons for thinking that vitamins may in the future contribute materially to mental health and to satisfactory psychological adjustments. It is recognized already that one vitamin can and does cure mental derangements. One of the most distressing symptoms of pellagra are the hallucinations, dreams and other mental symptoms. These are tremendously helped by nicotinic acid administration. People who were so "crazy" as to be totally incapacitated have been brought back to the point where they can perform the functions of a useful member of society. What other vitamins may do for mental ills is yet to be demonstrated.

It should be pointed out that good diets, which mean an abundant supply of vitamins, among other things, promote intellectual keenness as measured by psychological tests both on animals and human beings. There can be no doubt that much dullness on the part of school children, particularly among the lower income groups, can be traced in part to a lack of the proper kind of food and specifically to the lack of enough vitamins.

We may as well end this part of the discussion on as lofty a plane as possible. Recent studies, several of them in New York City, have shown without question that intelligence and morality go together. The more intelligent a child is the less is his tendency to cheat, lie, steal or become delinquent. This high correlation between intelligence and morality can lead us to one conclusion. Since an ample supply of vitamins can foster a higher intelligence in human subjects it has also the capability of fostering morality. Vitamins in the future will not only give people better health both bodily and mentally but will increase their intelligence and their morality. It remains for the future to show to what extent these ends can be accomplished and how useful vitamins will be as tools for their accomplishment.

OBITUARY

JACOB ELLSWORTH REIGHARD

AFTER an illness of some weeks, Professor Jacob Ellsworth Reighard died on the 13th of February, 1942, in his eighty-first year. Thus passed a leader in the field of ichthyology, fresh-water biology, animal behavior and evolution—a man whose biography

would involve a considerable portion of the history of the department of zoology at the University of Michigan.

Born of Pennsylvania parents at LaPorte, Indiana, on July 2, 1861, trained at Michigan and at Harvard under E. L. Mark, and with a background of two years as a private tutor and one year of high-school teaching, this enterprising young zoologist returned to the University of Michigan as instructor in 1886. He was given the title professor of animal morphology in 1892, and professor of zoology, director of the zoological laboratory and director of the museum of zoology in 1895. His directorship of the museum was relinquished in 1913, and that of the zoological laboratory in 1925, though he continued as an active member of the staff until his retirement in 1928.

Professor Reighard's interests were varied through his lifetime, but the phases of his activities were rather sharply marked off from one another. He concentrated on one thing at a time. A chronological list of his publications would appear to indicate a considerable overlapping of these phases, but it would be deceptive because of delayed publication. A number of times in his career he published from data that had been in his files for many years. It was obvious to his colleagues that preparation of such delayed papers was to him a peculiarly onerous type of drudgery, to which he drove himself with a feeling that it was his duty to put his accumulated information on record.

His early investigations were on the embryology and morphology of fishes, which involved naturally the taxonomy of that group. From 1890 to 1895 he was in charge of the scientific work of the Michigan Fish Commission, and from 1898 to 1901 directed the Biological Survey of the Great Lakes conducted by the U. S. Fish Commission. Interest in fish led him to studies of plankton, originally as fish food but later as a component of fresh-water communities in general and as important material for investigation of fresh-water biology *per se*.

Difficulty with his eyes led Professor Reighard to abandon indoor, particularly microscopic, work and to take up outdoor studies. A notable feature of these new investigations was that they were performed with the same critical standards, the same meticulous attention to any detail which might later prove important, the same rigid requirements for sound judgments which had characterized his laboratory studies. Laboratory methods were being transported into nature, where they served as a model for a then relatively new type of outdoor work.

The field studies naturally revolved around fishes and were concerned largely with breeding behavior. Nest building and the courtship and other mating activities of a number of different fishes, and lampreys, were carefully observed. The heightened color of some fishes at the breeding season led Professor Reighard, with certain of his students, to a critical study, first, of the psychology of color vision in fishes, and later of the significance of color in evolution. Under the latter rubric comes his notable reexamination of the supposed warning color of brilliant small coral-reef fishes. In this study he showed that it was not the color of these fishes, but the presence of the reefs, which saved them from attack, and he was led to formulate the theory of immunity color to replace warning color in this particular situation. The coral-reef experiments were judged by eminent contemporaries to be the "most important experimental study of natural selection" (Pearl) and the "best work done at the Tortugas Laboratory" (Mayor) up to that time.

His teaching mostly concerned the vertebrate animals. Once his principal course was on vertebrate (with emphasis on mammalian) anatomy. As his interests changed to outdoor studies, his main course was called simply vertebrate zoology, which included habits as well as morphology. This was later transformed into natural history, which included some invertebrate fresh-water ecology. The field thus covered was unwieldy, and the invertebrate part was split off (eventually changing to limnology, given by others), while the vertebrate part continued as vertebrate natural history. On Professor Reighard's retirement, the latter course was taken over and developed by the late Professor F. N. Blanchard. For many years Professor Reighard gave also a semi-popular course on evolution.

Late in his active life a growing deafness deprived Professor Reighard of many of the ordinary human contacts. He was stimulated to an effort to aid others similarly afflicted, and devoted much time to learning lip reading, to writing articles on the place of speech reading in schemes of education and to translating important foreign-language works in that field.

Mention should be made of one important service for which, in some circles, Professor Reighard was better known than for any other—the publication, with Herbert S. Jennings, of "The Anatomy of the Cat." This book was for many years the standard work for courses in vertebrate anatomy. Classes were small, however, and the book was never an important source of income for its authors, for it was many years after first publication that the senior author humorously displayed to his colleagues the first royalty check for a few dollars. In recent years, after a third of a century of use, this book has been revised by Dr. Rush Elliott in close cooperation with Professor Reighard and is again offered to students of mammalian anatomy.

Throughout his scientific career Professor Reighard

showed keen interest in the invention and construction of technical apparatus for use in investigations. Photography was the outlet for much of this natural bent, and several publications on the technique of obtaining photographs of biological material resulted. One of these was devoted to underwater photography. In his plankton work he introduced the new European methods to America and made important improvements upon them by modifications of equipment. In the coral-reef studies he contrived an ingenious device for recording his observations without taking his eyes off the fish. When the Natural Science Building at the University of Michigan was built and equipped, his mechanical propensities found expression in the design of the photographic and preparation rooms and their apparatus.

Scientific organizations have felt the influence of Professor Reighard's career in no small measure. Locally he helped found the Michigan Academy of Science in 1895 and was one of its early presidents; he was one of two coinstigators of the founding of the Research Club of the university and appeared repeatedly on its programs, and was active in the Michigan chapter of Sigma Xi. He was largely responsible for the establishment of the university's biological station in northern Michigan in 1909, and was its director the first six years (though resident at the station only three of these). Beyond the university's immediate domain, he was president of the central branch of the American Society of Zoologists, president of the American Fisheries Society and vice-president and chairman of Section F of the American Association for the Advancement of Science; and he presided at two sessions of the section on animal behavior of the International Zoological Congress in Boston in 1907.

Professor Reighard was an outdoor man in recreational as well as scientific ways. Member of a local club having properties on a group of nearby lakes, he could frequently be found living for weeks at a time in its cottages. Journals of some of his camping trips with friends, and appended lists of equipment for the instruction of other campers, have been preserved among his papers. He was instrumental in forming a faculty club, with fencing, boxing and the broadsword as leading activities; but when this later led to the establishment of a university club with social functions, he gradually lost interest in it. Never an effusive person who made friends by sheer charm of manner, he was nevertheless one of a considerable group of loyal and devoted persons among whom there was genuine and strong affection—a fact well demonstrated at a testimonial dinner given him a year or so before his retirement, at which "Old Friends" participated to an important degree. His scientific attitude was one of rigorous discipline; nothing was proved, in his estimation, short of proof. In his middle and earlier years his colleagues may have felt his driving industry, but he drove himself more than he drove any of them.

The passing of Professor Reighard will be regarded as a milestone in the progress of some of his fields of interest, in which there have followed still greater developments than any attained in his time. In others his work must still be seen in retrospect as a model scarcely equaled since, and, hopefully, as a stimulus to further advance.

A. FRANKLIN SHULL

REMEMBERING WILLIAM JAMES

THE *Harvard Alumni Bulletin* calls attention to the fact that January 11, 1942, marked the hundredth anniversary of the birth of William James, American philosopher. The *Bulletin* states that weeks before the actual date, societies, libraries, university departments and colleges the country over began to celebrate —as they are still celebrating—this significant event. William James taught at Harvard from 1872 to 1907, retiring as professor of philosophy emeritus.

A conference on methods in philosophy and the sciences was held in New York City at the New School for Social Research on November 23, 1941. One of the symposium titles was "Remembering William James," and the five speakers included Henry James, '99, of the Corporation; Dickinson S. Miller, '92, and Professor John Dewey of Columbia. On December 29, 1941, at Vassar the forty-first annual meeting of the American Philosophical Association held a William James symposium. Two of the speakers were Harvard teachers: Professor Ralph Barton Perry and Associate Professor Donald C. Williams. A William James exhibition opened at Widener Library on January 2. At the Harvard Club of New York, the club library held a special exhibition during the month of January of "Books Annotated by Great Harvard Scholars," centering on a few books comprising the William James collection in the Harvard College Library.

Then a William James centennial program was given by the department of philosophy in the University of Wisconsin, January 10, largely arranged by Professor Max C. Otto of that university. At Norwich University, January 11, the department of philosophy and psychology held a meeting in commemoration of William James. Professor J. Seelye Bixler, president-elect of Colby College, spoke at Colby (January 17); at the same time an exhibition of letters of William James and his father, Henry James, was arranged at the Colby Library. Scripps College in California carried out a centennial program, January 11, of which William Bennett Munro, Ph.D., '00, of the California Institute of Technology