me feel very grateful for the effort they make in the reporting of rather difficult matters.

If we trace the whole history of the subject, from the mind of the man who is working on it through his writings to the mind of the person who reads it, I think that, as a rule, the last lap of that journey is better seen by the professional press man than by the man himself who does the work.

There are two types of difficulty which arise. The investigator himself frequently starts with the feeling that his subject is a very difficult one. He does not see how it is possible to put it to the laymen at all, and endeavors to give a technical account of it, or a terribly simplified and forced analogy, to the great confusion of the reader. One of the best illustrations of this is to be found in the many discussions upon the theory of relativity. The things which we start to emphasize are four-dimensional space, curved space, and things of that kind which are not really related to the fundamental concepts which make the theory work. As regards its working content, the theory does not involve any of those things in the sense in which the reader would understand them. When the writer uses the word "space" the reader tries to get a picture of something which he thinks is in the mind of the writer and which is really not there at all. The harder he tries, the more he will get from the view which the writer intended to convey.

Then another thing: sometimes the writer, I think, is at fault in this matter by endowing the reader with too little intelligence. Thus referring again to relativity, it is impossible for the man in the street to understand what I might call the technique of the procedure, just as it is impossible for the man in the street to play the violin, although it is possible for him to get pleasure from the performance.

The thing of importance is to seek out the part of a theory which really matters and try to explain that to the reader. I believe that frequently this is possible. Personally, I would very much rather talk to an intelligent lawyer or clergyman upon the theory of relativity than I would to talk on this subject to a bad physicist. In my conversations with such individuals there would not be a single line of algebra. Turning to the press man, my criticism would be to the effect that I think there is a danger of his emphasizing matters which are irrelevant.

I think one should seek what there is of value to be said, and try to make that the central story, and not try to adorn the story with some things which are irrelevant simply because they are spectacular. There may be a certain piece of apparatus that we wish to write a story about. It may be very heavy, but the weight may have nothing to do with its performance. It is useless to try to introduce the weight as an essential feature. Let us omit all irrelevant adornment from the main subject which it is desired to discuss.

(To be concluded)

THE NEW HARVARD BIOLOGICAL LABORATORIES

By Professor G. H. PARKER

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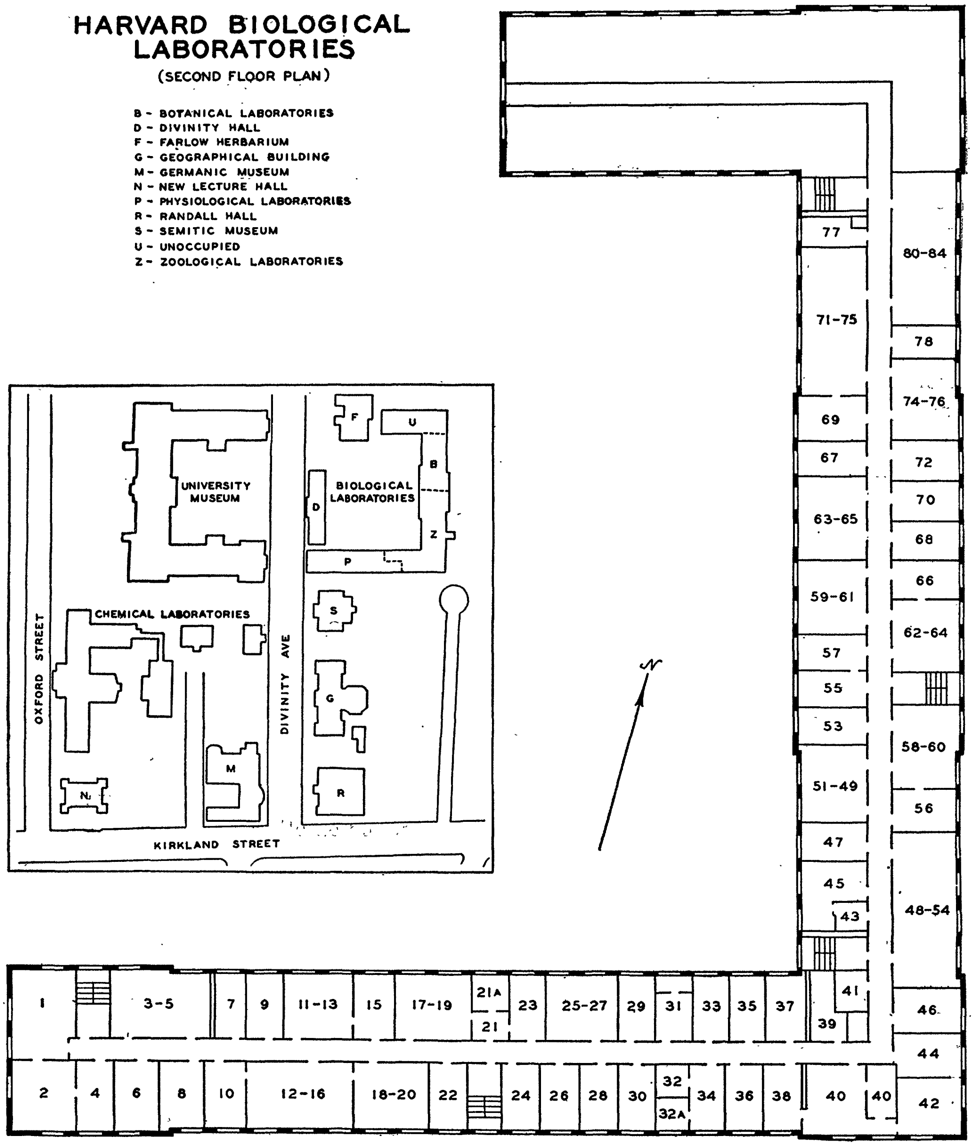
BOTANY and zoology in the last hundred years have undergone as profound a change as their sister sciences, physics and chemistry. Early in this period, workers in the organic fields were occupied chiefly with the description of plant and of animal species. At that time the study of organic processes attracted relatively little attention. But with the advent of the theory of evolution, and particularly after the appearance of Darwin's "Origin of Species," an intense interest sprang up in the operation of organic nature, and the earlier kinds of work were supplemented by a study of the activities of organisms. Reproduction and development, and a multitude of other processes, were the subjects of keen investigation. In the solution of problems in these new fields the methods of physics and of chemistry, with their accompanying mathematics, became a part of biological procedure, and attempts were made to elucidate organic operations in terms of basal conceptions. As a result, biology became permeated with the experimental spirit. The physiology of the medical schools had already taken this step and the biological sciences were quick to follow. Thus arose the functional approach to biological questions, an approach which eventually led to the fields of comparative and of general physiology. All this new expansion, with its increased scientific contacts, enriched and unified the biological sciences as had never happened before.

In the early days at Harvard, as elsewhere, botany and zoology were essentially unconnected subjects. There seemed to be no particular reason why those who were concerned with the description of new species of plants should carry on their work under the same roof as that which sheltered the describers of animal species. The activities at the Herbarium were in no intimate way associated with those at the Zoological Museum. These two institutions were separated by a considerable distance, and their work



J. E. Peabody, photographer

FIG. 1. Court Yard of the Biological Laboratories with the central section and main entrance to the right and the north wing to the left.

was carried out quite independently. A third biological center in the Harvard group was the Bussey Institution. As originally founded, it was concerned with agricultural problems, and in location, as well as in interest, it was remote from the botanical and zoological establishments in Cambridge. Its objectives being such as they were, it required the services of botanists, zoologists and chemists, and from this standpoint it became an unusual scientific meeting-place for its day. In a way the staff of the Bussey Institution foreshadowed a modern grouping. Thus the older Harvard contained several centers of first biological importance, but these centers were unconnected and scattered.

With the opening of the new Natural History Laboratories at the Museum of Comparative Zoology in the early eighties, botany, zoology and geology came into intimate relations. Workers formerly quite isolated were thrown together. With the introduction of physiological botany and the growth of the zoological sciences in experimental directions, a new atmosphere began to pervade the workrooms. The life histories of many of the lower plants and animals were investigated and their relations to food, to water supplies, and the like, were worked out, the reactions of organisms to their environment as seen in tropisms and in other types of response were studied, and the nature of inheritance, Mendelian and otherwise, began to excite the interest of investigators. Static morphology gave way to the experimental study of the genesis of form, and descriptive embryology changed to the experimental type. The new and important field of general physiology gradually emerged from the union of botany and zoology.

Much of this growth took place in the University Museum, where the chief laboratories for botany and zoology were located. But the Bussey Institution, which had been newly organized, was the seat of no small part of this change. Here grew up laboratories for both plant and animal genetics, for the experimental study of forestry, and for entomology, with its multitudinous contacts with practical affairs. The Medical School also entered into more intimate relations with biology. In the beginning its interests were almost entirely with materia medica, then with bacteriology, and finally they shifted to a full appreciation of the significance of biology for medicine. Medicine, in fact, was soon seen to be applied biology, and from this standpoint the Medical School quickly established a number of important contacts with the other biological centers. The modern student of medicine is profoundly interested in every aspect of biological investigation. Disease germs and their carriers, regeneration, heredity and a thousand other subjects are at once both biological and medical.

With this striking growth of the organic sciences it was not surprising that the old quarters and equipment should have become antiquated and inadequate. Much of the work in biology had been carried on in the University Museum. In the beginning this work was quite appropriate for such a situation, for it consisted of the dissection and study of preparations, most of which were really museum materials. But with the change of biological science already indicated, new methods were introduced. A new technique for the preparation of microscopic material was developed. This involved the use of stains, paraffin, and other materials, the employment of which called for fire risks wholly unwarranted in a building devoted to the preservation of priceless collections, records and books. With the introduction of experimental methods came the additional risks of chemical and physical manipulation, no part of which should have been allowed in a building whose chief aim was conservation. It therefore became imperative that new quarters for the growing biological work should be sought. Moreover, the expanding activities of the museum itself were seriously crippled by lack of space, a lack which might in part have been made good by relinquishing to the rightful owner, the museum, rooms occupied for biological work. Thus arose a growing need for the establishment of the new Institute of Biology. The founding of this institute was finally rendered possible through a munificent gift from the Rockefeller Foundation and the generosity of the Harvard Corporation.

But when the establishment of the institute came clearly into view, it was seen to be much more than the relief of overcrowded laboratories and an overcrowded museum. As President Lowell wisely pointed out, it was an opportunity for the reorganization of biological interests in Harvard such as the university had never known before. These interests, if united, might constitute a working biological unit of first scientific importance. A unit of this kind should be based on research, and its object should be the discovery of new truth in the realm of organic nature. It must combine all the possible and available groups of workers at present in the university from botany, zoology, general physiology and such other related fields as may be included with reason; hence the transfer to the new institute of all the research activities of the old Zoological Laboratories, the Laboratories of Botany, of General Physiology, and of the Bussey Institution to serve as a nucleus for this growing body. The new institute was planned to house adequately all biological interests now well established here: the activities of plants, their genetics, their diseases and the remedies for these ills, their rôles in supplying human necessities, such as food, building materials, and the like; the structure and activities of animals, their responses, their powers of repair and of reproduction, their types of inheritance, their assaults on man and on other animals as disease-producers and disease-carriers, as destroyers of his food and of other necessities, their parts as purveyors of much that is of importance to him; the life of organisms in the sea, that almost untilled field of future supplies, and in the tropics where growth is incessant. These and numerous other activities now find their place in the new institute.

To meet the needs of what is already established and to be prepared for future growth, the institute has been located in close proximity to those other establishments with which it is in most intimate relations. The building has been placed on Divinity Avenue, directly opposite the University Museum, whose library, collections and staff are of vital importance to it. It is almost equally near the new chemical laboratories and only a little farther removed from the newly enlarged plant for the physical sciences. Thus the Institute of Biology is not only an unusual unit in itself but also part of a scientific group whose mutual cooperation promises in every way the most effective kind of activity and future growth.

The building housing the Laboratories is a five-story structure of red brick in modernized Georgian style. It surrounds three sides of an open court. One of its unusual features is the hand-carved frieze above the upper tier of windows on the sides forming the court yard. This carving was done directly in the face of the brick in a bold, straightforward manner and portrays animal and plant life in its abundance. It was designed by the talented young sculptress, Miss Katharine Lane, and has excited the interests of artists far and wide.

Within the building are convenient laboratories of one, two, three or four units, furnished with all necessary service. Constant temperature rooms, soundproof rooms, photographic rooms, cold rooms, aquarium rooms, machine shops, etc., have been provided and equipped. Libraries, lecture rooms and seminar rooms have been conveniently located throughout; in the central portion of the structure an auditorium with the latest projection and sound devices has been provided.

The dividing partitions within the building are constructed of cinder-concrete blocks which have sound-absorbing surfaces. The floors are kalmen, linoleum or mastic. An internal telephone system has been installed and an elaborate system of ventilation, insuring a continuous change of air. Two electric elevators are conveniently located for both outside and inside use and two large greenhouses, each 110 feet long with six separate compartments, occupy a portion of the topmost floor of the central section. The architects for the building were Coolidge, Shepley, Bulfinch and Abbott, to whose wide experience and skill much that is admirable in the construction is due. The interior furnishings, which have proved most satisfactory and complete, were supplied by the Kewaunee Manufacturing Company.

The Laboratories of General Physiology occupy the basement and upper five floors of the western two thirds in the south wing. They are equipped with modern outfit and are planned for the quantitative study of animal and plant reactions. In the sub-basement of this section is a ventilated constant-temperature room with a range from 0° to 40° C. and capable of being held to within one degree. A system of soundproof rooms has also been constructed in this portion of the building. The basement contains several shops for working wood and metal and a triple-unit physical exercise room with connecting cold room, research rooms and shower baths. On the first floor are located most of the laboratories for class instruction. On the second floor are the offices of the department and of the chairman, library and librarian's room and research laboratories for the study of behavior. The third floor is given over to research rooms, of one, two or three units in size and planned especially for biophysical research. The fourth floor is arranged for chemical work, sensory physiology and the physiology of reproduction. On the fifth floor are rooms for the housing of small mammals such as rats, mice, guinea pigs, and the like. The planning of the section for General Physiology has been made with a view to reasonable flexibility and possible readjustment in future growth.

The Zoological Laboratories occupy the whole of the southeast angle of the building with rooms adjacent on the one hand to General Physiology and on the other to Botany. At the angle of the building from the basement to the fifth story are six suites of rooms for the professors of the department. The suites are more or less alike and consist each of a technician's room, a study, a laboratory with an attached dark-room and an aquarium room. In both directions from the professor's rooms are student research rooms with other rooms for storage, low temperature, light work, aquaria and class meetings. In the basement of the zoological section the work is chiefly biochemical, on the first floor histological, the second embryological, the third regeneration, the fourth animal reactions and the fifth oceanographic. The work in entomology occupies several floors in the portion of the building adjacent to Botany, where suites of rooms like those in the angle are set aside for the professors of this subject. Special animal rooms and store rooms for reagents, glass-ware and other apparatus are in the basement, and the office of the Zoological Department is on the first floor.

The Botanical Laboratories are housed in the northern half of the main section. They extend from the basement through to the fifth floor. The basement contains work shops, storage rooms and cold rooms. On the third floor is a large seminar room, and on the top of the middle section the large greenhouse already mentioned. The rest of the botanical section is for the most part broken up into research rooms of convenient size and grouping for the several professors with their assistants and students. These rooms house the Laboratories of Plant Morphology and Cytology, in which botanical research is pursued chiefly from the evolutionary standpoint and particularly from that of the formation of new species. Here also are to be found the Laboratories of Forest Pathology, in which are investigated fungi parasitic on forest and ornamental trees. The Laboratories of Cryptogamic Botany are located in this section where, in addition to the ferns, mosses, algae and lichens, study is made of that wide range of economically important plants, the fungi, whose relations to plant diseases and to human pathology are of the greatest significance.

The establishment of the new Biological Laboratories has thus brought about a unification of biological interest seldom seen elsewhere. With the close proximity of these laboratories to the new Harvard Chemical Laboratories, the new Geographical Building, the Laboratories of Physics and the University

Museum they enjoy an association of interest that can not help but be of the greatest importance in biological research. For these great advantages the departments thus newly housed are deeply indebted to the generosity of the Rockefeller Foundation and to the Harvard Corporation.

OBITUARY

IRWIN GILLESPIE PRIEST

IRWIN G. PRIEST, chief of the colorimetry section of the National Bureau of Standards, and internationally known as an authority on colorimetry and spectro-photometry, was taken suddenly ill on July 19, while working in his laboratory at the bureau and lived only a few hours afterwards.

Born on a farm near Loudonville, Ohio, on January 26, 1886, he had the misfortune while still a lad to lose his father. Contrary to the advice of relatives and friends, his mother courageously decided to invest her limited funds in her son's education—a sacrifice richly rewarded by his success and by a lifelong filial devotion—and young Priest entered the Ohio State University. Immediately after graduating in 1907 he came to the Bureau of Standards as Dr. Stratton's personal assistant. Thus began his work in optics, to which he applied himself henceforth with zealous enthusiasm. In scanning his fruitful research of a quarter century, one finds no evidence that he ever departed from this field.

In 1913 Mr. Priest was made chief of the colorimetry section, and from that time on he gave his attention largely to fundamental colorimetric problems. He was one of the first to recognize the importance of the spectro-photometer in colorimetric analysis and other lines of research and testing, and he contributed many ideas to the development of various types of spectrophotometric equipment. Much of the theory of interpreting spectrophotometric data in terms of dominant wave-length, purity and brightness is due to Mr. Priest, and his apparatus for the determination of color directly in these terms provided the first adequate means for testing the validity of such interpretation. This instrument, together with other apparatus which he designed, also yielded the first fundamental information regarding the sensibility of the human eye to wave-length change and purity change for nearly white colors.

He regarded the rotary-dispersion colorimetric photometer as his most important personal contribution to apparatus for color measurements. This instrument is admirably adapted not only to the determination of the color temperature and intensity of various incandescent illuminants, but is suitable also for the evaluation of these qualities for the various phases of daylight, such as sunlight, overcast sky and blue sky. His work on the standardization of Lovibond glasses has been of great practical value to the edible oil and mineral oil industries.

Mr. Priest married Miss Edna Ryan, of Washington, D. C., in 1917 and the location of their home, on the border of a wooded valley in sight of his laboratory, symbolized his devotion to his work. To this he gave himself unsparingly. He abhorred slovenliness in scientific work, and the results of his own investigation were published only after numerous repetitions of his measurements, accompanied by the most exacting attention to details.

He was fond of swimming, canoeing, walking and the woods. In his earlier years he gave generously of his time to a large and enthusiastic Boy Scout troop. His instinctive kindliness and keen sense of humor, characterized by a smile which illumined his whole face, endeared him alike to young and old.

Mr. Priest was a fellow of the American Physical Society and the American Association for the Advancement of Science, and a member of the Optical Society of America, the American Psychological Association, the Washington Academy of Sciences and the Philosophical Society of Washington. As secretary (1921–24) and president (1928–29) of the Optical Society of America he was instrumental in bringing this organization to new heights of usefulness and influence. He was a special representative of the Department of Commerce at the International Congress on Illumination held in England last year.

Though his life was short, it was extraordinarily fruitful. His name has been written indelibly upon the pages of the science he loved, and his memory is revered in the hearts of hosts of friends.

LYMAN J. BRIGGS

SCIENTIFIC EVENTS

THE BRITISH UNION OF CHEMICAL SOCIETIES

IN his presidential address to the fifty-first annual meeting of the Society of Chemical Industry, which was opened at University College, Nottingham, England, on July 13, Dr. G. T. Morgan took as his subject, "Ourselves and Kindred Societies," giving a review of the work of the union. Dr. Morgan said in part: