only possess a knowledge of applied physical sciences, economics and the like; eventually, if he is to make his work worthy of his opportunity, he must become familiar with the psycho-physiological aspects. For the artistic phase of lighting the lighting artist is evolving, but the lighting specialist should also develop himself in this direction.

Very little work is being done on the psycho-physiological aspects of the lighting art. Only a few individuals are interested as yet. Therefore, it may be permissible to refer to the Lighting Research Laboratory at Nela Park, where systematic work is being done on the relations of intensity of illumination, speed of vision, size of test-object and contrast of test-object. This is a work of years which has grown out of continuous work in the psycho-physiological realm begun seventeen years ago. Our goal is to establish eventually a complete relationship of these and other factors. Glare and visibility are also being studied year after year with the hope of eventually showing how improper lighting distorts the relationships already mentioned. Besides these we are studying such factors as eye-fatigue, visual acuity, accuracy, effect of contrast, color-vision and certain psychological effects of light and color as they influence the efficiency, the production, the welfare and the happiness of individuals. The large number of observers and the time required make such work laborious, but the results are supplying the foundation of knowledge for the development of lighting. Much more scientific work is needed relating light, lighting, color and vision. A few individuals are working elsewhere, but science has not generally awakened to the great importance and opportunities of work in the psycho-physiological realm of light and vision.

Illuminating engineers and others have applied scientific methods and knowledge to such developments as the coefficient of utilization method in the design of lighting installations, the visibility of electric signs, the design of lighting equipment utilizing the laws of geometrical optics and to the development of artificial daylight, colored accessories, special lamps and portable photometers.

Scientific methods are being employed in actual tests of street lighting, of automobile headlamps, of production in factories as influenced by lighting, of the relation of safety and lighting and other phases of lighting, but they are handicapped by the scanty knowledge and doubtful test-methods as yet available. The special applications of lighting in which scientific knowledge and research is entering already are vast in number.

I have dwelled longer upon light-production than upon light-utilization. But this has been done because the former has been well developed, and scientific work in the latter field only began relatively recently. The science of light-utilization, so far as it touches vision and the user of light, is in the early stages of evolution. It is getting its bearings; it is designing and trying out its tools—test-methods; but it is already involved in many fascinating problems, only a few of which have been mentioned in the foregoing. With space limited and with the work barely begun, it seems best to give only this glimpse to show what the field is like. However, I wish to emphasize that lighting, upon which vision is dependent, is important enough to demand not only the attention of the engineer and of every employer and user of light, but the assistance of many qualified scientific investigators in the psycho-physiological realm. The few of us associated with the work in this field find it difficult to avoid being overwhelmed with a view of the work to be done. The lighting specialist is waiting for more foundation upon which to build the utilization of light. There is nothing spectacular to attract workers to the field. On the contrary, the work is complex, tedious and time-consuming. However, there is the fascination of entering a field which explorers have just invaded and the satisfaction that one is dealing with an essential to our most important sense—vision. Furthermore, artificial lighting is still so far from the ideal in intensity and quality of the daylight under which our eyes evolved, that we may look forward into the misty future before seeing artificial light overtake natural light in these respects. And then, finally, we may have the satisfaction of improving upon natural light and lighting. Who knows? No one, for scientific investigation has still to supply the answer.

M. LUCKIESH

NELA PARK,
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BARRO COLORADO ISLAND BIOLOGICAL STATION

THE National Research Council has received the third annual report of the executive committee of the Institute for Research in Tropical America, prepared by Dr. Thomas Barbour, acting chairman of the committee. It is, in effect, a report on the conditions and activities of the Barro Colorado Island Biological Station for the period March 1, 1926 to February 28, 1927.

The station was closed to visiting scientists for a part of this year owing to the fact that extensive repairs were necessary to the launch, and that a great deal of new construction was undertaken which made it necessary to use the living accommodations for workmen. It was possible, however, to arrange

the plans of scientists who wished to visit the island so that their needs were met and no serious difficulty resulted from this arrangement, which will probably not have to be repeated.

Grateful acknowledgments are made to the governor of the Panama Canal, Colonel M. L. Walker, and to Colonel Harry Burgess, for their continued whole-hearted cooperation; also to Mr. Sam H. Heald, superintendent of the Panama Railroad, and to chief of police and the chief hydrographer, as well as to officers of the United Fruit Company, for many favors. The War Department, the governor of the canal, the United Fruit Company, and the Panama Railroad Steamship Company continue to make important concessions regarding the transportation of scientific workers from New York to and in and from the Canal Zone.

Dr. Frank M. Chapman, of the American Museum of Natural History, contributed $500 for a small new building suitable for living quarters and private laboratory which is available to other workers when Dr. Chapman is not using it. A substantial screened outdoor cage, 9 feet square by 7 feet high, suitable for sloths, monkeys, or other animals has been built back of the main laboratory. Five commercial firms have joined in building a new house, 16 feet by 16 feet, using lumber that had been treated to enable it to repel attacks of termites. Another building, 18 feet by 18 feet, has been built of redwood donated by the Little River Redwood Company of California, as an experiment to test the resistance of untreated redwood to termites. The Redwood Export Company of California has also contributed 15,000 board feet of redwood lumber and shingles with which to build other test buildings.

The clearing around the laboratory buildings has been considerably enlarged, trails have been extended and marked, and a channel wide enough for the station's large launch has been cut through the submerged forest all around the island, which makes it much easier for workers to explore the island shores, as well as easier to patrol the island against poachers. It is proposed to cut side channels from the main channel to each of the trails that open on the lake. The total length of the present trails is nine miles. They enable one to reach almost all parts of the island. The total coast line of the island exceeds 25 miles. The area of the island is 5.64 square miles.

The number of scientific workers and visitors on the island has been less perhaps than last year partly due to the closing of the station for a part of the year in order to make necessary repairs, but applications for places in the station for the coming summer are already numerous. The reports of workers who have visited the station in past years concerning the conditions for work and the ease with which the station may be reached are so uniformly favorable that the station is going to have difficulty in providing accommodations for the many who wish to come. However, the station officers will do whatever they can to take care of all applicants. Information regarding conditions of visiting and working at the station, and means of transportation, may be obtained from Dr. Thomas Barbour, Museum of Comparative Zoology, Cambridge, Massachusetts. On arrival at the station the visitor should learn details concerning the station's facilities for living accommodations and for work from Mr. James Zetek, resident custodian of the station. To consult with him in advance of arrival he should be addressed at Box 245, Ancon, C. Z.

The Barro Colorado Island Station is a success, but it needs help for extension and betterment. Universities and scientific organizations may help the station and at the same time help their own faculty members and advanced students interested in tropical biological research by subscribing for "tables" at an annual cost of three hundred dollars. This annual support will be of much use to the station, but a permanent endowment of from $100,000 to $200,000 is sorely needed. At present, the continued existence of the station is only maintained through the personal generosity of Dr. Barbour, Dr. David Fairchild and a few others. This is unfair and can not go on forever.

VERNON KELLOGG,
Permanent Secretary
NATIONAL RESEARCH COUNCIL

REPORT OF THE PRESIDENT OF THE ECOLOGICAL SOCIETY OF AMERICA ON THE QUESTIONNAIRE OF 1926

THE questionnaire sent out by your president with reference to research to the 602 members of the Ecological Society of America resulted in the receipt of slips from eighty-six members, or one seventh of the total membership. Twenty-six botanists, seven foresters and fifty-three zoologists returned the blanks filled out with many interesting details of their work and their hopes for future research. Space and time will not allow a complete analysis of the returns. The blanks will be kept by your president and will be accessible to members who may be interested in them.

The question, "Does your institution encourage research?" was answered by seventy-nine members. Fifty-eight persons unequivocally replied that the institution with which they were connected encouraged research. Six answered in the negative, one