500,000 acres, of which about 200,000 is now owned by the United States and the remainder is either in private ownership or is owned by the State of Michigan. The National Forest Reservation Commission has authorized the acquisition by the Department of Agriculture of the privately owned lands and it is expected, therefore, that these will ultimately be purchased.

THE International Education Board of the Rockefeller Foundation has given $200,000 to the Paris National History Museum to house the botanical collections in a new building. The total cost will be $280,000. The French government will contribute the balance.

UNIVERSITY AND EDUCATIONAL NOTES

ROBERT LAW, JR., has raised the amount he contributed to the development fund of the University of Chicago to $200,000. This sum will be used as an endowment for a distinguished service professorship.

DR. EDWARD H. ROCKWELL, dean of the college of engineering of Rutgers University, has been appointed professor of civil engineering at Lafayette College.

GEORGE W. SWENSON, assistant professor of electrical engineering at the University of Minnesota, has resigned to become professor of electrical engineering at the Michigan College of Mines at Houghton, Mich. He will be head of this department, which has just been established.

DR. GEORGE L. ZUNDEL, of Yale University, has been appointed assistant professor of plant pathology extension at the Pennsylvania State College.

DR. JOHN L. ULRICH, of the Plant Research Laboratory of Lehn and Fink, Bloomfield, New Jersey, has been appointed head of the department of physiology at the Homeopathic Medical School, New York City.

IN the department of zoology of the University of Pittsburgh, the following changes in rank are in effect for the coming year: Robert T. Hance, from acting head to head of the department; P. W. Whiting, from assistant to associate professor; E. Alfred Wolf, from instructor to assistant professor; A. W. Kozelka, from instructor to assistant professor at the Erie Center; E. P. Jones, from graduate assistant to instructor at the Uniontown Center.

THE China Medical Board of the Rockefeller Foundation has appointed Dr. Max M. Zinninger professor of surgery at the Peking Union Medical College. Dr. Zinninger has been with the Cincinnati College of Medicine and the Cincinnati General Hospital for about six years.

THE retirement of Professor Diarmid Noël Paton from the chair of physiology in the University of Glasgow will take effect on September 30. The Secretary of State for Scotland has recommended the appointment of Edward Provan Cathcart to the vacancy. Professor Cathcart at present holds the chair of physiological chemistry in the University of Glasgow, to which he was appointed in 1919.

DISCUSSION AND CORRESPONDENCE

"CENTERS OF RESEARCH," A REPLY

IN a recent article in SCIENCE entitled "Centers of Research,"[1] Professor S. R. Williams discusses what he believes to be the paucity and mediocrity of research in some of our graduate schools and suggests a remedy. While we agree that in some schools the situation is unsatisfactory we are inclined to differ as to some of the causes and the remedies. Professor Williams ascribes this condition to the practice of dividing research students among several members of the departmental staff, and suggests that the remedy is to place the department of research under *one outstanding leader who alone will direct and supervise the research of all candidates for the Ph.D. degree in that subject,* in analogy to the condition in German universities.

In contradistinction to conditions existing abroad where the funds for the support of more than one full professorship in a single subject are rarely available, our recent demand for wholesale education has created a very different situation. In the first place, many of our larger institutions are adequately supporting not one professorship in a department, but several. The demand for men to occupy the positions in competition with the excellent industrial opportunities for able men has filled many of these places with men of an average poorer quality than in analogous positions in Europe. In addition to this, the administrations of universities are demanding productive research from these men and their students. The result is, as Professor Williams states, rather lamentable in some cases. It seems to us, however, that the situation has been painted a bit blacker than it really is, and certainly than it will be in the future.

American standards for the Ph.D. are being perceptibly raised. Agencies such as the National Research Fellowships and the Bartol Research Foundation are training the abler Ph.D.'s in research for periods of several years after they have obtained their degrees. This is furnishing the universities with a most excellent supply of tried and able young men to carry on and direct graduate research.

Again, while it may be true that the smaller insti-

[1] SCIENCE, Volume 68, p. 61, July 20, 1928.

tutions are able to support the researches of only one of the abler men in a department, this is not so of the larger endowed institutions nor of any of a dozen state universities. While on certain problems co-operative research by a group under the leadership of one man is the best line of approach, it is seriously to be questioned whether in general the advance of knowledge can be furthered in this manner as well as by the more independent operations of a group working, however, in intimate contact. Although there are occasional men of genius among the leaders, the great complexity of modern science makes it questionable whether any one such man is going to be able adequately to direct researches over a broad domain. In fact, there is a great danger in putting, so to speak, "all one's scientific eggs in one basket." Finally, from the viewpoint of students whose study is for one reason or another confined to a given university, the concentration of research in one general field is a disadvantage, and where a single leader has to direct the researches of some thirty graduate students the situation becomes impossible.

If one examines the situation in such leading research centers of physics as California, Chicago, Harvard, Johns Hopkins, Michigan, Princeton, etc., one finds that the *group* is the productive unit, and that *no one man* is directing the researches, even though one man may be primarily responsible as the administrative head and organizer of the group. In fact, we differ so far from Professor Williams as to believe that the road to the best results lies in the direction of *assembling a group of able productive men, each active in directing the research of graduate students.*

The chief cause of our failing in research, as partially indicated before, we attribute primarily to the dearth *in the past* of able, original, well-trained men. This, in turn, is due to our rapid expansion and to disregard of the importance of research on the part of the public, resulting in the failure to support it adequately or to draw into it the best talent. It is a universal comment of distinguished foreign scientists who visit us, "We do not understand how you are content to work with so little *research assistance,* so little domestic help in your homes and so little public recognition."

In conclusion we might suggest that the policy of a large university in building up good research departments should not necessarily be to get "lustre names" to organize and direct their researches (there are all too few of these, anyway), but to select the new members of its staff with an eye to their research productivity in possibly several lines, to stimulate and encourage them by giving them opportunity to work with graduate students, and to urge departments to cooperate in discussing and working over their research problems and projects.

LEONARD B. LOEB
KARL T. COMPTON
RAYMOND T. BIRGE

PHYSICAL LABORATORIES,
UNIVERSITY OF CALIFORNIA

BLOOD PRESSURE DEPRESSION BY LIGHT IRRADIATION

IN a recent publication, Smetana[1] reports the results of experiments in which he used technique similar to that employed in a series of papers[2] on the effects of light from various sources thrown on the blood flowing through a quartz tube inserted in the carotid artery in etherized dogs; he reports three experiments on dogs and one on a cat in which a carbon arc was the source of radiation, with the result that there was an average depression of 25 per cent. in the blood pressure of the dogs and 57 per cent. in the cat. From these he concludes (p. 599) "that exposure of circulating blood alone to strong light produces no strikingly greater fall of arterial pressure than might be expected to take place following approximately two hours' anesthesia carried out in the ordinary light of the laboratory."

In my original papers there were reported the results of about two hundred experiments on dogs, and many of these have since been repeated for various purposes since that time with comparable results. In one of these papers was reported an extensive series of control experiments in which by no means as great depression of blood pressure occurred as in the irradiated animals. Smetana does not report any controls nor does he give any information as to current, size or nature of carbons, or the distance of exposure, all of which are important factors influencing photobiologic effects. It may be assumed, though he does not so state, that no condensing lens was used. In most of my experiments a quartz condenser was used, thus greatly intensifying the energy incidence.

While not questioning the major conclusions of his paper, it seems that his conclusion that my results have not been confirmed is not valid for the following reasons:

(1) He reports no control experiments.

(2) His experiments are too few in number.

(3) It is common experience that the dog's blood pressure may be maintained practically constant under ether for periods of as long as five hours with carefully controlled technique.

[1] Smetana, Hans, *Jour. Exper. Med.*, 1928, xlvii, 593.

[2] Reed, C. I., and collaborators. *Amer. Journ. Physiol.*, 1923, lxv, 477; *ibid.*, 1925, lxxiv, 511, 518, 525; *ibid.*, 1926, lxxv, 351, 616; *ibid.*, 1926, lxxvi, 54. *Arch. Phys. Ther.*, 1927, viii, 108.