DISCUSSION

SAFEGUARDING TYPE SPECIMENS

WITH two serious wars actually in progress in the world and constant threats of others, it is surprising that no general organized efforts have been made to safeguard the irreplaceable type specimens on which botanical nomenclature rests. This is a serious reflection on the breadth of vision of those engaged in systematic botany.

The importance of type specimens in taxonomy is now recognized by all competent systematists. Yet the care of these specimens is entrusted to any herbarium, large or small, in whose possession they happen to be. This is bad enough in the United States, where many institutions are not fully equipped for proper care of valuable material, but it is a crime against botanical science in those countries of the world where wars are being fought or constantly threatened.

With no intention of belittling the valiant efforts of those who have hidden the Spanish herbaria in cellars or of the British institutions which, during the world war, transported valuable specimens to country districts, and which were prepared to do the same during the recent crisis, it seems appropriate to ask why such uncertain measures must be necessary. Material is inevitably damaged during emergency packing and transportation, and in some institutions the task might seem so great as not to be attempted.

Scientists have no right to criticize the common people for having an apathetic attitude toward such important questions as national policies or to hold governments to account for the state of world politics, when their own inertia and provincialism stand in the way of solution of a problem as simple as that under discussion. The safeguarding of the specimens on which scientific language is based is an infinitely easier task than keeping nations out of war.

In the November issue of the *Journal of Botany, British and Foreign,* the writer has presented as a basis for discussion a plan for the preservation of all botanical types. It seems unnecessary here to more than summarize the features of this plan and to call the attention of American botanists to it. Most of those interested doubtless have access to the *Journal of Botany.*

It is suggested that a central herbarium be established for the housing of all types and historically important specimens, in a locality selected as most unlikely to see any future war activity, remote from any possible military objective. Here type specimens could be deposited by all herbaria as gifts, permanent loans or, where loans are forbidden, by establishment in the central repository of an actual branch of the herbarium concerned. Administration would be in the hands of a director and board of regents appointed by the International Congress of Botanists. Loans of specimens would be made freely to accredited institutions. Financing would, at first, necessarily be by assistance of various research foundations and botanical institutions. Gradually an endowment could be built up, and service to the botanical public be expanded. The main immediate objective would be to get all type specimens into a safe, yet accessible place.

Who knows what has become of the young Chinese herbaria, as yet, fortunately, without many types? Who can not imagine what might have happened if the recent European trouble had burst into war? Prague, Berlin, Vienna, Paris and London would certainly have been bombed. The belief has recently been expressed that no nation would waste a bomb on a museum, that any damage would be due to accidents. However, reports have been coming from reliable sources that many important Chinese educational institutions have been systematically destroyed. And the university at Madrid was used as a fortress. Military men should not be the only ones to learn lessons from these "rehearsals."

Types and other historic specimens can no longer be regarded as private property of individuals or institutions, but must be treated as a legacy, entrusted to us by the botanists of the past for the benefit of botanical science, present and future.

Certainly these considerations are important enough to merit discussion. It is to be hoped, too, that nationalism, institutional jealousy and the desire for institutional prestige may, for once, be entirely absent from the discussions. Local discussion is urged on this problem during the next year and a half, with a view to definite action at the congress at Stockholm in 1940.

F. R. FOSBERG
BOTANY DEPARTMENT,
UNIVERSITY OF PENNSYLVANIA

AN UNCOMMON METHOD FOR THE DETERMINATION OF "g"

AMONG the numerous possibilities of determining the gravitational acceleration g, one has found little or no attention. To the writer's knowledge none of the regular physics practica makes use of the conical pendulum for the determination of g, although this constitutes a very instructive experiment with a simple underlying theory.

For the conical pendulum, moving around a vertical axis, an equilibrium exists between the centrifugal force and the gravitational force. It is

$$(1)\quad mg = ml\omega^2\cos\alpha$$

where m is the mass of the pendulum, l its length, α the angle which the suspension forms with the axis, and $\omega = 2\pi n$, with n as the number of revolutions per second with which the pendulum rotates. One can substitute

$l \cos\alpha = h$, where h is the vertical distance between the suspension point of the pendulum and its center of gravity. This results in

$$(2)\quad g = h\omega^2 = 4\pi^2 n^2 h$$

All that is necessary to perform the experiment is a motor with adjustable speed with the turning axis in vertical position. From the axis a little weight is suspended by a string. Furthermore, a revolution counter has to be attached to the axis. The speed of the motor is adjusted so that the weight swings in a predetermined height h, which can be observed through a telescope, and which is kept constant. Then only the number of revolutions has to be determined over a given period of time. Even with a rather crude set-up reasonable accuracy is readily attainable. If a kathetometer is used for the height determination and a revolution count made over a longer period of time a rather good approximation of g may be obtained.

The method can be refined by controlling the height of the weight and the speed of the motor by a photoelectric cell and by placing the arrangement in a vacuum.

H. LANDSBERG
THE PENNSYLVANIA STATE COLLEGE

FOREIGN JOURNALS IN THE U.S.S.R.

IN a note in your issue of December 6, 1935, I compared the numbers of three British journals going to the U.S.A. and the U.S.S.R., respectively. In spite of the reiterated claim that scientific persons are treated more liberally in the U.S.S.R. than in any other country, and that the Soviet Union leads the world in its expenditure on and attachment to science, it appeared that in the United States *government and private effort together* obtained nine times as many copies of three important foreign scientific journals as in the Soviet Union.

It is possible that this comment did some good, for in the meantime the ratio has fallen from 9 to 4. Improvement is still necessary, for science can not be prosecuted without knowledge of what other people are doing, and the Soviet Union should need at least as many foreign journals as the U.S.A., since personal contact of its workers with foreign scientists is impossible. If the ratio (purchases by U.S.S.R.)/(purchases by U.S.A.) rises uniformly with time, it will become unity in about 1956. By then also it may be possible for scientific research workers in the U.S.S.R. to visit their colleagues in other countries. At present apparently it is not possible, for in spite of the evident attachment of the Soviet Union to physiology—not one physiologist was permitted to attend the International Congress of Physiologists last summer, nor even to answer the invitation.

Table 1, however, gives one hope of better things:

TABLE 1

	U.S.S.R.	U.S.A.	Ratio: per cent.
November, 1935			
Journal of Physiology	27	241	11.2
Journal of Experimental Biology	7	130	5.4
Biochemical Journal	47	374	12.6
Total	**81**	**745**	**11.9**
February, 1939			
Journal of Physiology	52	268	19.4
Journal of Experimental Biology	27	136	19.9
Biochemical Journal	126	390	32.3
Proceedings of the Royal Society A	25	191	13.1
Proceedings of the Royal Society B	15	146	10.3
Total	**245**	**1,131**	**21.6**

A. V. HILL
UNIVERSITY COLLEGE,
LONDON

THE MANIFESTO BY A PHYSICIST

NO one can read Professor Bridgman's "Manifesto by a Physicist" in the February 24 issue of SCIENCE without being profoundly impressed by the sincerity and high purpose of the author. Nor will any one doubt that his decision to close his laboratory to citizens of totalitarian states was taken "only after the gravest consideration."

One hesitates to call in question the carefully considered action of one of the most distinguished ornaments of American science, a man internationally known not only for his contributions to physics but also for his writings on the philosophy of science. Nevertheless, I venture to express the hope that few scientists in America and other democratic countries will follow Professor Bridgman's lead. I do this because of serious doubts respecting the efficacy of the procedure, its propriety, its justice and its wisdom.

It is difficult to see how such demonstration of hostility to the totalitarian conception of the state and the place of science in the state can be effective of great good. The detestation of democratic peoples for totalitarian ideas has long been proclaimed from the housetop. To express it in the laboratory can not add greatly to the weight of public opinion marshalled against the totalitarian régimes. Humiliation of visiting scientists, especially when it is visited upon the innocent as well as the guilty, must breed resentment against the behavior of scientists in the democracies.

Would not envy of them be more productive of action in the direction we wish? The scientist from Germany, Italy, Russia or Japan who visits our laboratories and observes the freedom in which we work can not but compare our liberty of action with the strait-jacket into which his government has put him, his colleagues and his students. Will not such visitor return to his land a more effective missionary for human liberty than one who has encountered only humiliating rebuffs?

The propriety of excluding visitors from scientific laboratories and other spheres of scientific activity, solely on the ground of citizenship in a totalitarian