tional relations, either on the lines of the Institute of Pacific Relations or by entrusting particular researches to individual institutions, was discussed. A study of the international implications in the relations between government authority and private economic activities of individuals and groups, with special reference to the new forms of public management, control, and supervision, national or international, direct or indirect, which have grown up since the war, and the motives and policies underlying them, is contemplated at the next conference. The possibility of a fundamental scientific study of the problem of disarmament was also suggested.

In industry, where an international outlook has become much more prevalent and the importance of scientific leadership is increasingly recognized, the possibilities visualised by General Smuts have found even more concrete expression. Sir Harry McGowan has already thrown out the suggestion of an International Council for Chemical Industry which would plan chemical industry as a world unit in regard to production, research and development. The World Social Economic Conference held at Amsterdam last August led to definite proposals for a five-year world plan which was to be based on world solidarity, the modification of national economic policy in accordance with its effect on world economy, and the pooling of losses due to the war. The plan involves a general moratorium on all war debts and reparation payments, a series of international loans and agreements in regard to markets and production, and the establishment of a World Research Council or Planning Board to stimulate thought and action in the planning and rational organization of the social and economic life of the world.

Were not scientific workers, as Ruskin remarked, "still eager to add to our knowledge, rather than to use it," the new opportunities confronting them of making a vital contribution to the solution of our present difficulties would have been seized with avidity. Not only industry but also whole sections of the nation are disposed to accept the leadership of science and to adopt a well-thought-out and comprehensive scheme of national and international reconstruction based upon an authoritative and scientific analysis of the whole situation. No such scheme can, however, be produced until scientific workers are sufficiently concerned with the economic and social consequences of their work to cooperate with industrialists and others who are imbued with the scientific outlook and capable of assessing the value of scientific method and knowledge. In such cooperation there should be adequate safeguard against the neglect or abuse of human values, which Bertrand Russell fears and depicts so vividly in his sketch of scientific society and scientific government.

There are all the signs that the age of individualism and competition is passing and will be succeeded by an age of cooperation and planning on a world scale. The danger is still acute that old prejudices may delay the transition and precipitate a conflict from which the recovery of civilization will be impossible. The existence of political prejudices in government circles should not lead us to overlook the facts that nowhere does prejudice and individualism linger more persistently than among the very scientific workers whose discoveries have made world cooperation and the renunciation of war at once inevitable and urgent. Even the difficulties and limitations on the intellectual classes and the intellectual progress of mankind directly imposed by the burden of armaments under present conditions have not sufficed to rouse general interest among scientific workers, or to induce them to make their fitting contribution in the analysis of the problem. Statesmen, indeed, need to take account of our prejudices as well as of the facts of life. Reason alone may be an incomplete guide for the control of human affairs and lead us into a tyranny which becomes intolerable to human nature because of its disregard for human values. Knowledge and leadership must be indissolubly linked if disaster is to be avoided, and to no class of the community is there a stronger challenge in the present emergency than that addressed to scientific workers to declare with a united and unequivocal voice the potentialities of science in the evolution of a better world order and the lines upon which a systematic policy can be evolved.—*Nature*.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

INFLUENCE OF METHOD OF SHAKING ON AMOUNT OF PHOSPHATE DISSOLVED FROM SOIL BY WATER

DISCORDANT results were obtained during the course of experiments designed to determine the optimum time for shaking a soil-water suspension in order to dissolve phosphate. Much more phosphate was dissolved from sandy soils when vigorously shaken than when gently agitated. There was only a small difference in the amounts extracted from clay soils whichever method of shaking was used. This note is written merely to direct attention to the facts observed, not as indicating intention to make a study of the subject.

The conditions were about as follows: Two grams of air-dry powdered soil with 200 cc of distilled water were placed in 500 cc wide-mouth bottles closed by rubber stoppers. After shaking the mixture for a definite time, it was filtered on ashless filter-paper on a Buchner funnel by the aid of suction. The first of the filtrate, which was turbid, was returned to the filter until it came through clear. In the clear solution, PO_4 was determined by the molybdenum blue method.

Two quite different shaking machines were employed. One had a reciprocal motion with a stroke of about two inches at the rate of 120 per minute. In this the bottles lay on their sides so placed that the motion was lengthwise of the bottles. Since the bottles were less than half full, their contents were rather violently agitated. The longer the time of shaking the greater was the amount of PO_4 dissolved from sandy soils. With clay soils time did not make so much difference.

In the other shaking machine, the bottles were placed with their longer axes perpendicular to the axis of the rotating holder in such manner that they were turned end over end at the rate of four revolutions per minute, which scarcely did more than keep the contents of the bottles mixed by very gentle agitation. After it was found that the method of shaking made much difference in the amount of phosphate dissolved, the position of the bottles in the end-over-end shaker was changed so that their long axes were parallel to the axis of the machine. In this way, the bottles were turned over by a sort of rolling motion which kept the contents in motion without violent agitation. The rotation was so gentle that an ordinary filter-paper placed in the soil suspension was not torn after two hours of agitation. In the reciprocal shaker, the filter-paper was disintegrated to pulp in a few minutes.

Results recorded in the appended table seem to indicate that about one hour's agitation in the end-over-end shaker is long enough for clay soils. With even this gentle motion, the PO_4 dissolved from soil 30, a fine sandy loam, increased with the length of time shaken, so that the length of time for shaking a sandy soil has been arbitrarily set at one hour, with the knowledge that slight changes in the conditions may cause considerable difference in the results. It appears probable that discordant results in the analysis of soils for various constituents have frequently been caused by differences in the method of mixing or agitating the suspension before filtering off the solution.

In this connection, it is of interest to note that workers in physical analysis of soils observe that the amount of colloidal matter extracted from some soils is increased by longer time of agitation of the suspension before making the separation.

EFFECT OF METHOD OF SHAKING ON PO_4 EXTRACTED FROM SOILS BY SHAKING WITH WATER

Kind of shaker	Time shaken	Soil numbers					
		Silty clays, No.'s			Sandy soils, No.'s		
		1c	38	65	30	53	68
		p.p.m. PO_4 in air-dry soils					
Reciprocal	1 hour	50	63	316	234	74	37
"	2 "				274		
End over end		49	49	316	100	37	30
Rotary	1 min.	21					
"	1 hour	42					
"	2 "	45					
"	½ "	40			58		
"	1 "	44			68		
"	2 "	43			82		
Shaken by hand once every five minutes for one hour, then filtered:							
Very gentle shaking					57		
Violent shaking					65		

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A METHOD OF ARTIFICIALLY FEEDING THE SUGAR-BEET LEAFHOPPER

CARTER[1, 2] devised an apparatus for the purpose of artificially feeding the sugar-beet leafhopper, *Eutettix tenellus* (Baker). He pointed out that this device is also suitable for studies on the properties of the curly-top virus and for nutritional studies with sucking insects.

For certain biochemical investigations on the curly-top problem, Carter's apparatus was found to be unsuitable. It became necessary therefore to devise a method whereby the sugar-beet leafhopper and other closely related species could be fed artificially on very small amounts of solutions of known composition.

Pieces of glass tubing 1.5 cm in diameter and 2 cm in length served as the cage. One end of the cage was covered with cheesecloth, which was held securely in place by a rubber band. A section of paraffin ribbon, cut 60 microns in thickness with a microtome, was stuck to the other end of the cage after the leafhopper had been placed inside. The assembled cage is shown in Fig. 1. The animal mesentery membranes or the baudruche capping skins used by Carter were

[1] *Jour. Agr. Res.*, 34: 449–451, 1927.
[2] *Phytopath.*, 18: 246–247, 1928.