cowpea crops were turned under, and of $5.42 where they were removed for hay. Phosphate rock, on the other hand, gave by a similar calculation a profit of only $2.58 where the cowpea crops were turned under and the same amount where they were removed for hay.

On pages 87 and 88 of the Tennessee bulletin, No. 90, Professor Mooers makes the following statements:

The steamed bone meal, although included among the relatively insoluble phosphates, appears in these experiments to occupy an intermediate place, with returns little inferior to those from acid phosphate. As compared with phosphate rock the mechanical condition of the meal is in its favor; also its content of organic matter is supposed to assist in its decomposition. But in these experiments the influence of the nitrogen contained in the meal must not be overlooked and probably gives it a higher standing than can be attributed to the phosphoric acid alone. Evidently it is a valuable fertilizer for soils like these, and the confidence placed in it by many farmers of the Highland Rim and other parts of the state seems not to have been misplaced.

The calculated profits mentioned in Professor Mooers's Science article are evidently based upon different valuations than those reported in the bulletin, as may be seen from the following table taken from page 89 of the bulletin:

RESULTS OF TENNESSEE EXPERIMENTS

Cowpea Crops Turned Under

Phosphates Used			Calculated Profit	
Kind	Amount	Cost	Unlimed	Limed
Acid phosphate.....	229 lb.	$1.83	$3.37	$4.47
Bone meal	218 "	3.27	3.13	2.73
Phosphate rock.....	383 "	1.53	2.57	1.37
Cowpea Crops Removed				
Acid phosphate.....	261 lb.	$2.09	$5.34	$5.98
Phosphate rock.....	385 "	1.54	4.73	−0.77

Easy computations show profits per $1.00 invested of $0.90 from bone meal and $1.29 from phosphate rock, as an average of the comparable figures.

On page 90 of the Tennessee bulletin Professor Mooers makes the following statement:

There seems, therefore, to be little promise in phosphate rock on soils like those under consideration, unless liming be omitted, and even then the results of Series III. and IV. show that acid phosphate may be much more profitable than the untreated rock.

Computation from the figures in the accompanying table show average profits from the unlimed land of $2.20 from acid phosphate and $2.38 from raw rock phosphate, for every $1.00 invested.

When we consider (1) that wheat was grown every year upon the same land in these Tennessee experiments; (2) that 70 per cent. of the phosphorus in the raw phosphate applied will remain in the soil for the benefit of future crops after the acid phosphate is exhausted; (3) that raw rock phosphate is now procurable in very much better mechanical condition than when these experiments were conducted; (4) that, as an average of sixteen years at Wooster and nineteen years at Strongsville, Ohio,[1] the increase in crop values were $4.01 from non-acidulated bone meal and $3.78 from acidulated bone black, on adjoining plots in a five-crop rotation system, providing for every crop every year; and (5) that, as an average of results from twenty years of investigation by the Rhode Island Experiment Station,[2] better returns per $1.00 invested were secured on both limed and unlimed land from both raw rock phosphate and ground bone than from any one of four different acidulated phosphates; then we find still more difficulty in harmonizing all expressed opinions with the established facts.

Cyril G. Hopkins
University of Illinois

THE ORGANIZATION MANIA

To the Editor of Science: It is to be hoped that the Report of the Subcommittee on Research in Industrial Laboratories, published in Science for January 12, marks the high water mark of the organization mania now sweeping the country. The research worker must have an assortment of extraordinary qualifications.

[1] Ohio Experiment Station Circulars 104 (p. 11) and 144 (p. 97).

[2] Rhode Island Experiment Station Bulletin 163, p. 547.

Nothing is said, however, of what rewards, either financial or social, are for him. Apparently he should be willing to be a cog in a machine in an institution. It is difficult, says the Report, to locate "a skilled private assistant—one who possesses not only originality, but also sound judgment and intellectual honesty." If you add to these qualifications a handsome appearance, you will have nearly the perfect man—and then you offer him the glorious position of private assistant. Happily, however, he will not be foolish enough to take it. He will make more money, have more independence, and win more social esteem if he devotes his originality to writing "compelling" soap advertisements. He will also have an infinitely easier life.

The amazing statement is made that "the individual can exert only a very small influence except as a member of an organization." One wonders what institution or organization Newton or Darwin belonged to, without which "they would have exerted only a very small influence." Coming nearer home, to what institution does Mr. Baekeland or Mr. Elihu Thomson belong?

The best possible thing that executives can do for science is to efface themselves as much as possible. Thank heaven, the "centralizers and coordinators" (as Sir Ronald Ross calls them) did not get hold of Dalton or Faraday or even Shakespeare, for creative originality is the same, substantially, to whatever it may be applied. Not only do executives often absorb salaries that ought to be paid to research workers, but they create a public impression that the workers are their subordinates, as if a scientific worker were an inferior sort of animal who needed some one to coordinate his activities.

Executives also absorb some of the most stimulating parts of the work—the planning and prominent public expression. Worst of all, they operate to deprive a scientific worker of that independent position which is the life blood of a man of original and vigorous habit of mind. The proper model of the scientist is the judge. The lack of independent position surely drives many away from fruitful work. The writer knows two men of scientific training and of vigorous and original minds who went into the advertising business. Needless to say, they are earning vastly more, and are enjoying a far more independent position, than the majority of scientific workers. No executive tells them to "cooperate." They cooperate or not, just as they see fit.

Of course cooperation comes in strong in the report, even if it works to deprive talent of its just rewards. Originality is not joint but personal. An army wins a battle, but the creative thinking is commonly done by some one Napoleon. The writer knows of a case recently where an organization worked on a problem for many months without achieving anything except more or less useful (mostly trivial) data. But one day a member not working on that problem, devoted some high tension thinking to the subject, aided by a happy combination of other knowledge, and was able to see the solution of the whole question on radically different lines. If he had turned in his contribution, he would have received only minor recognition, as he had spent only a short time on it. As it was, he kept it to himself and is now reaping a legitimate reward. How could his inventive originality be asked to divide the credit and rewards with mere data collecting—for the two things are not commensurate? To use a current expression, they are "not in the same class." And yet he should not be secretive, *i. e.*, talent should give its ideas to mediocrity. There are kinds of cooperation where one eats the dinner, and the other pays the check and tips the waiter and cloak room girl besides.

Other scientists would do well to take a leaf from the surgeon's book. Certainly in part, the high position of American surgery is owing to the fact that the surgeon's work is his own. I presume that the Mayo brothers have an "executive," precisely as any hospital has a manager, who attends to the buying of supplies, etc., but nobody ever heard of him. It is curious how American surgeons have been able to do such good work with no "executive surgeons" to occupy the center of the stage, and make them cooperate. Incredible as it may

seem, in this field the mahogany roll-top desk is not the greatest thing in the world.

Says Professor Fite in the *Nation:*

> Wherever two or three are gathered together, and even where they are not gathered together, some one is on his way to organize them. In the madness for organization we have long since lost sight of the end in the means; we have forgotten that neither the fruition nor the advancement of human life can take place in the absence of individual freedom and creativeness, and we have come to believe that the sole meaning of life and of culture is—to be organized.

INDIVIDUAL

SCIENCE AS CONTRABAND

TO THE EDITOR OF SCIENCE: Through the kind offices of Professor James Ward the British authorities have consented to release the books sent from Germany to the *Psychological Review.* The Psychological Review Company desires to express its thanks to Professor Ward.

For the benefit of other scientists who may be similarly involved it should be stated that the action taken was a pure act of courtesy to Professor Ward. The taint of contraband still infects scientific literature in the opinion of the procurator general; but he is willing to defer to expert judgment.

HOWARD C. WARREN

PSYCHOLOGICAL REVIEW CO.,
PRINCETON, N. J.,
February 20, 1917

TRIMMED MAGAZINES AND EFFICIENCY EXPERTS

TO THE EDITOR OF SCIENCE: Your correspondent "H. P." waxes somewhat warm in your issue of January 12 on the above subject and evidently prefers his untrimmed. To me it seems "all nonsense" to say that "I have always found that I got more out of an unopened magazine than an opened one." The contents are of course the same in either case, the difference is in one's mental attitude. I find my weekly copy of SCIENCE so interesting that I almost invariably read it clear through, and I do not want to be delayed in getting at its contents by having to cut its pages. I find it very irritating to have to cut the pages of an interesting book when I had much rather be reading it. Such work is to me a waste of time and energy. SCIENCE is read weekly by some 12,000 to 15,000 busy men and women whose time is valuable in the literal as well as in the figurative sense, hence the "general opinion that the copies should be trimmed." This suits the present writer, but it is to be regretted that "H. P." can no longer get his untrimmed.

E. W. GUDGER

STATE NORMAL COLLEGE,
GREENSBORO, N. C.,
February 1, 1917

QUOTATIONS

INTELLECT AND THE WAR

HAD not experience amply shown that no subject is so remote as to make it exempt from contact with the workings of the great war, one might expect such immunity in the case of a paper on "The Relations of Mathematics to the Natural Sciences." As it is, one is not in the least surprised to find that the bearing of the present state of the world on the future of mathematical research is the theme of the closing remarks in the presidential address with that title delivered at the recent meeting of the American Mathematical Society by Professor E. W. Brown, the distinguished mathematical astronomer of Yale. While the stupendous events of the past two years have caused the need for scientific research to be emphasized more strongly than ever before, he says, yet it is to be remembered that in this the practical end alone is contemplated, and the purely intellectual side is little regarded. "The future of research in pure science is in danger as never before," he warns.

For this fear there is only too much ground, though in our judgment it would be a deplorable error to accept as inevitable that which is only threatened. No man can say what reaction there may be after the war from that state of mind which the appalling demands of such a conflict as is now convulsing the world inevitably produce. Everything depends on the nature of the peace which is to follow. If it is to be such as will compel a