stimulation of greater interest in this problem. The speakers will be engineers and public officials of prominence and information regarding the practical phases of drainage will be made available to those in attendance. The organization and financing of drainage districts, the surveying of drainage areas, the design of systems and improved methods of construction are among the subjects to be considered. The meeting will be in charge of the department of civil engineering, college of engineering, Urbana, Illinois.

"ASPECTS of Modern Science" is the general subject of a series of lectures being given by members of the faculties of the University of Chicago, at the North Side Center of the University Lecture Association of Chicago. The series was opened on February 19 by Professor Robert A. Millikan, of the department of physics, who spoke on "Modern Views of Electricity." On the evening of February 26, Associate Professor William Draper Harkins, of the department of chemistry, discussed the subject of "Radium, the Breaking Up of Atoms, and the Evolution of the Elements." On March 5, Professor John Merle Coulter, head of the department of botany, will lecture on "The Revolution in Agriculture," showing how the investigations of heredity and of the soil have revolutionized agricultural practise and bid fair to solve the pressing problem of food production. On March 12, Associate Professor Walter Sheldon Tower, of the department of geography, will discuss "The Meaning of Modern Geography," and, on March 19, Director Edwin Brant Frost, of the Yerkes Observatory, will present some of the "Revelations of the Spectroscope." The closing lecture, "The New Geology," on March 26, will be given by Dean Rollin D. Salisbury, of the Ogden Graduate School of Science, who will present some of the newer theories concerning the earth's history, especially its origin and its age.

UNIVERSITY AND EDUCATIONAL NEWS

PRESIDENT WILSON signed, on February 23, the Smith-Hughes Vocational Education Bill, which provides large funds for federal aid to the states for the teaching of agriculture, trade, industries and home economics.

MR. AND MRS. MAX EPSTEIN, of Chicago, have contributed to the medical school enterprise of the University of Chicago $100,000 to erect and furnish the equipment for a university dispensary. This will provide a structure in which will be reception rooms, rooms for diagnosis and treatment, rooms for hospital and dispensary social service work and workers both professional and volunteer.

MR. FRANK G. LOGAN, of Chicago, has given to the University of Chicago a fund providing an income of $3,000 a year for three research fellowships, one in pathology and bacteriology, one in medicine and one in surgery.

AT a recent meeting of the faculty of the Long Island College Hospital it was voted to admit women students on the same terms as men.

IT is stated in *Nature* that Mr. E. J. C. Rennie, son of Professor Rennie, of the University of Adelaide, has been appointed acting lecturer in electrical engineering in the University of Melbourne. He will take the place of Mr. E. B. Brown, who is about to engage in munition work in England.

DR. C. E. MOSS, of the University of Cambridge, has been appointed professor of botany in the South African School of Mines and Technology, Johannesburg.

DISCUSSION AND CORRESPONDENCE

PHOSPHATE EXPERIMENTS

IN SCIENCE, January 5, 1917, pages 18 and 19, Professor C. A. Mooers writes as follows concerning the results of Tennessee experiments with different phosphates:

> Neither now nor in the past have these results allowed us to advocate, as intimated by Dr. Hopkins, the use of unacidulated bone meal. From the standpoint of economy, the data obtained here have been decidedly in favor of acid phosphate. In Dr. Hopkins's article omission was made of the fact that in the table referred to—Bulletin 90, p. 89, Tennessee Agricultural Experiment Station—every $1.00 invested in acid phosphate gave on the average a calculated profit of $4.28 where the

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.