ert C. Dexter, professor of social science. Dr. Barnes has accepted a position in the sociological department at Smith College. Mr. Dexter will become head of the department of sociology at Skidmore College.

DR. FREDERICK G. BANTING, Toronto, will be appointed to a chair in medicine at the University of Toronto if plans of the university and the provincial government materialize. An annual allowance of $10,000 accompanies the appointment, $6,000 being for salary and the remainder for supplies, assistants and other expenses.

DISCUSSION AND CORRESPONDENCE

CONCENTRATIONS OF IONS OF INSOLUBLE OR UNDISSOCIATED SALTS IN SOLUTION

PROFESSOR RODEBUSH in his recent comment[1] on a note by the writer on the mode of reaction of slightly soluble salts[2] has pointed out the improbability of the existence of a statistical equilibrium in a solution with only one ion or even less per liter. Since, as a result of the work of Gibbs and Boltzmann, entropy and thermodynamic equilibrium are considered to be statistical phenomena, it follows that when a statistical equilibrium is improbable, a thermodynamic equilibrium is likewise so. As a matter of fact, the concentrations of cathions of insoluble sulphides or complex ions obtained by calculation from E. M. F. measurements are of such a magnitude as to exclude thermodynamic equilibrium which is the fundamental assumption underlying such a calculation.

It is very questionable whether Knox's[3] calculations of the solubilities of the sulphides based on E. M. F. measurements should be taken literally. That these calculations are not always valid may be seen from the fact that while Knox gives a value of 2.6×10^{-15} for the solubility product of PbS, Noyes and Bray[4] find by precipitation methods a value of at least 1.8×10^{-22} and Stieglitz[5] believes that 2×10^{-27} is not low enough.

1 SCIENCE, N. S., lvii, 358, 1923.
2 *Ibid*, lvii, 26, 1923.
3 *Trans. Faraday Soc.*, iv, 44, 1900.
4 *J. Amer. Chem. Soc.*, xxix, 137, 1907.
5 Qual. Chem. Analysis, Vol. I, p. 212, 1916 edition.

One of two possibilities suggests itself: either there is a sufficient concentration of ions in the solutions of the insoluble substances to make possible a thermodynamic equilibrium and that the resulting E. M. F. is not indicative of the actual ionic concentration, but rather of the effectiveness of the concentration present as compared to that of a solution containing one mole of ions per liter; or there is no thermodynamic equilibrium and the E. M. F. is not the result of an equilibrium between the electrode and the particular ions in solution. From the agreement in the degree of insolubility of the series of sulphides as found by E. M. F. measurements and by precipitation methods, it would seem that we may assume the first alternative to be the correct one and as another instance of the unreliability of calculations from such measurements at low concentrations.

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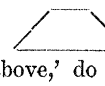
AN EGYPTIAN MATHEMATICAL PAPYRUS IN MOSCOW

IN an article[1] which appeared in 1917, Mr. B. Touraeff gives an account of a mathematical papyrus of the late middle empire, now in the Museum of Fine Arts in Moscow.

The translation of probably the most important new problem, giving the volume of a truncated pyramid, is as follows:

"The problem is to make a  . If it be said: ' . . . 4 below, 2 above,' do as follows: square this 4, which gives 16; duplicate 4, which gives 8. Do as follows: square the 2, which gives 4. Add the 16 to the 8 and the 4, which gives 28. Do as follows: take one third of 6, which gives 2. Do as follows: take 28 twice, which gives 56. This is the 56. You will find it correct."

This is precisely following the formula which we would use to calculate the volume of a truncated square pyramid with upper base 4 on a side, with lower base 2 on a side, and with altitude 6.

The remarkable appearance of this formula

1 "The volume of the truncated pyramid in Egyptian mathematics," Ancient Egypt, 1917, pp. 100-102.

is paralleled by the use of somewhat analogous formulas in finding the sum of a geometric series and in solving problems in arithmetical series in the Ahmes papyrus[2] which antedates by one hundred or more years the recently famous King Tut-ankh-amen.

Another problem in the Moscow papyrus is concerned with determining the "sides of a quadrilateral, when the relation of the sides and the area of the quadrilateral are known." This problem is almost equally important, as it indicates clearly the Egyptian inspiration of a whole series of problems found in Euclid's Data. The problems in question are concerned with the determination of the sides of a rectangle when the area and some other relationship of the sides are given.[3]

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ZIRCONIUM FRACTIONS

A COMMUNICATION by Professor Kurt A. Grönvall in *Svensk Kem. Tids.* for April may be of interest to some of your readers. Professor Grönvall has been reading some back numbers of his *Zeit. für Kristallographie* and came across references to zirconium fractions which led their observers to all the thrills of discoverers of new elements. These supposedly new elements were observed before Nils Bohr came upon the scene with a new fangled tool and could not therefore be clinched as was hafnium. The elements from zirconium are: ostranium discovered by Breithaupt of Freiburg in 1825, noranium by Svanberg of Uppsala, discovered in 1845, and jargonium by the first petrographer, H. C. Sorby, from zirconium collected in Ceylon, 1869. Now comes hafnium with its several discoverers. Professor Grönvall asks us, "Is hafnium a new element?"

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APRIL 22, 1923

2 Karpinski, "Algebraical developments among the Egyptians and Babylonians," *Amer. Math. Mo.*, Vol. 24, 1917, pp. 257-265.

3 Problems 85-90 in Simson's edition of Euclid's Data; in Opera Omnia ed. Heiberg and Menge, Vol. 6, Prop. 84-86, pp. 165-173.

QUOTATIONS

FEDERATIONS OF SCIENTIFIC MEN

THE reluctance to discuss the monetary value of their services is a tradition which dies hard among the brain-workers in this country and abroad, and is in large measure responsible for the unenviable position of many salaried workers during and since the war. In the legal and medical professions, which occupy a legalized privileged position and are further safeguarded by the needs and the attitude of the community, professional unity is possible and demands for improved conditions of service and better remuneration for these classes are generally successful. The success of medical men in this country in particular has given an impetus to other professional workers towards combination, and various organizations now exist having for their avowed object the improvement of the economic position of the professional classes. In France, after approaching first the Confédération Générale du Travail, and later the General Association of Employees—both organizations of manual workers—the brain-workers have decided to form their own independent Confédération des Travailleurs Intellectuels. It is already in a position to exert considerable influence in the chamber of deputies and the senate, and its success has provoked the creation of similar bodies in several other European countries. In this country there is an organization, the National Federation of Professional, Technical, Administrative and Supervisory Workers, founded in 1920, having similar aims. Hitherto it has not been able to obtain the support of the medical, legal, engineering, teaching or scientific associations. These may join the federation later, but, in the first instance, they will probably find it better to form their own federation. The time is certainly opportune for a movement to be made in this direction.—*Nature*.

THE INTERNATIONAL WORK OF SCIENTIFIC SYNTHESIS[1]

THE current development of science is so varied and so extensive that even the expert is

1 A review of the international journal, *Scientia*.