$a_H = \frac{h^3}{4\pi^2 e^2 m}$ (a_H = radius of the electron in the normal state).

$= 0{\cdot}532 \times 10^{-8}$ cm.

and

$\frac{e^2}{2a_H} = e(13{\cdot}54 \text{ volts})$. Therefore for an element x with an ionisation potential of V_x we have

$$a_x = \frac{(0{\cdot}532 \times 13{\cdot}56)}{V_x} \times 10^{-8} \text{ cm.}$$

Thus *the atomic radius varies inversely as the ionisation potential.*

The atomic radii calculated according to this formula are, in general, smaller than the atomic radii calculated either from crystal data (Bragg) or from the kinetic theory of gases (Rankine and others). They are shown in the appended table for the sake of comparison :—

Atomic Radius.

Element	I.P.	From I.P. $a \times 10^8$	Crystal measures $b \times 10^8$	Viscosity data
H	13·54	0·530	—	—
He	25·40	0·28	—	1·08
Ne	22·80	0·33	0·65	1·01
(Horton, *Phil. Mag.*, May, 1921)				
Li	5·40	1·34	1·50	—
Na	5·11	1·41	1·77	—
K	4·32	1·67	2·07	—
Rb	4·16	1·73	2·25	—
Cs	3·88	1·86	2·37	—
Cu	7·63	0·94	1·37	—
Ag	7·50	0·95	1·77	—
Au	8·63	0·83	—	—
Mg	7·61	0·95	1·42	—
Ca	6·09	1·18	1·70	—
Sr	5·67	1·27	1·95	—
Ba	5·19	1·39	2·10	—
Zn	9·35	0·77	1 32	—
Cd	8·95	0·81	1·60	—
Hg	10·38	0·69	—	—
Tl	7·30	0·99	2·25	—
Mn	7·38	0·98	1·47	—

The values of V_x for copper, silver, and gold have been calculated from Hicks's value of the (1S) term for these elements. That for manganese has been similarly calculated from Mr. Catalan's value of (1S) for manganese (not yet published). For these data I wish here to record my indebtedness to Prof. Fowler and Mr. Catalan. The sources for the other values are quite well known. MEGH NAD SAHA.

21 Cromwell Road, London, July 13.

American and British Superannuation Systems.

I READ with great interest the article in NATURE of June 30 on the American and British superannuation systems. The selection of a satisfactory scheme of superannuation is a matter of great importance in the organisation of a public service. On the one hand, an age limit can be effectively enforced only when suitable provision is made for those who are forced to retire, and on the other the provision of a pension conditional on the completion of a full term of service is objectionable, because a public servant who retires before that period is completed is penalised by the loss of a portion of the consideration for which he has given his labour. The result is that although a man may feel that he would do better work in another sphere, and has an opportunity of doing so, he cannot bring himself to forgo the pension towards which he has already contributed some years of service.

The recent Committee of the British Science Guild on the Utilisation of Science in Public Departments considered this question, and came to the conclusion (Journ. Br. Sci. Gd., June, 1921, p. 37) that the best solution appeared to be to award at the end of every year's service a pension (or alternatively an endowment insurance) accruing at the age fixed for superannuation (or in the case of the insurance at that age or previous death), independently of whether the officer had remained in the service or not. The advantages accruing in respect of a single year's service would, of course, be comparatively small, but those for successive years would, when added together, furnish an adequate provision for the old age of officials who had served the full term, while they would be a welcome addition to the resources of those whose later careers had followed other directions.

It is essential that these benefits should be secured by public funds, and based on actuarial calculations at current rates of interest. The amounts now quoted by insurance companies are apparently calculated on pre-war rates, and are far too low.

This scheme could be adopted whether the basis of the superannuation were contributory or not.

July 19. JOHN W. EVANS.

MAY I point out, in connection with the note appended to my letter printed in NATURE of July 21, p. 651, that if only one mutual life assurance company were available the argument quoted in the leading article of June 30 would be answered, for that argument implied that dividends necessarily go to shareholders? The remark about expenses in the note leaves the point of paragraph (3) of my letter untouched, and the final sentence of the note makes me wonder whether the two-year-old American "Teachers' Insurance and Annuity Association" will grow up and prove itself to be more "philanthropic" than the selected assurance companies in England.

I am afraid that, quite unintentionally, my former letter must have seemed offensive to have justified your note to it. The hot, dry weather has been, and still is, trying to us all, *et tout comprendre c'est tout pardonner!* W. PALIN ELDERTON.

July 22.

A Novel Magneto-Optical Effect.

IN connection with the very interesting observations communicated by Dr. R. Whytlaw-Gray and Mr. J. B. Speakman (NATURE, July 14, p. 619), I should like to point out the close similarity of the phenomena which they have observed with those observed in the case of soap solutions (Proc. Roy Soc., A, 1921, vol. xcviii., p. 395; and Journ. Chem. Soc., 1920, vol. cxvii., p. 1506).

Gray and Speakman describe the formation of flexible strings or fibres in clouds of various metallic oxides, these fibres being made up of particles of colloidal dimensions which still retain their individuality. Miss Laing, in her study of gelatinisation, was led to the conclusion that such conjunction or orientation of colloidal particles forms the mechanism of gelatinisation. For instance, in a soap solution the individual colloidal particles are otherwise the same in the liquid sol as they are in the elastic jelly. In the letter referred to it is pointed out that the particles in a cloud of cadmium oxide have an exceptional tendency to form such strings, and this agrees with the striking behaviour of Svedberg's sols of the same substance in alcohol, which on standing gelatinise, but on slight shaking revert to the fluid condition, an alternation which can be indefinitely repeated.