The recent important radioactive work proving the existence of the neutron affords, however, what may possibly be considered as an alternative or as an additional consideration. Bartlett [3] has shown that, starting with a helium nucleus, the continual successive addition of neutron, proton, neutron, proton, etc., up to O^{16}, and then neutron, neutron, proton, proton, etc., up to A^{36}, accounts exactly for all the existing isotopes; only He^5 is predicted also, but this has not yet been observed. It appears evident that α-particles, neutrons, and protons are the constituent elements of atomic nucleii. It is therefore quite possible that both neutrons and protons contribute to the production of nuclear spin. If the spin g factor of the neutron differs considerably from that of the proton, then 'anomalous' $g(I)$ factors will arise, for in one atom the nuclear spin may be largely due to protons, and in another due to neutrons.

The observations of McLennan, McLay, and Crawford may possibly be explained entirely by this alone, that is, providing the g factors are actually different; but the whole group of $g(I)$ factors, all anomalously too small, found by me in the lighter elements, is more difficult to account for. Perhaps orbital motion and variable g factor both contribute to the production of the observed anomalies.

S. TOLANSKY.

Imperial College of Science,
South Kensington, London, Aug. 15.

[1] J. C. McLennan, A. B. McLay, and M. F. Crawford, *Proc. Roy. Soc.*, A, **133**, 652; 1931.
[2] S. Tolansky, *Z. Phys.*, **74**, 336; 1932.
[3] J. H. Bartlett, NATURE, **130**, 165, July 30, 1932.

New Infra-Red Bands Photographed in the Absorption Spectrum of Acetylene

WE have recently investigated the vibration-rotation spectrum of acetylene in the near infra-red. This absorption spectrum has been photographed in the first order of the 21 ft. Rowland concave grating which has been recently set up in a Runge-Paschen mounting Various lengths of absorbing gas have been used, namely, 3, 6, and 9 metres, at atmospheric pressure. Employing the new Kodak zenocyanine infra-red plates, we have been able to extend our investigations beyond 1μ.

In addition to the two bands at λλ7887 and 8622 A., which have been previously reported by Mecke [1] and also by Badger,[2] two further bands have been obtained situated at λλ10164·8 and 10369·8 A. units respectively, all bands being entirely resolved and showing alternating intensity in the lines. The first three of these bands are of approximately the same intensity, and all are far weaker than the band at 10369·8 A., whilst the band which Mecke reports at 7956 A. could not be detected.

The 10369·8 A. band is interpreted as the third harmonic of the fundamental frequency ν_3 (notation after Dennison [3]). It possesses strongly developed P and R branches and a weak line near the origin (very weak Q branch ?). A few rotational lines appear to be split up into very narrow doublets, a point which is being investigated further. The general appearance of the band is closely analogous to that of the 3μ band, in which case also there is evidence of the existence of a weak line near the origin.

The other bands quoted above are interpreted as $\nu_1+3\nu_3$ (8622 A.), $\nu_2+3\nu_3$ (7887 A.), and $\nu_3+2\nu_2$ (10165 A.). Again P and R branches are strongly developed, but no Q branch or doubling could be seen in any of these bands.

The present interpretation of the bands agrees with the theory of Dennison [3] that only odd integral multiples of the optically active frequencies can be seen in the spectrum, and that the combinations must involve at least one of these frequencies.

Full details of the present investigation will be published later. W. LOCHTE-HOLTGREVEN.
E. EASTWOOD.

Physical Laboratories,
University of Manchester, July 28.

[1] K. Hedfeld and R. Mecke, *Z. f. Phys.*, **64**, 151; 1930.
[2] R. Badger, *Phys. Rev.*, **35**, 1433; 1930.
[3] M. Dennison, *Rev. Mod. Phys.*, **3**, 280; 1931.

Nuclear Structure

UNDER the above title, Mr. James H. Bartlett, jr.,[1] has indicated a simple regularity in the known nuclei of low atomic number, without being aware of the fact that I pointed out these regularities about a year ago.[2] He states: "The purpose of this note is to point out regularities for elements of low mass, and to suggest a possible building-up principle for such elements". The discussion of the next two paragraphs has been completely covered in the paper referred to above. The diagrams were made on the basis of building nuclei from protons and electrons, but the text pointed out that the building could be made from protons and neutrons very simply. This regularity was one fact which induced Dr. F. G. Brickwedde, Dr. G. M. Murphy, and me [3] to look for an isotope of hydrogen of mass 2, as stated in our paper. Moreover, in this paper we directed attention to this simple regularity among nuclei of low mass, and reproduced the proton-electron plot on page 14. It is only necessary to interpret each diagonal unit as the addition of a neutron and each vertical unit as the addition of a proton to secure the regularity pointed out by Mr. Bartlett.

I suggested further regularities beyond A^{36}. The regularity postulates the existence of many more nuclei than are observed, and it is, of course, a question as to whether these nuclei will be observed or not. There seems to be no particular reason at the present time for withdrawing the suggestions made, however. HAROLD C. UREY.

Chemistry Laboratory, Columbia University,
New York, Aug. 16.

[1] NATURE, **130**, 165, July 30, 1932.
[2] *J. Am. Chem. Soc.*, **53**, 2872; 1931.
[3] *Phys. Rev.* **39**, 164: **40**, 1; 1932.

Oogenesis in the Indian Earthworm

RECENTLY my attention was directed to a paper by Vishwa Nath [1] on the shape of the Golgi apparatus in the eggs of the Indian earthworm, *Pheretima posthuma*. Unfortunately, Nath has apparently not seen my paper [2] on the same animal (*Pheretima posthuma*), in which I discussed the shape, origin, and structure of Golgi elements and mitochondria as observed in the oogenesis of this animal. Tests with osmic acid on fresh ovary or the usual fixed preparations failed to reveal the presence of either neutral fat or yolk; although in certain preparations swollen bodies resembling fat were found which were later on revealed as artefacts. The Golgi elements were of the usual spherical type with a definite osmiophilic thick rim and a clear transparent core inside. Prolonged osmication made the vesicle blacker. The mitochondria were granular and not filamentar. It is obvious, therefore, that Dr. Nath has completely confirmed my original findings. U. S. SHARGA.

Rothamsted Experiment Station,
Harpenden, Herts, Aug. 18.

[1] Nath, Vishwa, "Studies on the Shape of the Golgi Apparatus: (11) Observations on the Fresh Egg of the Indian Earthworm, *Pheretima posthuma*", *Quart. J. Micr. Sci.*, **73**, 477; 1930.
[2] Sharga, U. S., "Cytoplasmic Inclusions in the Oogenesis of *Pheretima Posthuma*", *Alld. Univ. Stud.*, **4**, 177; 1928.