Letters to the Editor.

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The Constitution of Ordinary Lead.

AFTER repeated failures I have at last succeeded in obtaining the mass-spectrum of ordinary lead. This has been done by the use of its tetramethyl compound, a pure specimen of which was kindly supplied me by Mr. C. S. Piggot, of the Geophysical Laboratory, Washington. The vapour was first used diluted with carbon dioxide but later was admitted pure into the discharge tube. It works smoothly, but very long exposures are required. The three principal lines are 206 (4), 207 (3), 208 (7). The figures in brackets indicate roughly the relative intensities and are in good agreement with the atomic weight 207·2. This group is beautifully confirmed by its repetition 15, 30, and 45 units higher, corresponding with the mono-, di-, and trimethyl molecules. Comparator measurements show that all three of these lines are integral with those of mercury to an accuracy of 1 or 2 parts in 10,000.

There are indications that many other isotopes may be present in small proportions. An exceedingly faint line at 209 occurs in the atomic group, and on one plate is visible on the $PbCH_3$ group. This is almost certainly an isotope. Search for lighter mass numbers in the atomic group is unfortunately impossible owing to the mercury group and its penumbra. It was hoped that definite information would be available from the $PbCH_3$ group, but the unexpected appearance of lines certainly due to $HgCH_3$ complicates this region too. The evidence suggests the possibility that 203, 204, and 205 are all present in small proportion, but certain proof will only be available when mercury can be eliminated from the discharge.

The mercury lines in these experiments were more intense than any previously obtained, and indicate with certainty the presence of a seventh isotope Hg^{196}. Comparative exposures show that this is present to the minute extent of 0·04 per cent.

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July 30.

Helium Compound.

IT has been shown by Paneth and his co-workers in Berlin that any element which stands in the periodic table from one to four places before a noble gas will form an easily volatile hydride; such is the case with lead and bismuth, the hydrides being gaseous at ordinary temperatures. If, as is generally supposed, orthohelium has one electron relatively far removed from the nucleus with respect to the other, it is possible that in this state the helium atom might exhibit properties similar to, though less pronounced than, those of hydrogen; that is, it might be expected to combine with such an element as bismuth, and the resulting compound would in all probability be a gas.

The point can be investigated by the use of the radioactive isotopes of lead and bismuth, and a series of experiments has been made with this object in view. The results seem to indicate that such a gaseous compound does exist. Helium and other gases, at from 0·5 to 1 mm. pressure, were passed over a strong radioactive source of radium B and radium C, then, through a U-tube partially filled with glass wool, into a bulb containing a zinc sulphide screen; the gases could be excited in the tube surrounding the source by means of an electrodeless discharge. The relative amounts of radioactive gas formed were estimated by the number of scintillations appearing on the screen.

When a gas was circulated over the source and through the bulb, with no discharge passing, only a negligible number of scintillations was observed. With excited hydrogen a very large number appeared; it is most unlikely that these could have been due to particles of the source carried over in suspension, because similar experiments with oxygen and nitrogen gave no effect. When helium was used a radioactive gas was also found to be carried over into the bulb; the number of scintillations observed was much smaller than with hydrogen, yet much greater than that to be accounted for by hydrogen impurities in the helium or by radium emanation which had been occluded in the source. It thus seems probable that gaseous helides analogous to Paneth's hydrides can be formed.

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Breeding Places of Sucking-Fish in the North Atlantic.

IN a note in NATURE of Dec. 4, 1926, p. 805, Dr. H. C. Delsman described an attempt to hatch some fish eggs from the Java Sea which, according to his investigations, belong to *Echeneis naucrates* L. Hitherto nothing at all has been known about the propagation of this sucking-fish which is so common in tropical seas. Nor have we been any better acquainted with the breeding places and development of other sucking-fish, in spite of the attention given to these fish since early times.

Through the cruises in the years 1911–1922 of the *Dana* and other Danish ships in the tropical and subtropical northern Atlantic, some material has been collected that will throw a light on the breeding places of a few species of Echeneididæ. In this material we find post-larval stages (from a length of 5·6 mm.) of 3 species, namely, *Echeneis lineata* Menzies, *Remora remora* Linné, and *Remora clypeata* Günther (probably = *R. albescens* Temm. and Schl.). In the thousands of towings not more than the following numbers have been taken: about twenty specimens of *R. remora*, about ten specimens of *E. lineata*, and only one of the last-mentioned species.[1] All these post-larval stages have been taken in pelagic tow nets, working between the surface and a depth of 25-50 metres (one of them was taken at a greater depth, but may have been caught in hauling in the implement). All the post-larvæ were caught in the months April-November, and none of them during the months of the colder season (December-March).

The post-larvæ of *R. remora* have almost all been taken in the months of June-July, and one only in September and November (the most northern and the most southern find). The catchings of *E. lineata* extend over the months of June to November, with only a single find in April. The only specimen of *R. clypeata* was caught in November. So it appears—at least as to *R. remora*—that there is a sharply limited spawning time.

The free pelagic existence of the post-larvæ is evidently of a rather short duration for these species. At a length of 3-4 cm. *R. remora* joins its host, and

[1] In *Comptes rendus de l'Acad. des Sci., Paris*, 1926, t. 182, p. 1293, I have given a short survey of these young stages as to the position and development of the sucking disc during the ontogenesis.