re-state my general formula, with interchanged letters, as below :—

$A+d$	$C-a-d$	$B+a-b$	$D+b$
$D+c-d$	B	C	$A-c+d$
$C+b-c$	A	D	$B-b+c$
$B-b$	$D+a+d$	$A-a+b$	$C-d$

The condition that each quarter shall be equal to A+B+C+D is obviously $a-c+d=0$. Substituting $-a+c$ for d, the universal formula for a *square in equal quarters* is therefore :—

$A-a+c$	$C-c$	$B+a-b$	$D+b$
$D+a$	B	C	$A-a$
$C+b-c$	A	D	$B-b+c$
$B-b$	$D+c$	$A-a+b$	$C+a-c$

which, by putting $A+a$, $B+b$, $C+c$, for A, B, C, respectively, becomes :—

$A+c$	C	$B+a$	$D+b$
$D+a$	$B+b$	$C+c$	A
$C+b$	$A+a$	D	$B+c$
B	$D+c$	$A+b$	$C+a$

This is the familiar traditional form, being the addition of one Latin square (A, B, C, D) to another (o, *a*, *b*, *c*). It is usually written (inaccurately) as if it involved eight arbitrary variables, instead of seven.

ERNEST BERGHOLT.

Windsor House, Bream's Buildings, E.C.

Magnetic Deflection of β Rays.

THE nature of the emission of α rays from radio-active bodies, and the mechanism of their absorption when passing through matter, are well known from the experiments of Rutherford, Bragg, and others.

As regards β rays, our knowledge is not so complete. Although in recent years a large number of experiments have been undertaken in order to study the laws of their absorption, there still remains considerable doubt concerning several fundamental points. From the study of the absorption of β rays emitted from different radio-active substances, Otto Hahn and Lise Meitner arrived at the conclusion that the β rays, in the same way as α rays, are characterised by a definite initial velocity of expulsion. For different β-ray products the velocity may, of course, be different, but for a simple substance this velocity is characteristic of the rays. It was assumed by Hahn and Meitner that a homogeneous substance could be recognised as such by the exponential law of absorption by aluminium of the β rays which are emitted.

The experiments of W. Wilson were not in accord with this hypothesis. He found that the exponential law is not a measure of the homogeneity of the radiation, but, on the contrary, that homogeneous rays are absorbed according to a linear law.

In addition, the experiments of Kaufmann and Bucherer, who obtained a continuous magnetic spectrum of β rays in their determination of e/m and v for those rays, appeared to be contrary to the view of Hahn and Meitner. Such a spectrum could not be obtained on the assumption of groups of homogeneous β rays.

During the last few months the authors have investigated by a photographic method the magnetic deflection of β rays, and were able to show that in some cases very well-defined lines of deflection can be obtained. Experiments were especially successful when the active deposit from thorium served as source of radiation. As Hahn and Meitner have shown, this contains two groups of β rays (ThA and ThD). The authors obtained in this case two distinctly separated lines in the magnetic field. The line due to thorium A, which was further deflected, was nearly as well defined as if it were produced by α rays. Of course, by use of a stronger field, a third line, fairly well marked, was absorbed very near the ThA line, the source of which we are not yet quite certain.

But it is of interest that Hahn and Meitner recently discovered a new easily absorbed β radiation in ThX, and that the photographic impression, when using thorium X, really gave one more line as when using the active deposit alone.

Mesothorium gave a number of well-separated lines (about five or six). In this case the absorption experiments of Hahn and Meitner had already indicated a complex β radiation.

In the case of radium we have not, so far, been able to obtain single bands. This may perhaps be ascribed to the fact that the β rays from the radium products do not differ much in their velocities, and that the bands were consequently superposed, the intensity of the magnetic field being only about 80 Gauss. As a whole, the photographic impressions produced by the hard β rays are not very clear, since the rays pass through the photographic film without appreciable absorption, giving rise to a secondary radiation which fogs the plate.

The authors have proved by their experiments, at least for several of the radio-active elements, that these elements emit groups of β rays of definite velocity for which e/m and v can be separately determined.

A more detailed account of these experiments will be published elsewhere.

OTTO VON BAEYER.
OTTO HAHN.

Berlin, May 1.

Peripatus papuensis.

AT the end of last June I received from Mr. A. E. Pratt, the well-known naturalist, a number of fine specimens of Peripatus which he and his son, Mr. F. B. Pratt, had found in New Guinea on their recent expedition to that island. This is the first time Peripatus has been found in New Guinea. It was found by Dr. Willey in New Britain in 1897, and by Mr. Muir and Mr. Kershaw in Ceram last year (see NATURE, July 1, 1909, p. 17, and *Quarterly Journal of Microscopical Science*, liii., 1909, p. 737). The New Guinea specimens were found in January, February, and March at Sarayu, at an elevation of 3500 feet in the Central Arfak Mountains. Mr. Pratt, in describing his discovery, writes as follows :—"After my son found the first specimen amongst the roots of the grass, we at once showed it to the natives, offering them a large knife (which is most valuable to them) for every specimen. Quite sixty of the natives were searching for

the above months, and you have the results; so evidently they are not common in the part we were in. The curious thing is that, although we searched for weeks, we never found another specimen. The natives told me they found them at the roots of grass, under stones, and at the damp roots of clumps of bamboo."

Until the Ceram species was described it was quite uncertain whether the Papuan species would, when discovered, be found to belong to the Australian type or to the New Britain type, or to neither. Messrs. Muir and Kershaw's discovery settled that point. As a result of their work we know that *Peripatus ceramensis* belongs to the group Melano-Peripatus. It was therefore to be expected that the Papuan species would belong to the same type, as indeed it does. I propose to name the species *papuensis*, with the following characters:—

Peripatus papuensis, n.sp. Colour very similar to that of Capo-Peripatus, the principal pigments being a greenish-blue and an orange. Number of legs is variable, from twenty-three to twenty-nine pairs. Legs with three spinous pads. Nephridial openings of legs four and five on the proximal pad. Feet with three distal papillæ, of which one is anterior, one posterior, and one dorsal. Genital opening subterminal behind the legs of the last pair. Ovary small, with small ova (size not determined). Oviduct with a receptaculum seminis. Uterine embryos of very different ages in the same uterus. Spirit specimens which have been killed extended reach a length of 3¼ inches.

From this it seems fairly clear that we are dealing with a Melano-Peripatus. As the specimens are admirably preserved I hope soon to be able to work out the other characters. A. SEDGWICK.

Imperial College of Science and Technology, May 13.

The Bibliography of the Biology of the European Seas.

MAY I through the columns of NATURE direct attention to the fact that the Bureau of British Marine Biology, which for some time past has been engaged in the preparation of an extensive MS. bibliography of the fauna and flora of the European seas, is now making the experiment of printing and circulating, in the form of a periodical, the records which are thus being brought together?

The number of scientific journals has increased so enormously of late, and the output of biological work has now become so vast, that there would seem to be a very real need of some means by which the student may keep more fully in touch with the published work of his colleagues than is possible with the aid of the existing bibliographies alone; it has already become quite impossible for the specialist to himself search through all the various journals, &c., as they appear (even should he be fortunate enough to have access to adequate libraries), and, at the same time, to accomplish any research work of his own.

The bibliography of European marine biology now in progress (the first part was published on April 2) in the "Contributions from the Bureau of British Marine Biology" aims at providing a full title-entry and summary of the contents of every publication as it appears which is in any way concerned with the biology of the European seas (including the North Atlantic, Arctic, and Mediterranean). These summaries will, in general, appear *within a few weeks* of the publication of the works to which reference is made, while entries in the existing annual bibliographies are, of course, necessarily at least one or two years behindhand. The analysis of works indexed by the Bureau is also carried very much further than is attempted in any existing bibliography; for instance, a separate entry is made for practically *every mention* of a species in the work analysed. In addition to the bibliography and analysis of current work, the MS. records of the Bureau also include extensive annotated lists of the marine fauna and flora, alphabetical reference lists of specific and subspecific names and synonyms, particulars of type-localities, type-specimens, &c.; it is likewise intended to publish these records in the "Contributions." It may also be mentioned that all entries are being printed in such a form as will admit of their use as a card catalogue.

There is, of course, no desire to make a profit by the publication of these records, but, on the other hand, the Bureau cannot afford to incur any considerable financial loss by the undertaking, and the publication of the bibliography will therefore not be proceeded with for any length of time unless there is *by an early date* distinct evidence that sufficient support will be forthcoming to meet the cost of printing. For this reason I would urge all who may be willing to assist the undertaking to notify as soon as possible their intention of subscribing. The bibliography will, I am sure, prove most useful to those interested in any department of marine research if only publication can be continued for a sufficient period to enable the "Contributions" to become established. Full particulars, forms for subscription, &c., will be forwarded upon application to the undersigned. S. PACE.

6 Provost Road, Haverstock Hill, London, N.W., May 11.

An Improved Weight Dilatometer.

THE ordinary form of weight dilatometer is troublesome to dry and fill, and the filling takes much time. Air bubbles are removed with difficulty, and after cooling to a low temperature there is a risk of loss of mercury while weighing the dilatometer unless special precautions are taken.

To obviate these disadvantages the form of dilatometer here illustrated has been devised. The neck of the dilatometer is short and straight, and is enclosed in a cylindrical cup projecting a few centimetres above the neck, and sealed on to the body of the dilatometer.

To dry the bulb, the cup is fitted with a cork and a piece of tubing, and connected to the water-pump. By gently heating the bulb and exhausting, moisture is removed. In the second form (Fig. 2) air is drawn through the bulb by removing the clip and pad from the side tube.

FIG. 1.

FIG. 2.

To fill the simpler form, Fig. 1, dry mercury is poured into the cup; by gently tapping, the mercury falls into the bulb. The operation is repeated until the bulb is filled. To remove air from the neck the dilatometer is warmed, and when the mercury oozes out the cup is re-filled, and the dilatometer placed in ice water above the level of the neck. After cooling, the excess of mercury is poured out of the cup. The dilatometer is dried and weighed, any mercury expelled by expansion being collected in the cup. After heating to a higher temperature, the expelled mercury is poured out, and the dilatometer weighed after cooling. In the form shown in Fig. 2 the filling is more rapid, as air is expelled through the side tube; when this is filled with mercury the clip is fixed, and the tube closed by a screw pad. A. V. C. FENBY.

The Wyggeston Boys' School, Leicester, May 11.

THE INTERNATIONAL ASSOCIATION OF ACADEMIES.

FOURTH MEETING, MAY 9–14.

IT is now ten years since the association was inaugurated in a preliminary meeting held at Wiesbaden, and since then regular triennial assemblies have taken place in Paris, London, Vienna, and finally in Rome, where the fourth meeting, conducted under the presidency of Prof. P. Blaserna, of the Accademia dei Lincei, has just come to a close. The representatives of the Royal Society were Sir Archibald Geikie, Sir Joseph Larmor, Prof. Schäfer, Colonel Prain, Prof. Turner, and Dr. Arthur Schuster. In judging of the past activity and the prospects of the association, it must be borne in mind that, having no funds at its disposal, its influence must be mainly