Outlying Museums of the Empire*

THE great survey of the museums of the Empire, conceived by Sir Henry Miers and S. F. Markham, has now been completed by them with the assistance of Dr. F. A. Bather, T. Sheppard and others. The final reports, on the museums in scattered outliers of the British Empire, bring to a close a series of surveys which has reviewed more than a thousand museums and art galleries. For the accomplishment and success of these surveys, as well as to the surveyors, credit must be awarded to the Carnegie Corporation of New York which financed the inquiries, and to the Museums Association which acted as general headquarters and under the name of which the reports have been published. Along with the reports proper (bound in paper covers), there are issued (bound in cloth, as if for much service) a directory of the museums in Australia and New Zealand and another of those in the scattered islands of the Empire, compilations the merit of which makes it certain that from this starting-point the progress of these museums will be measured.

The condition of the isolated and island museums is the most unsatisfactory revealed by the Empire Survey. "The reason may be possibly historic, possibly psychological, but whatever the cause all observers agree that the islands of the British Empire present one of the most difficult problems in the realm of cultural services." Yet from the reports it is clear, and one's own knowledge of their publications confirms, that in places excellent scientific work has been done, as in the Raffles Museum at Singapore or the Sarawak Museum at Kuching. But in most places valuable scientific material is disappearing with little attempt at collection and conservation, simply because finances are inadequate. Exhibited collections suffer from the same inadequacies of money and staff, though the fact that in several of the places illiterate natives form (as in Colombo) an overwhelming proportion of the museum visitors, must tend to discourage the utmost effort at arrangement, since neither English nor vernacular labels are understood. Yet these natives get pleasure and interest from the exhibits themselves.

Many of the remarks in the report on Australia and New Zealand apply to both countries, and indeed to other Dominions. Both have been severely hit by the depression and the staffs of their museums have not kept pace with their growth or have been actually reduced, with the inevitable deterioration. Over and over again it is insisted that the chief need of a museum is a competent and keen curator, who deserves an adequate salary. We read of one of the oldest and most important museums being run by a director and a taxidermist and of university-trained botanists and entomologists receiving less than £3 a week. Buildings are often inadequate and liable to destruction by fire. In these circumstances the good work already accomplished, generally by private or municipal effort (more marked in New Zealand than in Australia), is to be warmly commended.

Writing for the Carnegie Corporation, the authors naturally emphasise the exhibition and educational side of museum work and occasionally seem merely to tolerate the researches made known by the museums in many excellent publications. No doubt they themselves actually realise that in a new country being changed by civilisation the first duty of a museum is conservation and that research must precede exposition. Governing authorities, however, are slow to realise the help that museums might give to education, to general culture, and to the severely practical work of life.

The advantages of co-operation are insisted on, and here the Museums Association can extend its good work. Recently it has brought into being a strong Empire Committee, on which representatives of the Home Government and of the Dominions meet those who have conducted the surveys, in order to administer to best advantage the funds allotted by the Carnegie Corporation. But loans, exchanges, and the pooling of information are no less important. The Dominions desire much from the Homeland, but is it not ridiculous that type-specimens of British Jurassic plants and shells should, as the Directory tells us, be in an Antipodean museum ?

* Reports on the Museums of Ceylon, British Malaya, the West Indies, etc. Pp. 58. Directory of Museums in Ceylon, British Malaya, Hong Kong, Sarawak, British North Borneo, Fiji, the West Indies, British Guiana. Pp. 67. (London: Museums Association, 1933–1934.) Reports, with Directory, 5*s*. A Report on the Museums and Art Galleries of Australia, by S. F. Markham and Prof. H. C. Richards, to the Carnegie Corporation of New York; and A Report on the Museums and Art Galleries of New Zealand, by S. F. Markham and W. R. B. Oliver, to the Carnegie Corporation of New York. Pp. v+113+13 plates. Directory of Museums and Art Galleries in Australia and New Zealand. Compiled by S. F. Markham and Dr. H. C. Richards. Pp. 115. (London: Museums Association, 1933–1934.)

The Roll-call of the Hydrogens (Hydranes)

By PROF. HENRY E. ARMSTRONG, F.R.S.

1. THE task of naming the homologues of hydrogen is not to be undertaken lightly. Nomenclature is of such importance that all considerations should be laid aside, except those of reasoned expediency and sound philological practice. The example set by Faraday, just a century ago, in framing names for use in describing and discussing electrochemical phenomena, may well serve us to-day. His words have stood the test of time, because of the extreme care with which they were chosen.

2. The new gases (from water) are clearly all *Hydrogens* (Water-stuffs), as each has its own water in water. They are to be grouped under their *Atomic Number* 1, as homologous members of the first term in the periodic series of elements. It would seem to be desirable to have an index name common to all members of the group. *Deuterium* is in no way reminiscent of water and also has no particular group significance. 'Second to what ?' is the question that at once arises. The name would be a fit one for the first member of the second group (*Atomic Number* 2) in the periodic series. If we could agree so to use it, succeeding groups might well have similarly significant group names—*Triterium*, *Tetraterium*, etc., up to 92, in addition to the familiar names.

3. Members of the first group are logically all to be regarded and represented as *Hydrogens*, in the same way that members of the C_nH_{2n+2} series of saturated hydrocarbons are all included under the group name

Paraffins or Methanes (*Ethanes*). The individual names of these all have the same ending and are also significant of composition, as a series of numerical indices are prefixed to a single terminal. The principle thus followed in naming homologous paraffins may well be followed in naming hydrogens. One of the happiest suggestions ever made was Hofmann's, that the terminal *ane* should be applied to all paraffins. In the chemist's mind, *ane* is now always associated with an initial series. Hofmann took the second great step in systematic nomenclature, the first being that taken by Lavoisier and his colleagues. Methyl, ethyl and propyl being well-established, good names, he preserved these and began numbering at the fourth term, tetrane.

4. Applying the Hofmann principle to the hydrogens we have the names

Hydrogen, Deuthydrogen, Trithydrogen.

Maybe it will be found that the series ends here and that further addition of a proton gives rise to a complex which swallows its own tail, producing helium. Helium may not be like a whale but it is very like the closed complex benzene. Earthly chemists may be forgiven if they go so far as to imagine that not a few elements may come to be regarded as polyhelides, just as a large proportion of hydrocarbons are polybenzenes. It is permissible to be prophetic even at a christening party. Lord Rutherford would seem to forecast the possibility of a *prohelium*, in the second group, of weight 3—an elemental trimethylene.

5. Hydrogen, however, is not a name that is universally used. At least an alias, of a more general character, may be desirable. In all humility, I suggest the simple term *hydrane*. The analogy with methane will be obvious :—

	Alternative symbols		
Hydrane	H	H^{α}	H
Deuthydrane	$\cancel{H}$	H^{β}	H^2
Trithydrane	$\cancel{H}\cancel{H}$	H^{γ}	H^3

With reference to the special symbols here introduced, we represent paraffins by complex structural formulæ, by special symbols such as $CH_3.CH_3$, why not hydranes ? Recent observations (NATURE, Feb. 17) seem to indicate peculiarities in behaviour which justify, if they do not demand, the use of peculiar symbols.

6. Compounds might be named systematically as follows :

Hydranol (Hydrol) Hydranone (Hydrone)	H.O.H
Deuthydranone (deuthydrone)	$\cancel{H}$.O.$\cancel{H}$
Hemideuthydranone (hydrone)	H.O.$\cancel{H}$
Hydranamine (hydramine)	NH_3
Deuthydranamine (deuthydramine)	$NH_2.\cancel{H}$
Di ,, ,,	$NH.\cancel{H}_2$
Tri ,, ,,	$N.\cancel{H}_3$
Deuthydranomethane	$CH_3.\cancel{H}$
Dideuthydranomethane	$CH_2.\cancel{H}_2$
Tri ,, ,,	$CH.\cancel{H}_3$
Tetra ,, ,,	$C.\cancel{H}_4$

7. If proton be the name given to the elemental unit H, the corresponding deuthydrogen or deuthydrane unit would be properly named if it were termed the *deuthydranon* or *deuthydron*. I would go a step further, however, and ask if it be not expedient to pay homage to Prout, whose prophetic contention that the elements are all of unitarian build has now been placed beyond doubt by Aston's refined measurements ? Proton might well be changed into *prouton*. This would be of meaning to all who have knowledge of the history of our science.

8. The *neutron* creates a difficulty, as do all things not understood. We shall do well, perhaps, to await its better acquaintance, before attempting to place it by name. Subatomic chemistry seems to be entering upon a phase not unlike that to which we are accustomed in atomic, structural chemistry—as the evidence grows that distinct structural units, not protons alone, are concerned. The use of prefixes denoting energy differences may well prove to be desirable : *Cataprouton* might serve as an alias of neutron in this event. *Balliston* is another possibility, as it is a mere missile.

9. The argument applies equally to electrons, now that so-called positrons are claiming attention. Might not these be brought under the Faraday hat ? Are such terms possible as an-, ano- or anodoelectron and cath-, catho- or cathodoelectron ? At present, the *on* is a mere terminal, without special significance. An alternative would be to speak simply of l- and d-electrons, according to the twist given to them in the magnetic field.

10. One other task that we have long shirked may be considered here—the naming of elements in the alternative states of atom and molecule. Lavoisier drew a clear distinction between *oxygen*, the stuff in oxygen compounds, on one hand ; and *oxygen gas*, on the other. We now symbolise the difference by writing O and O_2. Hydrogen and oxygen are the stuffs in water—why not use the names only with this significance and term the gases *Dishydrogen* and *Disoxygen ?* We have no hesitation in speaking of dimethyl and diphenyl. Ozone then becomes trisoxygen. Maybe the now conventional *ion* terminal makes such change unnecessary, though this is only applicable to hydrogen in salts. The long familiar term *radicle* also still holds the field. Probably together these terms will suffice : in any case, too many *radical* changes are undesirable.

Rubber-Growing Research in the U.S.S.R.

A DETERMINED attempt to make Russia independent of imported rubber in a few years' time is being made by investigating the possibility of home-grown rubber, and by the manufacture of 'synthetic rubber' ; four factories are already engaged in the industrial production of the latter. Research on the growing of rubber is carried out at two rubber institutes working in conjunction with the Institute of Plant Industry. Expeditions have been sent out to search at home and abroad for suitable rubber-bearing plants, the indigenous flora having been particularly carefully surveyed.

The three most promising plants so far appear to be *Parthenium argentatum*, Gray, *Scorzonera tausaghis*, and *Taraxacum gymnanthum*, D.C. The first-named, the guayule, brought from Mexico, has been the subject of several investigations[1]. This plant has several varieties, differing in rubber content, resistance