

of speech came also the development of conceptual thought and a corresponding progress in culture and civilisation.

A morphologic investigation of language enables us to trace the several stages of its development, and by supplying intermediate forms furnishes an important verification of the Darwinian theory. Thus we begin with isolating languages and monosyllabic roots, and then pass on through the agglutinative to the inflectional family of speech, each family, together with the members of each family, gradually increasing in complexity of organism. The roots themselves can be shown to be of onomatopœic or interjectional origin, and the interval between them and the six distinct sounds emitted by the *cebus azara* of Paraguay is far less than that between the several stages of linguistic development. Linguistic development itself depends upon the changes brought about in the pronunciation of words by natural causes, and since the laws which regulate these changes fall ultimately under the province of physiology, the "historical life" of language is as much a subject of natural science as the more special phenomena of the physiologist.

The main objection which offers itself to this theory is the necessity it involves of explaining the development of speech by the accidents of phonetic decay. No doubt the meaning of words is largely influenced by the forms they may assume in pronunciation under the action of phonetic laws which ultimately go back to such controlling conditions as climate, food, and the like; but just as often it is the meaning which determines the form. After all, it is not the particular phonetic sound which constitutes language, but the signification put into it by the joint but unconscious action of a community. Without language, it is true, there can be no thought; but it is equally true that language without thought would be only the gibberish of a parrot.

Another objection which holds against the view of M. Hovelacque is the undue limitation which it imposes upon the science of language. M. Hovelacque's work is little more than a catalogue of the various languages of the world, classified morphologically and genealogically, with a description of the chief phonetic and grammatical peculiarities of each. No place is left for that inner life of language which stands nearer to psychology than to physiology, and the science of language is accordingly made almost synonymous with phonology alone. One misses an account of the nature of language and the causes of its change and growth; one misses equally any reference to comparative grammar and syntax, to the changes of signification undergone by words, and the light they throw upon the history of the human mind. In short, in M. Hovelacque's hands the science of language appears as a classified collection of existing phenomena, while the causes and complex history of these phenomena are left untouched. In assuming, too, that the inflectional languages have once been isolating, M. Hovelacque assumes much more than can be proved. The Indo-European tongues may once have resembled Chinese; but there is no proof of the fact, if fact it be, and the "Parent-Aryan," as restored by Schleicher and Fick, is as thoroughly inflectional as Sanskrit itself.

On the other hand, M. Hovelacque does good service

in showing how fully all the evidence now at our disposal tells against the theory which would refer the manifold languages of the globe to only two or three original sources. On the contrary it would seem that the beginnings of speech were as numerous as the independent communities of primitive man. It is strange, however, that an author who hesitates about admitting the relationship of the Mongolian to the Finnic-Tatar group should yet accept without questioning the Indo-European affinities of Lycian and Etruscan.

To sum up, M. Hovelacque is a good scholar, and his book is a useful summary of the relationship and characteristics of the various languages of the world. It is also a valuable contribution on the side of those who hold that the science of language must be included among the physical sciences. But it exhibits the defects as well as the advantages of this view; and thus while it proves the difficulty of distinguishing between a physical and a historical science at least so far as the science of language is concerned, it yet shows that to regard the science of language as a merely physical one leads to an unsatisfactory inadequacy of treatment and an unjustifiable narrowness of view.

A. H. SAYCE

THE GERMAN NORTH SEA COMMISSION
Jahresbericht der Commission zur wissenschaftlichen Untersuchung der deutschen Meere in Kiel für die Jahre 1872, 1873. Im Auftrage des Königlich Preussischen Ministeriums für die landwirthschaftlichen Angelegenheiten, herausgegeben von Dr. H. A. Meyer, Dr. K. Möbius, Dr. G. Karsten, Dr. V. Hensen, Dr. C. Kupffer. (Berlin, 1875.)

THE second portion of the Report of the North Sea Expedition, just published, contains Article VI., Bryozoa, edited by Dr. Kirchenpauer. Like most of his countrymen, the author accepts Ehrenberg's name for this group, although there is no doubt that, as urged by Allman and Busk, Vaughan Thomson's name (Polyzoa) has the priority. The number of species met with is but small; we make it 55, the author 54, but perhaps he excludes *Pedicellina echinata*. A most interesting account is given of the Flustra of the Northern Sea, and we welcome the account of the geographical distribution which is appended to each species as a valuable addition to our knowledge. From the richness of Dr. Kirchenpauer's collections, he was peculiarly well able to give a long list of habitats. Among the very complete list of authors quoted, we miss a paper on New Zealand Polyzoa by Sir C. Wyville Thomson, published in the *Natural History Review* for 1858.

The Tunicata are described by Dr. C. Kupffer. Twenty-four species (not twenty-three) of Simple Ascidians are enumerated, belonging to the following genera:—Ciona, 3 sp.; Phallusia, 6 sp.; Corella, 1 sp.; Cynthia, 8 sp. (1 new); Molgula, 5 sp. (3 new); Pelonæa, 1 sp. The author describes as occurring in some species of Cynthia and Pelonæa certain nipple-shaped bodies met with in the water chamber. These are regarded as standing in close relationship with the circulatory system, and are called Endocarps. All of the species, except those for the first time described, are to be met with in Great Britain; some of them are among those recently described by Alder and Hancock from the West of Ireland, and five of them are

represented in a coloured plate. Of the Mollusca, the Gymnobranchs are described by Dr. H. A. Meyer. The number of species met with is but twenty-three; there is not much that is noteworthy in the list, but that "singular and gaudy animal" of Montagu, *Thecacera pennigera*, so rare on the British coasts, was met with. The list of the Brachiopods, Lamellibranchs, and Gasteropods is a very elaborate one, drawn up quite after the fashion of our British Association Dredging Reports; the locality, depth in fathoms, and nature of the ground in which each species was found is given, and a sketch of its geographical distribution is added. The greatest depth reached was about 365 fathoms. *Crania anomala* and *Terebratulina caput-serpentis* appear to have been met with in quite shallow water; *Malletia* (*Yoldia*) *obtusa*, Sars., *Kelliella abyssicola*, Sars., and other deep-sea species were met with at depths of from 50 to 360 fathoms. The following species are described as new:—*Lacuna vestita*, off Yarmouth; *Laëocochlis pommeraniae*, nov. gen. et sp.; *Fusus mœbii*, and *Lathyrus albellus*. These three latter species are figured.

Article IX., by Dr. Möbius, describes the Copepoda and Cladocera. *Euchaeta carinata*, sp. n., is described and figured. The remaining orders of Crustacea are described by Metzger. We note the appearance in the North Sea of an *Erichthus* form, thus indicating the presence of a Squilla. *Galathea Andreusii*, Kin., is placed as a synonym of *G. intermedia*, Lillj. b.; *Thia polita*, *Nika edulis*, *Bythocaris simplicirostris*, and other interesting forms, were met with. *Sergestes Meyeri*, *Byblis crassicornis*, and *Dulichia monocantha* are described and figured as new.

The list of fish taken is most meagre, containing but thirty-two species.

The meteorological investigations of Prof. Karsten are exceedingly interesting, and records are appended as to the temperatures of the sea at various depths.

Dr. Hensen appends a Report on the Fisheries of the German Coast, in which we find elaborate statistics of the number of fishing-stations, of the fishermen, and the amount of assistance given to them. The off-shore fishermen are distinguished from the deep-sea trawlers. The number of fishermen on the German coasts is 17,195, with say 8,130 boats; the number of English fishermen, is given as 134,000, with 36,000 boats. In France, the number is 73,757 men, with 16,819 boats; in Italy, 60,000 men and 18,000 boats; in Austria, 7,196 men and 1,852 boats. These numbers are based on reports dating between 1871 and 1874.

A portion of the Report is devoted to the subject of the possibility of estimating the take of fish. According to the official return of the German Treasury on the import and export of fish during 1873, it would appear that these equalled on—

River fish and cray-fish	...	...	342,000
Sea fish in general	...	...	3,154,000
Herrings	...	...	27,798,000
Shell fish	...	...	387,000
Caviar	...	...	973,000
Total	...	...	32,650,000

This portion of the Report of the North Sea Commission ought to be studied by all those interested in our own fisheries.

E. P. W.

OUR BOOK SHELF

Eighth Annual Report of the Noxious, Beneficial, and other Insects of the State of Missouri. By Charles V. Riley, State Entomologist.

THE perusal of Mr. Riley's yearly reports is one of the pleasures to which the entomologist looks forward with undiminishing eagerness. Each succeeding volume throws open to the student of science fresh fields of discovery in the realms of both nature and art. Mr. Riley's ready appreciation of the practically useful in invention, accompanied by that quick discernment which enables him at once to reject or rectify what is useless or cumbersome, renders him especially fitted for the responsible position which he occupies.

The report now before us is devoted to the consideration of five noxious insects, and one innoxious—the Colorado Beetle, the Canker-worm, the Army-worm, the Rocky Mountain Locust, the Grape Phylloxera, and the Yucca-borer, the greater space being given to the third and fourth of the above-mentioned species, in consequence of the ravages which they have committed in Missouri during the past year.

In the chapter on the Canker-worm an illustrated description is given of a very simple and ingenious contrivance (p. 20) for arresting the progress of the insect at the time of oviposition; it consists of a circle of tin which surrounds the trunk of the imperilled tree at a few inches distance, and which is held in position by a circle of muslin attached to the tin at its lower edge, and drawn closely round the trunk, with a cord, at the top; the tin is then covered with a mixture of castor oil and kerosene on its inner surface, which forms an effectual barrier to the insects.

Other interesting inventions are described; and not only are careful figures prepared of the noxious species in all stages, but also of their natural enemies; so that it is the agriculturist's own fault if he fails to distinguish between his friends and foes.

The Report concludes with the life-history of the Yucca-borer (*Megathymus yuccæ*), an insect hitherto referred to the moths, but which Mr. Riley determines to be a butterfly. Judging by the figure of the adult larva it might be questioned whether the insect is not as nearly related to the moths; it has the aspect of a *Sphinx* larva with the wrinkled and (apparently) shining character and general coloration of a *Cossus*; the pupa bears out the resemblance; the rapidity of its flight quite accords with what is notoriously the character of a Hawk-moth, and the form of its antennæ in no way militates against such an affinity; still it must in fairness be admitted that Mr. Riley adduces much evidence in favour of the Rhopuloceros character of the species, the value of which cannot be contradicted until we can bring forward proofs that some undoubted moth possesses the same structural peculiarities.

A. G. B.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

Optical Experiments

1. Fold a sheet of writing-paper into a tube whose diameter is about 3 cm. Keeping both eyes open, look through² the tube with one eye, and look at the hand with the other, the hand being placed close by the tube. An extraordinary phenomenon will be observed. A hole the size of the tube will appear cut through the hand, through which objects are distinctly visible. That part of the tube between the eye and hand will appear

¹ Mr. Riley notes its resemblance to this genus (p. 177).

² It is necessary to focus the eye upon any object seen through the tube.—Ed.