species had a breeding-place near which any whaling ship, in the present century at least, ever went; and those who accept this version recur to errors that were refuted by Prof. Steenstrup more than five-and-thirty years ago. ALFRED NEWTON.

Magdalene College, Cambridge, March 10.

The Decomposition of Liquids by Contact with Cellulose.

THE recent work of Dr. Gore, on "The Decomposition of Liquids by Contact with Powdered Silica," presents a striking resemblance to what has from time to time been ascertained with such substances as cellulose. In fact, the properties ascribed to silica are very likely shared under some conditions by colloids in general, whether they be "organic" or "inorganic" bodies. Cellulose, when immersed in diluted solutions of some metallic salts, has the power of abstracting from them a certain quantity of the salt for which it may have no chemical affinity as ordinarily understood. The amount of salt abstracted is dependent upon several conditions: the degree of dilution of the salt; the ratio of cellulose to salt; the ratio of cellulose to weight of solution; the temperature; the physical condition of the cellulose; and the chemical constitution of the cellulose.

Let us, in order to eliminate the last-named condition, confine ourselves to pure cellulose or cotton. When cotton wool is placed in a solution of a metallic salt, it abstracts the salt from the solution until equilibrium is established. If we regard the part played by the cellulose in the light of Witt's theory of solid solution, the amount of salt retained by cellulose is conditioned by the relative solubility of the salt in water and cellulose, and the ratio in which the three exist together. If water is now added, a certain amount of the salt dissolved by the cellulose will become resoluble in the water. Also, if the solution be concentrated, the fibre will generally take up a further quantity. In some cases, however, the amount of salt taken up by the cellulose is not imparted to the solution on dilution. This is probably due, as in the case, I believe, of the ferric salts, to dissociation in solid solution. The dissociated base being insoluble (in water) is retained by the cellulose on addition of water, whereas the acid may be dissolved. The physical condition of the same cellulose has a great influence upon the amount of salt which it is capable of dissolving. If cellulose be finely disintegrated, it behaves differently from that in which the ultimate fibres remain intact.

The cotton fibre, when seen under the microscope, is found to vary considerably in shape and size. It is probable, then, that each fibre has a certain constant of absorption peculiar to itself. Cellulose, when rendered anhydrous by placing it in a water-bath or desiccator, is found to rise considerably in temperature when exposed to a damp atmosphere. This may, however, be caused by the liberation of heat, due to the condensation of moisture from the gaseous state. If so, no rise of temperature would be noticed in plunging anhydrous cellulose into water. It appears, however, that cellulose is susceptible of a certain degree of hydration in coming in contact with water, which is probably attended by the liberation of heat. I have found that dried cellulose placed in a damp atmosphere remains at a higher temperature than its surroundings so long as it is taking up moisture, which appears to be greatest when the rate of absorption is greatest. By the time it has recovered its normal condition of moisture it has sunk to the temperature of its surroundings.

The above considerations seem to point out that cellulose, like silica, exhibits well the phenomena of solid solution.

C. BEADLE.

Physiological Psychology and Psycho-physics.

IN a note contained in your issue of January 11 (p. 252), upon the teaching of psycho-physiology in University College, I notice two errors; which, as they are, unfortunately, very widespread, you will perhaps allow me to correct.

(1) "Physiological psychology" and "psycho-physics" are not one and the same thing. The former science is a specially limited and specially enlarged psychology. Limited: in that it pays more attention to experimentation carried out by physiological methods than to any other psychological experimentation. Enlarged: in that it discusses the most important problems relating to the physical basis of mental life. These latter problems belong to psycho-physics, which is the science of the relation of "mind" to "body."

(2) A "practical course in psycho-physiology," which confines itself to the senses, is not a representative or adequate course, as the note implies. The psycho-physics of sensation is no more the whole of psycho-physics than the physiology of the sense-organs is the whole of physiology, or the psychology of sensation, perception, and idea, is the whole of psychology. A historical accident has led to this popular restriction of the term; but a glance at the literature of the science will show its wrongness. E. B. TITCHENER.

Cornell University, February 16.

DR. TITCHENER'S criticism of my note strikes me as a little strange. First of all, he objects to my speaking of "physiological psychology *or* psycho-physics," maintaining that they are different, and then proceeds at once to subsume psycho-physics under physiological psychology. As a matter of fact, psycho-physics, as understood by Fechner, the coiner of the word, and generally up to quite recent times, does not directly refer to the relation of the organism to psychical phenomena at all, but to the relation between the (extra-organic) stimulus and sensation, though of course this inquiry leads on to two further inquiries: (*a*) the relation of the extra-organic to the organic process, and (*b*) the relation of this last to sensation. Münsterberg and others now use "psycho-physical" for relations generally between neural processes and psychical processes, but the change of meaning is a little confusing. Anyhow, it will be seen that there is no general agreement about the expressions "physiological psychology" and "psycho-physics," such as Dr. Titchener's note suggests.

I may add that in using "or" rather loosely (as I felt justified in doing in a short note), I did not mean to imply that the two branches of inquiry were identical. I wanted to call attention especially to the fact that the course would go systematically over an experimental inquiry *into the senses* which would necessarily include reference to stimulus, and so psycho-physics, and reference to nerve process, and so physiological psychology. As to Dr. Titchener's second "error," I find him hypercritical. I am well aware that psycho-physiology covers more than the senses, and I think that nothing which I say implies the contradictory of this. There can surely be a practical course on a subject which does not exhaust all divisions of the subject. As a matter of fact, however, Dr. Hill *is* taking up other branches, as reaction-time experiments. I was content to emphasise the fact that *the senses* would be systematically examined; and all who know what psycho-physiology has done, know that by far the larger part of the really fruitful work leading to definite results has been done in the investigation of the senses. THE WRITER OF THE NOTE.

March 3.

THE LAST GREAT LAKES OF AFRICA.[1]

ADMIRABLY translated as it is, this book scarcely retains a trace of its previous existence in a foreign tongue; but although the translator states in the preface that she has slightly condensed the original matter in bringing it to its present form, we believe that much more rigid compression might wisely have been applied. Earlier books have placed later travels in Eastern Equatorial Africa so prominently before the British reader, that much of the ground which was full of fresh interest when the two gallant Austrians traversed it is now familiar, and its features common-place. Thus a great part of the first volume, detailing the troubles of inexperienced and, perhaps, somewhat imperious Europeans in organising a large caravan at Zanzibar and Pangani, and in crossing the coast-lands and ascending the slopes to Kikuyu, might well have been omitted without lessening the thrilling interest of subsequent chapters.

The expedition, primarily a sporting one, was also in large measure exploratory, and if the pursuit of big game, and the hairbreadth escapes of the hunters

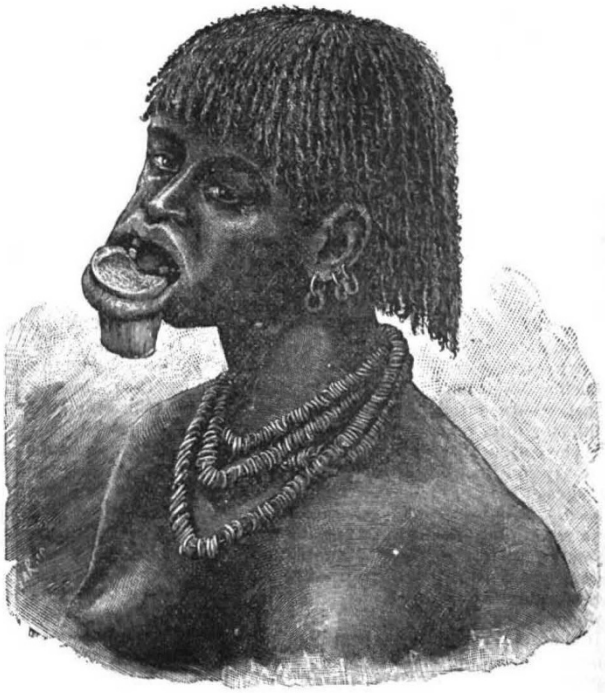
[1] Discovery of Lakes Rudolf and Stefanie. A Narrative of Count Samuel Teleki's Exploring and Hunting Expedition in Eastern Equatorial Africa in 1887 and 1888. By his companion, Lieut. Ludwig von Höhnel. Translated by Nancy Bell (N. D'Anvers). With 179 original illustrations and five coloured maps. In two vols. (London: Longmans, Green, and Co., 1894.)

occupy a more prominent place than the physical character of the country and the nature of the people, the author doubtless consults the taste of the majority of his readers in the arrangement. Besides, the really valuable scientific results, due almost entirely to Lieut. von Höhnel's skill and enthusiasm as an observer, are well known to the scientific world from the admirably precise memoir published shortly after the return of the expedition. The casual reader of this more popular work would hardly realise the magnitude of the services rendered to African geography by the few modest references to observations and collections made by the author. Two appendices summarise Count Teleki's "bag," and the natural history collections. The latter comprise 12 reptiles or amphibia, 247 species of Coleoptera, of which 60 are new to science, and 59 species of Lepidoptera, including 15 that are new. The botanical collections, named by Prof. G. Schweinfurth, include 171 species of phanerogams illustrating more than 50 orders, and over 60 mosses and lichens, a large proportion of them being new to science.

While it is well to remember the solid contributions to different branches of science made by the expedition, the interest of the popular record inevitably centres in the larger field of exploration, and especially in the splendid discovery which supplies the title. The whole first volume is filled with the journey through Masai-land and the partial ascents of Mts. Kilimanjaro and Kenia, which in the main confirm, although they occasionally extend, the earlier records of Joseph Thomson and Mayer. Volume ii. conducts the party from Lake Baringo into the heart of the mysterious region which separates the land draining to the Victoria Nyanza from the Galla country and Somaliland. The march northward was a work of vast difficulty, and its success says much for the perseverance and foresight of the leaders, for food was very scarce, and water often altogether wanting, while the native guides frequently caused much trouble by their ignorance of the country. Many curious facts are mentioned incidentally as to camp management. When the supplies ran short, one of the Zanzibari head-men himself hit on the device of paring down the wooden bowl which was used to measure out the rice, so that day by day the rations were reduced but the measure was always full. The Zanzibaris being somewhat strict Mohammedans, and having many prejudices, were difficult to cater for; they would only eat elephant flesh when driven by severe hunger, and threatened to starve rather than devour donkey.

The reward for the increasing hardships came with the discovery of Lake Rudolf, a noble sheet of water 170 miles in length, probably the last of the greatest lakes to be found in Africa. It lies in a region of strong volcanic activity; a great mountain was seen, though not reached, from the crater of which a cloud of smoke ascended, and the scenery of some parts of the lake-shore suggest an analogy with the lunar surface. The water was brackish, or rather alkaline, containing sodium carbonate in solution, so that when treated with tartaric acid it made a refreshing drink. The shores were absolutely barren, affording no food for cattle, and showed marks of recent great upheaval, while the lake itself was without outlet. After struggling along this land of volcanic gloom at imminent risk of death by starvation, the expedition reached the north end of Lake Rudolf, crossed a fertile region inhabited by hospitable tribes, and discovered Lake Stefanie, a smaller volcanic basin, the water of which seemed to be rapidly diminishing in volume. Here it was necessary to return; there were no maps of the country where the expedition was; no certainty of being able to gain the coast by the north or east, and failing supplies of goods for barter compelled a retreat on Lake Baringo and thence to Mombasa. The tribes of the Lake Rudolf region presented many points of great interest, and still remain an ethnological problem, although the observations of Lieut. von Höhnel on his expedition with Mr. Astor Chanler, from which he has recently been invalided home, may be expected to throw

Reshiat Woman.



Buma-Marlé Woman.

much new light upon them. The contrast between the handsome and comparatively fair Reshiats and the ill-favoured and artificially deformed Buma and Marlé people is singularly marked, although the tribes reside near each other. The Buma-Marlé women wear lip ornaments, closely resembling those of the Botocudo and other savages of the Amazon basin. Dwelling on the west side of Lake Rudolf, the Turkana tribes set some of the most curious fashions in hair-dressing that even the African mind has devised.

For some time to come this district, first entered by Count Teleki and Lieut. von Höhnel, will be the base for new exploring journeys of high importance; but it is difficult of access, and all those who have tried to follow in the footsteps of the pioneers, have so far been obliged to turn back unsuccessful. H. R. M.

THE BEETLES OF NEW ZEALAND.[1]

TIMES have changed since the founders of entomology considered it sufficient to use the words "in Indiis," when they were unacquainted with the locality of an insect they were describing; nor would it be possible now to publish a volume of "Insects of India," like Donovan's, issued no longer ago than the beginning of the present century, in which many of the species represented on the plates are conspicuous South American or African butterflies. At present it is hardly considered lawful to describe an insect without an exact locality, and the number of species has increased to an extent of which the older entomologists never dreamed. We cannot at present be acquainted with much fewer than 300,000 species of insects from all parts of the globe, and yet none but a few, even among entomologists themselves, have any conception of how much yet remains to be done before our knowledge of the insects of the world can be considered anything like complete; and some entomologists of great experience now mention ten millions as a mere guess at the approximate number of existing species.

But our knowledge of the insects of various countries is now being largely extended by the publication of local monographs of different groups of insects, mostly, but not always, relating to the *Lepidoptera*. These monographs are of the greatest value as a basis for future research, and are especially important in the case of island for several reasons.

Firstly, an island has a restricted area, and hence its fauna forms a compact whole; nor can there usually arise much difficulty in ascertaining what species are really indigenous.

Secondly, from the restricted area of islands, and the facilities they offer for colonisation and cultivation, the bulk of the native fauna and flora is peculiarly liable to be exterminated, not merely from the advance of cultivation, with its usual accompaniments of clearing of forests and drainage of marshes, but from the irruption of powerful competitors in the shape of dominan , if not almost cosmopolitan species from abroad.

Thirdly, many insular species, especially in the case of oceanic islands, are endemic, being peculiar to the locality, and found nowhere else in the world, and are thus liable to be lost to science for ever. Nor are we yet in a position to estimate the value of such species. It is even not impossible that in some cases, at least, they may be the last remnants of the productions of some long-vanished continent, and they may some day prove of service in helping us to map out the rough features of the former geography of the world.

[1] "New Zealand Institute. Manual of the New Zealand Coleoptera." By Captain Thomas Broun Parts v., vi., vii. Published by the Board of Governors. Wellington, New Zealand. (Government Printing Office: Samuel Costall, 1893.)

The volume before us, although issued as parts v., vi., and vii. of Captain Broun's "Manual of New Zealand *Coleoptera*," is really a supplement to the well-known and extremely useful work published by the Geological Survey and Museum Department between 1880 and 1886. These parts, issued as i.–iv., comprised 973 pages, and included descriptions of 1756 species. The present supplement continues the pagination to 1504 pages, and includes descriptions of 836 new species, thus raising the number of New Zealand beetles to 2592; and Captain Broun considers that over 700 species still remain undescribed. It will therefore be seen that, notwithstanding the extremely insular character of the New Zealand fauna, there is every reason to believe that the number of species of *Coleoptera* will ultimately far exceed that of our British beetles, which are not now considered to amount to quite 3000 species.

Dr. Hector, the Director of the Colonial Museum, Wellington, remarks, in his preface to Capt. Broun's work:

"Of the present additions, 660 have been described by Captain Broun, 172 by Dr. David Sharp, four by Mr. Matthews, and one by M. Fauvel; and in order to place these species in proper systematic position, Captain Broun has found it necessary to establish several new genera."

It is impossible to criticise a work like this, consisting almost entirely of technical descriptions of genera and species. A very few corrections to the former parts of the work are prefixed to this volume, in addition to a not very formidable list of errata. It is obvious that there could be no room in a book of this kind for more than a few of the most important comments which might be made on the earlier portions.

There is a good systematic index at the beginning of the volume, and we do not think that as there is no synonymy, the absence of an alphabetical index is of any importance. But we should have liked to have seen an index of localities, for although the places mentioned may be, and probably are, familiar to New Zealand colonists, yet other coleopterists may wish to know, at least, in which island each insect was taken; and in the case of mountain species, the approximate altitude, if known, should be recorded. We cannot have too much or too exact information on matters of this kind. W. F. KIRBY.

NOTES.

THE preliminary arrangements for the seventh International Congress of Hygiene and Demography, to be held at Budapest from the 1st to the 9th of next September, are well advanced, as many as 440 papers having already been promised. Most of these treat of hygienic subjects, but 78 papers are devoted to demography. The Congress will be opened by the Archduke Karl Ludwig.

THE Government has decided to place the direction of the Customs and Inland Revenue Laboratories under one administrative chief, to be styled the Principal Chemist of the Government Laboratories. The Principal Chemist will also receive references from the Board of Agriculture, the Local Government Board, and other Government departments. The appointment, which is in the gift of the Treasury, has been offered to, and has been accepted by, Prof. Thorpe, F.R.S., who thereby vacates the Chair of Chemistry in the Royal College of Science, which he has held since 1885.

DR. ARTHUR W. BISHOP, late Assistant Professor at the Heriot-Watt College, Edinburgh, has been appointed, by the Secretary of State for India, Professor of Chemistry in his Highness the Maharajah of Travancore's College at Trivandrum, Travancore.