

unknown chemical nature, the products of muscular contraction, acting upon the medullary centres, or that they are reflex? In this latter case two hypotheses may be adopted—viz. that the afferent impulse is due to peripheral chemical, or peripheral mechanical stimulation. So far as I am aware no work has been done on the lines of Geppert and Zuntz (*loc. cit.*), or Filehne and Kionka (*Pflüger's Archives*, Bd. lxii, 201, 1896) with regard to the vascular effects of exercise. A paralysing action on motor nerve endings has been ascribed to the products of muscular activity, but to what extent the nerve endings in non-striated muscle are influenced by these products has not been shown. A further question of interest, which remains yet to be decided, is what are the vascular areas which become anæmic during exercise? The nausea or vomiting, which is the frequent accompaniment of violent exercise when one is in "bad condition," seems to point to the splanchnic area as the one at the expense of which the muscular plethora occurs; but, so far as I am aware, no phlethysmographic records of the abdominal organs during extensive muscular contraction have as yet been made.

In considering the effect of the contraction of a muscle upon the circulation through it, the muscular substance of the heart itself naturally comes into consideration. The circulation through the coronary arteries when these vessels have not lost their normal elasticity from atheroma or other causes, is unquestionably increased by full and frequent cardiac contraction, and the state of nutrition of the heart thereby improved. Further, increased pressure in the aorta within certain limits is advantageous to the coronary circulation. The experiments which have been made recently upon the excised mammalian heart (Langendorf, *Pflüger's Archives*, lxx., 1898, p. 473) tend to show that the conditions for optimal contraction—that is, for a maximum output of energy at each beat—are practically the same in the case of the mammalian as in that of the frog's heart (Tunncliffe, *Journal of Phys.*, xx, 1, 96). Of these one of the most important is the choice of an optimal load, the cardiac muscle in this respect being similar to ordinary striated muscle. This, from a practical standpoint, amounts to the fact that although a heart can be, and of course very often is overloaded, or in other words is unable to meet the resistance which the normal circulation offers to its contraction, it can also be underloaded; that is, the cause of its insufficient contraction may be that not sufficient resistance is offered to its systole. This underloading of the heart may play an important rôle in sluggish circulations in women, and men living sedentary lives. Fairly severe but gradually commenced and gradually increased exercise in these individuals will often supply the necessary load, and bring back the cardiac action to the normal. It is the function of the physician to discriminate between the over- and under-loaded heart, and to treat it accordingly; exercise may find a place in each variety of this treatment.

In this paper nothing has been said with regard to another aspect of exercise from a therapeutic standpoint. We have discussed the possibility of certain chemical substances produced during the contraction of muscle exerting an action on the respiratory and cardio-vascular centres, but we have said nothing of the possible effect on general metabolism of such products or others accompanying them. That such an effect is produced is seen by the general nutritive results of local muscular exercise and of massage. Whether the physiological basis of such a result consists in the removal of waste products—that is, in essentially increased excretion—or in the production of substances which have an action allied to the internal secretion of glands, remains yet to be decided.

F. W. TUNNICLIFFE.

THE ZOOLOGICAL EXPLORATION OF THE GREAT AFRICAN LAKES.

OWING to the unique and extremely interesting nature of the fauna in Lake Tanganyika, the study of which was recently the object of an expedition supported by the Royal Society, and led by Mr. J. E. S. Moore, a Committee has been formed, consisting of Sir John Kirk, G.C.M.G., K.C.B., F.R.S. (late British Resident at Zanzibar), Dr. P. L. Sclater, F.R.S. (secretary to the Zoological Society), Mr. Thiselton-Dyer, C.M.G., F.R.S. (director of Kew Gardens), Prof. Ray Lankester, F.R.S. (director of the Natural History Departments of the British Museum), and Mr. G. A. Boulenger, F.R.S. (of the British Museum), for the purpose of organising another expedition to the same regions, to thoroughly survey the basin, not only of Lake Tanganyika, but also the unknown portions of the northern extension of the great series of valleys in which Tanganyika, together with Lakes Kivu and the Albert Nyanza, lie; to collect specimens of the aquatic fauna and flora, and to study the geological history of this part of Africa. The latter object of the investigation should be of especial interest, for it was shown by Mr. Moore that almost without exception the shells of the singular series of whelk-like molluscs, captured by him in Tanganyika, are indistinguishable from those now found fossilised in Europe, among the remains of old Jurassic seas. It would thus appear that at some remote period of time, the great valley of Tanganyika was in connection with the sea, and that the strangely isolated marine fauna, which still inhabits its slightly brackish waters, has remained there ever since. So far only the *Medusae* (jelly-fish), the *Mollusca*, and the *Crustacea*, belonging to this antique fauna, have been discovered in the lake; but when its vast size and depth are fully realised, it is unquestionable that by far the larger portion of its fauna is as yet unknown.

Tanganyika thus presents a unique field for scientific exploration at the present time, and is, indeed, one of the few places now left upon the earth where animals (like those peculiar to Australia) which have long since become extinct elsewhere, may still be found.

Another notable fact ascertained during Mr. Moore's last expedition, was that the marine, or *Halolimnic* fauna of Lake Tanganyika does not exist in either Nyassa or in Lakes Shirwa, Mweru, Bangweolo, or any of the remaining lakes about which anything zoological is known; but it may yet be found in Lakes Kivu, the Albert Edward and Albert Nyanzas, which lie, as has been said, in an extension of the same great depression which contains the Dead Sea towards the north. The probability of this being so, is also increased by the curious fact that the fauna of Tanganyika bears some resemblance to that of the lower portions of the Nile.

During the present expedition it is therefore intended to go north from Tanganyika, which will form the zoological headquarters of the expedition, through the unknown region which lies between Tanganyika and Lake Kivu, on, finally, to the Albert Edward and Rowenzori districts. It is intended then that the expedition shall pass eastward, through the Uganda stations north of the Victoria Nyanza, down the Uganda roads and railway to the sea. Mr. Moore's previous expedition was hampered by the unexpected difficulties of transport and the want of a steamer properly to carry on dredging and sounding operations in the lake, and, in consequence of this, much valuable material, particularly large specimens of entirely new species of fish, had to be deliberately left behind. At the present time, however, the African Lakes Corporation are running the London Missionary Society's old steamer once more upon the lake, and all these deficiencies can therefore now be overcome, provided the necessary funds are raised.

A careful consideration of the details of the expenditure has led the Committee to the conclusion that in order to enable Mr. Moore to successfully lead another expedition for two seasons, and to accomplish the above-stated objects, a sum of not less than 5000*l.* will be required. The Committee have already received encouraging offers of support, including one of 1000*l.* from a gentleman connected with the commercial and political interests of British Africa. They point out, however, that the results to be obtained will increase almost in the ratio of the square of the initial expenditure; and in a private circular, which has been issued, the members of the Committee appeal to those who feel interest in the objects of the expedition, for assistance in carrying out an enterprise which is not only of the highest scientific importance, but is also of great significance in securing British influence in a critical region of the African interior.

*UNIVERSITY COLLEGE AND THE
UNIVERSITY OF LONDON.*

WE are glad to be able to publish the following text of a resolution adopted by the Council of University College, London, at their session on December 10. The offer contained in the resolution is a noble one; and we hope that the example afforded by it will be followed by other similar institutions, in order that the labour of the Statutory Commission may be simplified.

That a Deputation be appointed to represent to the Statutory Commission that—inasmuch as

(1) University College, London, was founded as the University of London, with the object of providing a complete University education in London of the highest type.

(2) The intention of the founders and benefactors of University College will only be carried out by the incorporation of the College in the University, so that its resources shall still be utilised for the furtherance of the highest educational work and for research.

The Council are prepared to summon a general meeting of the members of the College, and to propose to them that such steps should be taken as may be necessary for placing the site, land, buildings and endowments of the College at the complete disposal of the reconstituted University.

In making this offer the Council do not desire to throw any obstacle in the way of any other institutions in London which may be disposed to place their resources at the disposal of the Governing Body of the University.

It will be necessary in accordance with the precedent afforded by the Universities Act (Oxford and Cambridge) to protect the interests of the existing teachers and executive staff of the College. The existing teachers are, however, to have no claim as such to any rank in the re-constituted University, or to any vested interest other than that they now have in the College.

Special provision will probably have to be made as to the boys' school and its endowments, and perhaps for appropriate buildings on another site being provided for this department of the College work. Arrangements will also have to be made with regard to the Hospital and its funds, of which the College is now the Trustee.

(Signed on behalf of the Council),
J. GREGORY FOSTER,
Acting-Secretary.

NOTES.

PROF. MARSH has been elected a correspondant of the Section of Mineralogy of the Paris Academy of Sciences, in succession to the late Prof. James Hall.

THE Geographical Society of Berlin (*Gesellschaft für Erdkunde zu Berlin*) have sent out a circular inviting the friends and promoters of geography in all countries, and especially the members of geographical societies and cognate scientific bodies, to be present at the seventh International Geographical Congress, to be held in the German capital from Thursday, September 28, to

Wednesday, October 4, 1899. Before the beginning and after the close of the Congress, excursions will be arranged through such parts of Germany as are of interest from the points of view of physical or economic geography. The subjects which are to be discussed at the Congress will be arranged in the following groups: (1) mathematical geography, geodesy, cartography, geophysics; (2) physical geography (geomorphology, oceanology, climatology); (3) biological geography; (4) industrial and commercial geography; (5) ethnology; (6) topical geography, exploring travels; (7) history of geography and of cartography; (8) methodology, school geography, bibliography, orthography of geographical names. According to the usual custom, the English, French, German, and Italian languages will be admitted as languages of the Congress, and all papers must be written in one of them. The latest date for receiving papers is June 1, 1899; and the subjects should be notified by April 1, 1899. All correspondence relating to the Congress should be addressed to the VII. International Geographical Congress, 90 Zimmerstrasse, Berlin, S.W.

DR. CAPITAN has been elected president of the Paris Anthropological Society for 1899.

THE Desmazières prize has been awarded by the Paris Academy of Sciences to Dr. J. B. de Toni for his "*Sylloge Algarum*."

THE Paris correspondent of the *Chemist and Druggist* states that a "Retrospective Museum of the History of Chemistry" is being organised to figure in the Paris Exhibition of 1900. It will comprise objects relative to scientific discoveries and industrial improvements—in fact, everything that can clearly show the successive progress accomplished in the chemical industry and the importance of the discoveries made by French savants. Amongst the objects indicated as admissible are laboratory apparatus, reports on discoveries, portraits of inventors, investigators, and manufacturers, descriptions of processes, products obtained by inventors or in scientific laboratories, drawings, plans, models in relief, &c. Industrial museums, faculties, schools, manufacturers, and private individuals are invited to send a list of articles they may be willing to lend.

A PRIZE of 1000 marks is offered by the Economic Society of Mohrunge, near Königsberg, for the best work on the relations of electricity to living organisms. The work must discuss either fundamentally new phenomena in plant or animal electricity, or, from the point of view of physics, discuss the sources of organic electricity, or its significance for life in general or for certain functions.

VERY little is at present known of the flora of Porto Rico. This is not likely to remain long the case, since the attention of the Americans has been turned to the island. An American citizen, Mr. Cornelius Vanderbilt, has offered to bear the expense of a botanical expedition to the island by Mr. A. A. Heller, under the auspices of the New York Botanical Garden.

AN informal Committee will shortly meet in Calcutta to consider the reports by the Astronomer Royal and Sir Norman Lockyer, who were recently asked for advice regarding Indian astronomical and solar observatories. The future working of these observatories will be discussed, and Sir James Westland, Messrs. T. Holderness and J. Eliot, and General Strahan, Surveyor-General, will probably be members of the Committee.

IT is announced that the Royal Academy of Medicine of Belgium has appointed a Commission to consider the following proposal:—"The Royal Academy of Medicine asks the Government to enter into negotiations with foreign Governments with a view to drawing up an International Pharmacopoeia."