'a radius of fifteen miles from Somerset House') a University . . . commending to its students systematic courses of teaching and methods of study." But "commending" is what we all do now.

The new University is to be of the federal type. Beginning with University and King's, "other Colleges may from time to time be admitted." This was inevitable, though my pointing out the fact made my friend Prof. Lankester somewhat angry.

Any medical school may be admitted which is recognized as efficient by any qualifying body under the Medical Acts. But while Colleges will have representatives on the Council, the medical schools will only have representatives on the Faculties.

Degrees may be granted apparently in any subject the Council please, subject to a regular course of study and examination. This will apparently admit theology, which is probably a desirable thing, provided it be unsectarian.

The powers to grant degrees are rather large, and deserve careful consideration. The London radius at once, as has been the case with the existing University, goes off into Imperial infinity in the provision that anyone who has been a resident student in any University in the Empire may count his time and examinations, except that a "final portion of the period of study" and the "final examination" shall be passed in the University.

There is an unlimited power to grant *ad eundem* degrees as well as honorary degrees at the discretion of the Council. Fellows of University and King's Colleges (a purely honorary distinction in itself) are indicated as fitting recipients, and also "past students of the said Colleges," a rather large door to open if in the future a degree is to have any meaning at all.

Power is taken to examine into the efficiency of schools or any academic institutions—work already in the hands of other Universities—and apparently the London radius again becomes infinite.

Independent University lecturers may be appointed.

The Council will consist of members appointed for five years by (1) the Crown (Lord President); (2) Convocation; (3) Colleges; (4) Colleges of Physicians and Surgeons; (5) Faculties. The Faculties are to be constituted (1) of teachers in the Colleges; (2) of examiners; (3) of persons who are or have been engaged in University teaching in London. The Boards of Studies are delegations from the Faculties, as they should be. All this is much on the lines sketched out in my own letter in NATURE.

A rather remarkable feature in the scheme is the creation of a Convocation of graduates. Whatever may be the function of this body in other Universities, it is somewhat surprising to meet with its existence in what professes to be a teaching University.

The examinations are to be conducted by examiners who are members of the respective faculties associated with external examiners; the teacher-examiner seems not to be insisted upon.

These are the essential elements of the proposed constitution. If it is asked what distinctive character the Albert University will possess which will mark it off from the existing University, or from that body as it might be conceivably reconstituted, I must confess that it seems to me to lie in a very small compass. Notwithstanding the use of the ambiguous word "commending," when one would have expected "prescribing," I take it for granted that the essential feature in the whole scheme is the enforcement upon candidates for degrees of attendance upon a curriculum. But in the existing University, this is already required in the Faculty of Medicine. Prof. Huxley has further urged it in the Faculty of Science; and for my part I believe that the time has arrived when it might be demanded without difficulty. The prominence given to practical work in the science examinations has made it all but impossible for a candidate to acquit himself successfully who has not attended a competent course of instruction. To insist upon a curriculum would be now scarcely more than the practical recognition of this fact. The only real point of divergence is in the Faculty of Arts; about this I speak with some hesitation. It may be that the enforcement of a curriculum is desirable; I am not satisfied that in this faculty it is so, or at any rate absolutely essential, as I think it is in the Faculty of Science. With this exception I can see no net public gain in the new scheme to justify the creation of the cumbrous machinery of a new federal University.

Seeing that the existing University is a State institution in actual possession of the field, I think the public at large might

have reasonably expected from the Senate some statesmanlike criticism, rising above the petty level of supposed self-interest in the very serious action which the Government is apparently about to take.

They content themselves, however, with a sort of half-sulky acquiescence in the scheme "so far as it proposes to confer on the petitioning Colleges the power of granting degrees in arts and science to students of the Colleges who have pursued their entire academic curriculum within the Colleges." The Senate, a little maliciously, proceeds to point out that "the petition of the Colleges lays great stress upon the paramount importance of close association of students and teacher-examiners, and of placing the power of granting degrees in the hands of those teachers who have instructed the candidates." It not unnaturally insists upon the inconsistency with this position of the proposal "to accept residence and examinations at other Universities," if only a final period of study, "which might be a short attendance at evening classes," be passed at the new University.

It also objects to the honorary and *ad eundem* degrees. But its criticism is even more destructive in regard to the Medical Schools. It is quite obvious that if the Medical Schools joined the Albert University, the teacher-examiner system would disappear, and the new and the old Universities would be simply competing agencies for doing the same kind of work in the same kind of way. The same argument applies more or less to the other faculties as soon as the number of constituent Colleges becomes numerous.

Yet so great is the magic of a phrase that the daily papers in reporting the proceeding in the Privy Council describe the scheme as that of a Teaching University. A University of the Scotch or German type may have some claim to that title; but no federal University can ever possess a valid one, for the simple reason that there will always be a morphological distinction between the Colleges which teach and the University which examines and grants degrees.

Prof. Lankester contended in his letter that the question whether University and King's Colleges should have a University Charter was a sort of private affair between them and the Government. But I do not think this view can be accepted. Whether we like degrees or whether we do not, they have a certain value in the eyes of the public. Personally, I have no objection to the multiplication of Universities, if each has a proper geographical area assigned to it. But the multiplication of Universities in the same place seems to me a great evil. It cannot be assented to without the necessity being shown to be overwhelming. And in the present case it appears to me that it cannot be so shown. If the existing University is so injurious to the best interests of the higher education that another is imperatively demanded to do the work in which it fails, then it appears to me that two obvious points present themselves:—

(1) The new University should be free from the defects that attach to the old one. Prof. Lankester speaks of the "thralldom" of "the Imperial centralizing institution"; but when the matter comes to be looked into, the new institution also proposes to be Imperial and centralizing, and will be found to exercise the same or even greater thralldom on the individual teacher.

(2) If the old University is really doing mischief, it is the paramount duty of the supreme Government, whose creature it is, to reform it. The fact that the Senate and Convocation are at loggerheads how this is to be effected is really beside the question. When public opinion demanded the reform of the older Universities, new ones were not created alongside the unreformed old ones; but a Commission with executive powers effected the changes which were necessary. And for a similar procedure there is still time at Burlington Gardens.

W. T. THISELTON-DYER.

Royal Gardens, Kew, June 30.

The Holarctic Region.

REVIEWING the recently-published "Introduction to the Study of Mammals" by Prof. Flower and Mr. Lydekker, Prof. Lankester states (*supra*, p. 122) that "The authors of the present work mention Dr. Heilprin's opinion that the Palæarctic and Nearctic regions should be united and called the Holarctic region. But they do not adopt this opinion, nor refer to Huxley's proposal to term this same area Arctogæa," and so on. Now, in this last statement my good friend the reviewer, perhaps writing from memory, is mistaken. Had Prof. Huxley proposed to limit his "Arctogæa" to the Palæarctic and

Nearctic regions of Mr. Slater and Mr. Wallace, I should certainly not have suggested to Prof. Heilprin a new name for that combination. Anyone looking to the passage (Proc. Zool. Soc., 1868, pp. 314, 315) in which Prof. Huxley defined his "Arctogæa"—a name to which, let me say, I have not the least objection—will see that it signifies that part of the world which is not "Notogæa," and therefore includes the Ethiopian and Indian regions of Mr. Slater, whereas my "Holarctic" region expressly excludes them, and is therefore a very different thing from "Arctogæa" in its true sense.

ALFRED NEWTON.

Magdalene College, Cambridge, June 12.

Force and Determinism.

IN your issue of March 12 (vol. xliii. p. 491), Dr. Oliver J. Lodge characterizes as "perfectly correct" the statement "that, although expenditure of energy is needed to increase the speed of matter, none is needed to alter its direction." I have looked in vain for some notice of this apparently strange doctrine in your subsequent issues, with the exception that Prof. C. Lloyd Morgan (April 16, p. 558) objects that the direction of motion cannot be changed by purely metaphysical means, or will-power. But passing over this rather important and interesting point with only the observation that Sir John Herschel thought differently—thought, in fact, that "without the power to make *some* material disposition, to originate *some* movement, or to change, at least temporarily, the amount of dynamical force appropriate to one or more material molecules, the mechanical results of human or animal volition are inconceivable" (*Fortnightly Review*, July 1, 1865, vol. i. p. 439)—I desire to call a moment's attention to the first statement alluded to.

Dr. Lodge admits that "expenditure of energy is needed to increase the speed of matter." But, as a matter of fact, is it not very difficult, if not indeed practically impossible, to change the direction of a moving body without affecting its speed? "A force at right angles to motion does no work," says Dr. Lodge. Let us examine this statement for a moment. Let a body be moving in the direction *a* to *b* with a speed sufficient to traverse the distance in one unit of time. Then let a force be applied to

the body at *a*, at right angles to the direction of its motion, sufficient, if acting alone, to carry the body to *d* in the same unit of time. By the composition of forces, the body, at the end of the unit of time, would, therefore, be found at *c*. But the distance *ac* is greater than *ab*; and as, by the interposition of a force at right angles to its motion, the body has thus traversed a greater distance in the same time, has not its speed, as a matter of fact, been increased? and is not this increase of speed actual work? and does not this work require actual energy to perform it?

EVAN MCLENNAN.

Brooklyn, Iowa, U.S.A., June 9.

I AM glad to see my statement called in question, and hoped that it would have aroused more antagonism than has yet been expressed; because I do believe that it has important psychological or metaphysical consequences, and should therefore either be repudiated by physicists or after due discussion be accepted by non-physicists.

With regard to the special objection raised by Mr. McLennan, it may be sufficient to remark that, in his diagram, *ac* is the line of motion, *ad* the direction of the force, and that *ad* is not at right angles to *ac*. His difficulty seems to be the one that some people always feel with regard to the use of infinitesimals in general. He must remember that his diagram will not apply

to the case of curvilinear motion unless the impulses contemplated are momentary and infinitesimal.

OLIVER J. LODGE.

The Scorpions at the Zoo.

YOUR contributor of the notice, published in NATURE on June 18 (p. 163), on the contents of the Insect-house at the Zoo, who laments the unfortunate circumstance that the scorpions there in captivity remain unnamed, may be glad to learn that these creatures may be easily identified, and, with a little dexterity, fearlessly handled.

During a recent visit to this house, the keeper obligingly showed me the two Egyptian scorpions, one of which—the black individual with the thick tail—was easily recognizable as *Prionurus crassicauda*, Oliv., a tolerably common North African and Syrian form.

To the other, however, I could not so readily assign a name; partly owing to its partial concealment, and partly to the fact that critical inspection is required to distinguish between the species of the genus to which it belongs. It appeared, nevertheless, to be a specimen of *Buthus europæus*, Linn., the commonest of all the Mediterranean scorpions. But my attempt to verify this point by closer examination was immediately frustrated by the keeper; who, evidently thinking that I was qualifying for incarceration in Bedlam, hastily interposed when I stretched out my hand to pick up the noxious animal.

The third scorpion I did not see; but doubtless it is a specimen of one of the species of *Euscorpis*. This, too, can be easily named, no doubt; but it will be necessary to handle the specimen in order to be certain on the point.

I would warn your contributor not to be too sanguine of the permanence of the amicable relations that appear at present to be established between these three Arthropods. If the supply of dead mice runs short, there will, of a surety, soon remain nothing but a few fragments of *Euscorpis*. Such thoroughgoing cannibals are not likely to be squeamish, when a member of another genus is before them.

In conclusion, some of your readers may be interested to know that the spider referred to as *Lycosa portosantana*—which, by the way, should be styled *Tarantula maderiana*—is a very near ally of the famous and historical Tarantula of Italy; and that the hairy Brazilian monster, the so-called Mygale, who squats under a broken flower-pot in the next cage, has no more claim to the title Tarantula than any other Arachnoid with a formidable aspect.

R. I. POCKOCK.

Natural History Museum, June 18.

Cetaceans in African Lakes.

WITH reference to Mr. Slater's inquiry (NATURE, June 11, p. 124) as to the occurrence of porpoises in the Victoria Nyanza, the following extract from Bernier, who wrote about 230 years ago, will probably prove of interest.

I may add that in another passage Bernier gives further information regarding the sources of the Nile.

It would seem from the passage quoted that the occurrence of a Cetacean in the Abyssinian sources of the Nile was probably known to early travellers, and, like the occurrence of diamonds in other parts of Africa, cannot be regarded as a new discovery.

Science and Art Museum, Dublin, June 22. V. BALL.

An Armenian named Murat and a Mogul who came as ambassadors from the Christian King of Ethiopia (*i.e.* Abyssinia) to Aurangzeb shortly after his accession to the Mogul Empire, in 1659, told the French physician Bernier, who then resided at the Mogul's court, "that the Nile had its origin in the country of *Agauas*, that it issued out of the earth by two springs bubbling up near to one another, which did form a little lake of about 30 or 40 paces long; that, coming out of this lake, it did make a considerable river; and from space to space it received small rivers increasing it. They added that it went on circling and making as 'twere a great isle, and that afterwards it tumbled down from steep rocks into a great lake in which there were divers fruitful isles, store of crocodiles, and (*which would be remarkable enough if true*) abundance of sea calves, that have no other vent, &c., than that by which they take in their food, this lake being in the country of Dambea, three small days' journey from Gundar and four or five days' journey from the source of the Nile, &c., &c." ("The History of the Empire of the Mogul," English translation of 1684, p. 44).