(3) *Lecanochiton*, Maskell. Two species. A very distinct genus.

The two following genera were thought peculiar to New Zealand, but are now known from elsewhere:—

(1) *Eriochiton*, Maskell. The only species referred to this genus from elsewhere than New Zealand is *E. cajani*, Maskell, which is in reality a *Ceroplastodes*; but Mr. E. E. Green (in litt.) tells me that he has just received a genuine *Eriochiton* from Australia.

(2) *Solenophora*, Maskell. This is now known from North America and Ceylon.

I have no doubt at all that *all* of the truly native species of New Zealand Coccidæ are strictly endemic. The only apparent exception is that of *Eriococcus multispinus*, Maskell, which is said to occur in Australia on *Acacia*; but the Australian form was separated by Maskell as a distinct variety (var. *laevigatus*), and is doubtless a valid species. T. D. A. COCKERELL.

Mesilla Park, New Mexico, U.S.A., January 26.

The Fitting of the Cycle to its Rider.

THERE is much interesting theory in your paper on the bicycle fitted to the rider in crank and gear, by Mr. Crompton (p. 87). But what is the practice? I agree with Mr. Crompton's theories, if a slight modification be made. I think that the crank-length should be proportional not only to a man's thigh-length, but to the weight of a man's leg. The loss of power in a bicycle, as soon as it travels fast, arises from the loss of momentum at each up and down stroke of the leg according to the well-known equation:—

$$M = mv.$$

Where M = momentum.

m = mass.

v = velocity.

A slender-built man with a light, thin (even although long) leg, can afford a higher value for v because his constant for m is low.

Not so the strongly-built man with a high constant for m . He must keep his velocity down, or M rises in value and there is a loss of power at each stroke when travelling fast.

Let me give an illustration. A few days ago I was riding an 8' crank and 84 gear machine rather fast on a down grade. I travelled swiftly but easily. In front of me was a low-g geared cyclist, his feet flying round at a high speed, the bicycle frame quivering with the velocity of his strokes, the cyclist breathing hard with his exertions. As I overhauled him I heard a pedestrian remark against his scorching. Certainly he was scorching in the sense of strongly exerting himself, but his exertions were mainly expended in the lost momentum of each stroke. The only remedy for this is a high gear.

Admitting the advantage of a high gear, the necessity for long cranks follows, otherwise the cyclist has not the power to face hills, winds, or bad roads. Two inches increased crank-length gives an enormously increased power of propulsion. I find that with 8' cranks and 84 gear I can climb hills easier than with an ordinary roadster, say with 6½' cranks and 64 gear.

The increased comfort and safety on a bicycle fitted as Mr. Crompton recommends are very remarkable and pleasing. The ampler free motion does away with most leg-weariness and saddle-soreness. The long, powerful cranks give one a command over the bicycle that is equally satisfactory up-hill or down-hill. One gets over the ground with a long, easy swing. Compared with the ordinary bicycle, it is like the outside edge and the inside edge in skating; or like rowing with sliding or fixed seats.

For track riding it seems possible that short cranks and high gears may give the best return for the muscular power exertion expended, since v is kept down by the high gear, and m probably represents the limb of an active young athlete weighing perhaps 10 stone. And, since there is little resistance to be overcome, the long crank may represent an unnecessary high lift of the leg.

Conversely, the greatest advantage is to be derived from long cranks and high gears in a hilly and difficult country, or where the winds are strong, as here at the Cape, and when the rider has a heavy, powerful leg.

Long cranks and high gears necessitate an alteration to the frame of the bicycle that is troublesome to makers. And hence,

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I suppose, the curious tabooing of the subject in the too-often interested bicycle literature of the day. D. E. HUTCHINS.

Kolara, Kenilworth, nr. Cape Town, January 7.

Telephones and Lightning Discharges.

IN NATURE of February 8, Sir G. G. Stokes suggests an arrangement for hearing a lightning flash in a telephone. To hear the corresponding earth current, it is only necessary to put a telephone in connection with the gas and water pipes of a house. These pipes seem to suffice to entrap the corresponding earth currents, which practically enable the listener to hear the lightning. Flashes invisible in the daylight are quite noisy in the telephone. A. R. HUNT.

Southwood, Torquay.

THE GEOGRAPHY OF EUROPE.¹

EUROPE is undoubtedly the most refractory of the great divisions of the earth to get within the limits of a geographical treatise. The mass and variety of data of high scientific accuracy are so overwhelming that it is impossible for any one man to make himself acquainted with even a small fraction of the whole, and the compilation of a book on Europe, even on the generous scale which two volumes permits, cannot in the nature of the case be much more than a compilation of earlier compilations. In unskilled hands it could not fail to become a heterogeneous collection of facts; but Mr. Chisholm has brought to bear experience and expert knowledge in the choice and co-ordination of his material, and the result is a credit to British geography. It shows a great amount of reading amongst original, and sometimes not very accessible, works in many languages, which few compilers would have considered it necessary to undertake in preparing a volume in a popular series. Numerous references are given throughout to the sources of information, and we hope that the second volume will be furnished with a bibliography of the best works dealing with Europe as a whole, and with its larger regions.

The plan of the "Compendium" has always been to take the country rather than the continent as the unit, and by doing so its scientific character has suffered, because the only possible element of unification has been ignored. Mr. Chisholm has endeavoured, with considerable success, to improve the plan of his volume by an excellent introductory chapter dealing with Europe in general, although this, to our mind, is too short; while the individual countries appear to be described in disproportionate detail. In a series obviously intended to convey information rather than to inculcate geographical principles this disproportion is, however, inevitable, and it is doubtless recognised more fully by the author than by the critic.

The guiding principle which has been kept in view throughout all the descriptions of countries is that the character of a country at the present time is due to the influence of the physical structure of the land upon the historical development of the nation. Hence a good many geological and historical facts are mentioned; but they are mentioned, not as facts for their own sakes, but as working causes accounting for the present adjustment of peoples to lands. The application of this principle has led Mr. Chisholm to commence his detailed description with Italy, which he treats with great fulness on account of its historical importance. He gives to the central Mediterranean peninsula nearly twice as much space as to Russia or France, and a third more than to the German empire. Interesting as Italy is, and vast as was its influence on all Europe, we confess that we should

¹ Stanford's "Compendium of Geography and Travel (New Issue), Europe. Vol. 1. The Countries of the Mainland (excluding the North-west)." By Geo. G. Chisholm, M.A., B.Sc. Maps and Illustrations. Pp. xx + 736. (London: Edward Stanford, 1899.)