and robustness of the bone," but to its comparative solidity. Again, the "dinornithic strength and proportions of the hind-limbs" is a reminder which should carry more weight than it was probably intended to bear, but is nevertheless but a partial statement of the fact, for it leaves out of consideration the great difference in the relative proportions of the bone under examination. It is not that the bone is altogether larger or smaller in the same ratios of length and breadth, but in different ratios, the dromornis and dinornis ratio being much the same. The dromornis femur is but one-third longer than that of the emu, yet its shaft is twice as thick transversely, and its upper end is more than twice as broad. With such bones the bird would probably have the general appearance, the gait, and habits of a moa rather than those of an emu. In short, dromornis exhibits at the least an intermediate form between the moa and the emu, probably a nearer approximation to the former than to the latter.

After another interval of fifteen years a third dinornithic bone was picked up in King's Creek, on the Darling Downs, by Mr. Daniels, and by him presented, with other contemporaneous fossils, to the Queensland Museum. This again presents the upper end of a thigh-bone, but minus the upper part of the great trochanter, which appears to have been shorn off by the abrading action of drift sand while the bone projected from the bed of a watercourse; in other respects it is in excellent preservation. Repeated comparison of this bone with species of dinornis, with dromornis, casuarius, dromæus, struthio, and rhea, has removed from the mind of its describer all doubt of the former existence of the typical moa in Australia. To him it appears to resemble as closely any one of the femurs from New Zealand as any two of these, specifically different, resemble each other, a view which of course implies the absence from it of features notably present in the emu bone. The most important of these is one to which reference has already been made. The "head" of the bone, or that hemispherical projection which fits into the corresponding cavity of the hip-bone, stands out prominently in the moas, in consequence of the neck behind it being somewhat long and of considerably diminished diameter; whereas in the emu the neck is short and thick, so that the limits of the head, especially on its upper surface, are less distinguishable. In this feature, easier to recognize by inspection than by description, dromornis agrees with the emu, while the Queensland moa exhibits the comparatively slender neck and well-defined head of its New Zealand successors. It is not necessary at this moment to insist upon the value of the several characters which aid in the generic identification of this bone with dinornis; they are to be found by any one sufficiently interested in the matter in the "Proceedings" of the Royal Society of Queensland for 1884. To others a recapitulation of them would be tedious.

Unfortunately the identification has not yet been supported by further testimony, a circumstance which can hardly be thought surprising when the extreme slowness with which dinornithic remains have been brought to light is borne in mind: three bones in over half a century has been the rate of discovery hitherto. Adding to these three others from which no precise information can be derived, viz., two ribs provisionally referred to dromornis, and the shaft of a femur too imperfect for determination, but certainly not dromornis, and in all probability not dinornis, all the fossils of this kind known to the writer have been mentioned. In a fairly numerous collection of bones of contemporary birds the paucity of such fossils is conspicuous, but it would hardly be safe to infer from that circumstance that the birds themselves were rare. The most we can say is that they were not among the ordinary frequenters of the lower levels in which the ossiferous drifts of the period were accumulating. It is therefore with sustained eagerness that every fresh tribute of bones is received and inspected, since the hope is always present that they may contain some further proof of the reality of the Queensland moa, as convincing to others as it would be welcome to the assertor.

Be it at the same time observed that there is no reason why a greater amount of proof should be demanded in this case than in others. There is no inherent improbability involved by it so great as to justify inordinate doubt, since the passage of dromornis into dinornis is not so long and difficult a matter as to require for its accomplishment a new home and a geological remove. The only objection to be raised against it is that it confirms and accentuates the antecedent difficulty created by dromornis itself,—the difficulty of accounting for the presence of moas in New Zealand under their lately existing circumstances. It is not a mystery that they should have been there at all, since it is anything but incredible that a subsidence of ten or twelve thousand feet should — during a geological age which has seen the whole Australian fauna profoundly changed — have taken place in an area liable to volcanic disturbance, such as we see effects of in Australia and feel the throes of in New Zealand. Before that subsidence, Mount Cook, from a height about equal to the Cordilleran peak of elevation, Aconcagua, would have looked down and over continuous land as far as the snow-capped mountains of Queensland, the view unhindered by the intervening peak of Lord Howe's Island,— the refuge of Meiolanian reptiles once in communication with their kinsfolk in Australia. The true difficulty is not the isolation of New Zealand from Australia, but the strange isolation of the moas from all other forms peculiar to Australian life. Why should their stock alone have escaped to an eminence of the sinking surface, or alone been introduced into the insulated land, or alone survived some change in its life-conditions fatal to the rest? The moa in New Zealand is the question that calls for an explanation; and in proof that it does call for an explanation, and is not to be dismissed as a voiceless phantasy, we point to dromornis followed (structurally) by dinornis in Australia, and we wait for its solution in the work of New Zealand's naturalists.

DESTRUCTIVE LOCUSTS.

SINCE the great "grasshopper years" of 1873–76 there have been frequent outbreaks of comparatively local species, as well as a few cases in which small swarms of the Rocky Mountain locust have flown out into the subpermanent region and have occasioned some damage for a year or so. The most notable cases have been the outbreaks of the lesser migratory locust in New Hampshire in 1883 and 1889, the extraordinary multiplication of the devastating locust in California in 1885, the increase of local species in Texas in 1887, the multiplication of a chance swarm of the Rocky Mountain species in a restricted locality in Minnesota in 1888, and last year's damage in Idaho by several non-migratory species combined.

For a number of years the first and second reports of the United States Entomological Commission, which contained the results of the labors of the commission upon the Rocky Mountain locust, have been out of print, and yet with every renewed alarm caused by locusts there has been a great demand upon the entomological division of the United States agricultural department for information, which could only be supplied by correspondence or by publishing the information in local newspapers. For a time the demand was filled by supplying the annual report of the department for 1877, which contained bodily the chapters upon remedies from the first commission report. The supply of this document was also soon exhausted.

The fact that Mr. Bruner, in his last summer's trip to Idaho, investigated the latest rumors, and found that considerable damage was being done, and that the farmers were not acquainted with even the most rudimentary measures for protection and remedy, showed the necessity of publishing a condensed and practical account of the species which become seriously injurious from time to time, and of republishing in as brief form as possible the matter on remedies and preventives from the reports mentioned. The result is the publication by the government of a bulletin on "Destructive Locusts," prepared by Professor C. V. Riley, government entomologist. This bulletin is, in fact, a reproduction of matter already published but now inaccessible for dissemination, and which, from its nature, has a permanent value, together with such additional facts as subsequent experience has revealed. It contains no technical matter whatsoever, and the farmer will be able to recognize the different species from the figures which accompany the consideration of each.

The portion which relates to remedies, while drawn up for use against the Rocky Mountain locust, will apply in large part to

other migratory locusts, as well as to the non-migratory species. Detailed descriptions of the various machines which were given in the original reports are, for the most part, omitted, in the belief that the figures themselves will be sufficiently suggestive for the purpose. In point of fact, many of these machines, especially the more complicated, while serviceable, cannot be recommended to the average farmer dealing with the locust plague, and experience has shown that those simple forms providing for the use of coal-oil and coal-tar are, on the whole, the most efficacious against the unfledged insects. It is, therefore, to this portion of the bulletin that Professor Riley particularly calls the attention of those needing the information contained in it. But little experience of practical value has been had since the last great invasion; hence little has been added to this section of the bulletin beyond a brief description of the trapping system used in Cyprus against the migratory locusts of the Old World, and an account of the bran-arsenic mash remedy used in California in 1885 against the devastating locust.

THE TREES OF TASMANIA.

THE government of Tasmania has recently issued a publication, the "Tasmanian Official Record," which contains much useful and interesting information concerning the trees of that island. It is peculiarly a forest country, and many of the trees are of great dimensions, towering over and eclipsing the lesser undergrowths on plains, valleys, hills, and mountain slopes. Of the 16,778,000 acres comprising the total area, there are only 75,000 acres occupied by lakes, and 488,354 acres of cultivated land only partially cleared of its timber. With the exception of minor areas on the tops of mountains or among the barren uplands of the western highlands, the whole of the rest of the country is occupied with an almost continuous virgin forest, mainly composed of the various forms of eucalypti (gum trees), one noted example of which, the Iolosa blue gum, has been recorded as measuring 330 feet high. Many of these trees have stems measuring 150 feet high without a branch, with a girth of about 40 feet towards the base; and it is also recorded that a blue gum at Southport (*Eucalyptus globulus*), the prevailing tree towards the south of the island, "contained as much timber as would fully suffice to build a 90-ton schooner."

With such a wealth of forest trees, Tasmania's sources of timber supply must be infinitely great, and in the near future must be of great industrial value; but the difficulties of transit, the ignorance of their economic value in distant markets, the plethora of local supply, and the necessity for clearing the land in the most convenient way, all tend, it is said, to produce waste and improvidence in respect of timber products, which might soon become a great source of national wealth.

The necessity for the better conservation of the natural forests in Tasmania has lately commanded the attention of the local government, and a department has been created for the purpose of establishing conserved areas, and for regulating all matters connected with the cutting of timber on government lands.

The following is a description of the more important timbers as regards their industrial value. The blue gum has its home principally in the southern parts of Tasmania, where it attains great dimensions. Many of these trees exceed a height of 280 feet, with a girth of from 40 to 50 feet. A tree called "Lady Franklin's tree," near Hobart, is stated to have a circumference of 107 feet at a height of four feet from the ground. The timber of the blue gum is of rather a pale color, hard, heavy, strong, and durable. In transverse strain its strength is about equal to English oak. It is used in house and ship building, and also by carriage builders and manufacturers of tools.

The "peppermint tree" has a wide range, as it is found in the southern and eastern humid districts of Victoria and New South Wales, as well as in Tasmania. It varies greatly with altitude, climate, and soil, and is found at all heights up to 4,000 feet elevation. In the poorer lands the trees, though tall, are not remarkably so, but in the deep wooded gullies and in the moist ravines of mountains it attains such remarkable dimensions that it has obtained the distinction of the "giant eucalyptus" of Australia. The timber of this tree is useful for many kinds of carpenters' work, as in drying it does not split. It is also used in ship-building, for keelsons and planking. Besides its timber, this tree is famous for other products of value. The ashes of the foliage yield, it is stated, ten per cent pearlash; and from one thousand pounds of fresh leaves, with their small stalks and branches, the yield of eucalyptus oil by far surpasses all that of other congeners, amounting to five hundred ounces per thousand pounds.

The stringy-bark gum is a valuable tree, found in abundance in Victoria, South Australia, and Tasmania. It is straight stemmed and of rapid growth, attaining a maximum height of 300 feet. The wood of this tree supplies a large portion of the ordinary sawn hard timber for rough building purposes. It is also well adapted for carriage, cart, and wagon building, wheelwork, and agricultural machinery, as well as for the framing of railway carriages and trucks. The white gum, or "manna tree," is abundantly distributed throughout the island, and has also a wide distribution on the mainland of Australia. Its timber is used for shingles, rails, and for rough building materials. The small branching trees on open ridges and plains are noted for exuding a sugary substance called "manna," which is esteemed a great luxury, and is eagerly sought for by the young.

The gum-topped stringy bark is held in high esteem in Tasmania, and the chief peculiarity of this tree is that, while the lower part of the butt is clothed with a thick fibrous bark, the upper part and the smaller limbs and branches are quite smooth. The timber from this tree is highly prized, and it is described by competent authorities as second only to the blue gum. The iron bark is a valuable tree attaining a height of 150 feet. The trunk is sawn into good timber, and it is also used for posts and rails.

One of the most handsome of the native trees is the blackwood, which is widely distributed along the slopes of the north-west coast. It attains a height of from 60 to 130 feet. The timber is of a brownish color, closely striped with streaks of various shades of a reddish brown. The more ornamental logs of this wood are exceedingly beautiful, and fetch a high price. The myrtle or beech is common in Tasmania, and forms a large proportion of the forests. The "huon" pine is said to be the grandest and most useful of all the soft woods. It is abundant along the rivers of the south-western parts of the island, attaining a height of from 60 to 120 feet, with a diameter of three to eight feet. Its timber is almost indestructible in any situation. It is largely employed, locally, for all kinds of furniture and ornamental work, and is the most highly-esteemed of all kinds of wood for the lighter sea craft. Among the other trees of Tasmania may be mentioned the red pine, oyster bay pine, silver wattle, black wattle, and native cherry.

LETTERS TO THE EDITOR.

Growth of the Face.

DURING the past year investigations upon the physical growth of children have been conducted in the Worcester schools. The preliminary tables on the growth of the female face bring out some facts of considerable interest. There seem to be three distinct periods, the first ending about the seventh year, and the third beginning about the fifteenth year. A striking peculiarity is the seemingly abrupt transition from the types of one period to those of the succeeding. The sudden disappearance of the lower widths of face, and the equally sudden appearance of the types of the succeeding period, e.g., the sudden shooting up of the widths to almost adult dimensions at about the age of eight or nine offset by the equally sudden disappearance of the distinctively childish characteristics at the age of eleven. These peculiarities also appear at the ages of twelve and fourteen respectively in the succeeding period. This would seem to indicate the very slow growth of some children until the ages of about eight and fourteen respectively are reached, and then a very rapid development of each individual to her proper position in the series. This Axel Key found also to be true with respect to the total height of the Swedish children observed by him.

In the second period very many of the forms are already adult, and, if not at their fullest development, have very nearly ap-