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millions of sheets, and thousands of miles on these, and still the number will lack its due amount. Let us pause to look at the neat ploughed edges of the book before us. See how closely lie those thin flakes of paper, how many there are in the mere width of a span, and then turn our eyes in imagination upwards to our mighty column of accumulated sheets. It now contains its appointed number, and our one billion of sheets of the *Times* superimposed upon each other and pressed into a compact mass has reached an altitude of 47,348 miles.

"Those who have taken the trouble to follow me thus far will, I think, agree with me that a billion is a fearful thing, and that few can appreciate its real value. As for trillions and quadrillions, they are simply words, mere words, wholly incapable of impressing themselves on the human intellect."

I think you will all agree with me that the moral conveyed in this communication is not the least interesting nor yet the least instructive feature in it.

Tasmanian Forests: their Botany and Economical Value.

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[Read before the Royal Society of N.S.W., 5 June, 1878.]

In February, 1874, I visited Tasmania for a missionary tour throughout the island, and for nearly three years traversed its various districts. I had thus an opportunity of becoming acquainted with all the inhabited portions, except the north-west and two or three places on the east coast. I sometimes resided for weeks together in some localities, and on the south coast made frequent journeys on foot amongst the splitters and fishermen on that part of the island. These journeys gave me leisure for observation, and I was able in some small degree to increase the knowledge of Tasmanian natural history. Many of the notes made have been published, and some I hope still to place in an available shape before the public. Some are of a strictly technical character, but some have a more simple and popular aspect. Such, for instance, are the notes made upon the forests and timber resources, and I venture to think it may be worthy of a place in the Royal Society's proceedings if I bring before them what I have been able to note on this subject. It is well known that Tasmania has in its timber one of its very great industrial resources, and a more intimate knowledge of what these are cannot fail to be of service to the public.

Tasmania may be said generally to be a thickly timbered country. With the exception of the table-lands and the slopes between the main ranges and the sea, the soil is usually clothed with forest. But these forests are not the timber-producing forests of the islands. These are confined to a few localities, and are limited in extent. They are only found in the narrow deep gorges and gullies proceeding from some of the highest mountains. They do not appear to be confined to any particular soil, though some of the best are found on modern (Tertiary) basaltic rocks; neither are they confined to any particular height above the sea level. The fine timber near the Mill-house Falls grows in gullies 1,000 feet and more above the sea, while the forests on

the banks of the Huon and Kermadec descend right down to the beach. The aspects of these forests are most peculiar, and quite different from the thickly timbered country of other parts of the island. The vegetation is dense and almost tropical in character. The most conspicuous objects are the tall and tapering blue gum trees, by which name I shall always refer subsequently to the *Eucalyptus globulus*. They grow so close together as quite to shut out the prospect, but so straight and wand-like that the slim lines of bark look like fine ornamental graining. They are of immense height; 200 feet without a branch is not at all uncommon, and there are very many trees ranging from 300 to 400 feet high. Long bands of bark hang down from their sides and across their branches, and these when set in motion by the wind keep up a constant rattle and creaking, filling the gloomy forest with the strangest echoes and sounds. The great height of the trees would never be imagined from the aspect they present. As they always grow on very steep slopes and never crown the summit of the ridges, their height is lost against the adjacent ranges. It is only when standing at the foot of their moss-covered stems, where the roots rise gracefully up around from the buttress-like base, twisting and turning round the bole like massive moorings, that one gets an idea of their enormous size. Far above one's head, twinkling in the daylight, which contrasts so strongly with the sombre green atmosphere around, a moderate tuft of leaves is seen at the summit of the graceful yet massive stem. The branches look nothing beside the butt, and in reality the effect of the crown with the straggling branches and ragged untidy strips of bark is disappointing and insignificant. Here the true rugged character of the *Eucalyptus* asserts itself, which is in the strongest contrast to the regular and so extremely graceful stem. Beside the *E. globulus* there is always a very dense growth of other but smaller trees. In Tasmania it is generally what is called sassafras (*Atherosperma moschatum*), muskwood (*Olearia argophylla*), beech (*Fagus cunninghami*), pine (*Frenela rhomboidea*). Underneath this there is always an almost impenetrable scrub of pear tree (*Pomaderris elliptica*), stinkwood (*Ziera smithii*), varied with fern trees, rarely any other than *Dicksonia antarctica*, with an undergrowth of *Lomaria patersoni*, &c. Sometimes the forest is a little changed in appearance by a dense growth of *Bedfordia salicina*, *Olearea rosmarinifolia*, *Senecio lautus*, *australis*, and *velleioides*, *Olearea viscosa** and *glandulosa*, *Aster ramulosus*, &c.; and it is very beautifully covered over with the showy blossoms, or still more showy seed-vessels, of the *Clematis aristata*.

* It is *O. viscosa* which is said to have a musky odour, but I have never observed it, except on *O. argophylla*.

To a casual observer there seems to be absolutely no difference between these forests and those of the Dividing Range in Victoria; as, for instance, on the Upper Yarra and along the Wood's Point Road, the great bulk of the vegetation is certainly the same. Thus the *Olearea rosmarinifolia*, *Aster stellulatus*, and *ramulosus*, *Pomaderris elliptica* and *Bedfordia salicina* meet the eye on every side. The two last, indeed, almost exclude every other undergrowth, the long narrow stems of the *Pomaderris* forming almost impenetrable thickets on the Black Spur. But the *Eucalyptus*, though identical in aspect and graceful height, is not the same species. *E. amygdalina** taking the place of *E. globulus*, which is the more singular as they are both accompanied by stringy bark trees (*E. obliqua*), which affects the same lofty habit in both localities. The fern tree is different; at least *Dicksonia* is not so common as *Alsophila excelsa*; the other common plants are the same in both places, such as *Olearea argophylla*, *Olearea stellulata*, *Fagus cunninghami*, *Drimys aromatica*, and the common *Lomaria*. A close attention, of course, will reveal a good many differences. One will miss numerous familiar beauties of the Tasmanian forests, and their places will be taken by forms as peculiar and interesting.

This close resemblance is more remarkable if we bear in mind how very distinct and almost complete these forests of Tasmania and Victoria are from those of New South Wales at the east side of the continent. There the *Eucalypti* are different, and the undergrowth of shrubs is almost entirely different. The vegetation is sub-tropical in character; at least as far south as Ulladulla. The gigantic nettle (*Laportea gigas*) and cedar (*Cedrela australis*) take the place of *Fagus cunninghami*; while the fern trees are few in comparison with the stately palms. *Seaforthia elegans* and the cabbage-tree (*Corypha australis*) shoot up continually, high above the brush, and vie in elevation with the elegant turpentine (*Syncarpia leptopetala*) and ironbark (*Eucalyptus siderophloia*). The sub-tropical vines of various descriptions bind the vegetation into massive walls of dark shining green, while the stems of the trees are varied and adorned with immense fronds of the epiphytic ferns (*Asplenium nidus* and *Platyserium alaicorne*), which here reach their perfection. There are some few points of resemblance between the Eastern forests and those of Tasmania. *Olearia argophylla* is found in both, and it is in the New South Wales forests only that its odour of musk is fully developed. In Victoria the scrubs are in some places (on the slopes of Mount Juliet for instance) crowded very thickly with the dense leafy bushes of *Prostanthera*

* This tree, known as peppermint gum, has a poor and worthless character in light soils, but becomes in the shaded gullies of the Dandenong Ranges one of the finest and loftiest trees of the world.

rotundifolia, a labiate of very pretty flowers but most offensive odour, which seems to be given off from a sticky resinous exudation abounding in the branches and leaves. The same shrub is very common in the scrubs of the Illawarra and Shoalhaven districts, equally abundant, and equally offensive. It is found in N. Tasmania, but I never noticed it among the timber-producing forests of Tasmania; indeed there are but few species common to all three. Those found commonly in Victoria and Tasmania are not common in New South Wales, and those common in the forests of the latter Colony are either absent from Tasmania or from Victoria. Of course this is speaking in a general way. There are exceptions, which, however, do not go far beyond those I have mentioned, to which I might add *Leptospermum lanigera*, *Daviesia latifolia*, *D. ulicina*, *Hakea pugioniformis*, *Gleichenia dicarpa*, *G. flabellata*, and a few others.

Before I pass on to the consideration of the timber products I may say a word here as to what I regard as the cause of the singular height and straightness of the *Eucalypti* in these forests. This is a peculiarity almost restricted to Tasmania and Victoria. The trees grow to a great height in the forests of New South Wales, but nothing like the altitude they attain in the other Colonies. In this respect the greatest height seems to be reached in Victoria. Trees have been felled which measured over 460 feet, and it is common to see them in both Colonies rising 200 feet and more, as straight as an arrow, before sending forth a branch. Now, in what way are we to account for this? First of all it must be observed that we never see this kind of timber except in very deep gullies, where we may say the light is almost shut out by the rich close vegetation, and where the subsoil is probably several feet of a humus composed of decayed wood and leaves. As soon as the seeds of the gum tree germinate they shoot up with extraordinary rapidity. Young stems may be constantly seen 25 to 30 feet in height, and the stem not 2 inches across near the ground. At the top there are only a few leaves, set on small twiggy branches. Some of them can be seen not more than two years old, because they have risen around timber that was quite recently felled. I consider that three causes combine to produce this rapid and straight growth, which might easily be secured in other countries, where this (to my mind the most wonderful) property of the *Eucalyptus* might be developed. One is the extreme richness and moisture of vegetable soil; second, perfect absence of disturbance, even by the wind; third, the comparative obscurity or modified light, which causes this young plant to throw out but few branches or leaves until the light of day is reached, which is often at a height of 100 feet or more above the root. It must be remembered also that in the young state of *Eucalypti*, with few

exceptions, the leaves and young branches are quite of a different pattern and plan from those of the mature tree. The earlier stages fall away and leave the tree still more bare as it grows up. That light and shade and absence of movement are the main causes can be easily seen on the more exposed summits. At Mount Juliet the trees at the base are very lofty, though not the most lofty of the range or equalling those of the Black Spur; but at about 400 feet below the summit the timber becomes stunted and ragged, and those lofty trees on the slope which send these branches thus far partake of the knotted twisted character, and have them all very singularly bent towards the mountain by the prevailing direction of the winds to which they are exposed.

It is a very important fact to ascertain if these views as to the growth of the *Eucalyptus* are correct. There are plenty of deep shady gullies in the mountains of Europe where the experiment might be tried. In Norway and in some of the valleys of the Alps favourable places might very easily be found. I am convinced that the trees are of very rapid growth, and even the largest are not of great age. Cold does not affect them. In many of the gullies of Tasmania the snow lies around the trees for six months of the year or even longer; and in Victoria the same trees are sometimes exposed to a very high temperature. The acclimatization, therefore, ought not to be a matter of great difficulty, neither would much time be required for the experiment. Baron von Mueller assures us in his "Select Plants" that the *Eucalypt* is much more hardy than the orange or lemon tree.

It is a very interesting inquiry to know how old are the stately trees which people these forests. Judging from their size, one would be inclined to attribute to them great antiquity. I was very anxious to collect data on the subject; but to nearly all my inquiries I only received mere guesses; from 200 to 300 years was the general reply. I found, however, in Mr. Hill, a source of information at once reliable and valuable. Mr. R. Hill is the proprietor of an extensive sawmill at Honeywood, on the Huon; he is also a shipbuilder and hop-grower. It is from him that I have derived the most of the statistical information in the paper, and the facts which did not come under my personal observation: and I take this opportunity of thanking him for his readiness in affording every aid to inquiry, and express the hope that the Colony may long profit by his intelligence, industry, and enterprise. Mr. Hill assured me that some of the gum trees, and perhaps all of them, shed their bark twice in the year. The stringy bark (*E. obliqua*) is one of the most striking instances of this. He further informed me that, hearing a lecture from Mr. Bicheno on the growth of trees, and the statement that a ring of wood was added to the diameter each

year of growth, he was induced to test the truth of this. There was a blue gum tree in his garden in Hobart Town, the age of which he was sure of, as his brother had planted it eighteen years previously. He felled it and counted the rings, and found them to be thirty-six in number, or two for every year. From this, and from the shedding of the bark as described, and a long series of observations, he concludes that the sap rises twice in the year. He has for many years watched the growth of the trees, and he believes that for the first twenty years the average growth is about one inch in diameter for each year. Out of thousands of trees felled or cut in his mill, he has not found one over seventy-five years old, and a very large proportion of the serviceable timber is composed of trees about fifty years of age. Quite recently he has had a very interesting opportunity of verifying these observations. At Ladies' Bay (between Port Esperance and Southport), a paddock on the farm of Mr. D. Rafton was cleared for the purposes of cultivation. It was exactly sixteen years this summer (1877-78) since a crop was taken off it, and was quite overgrown with saplings, which were all cut down. Mr. Hill, at my request, wrote to Mr. Rafton, requesting him to examine the stumps, and I append his reply: "Ladies' Bay, April 26, 1878. According to your request I send you the result of my examination of the stumps of young saplings in the paddock which we are now clearing. Number of rings in the longest saplings, thirty-three; size across the heart-wood where the rings cease, one inch. The rings, I observe, are not an equal distance from each other, some of them being three times the size of the others. On making inquiries I find beyond a doubt that it is exactly sixteen years this summer since the last crop was taken off the paddock.—Yours truly, D. RAFTON." From these facts I think we may safely adopt Mr. Hill's conclusion that there are two rings of growth for each year, and that the tallest trees of the forest, the giant timber of Tasmania, range from fifty to seventy-five years old.

I may mention here incidentally two inconveniences to which the Tasmanian forests are subjected. One is the "tick." This is a small insect which lives on the fern leaves. It burrows readily under the skin of any animal upon which it creeps and produces much irritation and inconvenience. It is said sometimes to cause the death of dogs, calves, and goats. I do not know whether the species is the same as that which is found in the fern gullies of New South Wales and Queensland, where the bite is regarded, though erroneously, as almost venomous. The other pest is the abundance of leeches which swarm the undergrowth. After even slight rain they come out in great numbers, and unless a pedestrian takes precautions against them, and keeps a careful watch, they may not only be painful but dangerous in their attacks. A

similar plague used to be common on the open swampy plains of the south-eastern district of South Australia, especially on the Mosquito Plains. Cattle suffered much from them in the long grass, but of late years they have disappeared.

The principal use to which the timber is put is for what is called "sawn stuff," coopers' staves, shingles, and palings. The shingles are for the most part now made by young girls, and they do all the work, even in some instances to the felling of the trees. It is not every tree that will suit for the purpose. It must be a young tree, or "spar" as it is here called, and must be very straight in the grain. This is ascertained by cutting a square block out of the side at about 10 or 15 feet from the ground. A stout young sapling is first cut down. One with a good strong fork is necessary, and thus it is seldom a Eucalypt. It is cut to a length of 18 or 20 feet. A deep notch for a foothold is cut a little below the fork, and it is then rested against the tree which is to be tried. The wood-cutter then climbs to the fork, in which one foot is placed, and the other a little below on the notch. This gives a firm enough footing to wield the axe. The tree is then tried, and if found suitable a stage is erected at a height of 10 or 12 feet from the surface. From this the tree is felled. It not unfrequently happens, however, that the labour is in vain, as the timber is so close around that the tree will not fall—it merely topples over and reclines against its neighbours. The "trying" a great height from the ground and the stage is seldom necessary except for very heavy timber. The "spars" are more easily dealt with; when fallen they are rapidly cut into short lengths with a crosscut saw. The billets are again split with wedges into the requisite width, and then by a rapid series of blows with a wooden mallet and a shingle knife, the shingles are split, two being generally slit with one blow. The shingle knife is first used as a wedge; the handle, which is at right angles to the back of the blade, then is worked as a lever to widen the opening, in which the hand is inserted while the knife is worked down. The wet sap of the wood is full of tannin, with which the iron of the knife combines to make a deep black stain wherever it rests. The poor girls who work at this trade have their hands almost permanently stained a deep inky hue.

Where the useful timber grows the brushwood is always so thick that regular tracks have first to be cut to the places. First of all the owners of the different sawmills run out tramways in various directions for three or four miles. These tramways are of the simplest kind, being merely cross sleepers, on which square wooden rails are pegged down; yet they are rather expensive structures, because of the many bridges that have to be made over the numerous creeks. From various points on these tramways tracks are cut into the thick scrub. First of all a gigantic

gum-tree is cut down, and its stem is used as a bridge over the brushwood, thus leading 300 or 400 feet into the scrub, and often arching some feet above it; from this the track is carried further, either by cutting fresh trees, or by using the stems of fern trees either as flights of steps or pathways. Thus, perhaps, the scrub will be penetrated for half a mile, and the huge and lofty timber will be seen rising on every side. The scene is one of peculiar beauty. Dull green is the light, and the perfect stillness and quiet is disturbed by nothing but the distant rustling of leaves far overhead, the sound of some woodman's axe, or the peculiar cry of the wattle bird (*Anthochaera inauris*), or the loud smack of the whip bird (*Pachycephala glaucura*). The ground is carpeted with bright green moss, elegant brakes and flowers spring up all around, and the brown stems of the fern trees, bearded with *Hymenophyllum* and surmounted with whorls of palm-like fronds, shut in the view on every side, and make the seclusion lovely beyond description. The whole place is, however, dripping with moisture, so that the poor young workers may be said to be always wet through. They make their shingles into bundles of fifty, fastened round with bands of green bark, but as tight and compact as if the whole mass were of stone. This is done by tying up a bundle of somewhat less than the number and then wedging in the remainder. A bundle of fresh wet shingles will weigh from 50 to 60 lbs, yet I have seen young girls of sixteen years of age carrying out two of such bundles on their shoulders. They divide the labour between themselves in this way, that a party of four, often sisters, will have two for splitting and felling and two for "carrying out." They arrange rests or "spells," as they are called, every furlong, where is a small stage of paling about three feet from the ground. The bundle of shingle has a long peg driven into the centre, and two bundles are held together by a cross strap of bark. The "carrier" stoops with her back towards the bundle, raises her hands over her head, and by means of the two pegs tilts the load on to her shoulder and staggers along to the first "spell," where the burden is slid down on the stage for awhile. It is certainly a most unfeminine occupation, and still less is it adapted to comparative children. The splitters are very often utterly uneducated; yet in spite of the way young females are thus exposed in the midst of the remains of an almost entirely ex-convict population, they are simple and innocent and wonderfully accessible to religious impressions and teaching. The boys and girls are able to earn about 2s. 6d. or 3s. a day, while men can make from 6s. to 7s. There seems to be no scarcity of employment, but the supply of labour is at least not less than the demand. Most of the sawmillers keep their own stores, so that most of the wages are taken out in goods; and though the disadvantages

of this are felt on both sides, yet the very few inducements for small capitalists to settle in these wild districts renders this system almost unavoidable.

The larger timber which is useful for heavier purposes than shingles, is treated in a different way. The trees, when they are felled, are cut into lengths of 10, 12, and 14 feet, according to the nature of the "stuff," as it is called. The huge round logs thus resulting are rolled down to the edge of the tramway, or drawn by bullocks on a kind of wheeled sleigh. It is thus brought to the sawmill, where it is speedily cut up into "sawn stuff." The thickness and length of course depend upon the kind of timber required. At the time of the gold fever (1852-3-4), when the timber trade of the Huon reached a prosperity which has never been seen before or since, the demand was enormous. But it could not be cut too light; the thinnest shingles, studs, palings, and battens were sure to meet the readiest sale. The state of the roads to the diggings, and the difficulty of carriage, explain this peculiarity. At the present the trade is very fluctuating, and the supply probably in excess of the demand. The favourite timber used for sawing is stringy-bark (*Eucalyptus obliqua*) and blue-gum (*Eucalyptus globulus*). The former is most in use—first of all because it is more abundant, but probably, also, because it is a softer timber and more "mellow," as they say here, to work. It is preferred for all kinds of carpentry where more strength is required than pine could furnish. But there is a second species of stringy-bark which is called here "gum-topped stringy-bark." I have very little doubt that this is *Eucalyptus virgata*, of Siebold. The Rev. W. W. Spicer has made known its existence in Tasmania, which was not hitherto recorded. It is the "mountain ash" of New South Wales splitters, and occurs in the south-eastern part of this Colony and in Victoria. In South Australia it is a mere twiggy bush 15 to 20 feet high. It is exactly like stringy-bark in the fibrous twisted bark, but it is very much more like the blue gum in the leaf. I never examined the seed-vessels or flowers. The wood is lighter in colour than *Eucalyptus obliqua*, which goes by the name of brown stringy-bark. The "gum-top" is close-grained, and very few are able to distinguish the timber from blue gum. It is much used for shipbuilding purposes.

But for all work where length, strength, and durability are required *Eucalyptus globulus*, or blue gum, is most in demand. It is generally procured by hand sawyers, who cut up the trees where they fall in the forest. Its uses are very various. It is in demand for bridges, railway sleepers, coach and wheelwright work; but to shipbuilders it is invaluable. It makes the very best planking for ships' bottoms. It has the property of swelling under water to such an extent that it becomes a matter of

some difficulty to find the seams when the vessels are put upon the slips for coppering. When properly seasoned it is the best timber for keelsons, keels, ribs, knees, beams, and stringers. But much judgment is required in selecting the timber. All pieces that contain heart-wood or sap-wood must be rejected. These are both worthless and soon decay. The true serviceable blue gum must come from the circumference of the tree, about midway between the bark and centre.

There are other trees used besides these, but they are not the main sources of supply. The celebrated Huon pine (*Dacrydium franklinii*, Hooker) is much in demand, but getting daily more scarce; it is only found in a few remote spots far in the mountain ranges. The sources of the Picton are now the principal localities whence this timber is derived. Another tree, much used for spars, is the celery-topped pine (*Phyllocladus rhomboidalis**); it is much more common than the former. Muskwood (*Oleacea argophylla*), dogwood (*Bedfordia salicina*) are used for ornamental purposes with lightwood, or blackwood, for it goes by both names (*Acacia melanoxylon*) she-oak (*Casuarina stricta*), and other trees.

The blackwood (*Acacia melanoxylon*) is largely used for oil-casks, and is the only wood we have in Australia, as far as we know, that is suitable for the purpose. The tree, on good soil and well-watered valleys, reaches a height of 80 feet, with a stem several feet in diameter. It is split into staves 6 by 8 inches thick and 6 feet long, and then shipped from the Tamar to Victoria. The wood is also considered most valuable for furniture, railway carriages, boats, casks, billiard tables, pianos (for sounding boards and actions), and numerous other purposes. Silver wattle (*Acacia decurrens*) is also much used for staves, from 20 inches to 5 feet long; it is shipped in quantity to Victoria, and used for beef and water casks. Trees from 12 to 24 inches in diameter are the usual sizes worked; but they become daily scarcer, from the fact that they are annually destroyed in hundreds of thousands for the sake of the valuable bark. The bark and gum of this tree are becoming highly esteemed because of the many dyeing purposes for which it is found they are almost unequalled. Young trees are still very common, but the time is not far distant when Tasmanian colonists will find it worth their while to cultivate them.

The sassafras (*Atherosperma moschatum*) is found to be very valuable for munn and door work. The myrtle or beech (*Fagus cunninghami*) is equally prized for the same purposes, and indeed all kinds of light joinery. Latterly sash and door

* Besides the Tasmanian tree, which is endemic, there are only two more species of this curious genus known, one in New Zealand and the other in Borneo.

machinery have been introduced into Hobart, and thus these trees have come into much demand among the sawyers, though hitherto they have been in a measure spared. They are both splendid trees, but the beech, for elegance of foliage—that is to say, in shape, denseness, and for colour, which varies in every shade from light orange to a rich dark glossy green—has no equal in Australia. Its elegant sprays of leaves form lovely backings for vases of flowers or greenhouses. It is to be regretted that it is not used more to vary the monotony of the Moreton Bay fig in our streets and parks; it is quite equal to it as a shade-giving tree.

The principal places of export for timber are the Huon district, including Franklin, Honeywood (on the Kermadec), and Port Cygnet; next is Port Esperance, then Southport. All of these employ two or three sawmills, with some at intermediate places. At Recherche Bay there is no mill, but some hand work is done; and the same at Port Davy, which is a very remote district on the extreme south-west of the island. The timber is brought up from these places to Hobart Town in small cutters or "crafts" as they are called, very much like the oyster dredgers and herring ketch of the British Channel.

Quite a flotilla of these small vessels are employed in the trade, and the port of Hobart is principally occupied with them. Were the export trade of timber to fail in Tasmania the harbour would look barren indeed. There is a considerable trade with New Zealand as well as with Australia; the former island sends timber, kauri pine (*Dammara australis*), to Tasmania, and receives hardwood (blue gum and stringy-bark) in return.

The question naturally arises whether the supply of timber is likely to fail. I have had the opinions of some of the most experienced sawmillers, and they were unanimous that the supply is rapidly decreasing. But this arises not so much from the quantity cut as from the absence of timber reserves, where the sawyer could precede the settler. Under the present (1876) Waste Lands' Act of Tasmania, the 24th section binds purchasers to reside for fourteen years upon the ground he selects, and to improve it. He generally chooses where the blue gum grows, as the soil is there of the best description. To fulfil the conditions of the Act, he "rings" all the standing timber—that is, he makes a deep incision all round the tree so that it may die. In about two years the timber is thus rendered utterly worthless, being full of "sun-shakes," as the irregular splitting and weathering is termed. The consequence is, that there is daily greater difficulty experienced in finding suitable trees. If young trees were allowed to grow up to supply those which have been felled, the supply might be considered inexhaustible. But this is not the case. If the ground has been at

all well cleared by the splitter or sawyer it is seized upon by the settler, who grubs the stumps and destroys the saplings, planting in place raspberry canes, currant bushes, and those fruits which next to timber, form the principal export of the Huon.

Yet, in spite of all these drawbacks, there is still a considerable supply of timber in the forests which can hardly be ever selected, as the scrub is too dense. I am informed that, judging from the area of land worked over in the Huon district for the last thirty years, there is beyond a doubt a supply for fifty years at the same rate of production.

The only way to prevent the wholesale destruction of the timber will be by proclaiming reserves or State forests, as they have done in Victoria. This is what the sawyers and splitters are crying out for, but as yet without effect. I do not undertake to pronounce an opinion on a question which may have political difficulties unappreciable by me; but it does seem a mistaken liberty to allow selectors to settle on land of great value as a timber forest but useless for agriculture, until the whole of the valuable timber is ruthlessly destroyed. It seems to me that as long as any available land can be obtained free from timber, or with timber of little value upon it, no selector should be allowed to destroy the forests. The matter is one which the Legislature should deal with promptly, or the forests of Tasmania, peerless and priceless as they once were, will soon be things of the past.

The Molluscan Fauna of Tasmania.

By the REV. J. E. TENISON-WOODS, F.L.S., F.G.S., Hon. Member
Royal Society, N.S.W., &c., &c., &c.

[Read before the Royal Society of N.S.W., 4 September, 1878.]

HAVING recently completed a census of the Molluscan Fauna of Tasmania, it will be probably useful if I add some remarks on the nature of that fauna and its geological relations. The time has hardly come when this can be done completely. Dredging operations have not been carried out to any extent, so that the nature of the laminarian zone is little understood. The Molluscan Fauna of Australia is also only very partially known. New South Wales or the east coast is perhaps the best explored, but still far from completely; and as for South Australia and Victoria, our knowledge is extremely imperfect. It will be seen, therefore, that I can only give broad and very general conclusions, such as I think future discoveries will not materially alter.

In order to understand the fauna of Tasmania we must bear in mind first of all the physical character of the island. It is separated from Australia by a wide and deep strait, 90 miles at least at its narrowest part, though that interval is to some extent bridged over by groups and chains of large islands. It is situated in more temperate latitudes than any part of Australia, and on its southern side it is exposed to the full force of the southern ocean, as well as to the influence of much colder seas. The coast is almost without exception bold, precipitous, and rocky, with many islands. There are numerous inlets and bays running up very far into the land and perfectly sheltered, so that tranquil and shallow waters are by no means wanting. The sea, though not a warm one, appears to be very equal in temperature. It is fed by numerous freshwater streams, and there are many brackish estuaries. In these particulars Tasmania contrasts very strongly with the south coast of Australia. The sea there is warmer, and the coasts are seldom bold. There are immense stretches of sandy beach of nearly 100 miles at a time. There are few rivers, and instead of estuaries there are many shallow arms of the sea or brackish water lakes. The south-east coast of Australia differs in some extent from this, resembling Tasmania more. The coast there is often bold and much more broken; there are scarcely any islands, and the seas are exposed to the full influence of the southern ocean.