THE ANTIQUITY OF MAN IN TASMANIA.

Pl. I. and II.

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(Read April 11th, 1910.)

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1. INTRODUCTORY REMARKS.

There exists in Tasmania perhaps the greatest unconformity in the history of evolution of the human race that we know of. Modern civilisation follows immediately on the most typical archaeolithic stage that is known to us. All intermediate stages which we observe in other countries are missing in that island. From this point of view it was fortunate that the contact between the lower and the higher civilised race lasted for such a short time only. Not thirty years lapsed between the first encounter at Risdon ferry and the final deportation of the Aborigines to Flinders Island. This time was not long enough to adulterate the archaeolithic civilisation by the introduction of foreign ideas. However deplorable it may be that the Aborigines died out so rapidly, there is at least one consolation in their fate —their civilisation has been delivered to us in all its characteristic features. But we have to thank another lucky accident for this, viz., the insular seclusion of Tasmania. On the eastern, southern, and western coast we find abysmal depths within a few miles from the shore. The 500-fathom line is hardly more than 30 nautical miles from the land. Only in the north of the island we notice shallower water. Nowhere in Bass' Straits between Hunter's Island in the west and Cape Portland in the east, Tasmania in the south and Australia in the north, does the depth exceed 50 fathoms (1).

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(1) In the south the coast drops within two miles from the shore to 61 fathoms depth.

While in the west, south, and east the nearest land is thousands of miles distant, the north coast of Tasmania is in a straight line about 184 miles from the coast of Victoria. We therefore have an area absolutely isolated from the remainder of the world, and it is only thanks to this isolation that the Tasmanian race has been preserved as long as it had been. We may safely assume that had there been any connection whatsoever between Tasmania and Australia before the arrival of the Europeans, the Aborigines would have been wiped out by a superior race long before we ever knew of their existence. We may now well raise the question, how did the Tasmanians get into their island country? As they cannot have arrived in boats or canoes, they must have arrived over a land route. We know sufficiently enough of their habits that it is a certainty that they could not build any canoes or boats worthy of that name. The fabrics that go under this name are nothing more than bundles of reed and grass tied together with a grass rope. These structures might serve to cross a river, or to reach Bruny or Maria Island from the Tasmanian coast, but it would be more than absurd to assume that the Tasmanians navigated a stormy sea on these reed bundles without sails and paddles. The best proof, if any such would be required to support this view, is the transportation of the last remains of the race to Flinders Island. Had there been the faintest idea that they could construct serviceable canoes, by means of which they might manage to escape, they would certainly not have been sent to Flinders Island. But nobody seems to have entertained even the faintest notion that such could be possible. Davies (1) in his valuable account of the Aborigines, says:—"This (viz., their reduced number) may have been in a great measure owing to their change of living and food, but much more so to their banishment from the mainland of Van Diemen's Land, which is visible from Flinders Island; and the natives have often pointed it out to me with expressions of the deepest sorrow depicted on their countenances."

Had the Aborigines really possessed the faculty to construct serviceable boats, surely they would have built such in order to escape from a place which was appa-

(1) The Aborigines of Van Diemen's Land, Tasm. Journ. of Nat. Science, 1846, Vol. II., pag. 419.

rently detestable to them in order to reach their beloved old home.

It is therefore more than certain that they must have arrived at a time when present Tasmania was connected with some other outside region. If we assume that the Aborigines came from some more southern region, we must presume the existence of an antarctic land free of ice and snow, and that there existed a continuous stretch of land from Tasmania to the South Pole. If such land existed it would be absurd to assume, in face of the depths that have been recorded north and south of the island, that Tasmania was not also connected with the continent of Australia. Some faddists favour this theory, but is it probable that when all these enormous changes took place that resulted in the glaciation of the antarctic, and the creation of a deep ocean where hitherto land had been, the Tasmanians peacefully remained in the island? It is much more probable to assume that when the first earthquakes shook the surface, when large tracts of land suddenly disappeared under the infuriated waters of the ocean, when volcanoes were belching forth their fiery streams of lava, they fled in mortal terror in that direction which was the safest, namely, towards north. Unless we believe that within 24 hours a catastrophe occurred that turned Tasmania from being part of a continent into an island, whose inhabitants, either human or animals, were thus cut off from all retreat without a moment's notice, the theory of immigration from the south is untenable. Even if this were probable, or even possible, we will see later on that all the survivors would have miserably perished of cold and hunger, and Tasmania would have remained uninhabited either by human beings or animals. Similar arguments apply to the theory of immigration from the east or west. There remains, therefore, only one direction from which the Aborigines can have come, viz., the north—that is to say, from the continent of Australia. At the present day a shallow, rather narrow, strait separates Australia and Tasmania, but it is still broad and deep enough to prevent even the Aborigines of Victoria, who understand how to construct serviceable boats far superior to the grass bundles of the Tasmanians, from reaching this island. Is it probable to assume that the lower Tasmanians succeeded where the more intellectual and

higher civilised Victorians failed? Even if they had achieved the improbable, why did they not keep in communication with the mainland? It would be waste of space to discuss these questions any further; everything tends to prove that the Aborigines must have arrived in Tasmania when a land bridge or isthmus connected the island with the continent.

Are we in the position to fix the time when Tasmania was still connected with the mainland, and can we also fix the time when the separation took place? We can say that the time of separation fixes the time of immigration, because the latter must have taken place before, but cannot possibly have happened after the former.

The question is essentially a geological one, and can only be answered by a geologist. I will here attempt to give a solution, based on my studies of the Admiralty chart of Bass Straits, and geological observations in all parts of Tasmania.

2. HISTORICAL SUMMARY.

If I am not mistaken Howitt (1) was the first who attempted to solve the problem of the origin of the Tasmanian race and the time of their migration to the present island. Of course, I mean that the problem was treated in a scientific way, because the number of idle speculations is legion. Howitt's paper begins with a valuable review of all older views regarding the origin of the Australians, of which the Tasmanians were to be considered a branch only, and he arrives at a very important conclusion with regard to the Tasmanian race. He says, l.c. pag. 730:—"But there is not a tittle of evidence in support of the belief that the Tasmanians ever were acquainted with the art of constructing a canoe able to cross such a sea-strait as that between Tasmania and Australia." And further on:—"I have long since come to the conclusion that one of the fundamental principles to be adopted in discussing the origin of these savages

(1) On the origin of the Aborigines of Tasmania and Australia. Report on the seventh meeting of the Australasian Association for the Advancement of Science, Sydney, 1898, Sect. F., Ethnology and Anthropology, pag. 723-758.

must be that they reached Tasmania at a time when there was a land communication between it and Australia." And further:—" From the conclusions to which I have now been led, it follows that the Tasmanians were the autochthonous inhabitants of Australia, and that their preservation in Tasmania was due to isolation by the formation of Bass Strait (l.c. pag. 741).

Howitt is therefore of the opinion, and this is perhaps one of the most interesting conclusions, that the Tasmanian Aborigines inhabited the Australian continent before the immigration of those races that now dwell there. If this be so, and I for one fully support this theory, we must assume that there existed in Australia at least two, if not three, stone ages. The first and oldest represents the archaeolithic stage of the Tasmanians, which was superseded by the palaeolithic-neolithic (1) stage of the Australians. It follows that when stone implements are collected in Australia the greatest care must be taken, in order to ascertain to which stage they belong. Howitt's theory assumes that the Tasmanians inhabited the Australian continent, and if that be so they must have left the same remains behind as they did in Tasmania. Shell heaps in which only archaeolithic implements occur, camping grounds on sandy soil where the same implements are found, should always be suspected to represent relics of the autochthonous and not of the younger race (2). Howitt's geological conclusions are,

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(1) I cannot enter here in the discussion of the question whether there is a true palaeolithic stage in Australia, such as we know to exist in Europe, or whether the Australian civilisation has to be considered as a neolithic stage, with a strong admixture of palaeozoic types.

(2) It is difficult to understand how, in direct contradiction to this well-supported theory, Herr Klaatsch could arrive at the conclusion that it was impossible to distinguish in Australia the different stages recognised in Europe, and that types of implements which in Europe occur in different chronological stages occur in Australia simultaneously. Nobody doubts that implements of the archaeolithic type were still used in neolithic or even later periods, but it is quite certain that there exist in Australia in at least two periods which represent chronological stages, and which are characterised by implements of a different type. Herr Klaatsch's view is one of those numerous superficial and hasty judgments by which this author has obtained an unenviable notoriety. Perhaps Howitt's paper was unknown to him.

however, of the greatest importance. He assumes that:—

(a) The isthmus between Tasmania and Australia existed during the younger volcanic period.

(b) The dingo did not exist during this time in Victoria, otherwise it would have migrated with the Tasmanians into the island.

(c) The land-connection between Australia and Tasmania was interrupted when Diprotodon and the other gigantic marsupials existed on the Australian continent. (See pag. 24.)

A few years later C. Hedley (1) carefully discusses the question, and what effect the so-called Bassian Isthmus would have on the marine fauna. Though Hedley's paper does not bear on the question of the immigration of the Aborigines, it is of the greatest importance with regard to this problem, because it presumes the existence of a land connection between Tasmania and Australia in recent times. Hedley points out the difference in the marine fauna east and west of Wilson's Promontory, and his lists of the Adelaidian (west) and the Peronian (east) fauna prove conclusively that there exists a vast difference. Such a faunistic difference in an open sea can only be accounted for by the existence of a former barrier of land which prevented the interchange of the faunas. I think there can be no difference of opinion on this point. The sketch map accompanying Mr. Hedley's paper is, however, erroneously constructed, because he assumes that the isthmus connected only the eastern part of Tasmania with Australia. This is certainly wrong, as a consultation of the Admiralty chart would have shown him. The southern continuation of Tasmania as constructed by Mr. Hedley is more than problematical; it is certainly not borne out by the soundings marked on the chart. However, this does not detract from the great importance of Hedley's conclusion that a land connection must have existed between Tasmania and Australia within such a recent period, that there was not time enough for a mixture of the two

(1) The effect of the Bassian Isthmus upon the existing marine fauna: a study in ancient geography. Proceed. Lin. Soc. of New South Wales, 1903, Pl. iv., pag. 876-883.

faunas east and west of that bridge, but that the two are as separate as if the isthmus still existed.

3. THE SUBMARINE TOPOGRAPHY OF BASS STRAIT.

Independently of Howitt, my own studies into the civilisation of the Aborigines have led me to assume that their immigration must have taken place at a time when Tasmania and Australia were connected by a land bridge. I went, however, somewhat further than Howitt, who only constructed the 50 and 100 fathom line. I argued if such a bridge existed, the submarine topography of Bass Strait should reveal us its features provided we assume that the sea level rose and water covered previously existing land. I consulted the Admiralty chart, which contains a wonderful mass of information, and after a good number of failures I succeeded in drawing the isobathic lines from 5 to 5 fathoms.

In order to fully understand the changes, we will begin with the appearance of Bass Strait at the present day. We will then assume the sea level to subside to the 20-fathom line, because the changes in the contour between the 0 and 20 isobathe are very small. We will then follow up the changes that take place when the sea level gradually recedes to the 25, 30, 35, 40, 45, and 50 fathom line.

(a) BASS STRAIT AT THE PRESENT DAY. (PLATE I., FIG. 1.)

Bass Strait of the present day has a curious elliptical form; its longest axis runs almost due north-west to south-east, and its length between Cape Otway and Cape Portland is approximately 345 miles. The smaller axis from Hunter's Island to Wilson's Promontory measures

about 184 miles. The total area of Bass Strait within the boundaries presently described can be estimated at 60,994, say 61,000 square miles.

The southern boundary is formed by the north coast of Tasmania, beginning at 144deg. 50min. long., and extending for about 200 miles towards east, where Cape Portland, about 148deg. long., marks its eastern end. The most conspicuous feature of Tasmania's north coast is the very regular concave line it forms; its lowest point is about between the rivers Leven and Forth, while the eastern and western ends extend 40 and 30 miles respectively above this point in northern direction.

The opposite (northern boundary) is formed by the south coast of Victoria from Cape Otway (143deg. 35min. long.) to Wilson's Promontory (146deg. 25min. long.). This boundary is almost the exact counterpart of the southern one; its total length is the same, about 200 miles, and, like the former, it is concave, with that difference, however, that the eastern end (Wilson's Promontory), instead of the western, reaches further towards south (about 50 miles) above the lowest point.

The eastern and western boundaries are much less continuous, only a few remnants being still in existence.

In the west we have Robins', Hunter's, and Three Hummock Islands; a little further towards north-west are the rocks Black Pyramid, Albatross Island, and the Reid Rocks. The latter are on the south-east corner of King Island, which marks the last piece of the western boundary.

In the east the number of remnants is much larger; close to Tasmania we have the Furneaux Islands, followed by numerous islands and rocks, of which we only need to mention the Curtis, Kent, and Hogan groups.

(b) THE 20-FATHOM LINE.
(PL. I., FIG. 2.)

If the sea level were to subside to the 20-fathom line we would find that the north-east corner of Tasmania

forms a broad peninsula, whose point is slightly curved towards west. Flinders Island, the Sisters, Badger, Barren, and Clark islands are connected with Tasmania. A fjord cuts deeply into the southern part of this peninsula. The north coast has only slightly increased.

In the north-west corner, Hunter's, Three Hummock, and Robins' Islands are connected with the mainland, but we observe that this peninsula reaches much less towards north than the eastern one.

The east coast of King Island sends out a curious two-pronged peninsula, while the west coast shows hardly any changes.

The Australian coast is not much altered in the south, but in the east it has considerably grown.

(c) THE 25-FATHOM LINE.
(PL. I., FIG. 2.)

A further receding of 5 fathoms produces the following changes:—The eastern peninsula has become much broader, and has particularly grown on its western shore. The deep channel in the south has disappeared, and all rocks and islands between Tasmania and Australia have considerably grown in size, in particular the Kent Group.

The north-west corner of Tasmania sends out a long, narrow peninsula running straight towards north, and a somewhat shorter one in north-western direction, by which the Black Pyramid and the Reid rocks are joined to Tasmania.

King Island continues to increase in size in eastern direction, and in a similar way as Tasmania it sends a long, rather broad peninsula towards north. King Island and Tasmania are now separated by a very narrow strait of not more than 30 feet in depth.

The changes of the Australian coast and the north coast of Tasmania are insignificant.

(d) THE 30-FATHOM LINE.
(PL. I., FIG. 4.)

A further subsidence of the sea level of 5 fathoms produces great changes. The Kent group and the Wright rocks have joined the eastern peninsula, and a narrow isthmus, which is not raised more than 30 feet above sea level, joins Tasmania with Australia. This eastern isthmus is still very broad and compact in the south, but very narrow in the north, where it is deeply cut into by gulfs and bays.

The north coast of Tasmania shows no great changes. On the other hand, the north-western peninsula has considerably grown, and King Island has joined Tasmania. A large peninsula extends therefore from the north-west corner of Tasmania in northern direction close to the mainland of Australia. A rather winding channel, which in the whole takes a south-westerly direction, cuts deeply into this peninsula, dividing it into two parts. The south coast of Australia has not grown very much, but the land has greatly increased in eastern direction.

We have therefore a large inland lake or basin between Tasmania and Australia, which is connected with the open ocean near the Australian coast by a narrow strait of about 30 feet in depth. We already perceive that this basin is unquestionably divided into two parts.

(e) THE 35-FATHOM LINE.
(PL. I., FIG. 5.)

The eastern isthmus continues to grow in breadth, but in the north there is still a deep bay, which reaches nearly up to the Kent Group.

The western peninsula has greatly increased in size; though still existing, the south-western channel is considerably reduced in breadth. The inland sea is still connected with the ocean, but the depth of the strait is considerably reduced; the division into two parts is now plainly marked.

(f) THE 40-FATHOM LINE.
(PL. I., FIG. 6.)

When the sea level has reached the 40-fathom line the western peninsula joins the mainland of Australia, and within the broad isthmus now connecting Tasmania and the mainland there appears a true inland lake, having an area of 9,944, say 10,000 square miles; that is to say, about the size of Lake Erie. This lake has no outlet into the open ocean, and it is distinctly divided into two portions—a southern and a northern one. The southern portion is the larger, and its greater axis runs almost due north-south. The eastern and north-eastern shore show numerous bays and fjords. The northern portion is much smaller, and its larger axis runs north-west to south-east.

(g) THE 45-FATHOM LINE.
(PL. I., FIG. 7.)

We will now assume that if the sea level on both sides of the isthmus recedes another 5 fathoms, the level of the inland lake will do the same. Of course, this need not be so; it is quite possible that though the level of the open ocean still receded that of the inland lake remained stationary; but for the sake of argument we will assume that the level of the inland lake followed that of the open ocean.

The inland lake, as it would be shown by the 45-fathom line, represents a basin whose main axis bears north-west to south-east. A line from the mouth of the Tamar to Port Phillip almost coincides with the direction of this line. A large, narrow stretch of land which extends from the western shore, and which is nearly met by another one from the eastern shore, subdivides the basin into two parts, which communicate only by means of a narrow and shallow strait. In fact, it is quite probable that the two basins are separated. In this part of Bass Strait the soundings are not very numerous, and the course of the 45-fathom line is therefore somewhat hypothetical. However that may be, whether connected or separate, the southern basin is the larger, and it is almost of circular shape, its main axis bearing almost due north-south. The main axis of the smaller northern

basin is turned in westerly direction, and bears north-north-west-south-south-east. The area of the basin is 4,508, say 4,500 square miles.

A further receding of the water level of 5 fathoms would even lay this lake dry, provided that the level of the inland lake follows that of the open ocean.

If the level of the inland lake would not follow that of the open ocean we would have the features shown in Fig. 8, Pl. I., supposing the outer ocean had receded to the 40-fathom level.

A broad isthmus would connect Tasmania and Australia. The largest width of this isthmus would be under 40deg. lat., and it would extend from 144deg. long. to about 148deg. 55min. long.; that is to say, for about 345 miles. The east coast of this isthmus would be monotonous without deeper bays. The west coast shows, however, a large bay cutting into the land up to 145deg. long., being separated from the inland lake by a narrow and low ridge. South of King Island there are three broad bays. In the centre of the isthmus is a large inland lake, which in the south reaches almost to the present coast of Tasmania, while in the north it is close to the Australian coast. From the eastern ocean this lake is separated by a broad land bridge, whose highest point in Flinders Island is at least 1,400 feet above sea level, while the lowest elevation is not less than 300 feet above sea level. The bridge which separates the lake from the western ocean is, on the whole, somewhat broader than the eastern one, but it is joined to the mainland of Australia only by a very narrow strip of land hardly raised above sea level. A winding but narrow channel reaches from the west shore close to the Black Pyramid, where again only a narrow strip of land separates it from the open ocean. All the rivers of the north coast, from Montagu River in the west to the Ringarooma in the east, which now discharge their water into Bass Strait, would run into this lake. From Victoria we would have the Snowy and Mitchell Rivers, as well as a number of smaller ones, but Port Phillip would discharge into the open ocean. In all probability this lake would be saline, being without an outlet, a fact which is of some importance, as we shall see later on.

4. THE AREA OF THE DIFFERENT STAGES DESCRIBED IN PARAGRAPH 3.

We can express the increase of land if the sea level were to recede from 0 to 50 fathoms in absolute figures, as shown in the following table:—

THE AREA OF THE LAND APPEARING ON THE SURFACE, WERE THE SEA LEVEL IN BASS STRAIT TO RECEDE TO THE 20 FATHOM LINE AND THEN FOR EVERY 5 FATHOMS UP TO THE 45 FATHOM LINE, IN SQUARE MILES.

	Present Level.	20 Fathom Line.	25 Fathom Line.	30 Fathom Line.	35 Fathom Line.	40 Fathom Line.	45 Fathom Line
Total Area of Land (1)	10,855	17,771	23,735	29,752	37,392	47,999	57,200
(*a*) Australia	5,038	7,027	7,690	10,177	10,677		
(*b*) King Island	425	1,462	2,519	6,493	9,993		
(*c*) Western Islands	102	1,194	2,519			47,999	57,200
(*d*) Eastern Islands	1,047	3,182	5,701	7,676	10,676		
(*e*) North Coast of Tasmania	0	663	1,063	1,163	1,803		
(*f*) Tasmania	4,243	4,243	4,243	4,243	4,243		
Total Area of Water	61,196	54,280	48,316	42,298	34,659	24,057	14,851
(*a*) Ocean	61,196	24,314	23,653	18,961	15,746	14,108	10,343
(*b*) Bass Straits (Lake)		29,966	24,663	23,337	19,013	9,949	4,580
Area of Isthmus	—	—	—	—	—	47,093	50,853
(*a*) Land	—	—	—	—	—	37,144	46,345
(*b*) Water (Lake)	—	—	—	—	—	9,949	4,580

(1) As shown in the map.

Before going into details I wish to say a few words with regard to my calculations. I have no such instru-

ments which are generally used in the calculation of the area of surfaces; I constructed therefore a network of squares, each having an area of 100 nautical square miles, and by means of these I could estimate the area of each stage. The values so obtained I converted into ordinary square miles, and this being done by logarithms, the figures appear to be painfully correct, though in fact they represent estimates only. Nobody will dispute that, considering the crude method, I might, for instance, just as well have written 10,000 instead of 9,993 square miles. It would perhaps have been much better had I given round figures, but this would have again required all sorts of corrections in order to make the aggregate of water and land agree with the area of the map. I therefore preferred to give the figures as I obtained them, leaving it to somebody better equipped than I am to obtain more accurate ones. I may, however, say that a check of the area of the islands which is known and the area obtained by my method give a difference of only 20 square miles, a result which is very satisfactory considering the crude method used.

We find that the actual increase of land for every 5 fathoms changes considerably, and in the following table I give it in absolute figures and in per cents.:—

Fathoms.	Total area of land in sqr. miles.	Actual increase sqr Miles.	Per cent. of the preceding area.
0 to 5 5 to 10 10 to 15 15 to 20	17,771	6,916	—
20 to 25	23,735	5,964	—
25 to 30	29,751	6,017	25.351 per cent.
30 to 35	37,392	7,640	25.679 per cent.
35 to 40	47,969	10,607	28.367 per cent.
40 to 45	59,200	9,207	19 169 per cent.
45 to 50	63,780	6,580	11.503 per cent.

This table wants also a few words of explanation. I mentioned above that the changes which take place if the sea level were to recede from 0 to 5, from 5 to 10, from 10 to 15, and from 15 to 20, are comparatively small, though on the whole the receding from 0 to 20 fathoms produces an increase of the land of 6,916 square miles. The average increase per 5 fathoms would therefore be 1,729 square miles. It is, however, very probable that the actual increase from 0 to 5 fathoms is

less, and that from 15 to 20 fathoms considerably higher, than the average. It is, however, impossible to give even fairly accurate estimates, because the rate of increase apparently does not follow a regular law. We see that between 25 and 40 fathoms it increases, and from 40 to 50 fathoms it decreases again.

For the same reason it is impossible to give the correct ratio in per cents. We may say 6,916 square miles, representing in the aggregate 63.172 per cent. of the land shown in the map, have been added to it; but if I were to add only a short strip of land both to Australia and Tasmania, this would in no way alter the addition to the coast line, but it would at once alter the percentage.

The same argument applies to the increase between the 20 and 25 fathom line. We know the absolute increase in square miles, but nothing of the area of the 20-fathom line is known, except that it must be larger than 10,855, but smaller than 17,771 square miles; a percental figure cannot be calculated.

The average increase of land between 0 and 50 fathoms is 5,293 square miles for every 5 fathoms of depth, but it is clearly shown during the different stages that the ratio of increase varies considerably. The greatest increase takes place between the 35 and 40 fathom line, and thence it decreases in both directions. This plainly indicates one fact: the agencies responsible for the change of land into water have been increasing in force, first slowly, then quicker, till the maximum was reached between the 35 and 40 fathom line, and then their energy commences to decrease again. We will see later on that this fact deduced from the increase or decrease of area as the case may be is fully corroborated by certain geological changes known to us.

5. THE CAUSES THAT PRODUCED THE FORMATION OF BASS STRAIT.

The successive pictures as revealed to us of the submarine physiography of Bass Strait, should the sea level gradually recede from 0 to 45 or 50 fathoms, point conclusively to the agencies to which these features are due. The submarine features of Bass Strait are unquestionably not of primary origin, that is to say, they did not exist before the submergence of the isthmus. The features of present-day Bass Strait already indicate clearly enough that its origin must be due to dynamic agencies. In fact, Bass Strait can be considered almost as a model of a basin of subsidence. Segments of the earth's crust commenced to subside, slowly at first, more rapidly afterwards, the force rapidly gaining in energy till the maximum was reached, and then slowly decreasing again.

All geological observations tend to prove that an area of subsidence is accompanied by volcanic outbursts either within the area or along its edges. Evidence of an intensive volcanic action is common enough along the coasts of Bass Strait. It would go too far to enumerate all the occurrences, but the submarine features, together with its present outline, and the geological evidence of the coast, prove conclusively that Bass Strait was formed by the subsidence of portions of the earth's crust, accompanied by volcanic outbursts.

If this be so, the inland lake as depicted, Pl. I., Fig. 8, probably never existed; that is to say, when the first subsidences commenced, ashes were thrown up, craters were formed emitting lava streams, but as the subsidence continued a large bay was formed, even before any inland lake could be established.

If we admit that the present submarine features of Bass Strait are not primary—that is to say that they were formed only towards the end of the period when Tasmania still formed part of the mainland, we must presume a period when they did not exist. As working backwards has not helped us very much, it will be better to start from a certain datum level, so to speak, and to

work forwards. We will take the glacial period (1) in Tasmania as this datum level, irrespective for the moment of its correlation with European and American glacial stages.

6. THE PLEISTOCENE ICE AGE IN TASMANIA.

It would be out of place to go here into a detailed description of the features of the last glacial period in Tasmania. These have been sufficiently set forth by Montgomery, R. M. Johnston, and others. My investigations have shown that we can distinguish at least three centres of glaciation. It has not been quite proved whether these three centres existed all the time separately or whether they once merged into one sheet of ice. Further information is badly needed on this point. However, it does not matter much as far as the problem we are interested in, is concerned.

In the sketch map (Pl. II., Fig. 1) these three centres are named—

(1) The Cradle Mountain Centre.
(2) The Ben Lomond Centre.
(3) The Mount Wellington Centre.

(a) THE CRADLE MOUNTAIN CENTRE OF GLACIATION.

This area of glaciation includes all the highlands in the middle and north-west of the island, from the Great Lake on to Mount Lyell. The average present height of the plateau is about 2,000 feet. Though most, if not all, observations concerning the glacial period in

(1) It must be kept in mind that in Tasmania there is evidence of at least two, if not three, glacial periods, separated by enormous intervals of time. The Permian and the Pleistocene period are undisputed, but since Howchin's epoch making discovery of a cambrian glacial period in South Australia, it has to be investigated whether certain conglomerates in Tasmania may not probably be due to the same cause.

Tasmania refer to this area, very little is still known about it; we even do not know its exact limits. It appears that in the west and north the terminal moraines reached down to a much lower level than in the west. Montgomery stated that on the Upper Pieman they descended to a level of 500 to 600 feet. On the Upper Forth I nowhere observed them to descend lower than 1,500 feet.

(b) THE BEN LOMOND CENTRE OF GLACIATION.

The extended plateau of Ben Lomond towers in the north-east corner of Tasmania up to a height of 5,000 feet. So far I have not visited it, but photographs exhibited by Colonel Legge show plainly moraines, roches, moutonnèes—in fact all the characteristic features of a surface formerly covered by ice. Mount Cameron, which I visited, shows the dome-like, roundish features which have been recognised as signs of a former glaciation.

(c) THE MOUNT WELLINGTON CENTRE OF GLACIATION.

Though almost at the gates of Hobart very little is known about this area. It extended probably towards west as far as Port Davey, where the dome-like figure of Mount Misery indicates glaciation.

Now, whichever view we take, it seems pretty certain that all that portion which is at present 2,000 feet and more above sea level was once glaciated, forming a nevèe. This probably sent out large glaciers, which descended if not into the sea probably close to the sea level. I estimate the area under glaciation at roughly 6,000 square miles—that is to say, one-quarter of the present Tasmania. This proves that the climatic conditions of Tasmania during the glacial period must have been considerably different from those of Tasmania of the present day. It is pretty certain to assume that the same conditions that produced the glaciation of the highlands of Tasmania prevailed also on the Antarctic continent; in other words, that the ice reached much further

north than nowadays. The northern limit of the icebergs reaches in the meridian of Tasmania up to 50deg. lat.; that is to say, it is only 483 miles from the southern point of Tasmania (1). It is not too rash a conclusion to assume that during the glacial period the icebergs drifted some 7deg. further north, and probably stranded on the south coast of Tasmania. Considering all this, we can assume that Tasmania had during that time perhaps the climate of the Kerguelen islands; that is to say, a bleak, cold, and moist atmosphere, for the greater part of the year enveloped in a dense fog. There was no vegetation so to speak but moss and low shrubs. The button grass plains, as seen on the West Coast, and on the plateau near Barn Bluff, are perhaps the representatives of the flora that covered the lower elevations during the glacial period.

It is impossible to assume that human beings, even if equipped with all modern requirements, could exist under such climatic conditions, and we must therefore assume that the advent of man in Tasmania must have taken place after more congenial conditions had been established; that is to say, after the glacial period.

If we could correlate the last Tasmanian glacial period with any one of those recognised in Europe, we would have gained an important step. Unfortunately we have no certain data to go upon. All observers, in particular Montgomery, agree that the glaciation cannot be but of very recent date (2). It is probably not wrong to assume that the maximum of glaciation of the northern hemisphere coincided with that of the southern one, though one might perhaps argue that because the conditions of the southern hemisphere are the reverse of those of the northern, the glaciation of Tasmania coincided with an interglacial period of the northern hemisphere. I do not feel inclined to support such a view because it is more probable that those factors which produced the ice age acted simultaneously all over the earth and not alternately.

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(1) An 18-knot steamer sailing from Hobart would reach this line in about 24 hours.

(2) I can fully confirm this view. Near Barn Bluff the country looks as if the ice had melted away only yesterday.

I therefore assume that the last glacial period in Tasmania coincided with one of the stages of the last glacial period in Europe and America, and I presume that it corresponds to the Wurmian, if we presume that when the ice reached its last extension in Europe the causes were such that they also affected other countries producing glaciation. When there was one of the smaller stages in Europe, the causes producing glaciation were not strong enough to produce it somewhere else. I admit this is a theory pure and simple, but it is a workable theory. According to my view the charges resulting eventually in the formation of Bass Strait cannot have commenced earlier than after the Wurmian stage (1).

7. THE POST-GLACIAL RISE OF TASMANIA.

As far back as 1888 Johnston, and later on in 1893 Montgomery, were of the opinion that the present level of Tasmania is higher than it was during the glacial period. The logical sequence of this view is that during that time portions of Tasmania that are now dry were under water; in other words, the area of Tasmania during the glacial period must have been smaller than it is now. (See Pl. II., Fig. 1.)

Subsequently Gregory emphatically shares this view. A visit to Mount Lyell convinced him that during the glacial period Tasmania must have been several hundred feet lower than it is at present.

Independently of these authors, I arrived at the same conclusion when I ascended from the deep canon of the Forth to the plateau of Barn Bluff. The difference in height between the River Forth and the end of the glacial valley on the plateau is 1,500 feet. The Forth is one of the rivers that discharge into Bass Strait, and it is obvious that its deeply cut canon can only have been formed during a time of rise aggregating to 1,500 feet at least.

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(1) The maximum glaciation in Europe took place during the Riss stage. If the glacial period in Tasmania corresponded to this stage, the subsequent elevation and the volcanic outbursts would correspond to the Wurm stage. This is a probability which has to be considered, particularly in face of the recent discovery of gigantic marsupials in Tasmania.

There is further evidence for a rise of the island all along its coast. These terraces can be seen near Strahan, the lower being about 50 to 60 feet, the higher about 1,300 feet above sea level. All along the north coast, in the neighbourhood of Hobart, in fact everywhere, terraces occur, indicating a rise. These terraces may have partly been formed during the melting of the ice; they may also have subsequently been deposited. They are therefore not pre-glacial, but either glacial or post-glacial. My observations in the valley of the Forth prove that during the glacial age Tasmania must have been about 1,500 feet lower than it is now (1).

This proves that Tasmania must have been much smaller than it is now, and I estimate that part which would be covered under water if the sea were to rise 1,200 feet above its present level to be about one-quarter of the total area. Tasmania would have therefore had an area of 18,000 square miles, one-third of which was under ice and snow. At the outside 12,000 square miles were free of ice, but it is probable that this land did not form a compact area, but rather narrow strips between ice and water, on which numerous icebergs floated. During the glacial period Tasmania must have therefore formed an island of about three-quarters of the present area, and there existed no land connection with Australia.

8. THE DURATION OF THE POST-GLACIAL RISE.

(PL. II., FIG. 1.)

I stated above that we are led to assume that the total rise can be estimated at 1,500 feet. Assuming the average height of the high terrace to be 1,200 feet—Gregory estimates it at 1,300 feet—we have to suppose that 300 feet more were laid dry. In other words, if we take present Tasmania and assume that the sea level

(1) If I understand Gregory correctly he estimates the rise to be 1,300 feet.

were to recede 300 feet, we would have about the land as it appeared in post-glacial times.

A receding of the sea level for 300 feet corresponds with the 50-fathom line. On the eastern coast of the isthmus the 50-fathom line is monotonous and not interrupted by any bays, but on the western coast we perceive a number of deep bays. The largest bay is found between 39deg. and 40deg. lat., and 143deg. to 144deg. long. A little further south there are three more bays, and further south still the 50-fathom line comes close on to the present coast line.

The whole appearance of the bays above-mentioned is such that they probably represent the mouth of old rivers coming from the north-east.

Now, let us assume that the sea level having receded to the 50-fathom line, and the basin of subsidence between Tasmania was not in existence. The south-east corner of Australia would then represent a large pointed peninsula, reaching almost to 44deg. lat. (1). It is obvious that under these circumstances the course of rivers from the north of Tasmania and from the southern coast of Victoria, in particular those east of Wilson's Promontory, must have been different from what it is to-day.

The rivers from Tasmania will have continued to run towards north, and those from Victoria towards south, till the two systems met, probably forming one large stream running in south-western direction across the peninsula. Traces of these old river courses are still preserved in the submarine contours of Bass Strait, the 40-fathom line showing them particularly well. The indented course in its eastern portion indicates the course of the old rivers, and the deep channel which runs in south-western direction represents most probably the course of this ancient river.

This hypothesis is strongly supported by another fact. Hitherto it has been rather a mystery to account for the strange similarity that exists between the fauna of the rivers in southern Victoria and northern Tasmania. Mr.

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(1) Australia would have a strange likeness to present Africa, during that time.

R. M. Johnston has kindly supplied the following information on this point:—

Four species of fish are identical, viz.:—

1. Gadopsis marmoratus (the well-known black-fish).
2. Galaxeus attenuatus (the jollytail).
3. Prototroches marena (the fresh water herring).
4. Retropora richardsoni (the fresh water whitebait).

Of molluscs there is

Unio mortonicus.

All these species originally occur only in the northern, but not in the southern rivers of Tasmania (1). The faunistic difference between the northern and southern rivers could not be sharper marked than by the distribution of the genus Unio.

The hypothesis here promulgated affords the easiest solution of the problem. If we assume that a large stream—the combined Mitchell and Snowy rivers—was running across the peninsula, successively taking up in its course the northern rivers of Tasmania, the road for a migration of the Victorian fauna into the northern rivers is open. Naturally the more mobile fishes found their way in larger numbers to Tasmania than the more slowly moving mollusca.

It will further be seen that on account of this fresh water fauna no saline lake, such as would result to-day if the sea level were to recede to the 45-fathom level, would have formerly existed. All lakes without discharge are saline, and the Bassian Lake would make no exception to this rule if it came into existence. Though therefore the Victorian rivers would discharge their water into this lake, its saline nature would certainly prevent the migration of the fresh water fauna from Victoria to Tasmania. It is, therefore, pretty certain that the depression in the centre of Bass Strait which would appear as a lake, if the sea receded to the 45-fathom level, was formed after the migration of the Victorian fauna into

(1) Gadopsis marmoratus has now been imported into several southern rivers.

Tasmania. If we attempt to estimate the duration of the rise we may assume that the land rose say 3 feet for every 100 years, and the time required for a rise of 1,500 feet would be 50,000 years. We may therefore say that not less than 50,000 years ago a broad isthmus connected present Tasmania with Australia. This isthmus was traversed by a great stream coming from Victoria and discharging its water in south-westerly direction.

For the present it is impossible to say for how long this condition of things existed—in particular, how long the river system lasted. The gigantic marsupials which were believed to be restricted to the Australian continent have now—August, 1910—also been discovered in Tasmania. While cutting a trench in a marsh near Smithton, in north-west Tasmania, the remains of a large marsupial, probably Diprotodon, were unearthed. These giants had therefore already found their way to what is now the northern coast of Tasmania, but it seems pretty certain that they became extinct before they migrated further south. The problem is a very interesting one; so far none of their remains have been found in cave deposits or in the southern part of Tasmania. Is it probable that these gigantic marsupials represented animals that thrived only in a cold climate, and with the final disappearance of the glaciers they became extinct. Is it possible that the gigantic Diprotodon replaced in Australia the gigantic Elephas primigenius of Europe during the glacial period? This problem is of immense interest; but still much work has to be done before we can say anything definite. So far it is pretty certain that the gigantic marsupials can only have migrated to Tasmania when this country was connected with the mainland. This migration must have taken place either towards the end of the glacial period or immediately afterwards, but the animals died out before they had time to spread to the southern portion of Tasmania, and also that they had become extinct before the separation of Tasmania and Australia, viz., before the arrival of man in this island. We have no records that the Tasmanian Aborigines ever came in contact with these gigantic animals, and so far none of their bones have been discovered in the cave deposits near Rocky Cape.

The time when Tasmania was connected with the mainland by a broad isthmus, across which the Snowy-

Mitchell river flowed in western direction, was also the period of the gigantic marsupials. These became extinct before the arrival of man and the total separation of Tasmania, most probably either before or during the great volcanic eruptions that eventually led to the formation of Bass Strait. It is very probable that these giants were indicative of a cooler climate, but some further evidence is required before this question can be finally answered.

9. THE FORMATION OF BASS STRAIT. (PL. II., FIG. 3.)

At the time when those tremendous disturbances set in that eventually resulted in the formation of Bass Strait, the following conditions must have prevailed.

The ice floes that covered a large part of Tasmania had disappeared, the land had risen—slowly perhaps, but probably rather rapidly—to such an extent that not only the present level had been reached, but that the sea level was 300 feet lower than it is at present. The energy of the erosion during this period of rise must have been very strong; the rivers had cut deep gorges into the country, and large quantities of debris were washed away by them, to be redeposited again in the shape of terraces along the rising coast. The present island of Tasmania formed the south-eastern corner of Australia, and the land that existed between it and present Victoria was traversed by a large river whose sources were in Victoria. The rivers coming from Northern Tasmania discharged their waters into this river, thus establishing a faunistic communication between Victoria and Northern Tasmania.

The climate may have been similar to the present one. It is more than probable that during this time the first animals migrated into Tasmania—a mixture of the present fauna and the gigantic marsupials of Australia. It is certain, as I will prove later on, that no human beings existed in this south-eastern corner of Australia during this period, which we must correlate to the post-Wurmian stage of Europe.

Before we follow up the different stages of the changes that now set in, we will endeavour to calculate the time that would be required to change the above

features into those of the present day. A rise of the sea level of 300 feet would be sufficient, and assuming the rate to be 3 feet per century, altogether 10,000 years would be required. According to my estimate 60,000 years would have lapsed since the end of the glacial (Wurmian) period. This figure agrees remarkably well with those obtained elsewhere. It is estimated that 56,000 years lapsed since the end of the glacial period in America. The German geologist Penk estimates that 50,000 years rather than less have lapsed in Europe; others, like Hildebrand, estimate the time to be 30,000 years. However, it seems to be pretty certain that not less than 24,000 years, but probably not more than 60,000 years, have lapsed since the end of the last glacial period.

The last 10,000 years of this period witnessed tremendous changes in Tasmania—those changes which are responsible for our present-day features. They must have commenced with a subsidence of the surface between 39deg. and 41deg. southern lat. and 145deg. and 146deg. long. It is not only probable, but pretty certain that this catastrophe was accompanied by earthquakes and volcanic eruptions. All along the northern coast of Tasmania we find the remains of lava streams. Though some of them seem due to local eruptions, others cannot have possibly come from the south—i.e., Tasmania; their origin must be in the north, where Bass Strait is now. For instance, the cap of basalt on Freestone Bluff, near Wynyard, must be considered as a rest of such a stream.

We have another remarkable proof that the first area of subsidence as represented by the 45-fathom line must be connected with volcanic eruptions. We see that all the younger volcanic rocks of the Midlands and Southern Tasmania are situated on a line which forms the southern continuation of the main axis of the trough formed by the 45-fathom line. (See Pl. II., Fig. 3.) It is perhaps probable that a fissure resulting from the squeezing up of Tasmania gave first rise to these volcanic outbursts.

The lava streams of the great volcano in Bass Strait which flowed towards south blocked the course of the rivers flowing north, the water was dammed up and be-

hind the walls of lava, those fresh water lakes were formed whose deposits we now find everywhere in Northern Tasmania.

It is difficult to say how long this period of volcanic activity has lasted. It is possible that everything was over with one great eruption; but it also seems as if there have been several successive eruptions. We have seen above that the greatest changes took place between the 35 and 45-fathom line. If we assume that the greatest volcanic activity was finished at the period represented by the 35-fathom line, the volcanic period would have lasted about 3,000 years.

It is pretty certain that during the volcanic period, and probably also for some time afterwards, the subsidence of the surface continued: it is, however, also certain that when the sea had reached the 35-fathom level the subsided area was filled with water. The craters (1), consisting mostly of ashes and loose material, were washed away, and a great bay or almost inland sea was formed, which communicated in the west by a narrow strait with the open ocean. The road for the migration of the Adelaidean fauna was open, but it could not move beyond 147deg. long., because an isthmus still intervened here.

A further rise of the sea level for 30 feet, corresponding to a period of 1,000 years, considerably reduced the width of the eastern land bridge, and we see that now only a very narrow isthmus connects Tasmania with Australia.

Another rise of 30 feet, corresponding to a period of 1,000 years, is sufficient to separate Tasmania permanently from the mainland.

The further changes do not interest us much, except that the last period, including the stages from the 25-fathom line to the present level must have lasted 5,000 years if the sea rose at the rate of 3 feet per 100 years.

The comparatively short period of 5,000 years fully explains why the Adelaidean and Peronian faunas are still so sharply divided. The time since the opening of

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(1) It is very probable that a considerable quantity of the material which formed the craters was redeposited by the water, thus levelling up again the depressions.

the eastern strait has been too short to allow for a mixing of these two faunas, even if we assume that the Adelaidean fauna migrated into the inland sea the moment communication with the western ocean was opened.

I need hardly to mention that the above figures are based on averages, and though the aggregate may be fairly correct the components may be quite erroneous. For instance, if we take the time since the commencement of the volcanic activity till the time when Tasmania became separated from the mainland to be 5,000 years, we may assume that the whole of the volcanic activity was over in, say, 1,000 years, while the balance of 4,000 years represented a period of quietness, or better, slow changes. It may also be that the second period of 5,000 years which have lapsed since the separation is in fact much shorter, owing to the sea rising quicker during this than during the earlier period. It is, of course, impossible to go into such questions, which are but vague speculations. We are bound to go by average figures, on which a working theory can be based, but we must not be led astray by factors which may be probable but which cannot be proved.

10. THE TIME OF THE IMMIGRATION OF THE ABORIGINES INTO TASMANIA.

The above arguments give us the key to the solution of the problem when the Tasmanian race first arrived on the island. Three facts are absolutely certain, viz.:—

(a) The immigration must have taken place while Tasmania was still connected with the mainland of Australia.

(b) The immigration must have taken place after the disappearance of the gigantic marsupials.

(c) The immigration must have taken place before the appearance of the dingo in Victoria.

The immigration must therefore have taken place in post-glacial time; the period that lapsed since the glacial time has been estimated at 60,000 years, which can be divided into two very unequal stages, the earlier lasting 50,000, the later 10,000 years. At the beginning of the later period great tectonic and volcanic changes took

place on that portion of the earth which is now occupied by Bass Strait. Had the immigration taken place previous to the volcanic period, we must expect to find remains of the race, such as their archaeolithic implements, in beds overlaid by the basalts and lava streams. No such traces have ever been found, though the tin-bearing drifts, which are overlaid by volcanic rocks, have been extensively worked. We must assume that the immigration took place after the young volcanic period. This view fully harmonises with that of Gregory, who conclusively proved that the immigration of the human race in Victoria must have taken place after the young volcanic period. Man, therefore, did not witness those enormous volcanic outbursts which are chiefly responsible for the production of the present outlines of Southern Victoria and Northern Tasmania; he arrived after everything had quieted down. I have above pointed out that the end of the volcanic period most probably coincided with the 30-fathom line. During this period Tasmania was still connected by a narrow isthmus with the mainland, but a rise of five more fathoms is sufficient to separate it permanently.

The immigration of the Aborigines must therefore have taken place after the young volcanic period, but before that period which is represented by the 25-fathom line. According to my calculations the immigration cannot have commenced earlier than 7,000 years ago, and it must have been finished 5,000 years ago. In other words, the Aborigines cannot have arrived in Tasmania earlier than 5,000 B.C., and not later than 3,000 B.C.

The total number of years the Tasmanian race inhabited this island can therefore be estimated at from 5,000 to 7,000 years.

This may perhaps be a somewhat startling view, contrary to time-honoured notions (1), but if we want proofs for a great antiquity not one is forthcoming. On the other hand, my view is fully borne out by the investigation of the camping grounds. I, as well as numerous

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(1) One of the most favourite arguments in favour of a great antiquity of the human race in Tasmania are the enormous shell heaps. According to the prevailing views these shell heaps can only have been formed in the course of a very long period. Nobody has, however, taken the trouble to ascertain whether

others, have noticed that the tronattas are restricted to the surface; none are in the subsoil, however much I searched for them. The number of specimens on the surface is never very large (2), and this proves that the camping-grounds could not have been used for any length of time. In fact, the whole appearance of the camping-grounds proves them to be of quite a modern date; not a single one has been found which could claim any antiquity.

Even if my figures are not accepted, there remains at least one unshakeable fact—the immigration of man into Tasmania must have taken place in a geologically very recent period, viz., after the young volcanic period, but it must have taken place before the appearance of

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this view is borne out by the facts. A short calculation will show us that enormous shell heaps must collect in comparatively short time.

According to the best authenticated figures the total population of Tasmania was 2,000 souls in 1803. Now, let us assume that each individual consumed 50 oysters, including mutton fish, mussels, etc., per day—surely not too great an allowance. Therefore, 100,000 shell fish of sorts were consumed per day, or three million per month, equal in round figures to 36 millions per year.

According to my estimate of time 180,000 million shell fish would have been consumed in 5,000 years, and 254,000 million in 7,000 years Assuming that the valves did not weigh more than two ounces, the weight of these shells would be 13.2 million tons and 18.8 million tons respectively.

Now, let us assume that in the average each oyster or haliotis shell measures 4 x 3 x 1 inch—a very moderate estimate of size; therefore 144, say 150 shells, would go to the cubic foot, and the above numbers would be equal to 1,200 million and 1,693 million cubic feet respectively, which would cover a tract of land measuring half-a-mile in width and 10 feet deep for 10 or 16 miles in length, according to the lower or higher figure.

These figures prove conclusively what enormous shell heaps gather in such a short time as 5,000 or 7,000 years. If Tasmania had been inhabited for any longer period, say 50,000 or 100,000 years, the shell heaps would be much more extensive than they actually are. According to the above calculations, 12,000 million cubic feet of shells, weighing 92.4 million tons, and covering a strip of land half-a-mile in width and 10 feet deep for 20 miles in length, would have been left behind, an area which would increase to 40 miles in length were the time to be 100,000 years.

From what I have seen of the shell heaps their total bulk would not come anywhere near 1,200 or 1,700 million cubic feet, much less to 12,000 or 24,000 million cubic feet. The shell heaps, large as they appear, are therefore rather a proof in favour of a small than of a great antiquity of man in Tasmania.

(2) Except, of course, in the quarries.

the dingo in Victoria. All those who have earnestly studied the subject, like Howitt, Gregory, Etheridge, and myself, come to the conclusion that the arrival of man in Australia must be of very recent age. We all agree that it must come, as far as Tasmania is concerned, between the above two limits, which in my opinion are represented in absolute time by 5,000 B.C. and 3,000 B.C., and that it was finished when the dingo appeared in Southern Victoria.

The foregoing features are summarised in the following table:—

Stages.	Geological Events.	Sediments and Rocks.	Fauna.
Present Times.	Complete separation of Tasmania and Australia		The European Race occupies Tasmania.
Pre-Historic Times.	Formation of Bass Strait finished (about 5000 years ago)	Modern Silts and Sands Formation of Shell Heaps.	Immigration of Canis Dingo in Australia.
	Submergence of Bassian Isthmus continues (about 7000 years ago)		Immigration of the Tasmanian Aborigines 5000–3000 B.C.
Post Glacial Stage. — Younger Volcanic Epoch	Gradual destruction of Bassian Isthmus. Submergence of Land (about 10 000 years ago)	Basalts of Table Cape. One Tree Point, Geilston, etc.	Fauna not known yet.
Post Glacial Stage. — Bassian Isthmus Epoch	Gradual rise of land a broad isthmus connects Tas. and Aust. The combined rivers of S. Vic and N. Tas. form large stream which flows in a western direction across the isthmus (about 50,000 years ago).	Formation of Gravel Terraces. Wynyard Beds (?).	Gigantic Marsupialia disappear. Diprotodon Fauna.
Last Glaciation Wuerm Stage.	Glaciation of Tasmania (about 60,000 years ago)	Moraines in different parts of Tasmania.	Fauna unknown, but most probably of Arctic character.