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PAPERS AND PROCEEDINGS

OF THE

ROYAL SOCIETY

OF

TASMANIA

FOR THE YEAR

1908.



Hobart.

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Royal Society of Tasmania.

1908.

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The responsibility of the statements and opinions given in the following Papers and Discussions rests with the individual authors or speakers: the Society merely places them on record.

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Royal Society of Tasmania.

ABSTRACT OF PROCEEDINGS.

APRIL 7, 1908.

A Meeting of the Society for the transaction of ordinary business, and the reconsideration of the Balance-sheet submitted with the Annual Report for 1907, was held at the Museum on Wednesday evening, April 7, 1908.

Mr. T. Stephens, M.A., F.G.S., in the chair.

Mrs. C. S. Agnew, Messrs. Hugh Armstrong, F.R.C.S., W. A. Harvey, M.B., Lyndhurst F. Giblyn, B.A., A. W. Courtney Pratt, W. Minchin Nicholls, and A. R. Reid were elected Fellows of the Society.

In reference to the question of the reconsideration of the Balance-sheet for 1907, the Chairman announced that Mr. Bernard Shaw, their recently-appointed Honorary Treasurer, had taken a great deal of trouble in going through the accounts of the Society for the last four years, and would now furnish any information that was required on the subject.

Mr. Shaw laid on the table printed accounts showing the receipts and expenditure for the years 1904 to 1907. The Balance-sheet for 1907 had been amended by the transposition of figures. The error in the accounts of the Morton Allport Memorial Fund was connected with the purchase of a valuable work for the Memorial Library when the funds in hand were insufficient for the purpose, and the deficiency was made good by a loan from the General Funds of the Society. There should have been some explanatory note to show that the amount of this loan was a debit balance against the Memorial Fund, which would be repaid to the Society as soon as the next instalment of interest was received. The Balance-sheets for 1904-5-6 had now been compiled, and, with the revised Balance-sheet for 1907, had been examined by the Auditor and certified as correct.

Mr. A. J. Taylor thought the Society might now congratulate itself on the fact that it had a business-like statement put forward, and he claimed that the course he took at the previous meeting, in moving that further consideration of the Balance-sheet be postponed, was fully justified by the clear statement of accounts which was now before them. Mr. Bernard Shaw had taken a vast amount of trouble in going through the accounts for the years which had been mentioned. He (Mr. Taylor) did not at the previous meeting for a moment dream of casting any reflection on the Council or the late Secretary.

Mr. Shaw, in reply to Dr. Crouch, said a grant to the medical section for 1905 did not appear in the accounts, as it was not paid.

Dr. Noething raised the question of insurance. He noticed there was an item in the 1904 accounts for insurance, but not subsequently. The valuable books in the library could not be replaced for £5,000.

Mr. Shaw said the books were now reinsured as the property of the Society for £1,000.

The motion for the adoption of the accounts was then put and carried.

Mr. J. W. Gould moved, Dr. Crouch seconding the motion, "That a hearty vote of thanks be given to Mr. Bernard Shaw for the large amount of trouble he had taken in examining the accounts of the Society for the past four years." The motion was put and carried with applause.

APRIL 13, 1908.

The Monthly General Meeting of the Society was held at the Museum on Monday evening, April 13, 1908.

Mr. Russell Young in the chair.

The Chairman referred in feeling terms to the cause of the absence of Sir John Dodds (Lieutenant-Governor and Acting-President of the Society), and felt sure that the meeting was in deep sympathy with him and his family.

The Secretary to the Council (Mr. Robert Hall) notified the receipt of valuable literature from kindred societies in all parts of the world, from Russia, Argentina, Canada, the Mediterranean countries, and Great Britain. The Smithsonian Institute, U.S.A., had sent books of very great value.

Mr. Hall then gave an account of the travels of himself and friend through Siberia to Moscow and St. Petersburg, and then on to London. He described the fauna and flora met with in a journey of 6,000 miles on the little-known Lena River, in Siberia. The people, their modes of living, etc., were well illustrated and described. He said we have on our beaches all round the coast millions of little wading birds, very little larger than sparrows, called sand-pipers, which stay with us over Christmas till about April, and then fly 8,000 miles northwards to Siberia, where they breed their young, arriving just after the ice melts on the largest swamp in the world, called the Tundra, extending over 2,000 miles east and west. In the following October they started again, with their young birds, back to Tasmania. Then there was a fish popularly known as the herring in Bass Strait, which migrated past the Philippines and Corea right up to Kamschatka, making a return trip the same year, and this went on year after year. Most of the

food fishes deposited their eggs out in the open ocean, but the herring was quite an exception. It was not known in which rivers this herring deposits its eggs; possibly in the southern streams. It was wonderful how those birds made such long flights annually, and especially how the young birds, which travelled for the first time, got back to the land of their birth. They seemed to have some special sense of direction. These birds had been migrating in this way, possibly, for millions of years, and from a time when Siberia had a very different climate from what it has to-day, as was evidenced by geological impressions of tropical plants that once grew there. Now it had a terribly severe winter, during which quicksilver remained frozen in barometers and such instruments for months. He presented views, and described Irkutsk, the capital of Eastern Siberia, Yakutsk, centre of the Siberian fur trade, and Verko-yansk, one of the coldest places in the northern hemisphere; yet, in the spring, birds migrating between Tasmania and Siberia nested there, finding an abundance of food in the shape of berries and grubs. Parts of Siberia, like Canada, had very genial spring and summer seasons, when everything grew quickly. He and his friend experienced weeks of perpetual light, and clouds of mosquitoes. Siberia, in addition to having the largest swamp in the world, had the largest plain and the largest pine forest, the latter extending for thousands of miles, and running through it were grand rivers teeming with salmon. The coasts and rivers were rich in fishing grounds. The country contained many plants and flowers never seen in the Southern Hemisphere, pictures of several of which were thrown on the screen. There was a good prospect for the country for settlement by political exiles from Russia; these were mostly superior people. Siberia teemed with birds, flowers, and mosquitoes.

MAY 11, 1908.

The monthly General Meeting of the Society was held at the Museum on Monday evening, May 11, 1908.

Mr. T. Stephens, M.A., F.G.S., in the chair.

Messrs. W. N. Atkins, L. A. Evans, O. P. Law, and L. Rodway were elected Fellows, and Mr. A. Conlon Associate of the Society.

THE FOLLOWING PAPER WAS READ:—

Notes on a Chipped Boulder from near Kempton. By Fritz Noetling, M.A., Ph.D.

The author described the boulder as one that had been chipped by the aborigines in getting their cutting implements from it. He found around it the principal flakes belonging to the stone. The place where the stone was found was the site of an old aboriginal camping ground on the slope of a hill on the northern side of Kempton. He described how the flakes were used as implements, and how they were struck off the core. The specimen was unique for Tasmania. It was a piece

of water-worn pebble stone, and must have been carried for a considerable distance to the camping ground for the manufacture of the cutting instruments of stone.

Mr. R. M. Johnston said the specimen Dr. Noetling had exhibited to them that evening was one of the most interesting that had been found in Tasmania. Eleven of the chips fitted beautifully on the core. Often pieces of rock chipped off from great changes of temperature, such as during bush fires, but he believed that these pieces were chipped off the core before them by aboriginals.

Mr. A. J. Taylor said he did not think the fragments were flaked off by fire, for fire would only cause fractures from the outside, and this core had some fractures from the inside.

The Chairman said that fire would have broken off the flakes more from the outside. A rich field for Dr. Noetling's investigations would be found near the head of the Macquarie River, where the aborigines had a favourite camping ground near the outcrop of a cherty rock, which formed the material of most of their implements. He called attention to some flint and obsidian arrow heads which he had collected in Texas, U.S.A., some years ago, as illustrating a different phase of civilisation.

NOTES AND EXHIBITS.

Mr. R. M. Johnston exhibited a small specimen of a mountain trout (*Galaxias truttaceus*), captured by Mr. Tute at the Great Lake, which had an abnormal development in the shape of two mouths, being a sport or freak of nature; from the mouth, below the chin of the creature, the tongue protruded. A similar curiosity had been noticed by him some years ago in a sea perch.

Mr. A. J. Taylor made some remarks on the so-called bulrush caterpillar (*Sphaeria robertsia*). He said the caterpillar is interesting because of the peculiar way in which it becomes the host of a vegetable form of life, which uses up the animal structure of the caterpillar for its own nourishment, while at the same time it replaces every portion so robbed with vegetable tissue to an equal extent. In this way the caterpillar is by degrees converted entirely into a vegetable root, exactly resembling, in every respect, the original form of the insect from which it had derived sustenance during its period of growth. The process of vegetation is this: Whilst burrowing in the light vegetable soil, previous to undergoing the process of its natural metamorphosis, the caterpillar gets some of the seeds of the fungus under the scales about its neck; and from this part of its body a seed vegetates, and grows into a single stalk, from six to ten inches high, the top portion of the stalk in the female plant, when fruiting, representing, only in a much smaller degree, the club-headed bulrush with which we are all so familiar. The body of the caterpillar is, as already described, gradually metamorphosed into the vegetable root of the plant. The seed vessel is the only portion of this curious plant found above ground, therefore it may be easily overlooked. When freshly dug up the root is soft, and, in spite of its woody

structure, may be found to contain satisfactory evidence—such as the intestinal canal—of its animal origin. The bulrush caterpillar is to be found in New Zealand and Tasmania. Other insects that suffer the same fate are known of; but none of these afford a more interesting illustration of the process by which Nature sometimes makes an apparently retrograde step—by descending from a higher, or insect, form of life to that of a lower or vegetable condition—than we find in the case of the bulrush caterpillar. He referred to samples of the bulrush caterpillar in fruit and sections indicating the woody structure of the insect after passing through the changes described.

The Chairman and Mr. Johnston corroborated the description of the development of this interesting parasitic fungus, the former remarking that its modern generic name was *Cordyceps*, and exhibiting a very perfect specimen of *C. Gunnii*, found at Franklin Village, near Launceston.

Dr. Noethling exhibited two minerals found by him at Gad's Hill and at Barn Bluff—viz., analcime and actinolite—the former being a species of zeolite heretofore found only near Port Cygnet.

JUNE 16, 1908.

The Monthly General Meeting of the Society was held at the Museum on Tuesday evening, June 16, 1908.

Sir John Dodds, K.C.M.G., Lieutenant-Governor, in the chair.

Messrs. L. F. S. Hore, B.A., Leonard Seal, and Joseph Love, M.B., were elected Fellows of the Society.

THE FOLLOWING PAPER WAS READ:—

On State Borrowing and Sinking Funds for the Redemption of State Debts regarded from an Economical Point of View. By R. M. Johnston, I.S.O., F.L.S.

In the first part of his paper, relating to state borrowing, the author points out—(1) the unprecedented progress of all civilised countries, especially within the last forty years; (2) that this progress entirely altered the methods and instruments formerly employed in the industrial world; (3) that the introduction of the improved machinery and instruments of transport and production involved immediate, enormous, and original outlay of capital; (4) that the consequent reduction in cost of production and transport, and of prices, so affected all parts of the world that new and old countries alike were, perforce, obliged to largely invest fresh capital for such purposes; (5) that great undertakings (such as the building of the great Canadian and Pacific Railway system), could not, practically, be constructed in a piecemeal fashion, over a period of from forty to sixty years, to accommodate the burden of the

payment of the principal required immediately, and, consequently, this impracticability, and also the necessity of securing a just and equitable share of burden to all who in the future derive benefit from the original outlay, the method of only charging interest on capital to each year's current revenue has invariably been adopted in all civilised countries. He illustrated, by reference to the United Kingdom, how capital investments were developed. That Australia, latterly, has not been investing capital in this direction, either absolutely or relatively to population, at as great a rate as the United Kingdom was indicated by the fact that during the last five years invested capital of the kind referred to in the United Kingdom represented a sum of 62s. 6d. per head per year; while in Australian States, in a country nearly as large as Europe, and as yet scarcely begun to be developed, the corresponding capital investments only represented a sum of 28s. 10d. per head per year. Would the present population, with its relatively high "standard of living" and its vastly increased wealth, have existed had the "retrenchment-and-ruin" cry of the year 1870 succeeded in forcing upon the states, at the time, the retrograde advice, "no borrowing" and "retrenchment." This, though eminently prudent, from the standpoint of a private individual, might still be open to question or qualification, when applied to the economics of a corporate body. He was of opinion that the state taxpayers of the day stand, in relation to the ever-changing individuality of the state taxpayers of the past and future, in exactly the same ethical and economical relation to each other, as do the existing shareholders of a private railway corporation to past and future shareholders of the same concern; and, consequently, there is neither moral nor economical grounds why either taxpayers of the state or railway shareholders of the day should, in addition to their own equitable share of burden, mulct themselves in additional heavy taxation or expense (as by sinking fund contributions) for the purpose of lessening the fair and equitable share of burden of their future personally disconnected representatives.

The author of the paper, in conclusion, affirms as his strong opinion that sinking funds for the absolute redemption of loans invested in railways, harbours, and other great public works, should be restricted to the portion of such loans whose assets are short-lived, and, like the short terminable life of marine vessels, cannot be permanently preserved in their pristine value and utility by the ordinary yearly contributions from current revenue funds to maintenance, renewals, and repairs, by which means the whole permanent way, machinery, and other equipments of railways are ever kept up to their pristine value and utility as bona-fide state assets.

Mr. T. Stephens said that the Fellows of the Society must congratulate themselves that, although Mr. Johnston had been away on a visit to the old country, he had returned to them with no loss of that force with which he had many times previously interested them. The subject upon which he had addressed them that night was such a big one that it would be well to postpone the discussion upon it in order that the Fellows might have an opportunity of seeing it in print.

Mr. James Macfarlane also wished to have an opportunity of studying the paper in print before discussing it.

After further discussion, it was decided that the paper should be taken into consideration on a date to be fixed by the Council of the Society.

NOTES AND EXHIBITS.

Mr. Henry Baker gave an account of his recent visit to the Furneaux Group to study the habits of the mutton-bird. He found when he reached the islands that the birds had left about ten days previously. There appeared to be a tendency on the part of the birds to leave a little sooner every year. This was probably due to the encroachment of sheep and cattle on the rookeries, and the vast amount of egging which went on. The Government had imposed regulations, but they did not appear to be stringent enough. He had been told that the number of young birds that escaped was much less than it used to be. Next to mutton-birding, kangarooing was the most habitual occupation of the islanders. These animals had practically disappeared from all the smaller islands, and were becoming scarce on the larger ones. Three thousand a year would be a low estimate of the number that were killed. The kangaroo were hunted by dogs, which were kept half-starved to render them savage. It seemed a pity that so many kangaroo should be killed, considering the small price the skins brought. They were an important source of meat supply to the islanders, and if the close season were strictly enforced they would be subjected to considerable suffering. It was necessary, however, that the indiscriminate destruction that went on at present should be checked. He thought it was a great pity that the islanders could not be induced to take up some other forms of earning a livelihood than those they followed at present. If the people of Tasmania would interest themselves a little bit more in the islands their future would be brighter.

Mr. R. M. Johnston said he had visited the islands in 1874, and related some of his experiences. He agreed in the necessity for the preservation of native birds and animals, and hoped that Mr. Baker's reference to the matter would result in good.

Mr. T. Stephens thought the matter ought not to be allowed to rest. He suggested that the Council of the Society should address a letter to the Government, asking them to cause inquiry to be made as to the extent to which the existing regulations were carried out, and as to the wholesale destruction of kangaroo and wallaby. He moved a resolution to that effect, which was carried.

JULY 13, 1908.

The Monthly General Meeting of the Society was held at the Museum on Monday evening, July 13, 1908.

Sir John Dodds, K.C.M.G., Lieutenant-Governor, in the chair.

THE FOLLOWING PAPER WAS READ:—

On a recent visit to the River Gordon, illustrated by lantern slides, with remarks on the need of reservation of land along the banks of the River. By J. W. Beattie.

The visit was made in the middle of April last, eight days being spent in exploring the River Gordon. Unfortunately, for six days the weather was very wet, less than two days being available for the photographic work of the trip. Photographs of Macquarie Harbour Heads were displayed, showing the dispositions of the various harbour works. The outer and inner islands, and their lights, the breakwater, and the wreck of the s.s. Kawatiri, were shown, and gave a clear idea of the character of this wild western port of Tasmania, the "open door" of the West Coast mineral fields. The late Mr. Napier Bell's scheme for the removal of the bar was referred to, and another scheme, with a similar objective, but antedating Mr. Bell's by some seventy years, was mentioned. This early scheme, however, appears to have never gone beyond the presentation of a report by the originator—Captain James Hobbs—to the then Governor, Colonel George Arthur, in 1824. The discovery of Macquarie Harbour by Captain James Kelly was dealt with. Illustrations of the Port of Strahan were given, and also a fine series portraying the beautiful natural reserve of 70 acres called "The People's Park." These serve to emphasise the value of the forethought of the Strahan residents in obtaining one of a series of what have been aptly termed Natural Monuments, which will remain an abiding type of the indigenous flora. The historic places en route to the River Gordon were next dealt with—Phillip Island, Sarah Island, etc., being historically treated, and the beautiful and impressive mountain backgrounds overlooking the entrance to the river fully described, with some of the historical associations attached to them. The grandeur of the different reaches and bends of the Gordon was well illustrated, and served to emphasise the unique beauty of the river, and the urgent claims for its protection from the ruthless hand of present-day utilitarianism. The scenery at Gould's Landing, the various rapids in the upper reaches of the river, the River Franklin, and the scenery at the Great Bend, 65 miles from Macquarie Harbour, were well represented, the characteristics of the river being minutely described where illustration was not available. A brief sketch of the pine industry in the vicinity of the Gordon was accompanied by several illustrations of pine forests and logging.

In conclusion, the author urged most strongly that immediate and vigorous action be taken to thoroughly protect the banks of the River Gordon from Macquarie Harbour to a mile beyond the Franklin, a total distance of 26 miles, the area of reservation to extend to the line of hills running on either side of the river from the water's edge to at least one chain beyond their summits. On level river flats, where no hills

obtain, five chains from the river to be reserved. These reservations, in the opinion of the writer, should effectually prevent the destruction of the beautiful foliage, and retain not only an aesthetic asset of unique character, but an asset of great value from the tourist standpoint, which, if protected from the axe and fire, will undoubtedly become of great monetary value to the state.

Dr Noetling said that there was the finest scenery on the Gordon that he had ever seen in his life, and it would be a great pity if the insatiable timber merchant was allowed to destroy it. It was the duty of the Government to try and preserve that scenery and he favoured the land on each side being reserved up to the tops of the hills.

Mr. R. M. Johnston said that no one had done so much to make the scenery of Tasmania known as Mr. Beattie. It was due to his hard work and careful selection of subjects that the world knew so much of the beauties of Tasmania. They were all very much indebted to Mr. Beattie for the work he had done, not only in making the beauties of our state known, but in the patient and careful researches he had made into its old history.

Dr. Noetling said that if it was a fact that the Gordon ran for two miles under the Wilmot Range, as had been reported to Mr. Beattie, it would be the most extraordinary geological wonder in the world.

The Chairman said that he fully endorsed all that Mr. Beattie had said in regard to the necessity for the preservation of the scenery on the beautiful Gordon River, and he sincerely recommended everyone who had not had the privilege of visiting that part of the country to do so as soon as possible. The time would come when the West Coast would prove most attractive from a tourist point of view; and it therefore behoved the Government to preserve, as far as they could, these beautiful scenes from destruction.

Mr. Beattie said that he had had that day received a telegram from Mr. Robert Sticht, manager of the Mount Lyell mine, supporting all that he had said in regard to the necessity of preserving the scenery along the Gordon, and stating that the present reservation made by the Government was inadequate. Nothing less than the whole range visible to the eye should be reserved. The interests of the pine-getters were paltry compared with the preservation of natural scenery.

NOTES AND EXHIBITS

Mr. R. M. Johnston exhibited some specimens of timber which had been treated with Captain M'Fie's white-ant specific, and pointed out that it not only preserved the wood from the attacks of insects and fungi, but enabled it to take a beautiful polish.

AUGUST 10, 1908.

The General Monthly Meeting of the Society was held at the Museum on Monday evening, August 10, 1908.

Mr. T. Stephens, M.A., F.G.S., in the chair.

THE FOLLOWING PAPERS WERE READ:—

(1) On the Native Quarry at Syndal, near Ross. By Fritz Noetling, M.A., Ph.D.

The author first mentioned a reported aboriginal quarry at Stocker's Bottom, near Ross. Some thought it was a myth, and so he found it; but on further exploration he found such a quarry at Syndal. Hundreds of thousands of fragments that had passed through the hands of aboriginals were found lying about. He exhibited specimens. From this quarry stone for the implements used by the aboriginals was obtained. A vast amount of time and labour must have been spent in vain by the aboriginals whilst shaping their implements, and in connection with these operations they used fire. The other quarries of this character in Tasmania, the lecturer said, were at Cole Hill, near Melton-Mowbray; a small one near the railway station, Pontville; one at Shene Estate; at Charlie's Hope, Plenty; the Great Lake; on the road from Campbell Town to Swansea; on the South Esk, near Perth; at Pipeclay Lagoon; on the Tamar River; and on Mount Communication, near Salt-water River. Most of these might, at any rate, be considered as native quarries. He referred to the flints discovered in the tertiary formation at Thenay, in France, as to the origin of which there had been much controversy.

Mr. R. M. Johnston spoke of the kinds of rock from which the aboriginals formed their stone implements and weapons. Among the natives of West Australia to-day there were to be found the same primitive stone implements as were found after the Tasmanian aborigines had disappeared; the West Australian natives preserved their ancient chip flints for sacred rites purposes.

(2) On a Native Burial Ground at Charlton, near Ross. By Fritz Noetling, M.A., Ph.D.

The author remarked that Ling Roth's book on the aborigines of Tasmania had fully dealt with the character of these burial places. The one under notice had been very carefully examined. It seemed certain that the natives on this island burnt their dead, but differences of opinion arose as to their disposal of the ashes. It was pretty certain that they used to smear their faces with the ashes. Some were said to have put dead bodies in hollow trees, fencing them round with bushes. They knew that the names of deceased persons were never mentioned again, as the race were very superstitious about the departed. He believed there were regular aboriginal burial grounds, and his discovery on the Charlton Estate seemed to settle the question. There were heaped up a number of little mounds, in which large stones were embedded. There were no

bones to be found. The Charlton burial ground must be of great age. It was a question whether the corpses were carried to the burial ground and burned there, or whether the ashes of the departed were subsequently carried to the burial ground. He favoured the latter idea, a pyre having been erected and a body cremated at the spot where death took place. It would be interesting to know whether other similar burial grounds existed in Tasmania. He was told that there was one at Pontville, and another at Darlington Park.

Mr. A. J. Taylor described a burial place of probably a Tasmanian aboriginal warrior. He quoted Backhouse's and Robinson's descriptions of the incinerating process which was resorted to. The natives were very jealous of Europeans witnessing their burial ceremonies.

Mr. Bernard Shaw said the late Mr. Jno. Lyne used to mention a case under his own observation of the burial of a native in a hollow tree, but the body was afterwards removed.

Mr. Henry Foster remarked on the very few skulls of natives having been found, which was, no doubt, due to their generally burning their dead.

SEPTEMBER 14, 1908.

The Monthly General Meeting of the Society was held at the Museum on Wednesday evening, September 14, 1908.

Mr. T. Stephens, M.A., F.G.S., in the chair.

THE FOLLOWING PAPERS WERE READ:—

(1) Additions to the Tasmanian Molluscan Fauna. By W. L. May.

This paper, a portion of which was read by the Secretary to the Council, is of a technical character, and describes the results of dredging near the 100-fathom line off the south coast of Tasmania.

Mr. R. M. Johnston referred to the two species mentioned by Mr. May as belonging to a family of fissure-grooved shells of very ancient origin.

(2) On Solar Eclipses, illustrated by lantern slides. By H. C. Kingsmill, M.A.

The author referred to the total eclipse of the sun, to take place on May 9, 1910, and the proposed visit of an English expedition to observe it in Tasmania. Owing to the rarity of solar eclipses, expeditions have generally to be made to distant countries by those who require to investigate the phenomena of eclipses. It happens that Tasmania is the only land in the world from which the total phase of that eclipse will be observable, if we except the icy regions near the South Pole. The central line of the eclipse would pass a little to the south

of Tasmania, whilst the northern edge of the totality would hardly extend to Launceston. Tasmania would have, therefore, on the occasion a unique importance in the eyes of astronomers, who would be attracted from distant parts of the world. There had been one astronomical expedition to Tasmania which led to important results, namely, the American expedition for observing the transit of Venus in 1874. The object of that expedition was to obtain data for a more accurate determination of the distance of the sun from the earth, which is the largest base line we have for astronomical measurements. Incidental to that expedition was the accurate determination of the latitude and longitude of a station in the Hobart Barracks, which was done by means of simultaneous observations taken at the Melbourne Observatory and by the American astronomers at Hobart. The Agent-General had forwarded letters from General Tennant asking for information as to eligible sites for the observation of the eclipse. Mr. Kingsmill explained and illustrated by lantern slides total eclipses of the sun with the corona in each case extending far beyond the sun as obscured by the moon. But for this a total eclipse would mean for the time being absolute and total darkness. It was found that when a profuse crop of sun spots showed the sun to be in exuberant activity, the action of this exceptional excitement produced a corresponding influence on the magnetic state of the earth. There was a large and valuable body of evidence available to demonstrate that there did exist some sympathy between periods of solar agitation and periods of excited terrestrial magnetism.

The Chairman thought there were three places which stood out as eligible for the purposes Mr. Kingsmill had mentioned: 1. Near lighthouse on Bruni Head (South Bruni), 335ft. above high-water mark. Access from Great Taylor's Bay. 2. Southport Bluff, nearly opposite lighthouse. Access from a jetty on the south side of Southport, with deep water near at hand, and good anchorage; thence two or three miles' cartage to the Bluff. Depth of water at the entrance to Southport, 10 to 17 fathoms. 3. Between Point Arthur and second look-out on south side of Recherche Bay, and about six miles south of Southport Bluff. Entrance to Recherche Bay has depth of from 8 to 16 fathoms, with good anchorage inside.

Mr. R. M. Johnston referred to the importance of the expedition to Tasmania, and hoped institutions on the mainland would join in the reception of such an important body of visitors.

Dr. Noetling enlarged on the grandeur of the total eclipse of the sun, which he had witnessed in India, and said that scientists were very keen on observations at such a time to try to discover another planet believed to exist nearer to the sun than the planet Mercury. At the forthcoming observations in Tasmania he feared the sun would be rather low down in the heavens at the hour at which the total eclipse would take place, namely, 4 p.m. Would not the top of Mount Wellington be the most suitable situation for the observations?

Mr. Piesse thought that the South Bruni site was the best of those mentioned by Mr. Stephens. Maatsuyker Island or Port Davey might be suitable if helpers could be got, as the farther west the better. He also mentioned positions near Daniel's Bay and Mill's Reef. He was doubtful whether any real advantage would be gained in going south of Hobart. Mount Rummy would be an excellent situation, he thought. Mount Wellington was apt to be cloudy in the afternoon, whilst Mount Rummy was not so.

Mr. Bernard Shaw moved the following resolution:—"That in connection with the proposed expedition to observe the total eclipse of the sun on May 9, 1910, a letter be addressed to the Premier urging the necessity for a careful examination by an observer acquainted with astronomical requirements of sites which appear most likely to be suitable for the purposes of the expedition and the collection of information on the following points:—Climate; protection required for the instruments and observers at the chosen station; amount of cloud and rainfall; liability to fogs; accessibility for members of the expedition, and for any other purpose; natural harbour accommodation; facilities for obtaining material and labour for erection of temporary buildings, and facilities for commissariat."

Mr. R. M. Johnston seconded the motion, which was carried.

OCTOBER 12, 1908.

The Monthly General Meeting of the Society was held at the Museum on Monday evening, October 12, 1908.

Mr. T. Stephens, M.A., F.G.S., in the chair.

Messrs. E. J. Roberts, M.B., B.S., and Leonard E. Hubbard were elected Fellows of the Society.

THE FOLLOWING PAPERS WERE READ:—

(1) The Aboriginal Designations for Stone Implements. By Fritz Noetling, M.A., Ph.D.

The author points out in great detail that the vocabulary of the aborigines was very limited in extent. Calder, whose compilation was probably the most comprehensive, enumerated only 1135 words, some of which were unquestionably adapted from European sources. The results of his investigation tended to show that the aborigines did not have different names for the different kinds of stone implements they used. He thought he had proved that the Tasmanian natives only had one word for their stone implements.

(2) On the conclusions of Dr. Noetling respecting the Aboriginal Designations for Stone Implements. By Hermann B. Ritz, M.A.

Further particulars of the subject are given in the paper. The author remarks that the records were very meagre, and that these were made by men who had no special knowledge of philology. The number of words in the aboriginal language was small, much smaller than the lists which had been drawn up would lead one to expect. Many of the words, apparently different, he believed to be really identical, and the apparent difference was due to the habit the Tasmanians possessed, in common with the South Sea Islanders, of interchanging members of various sound groups.

Mr. R. M. Johnston said their attention hitherto had been confined to the things themselves, instead of to the language applied to them. Both the Tasmanian and Australian races would afford a great field in the future to the philological student, and Dr. Noetling had opened up a question that would be pursued with great interest. It was the beginning of a very important study in connection with the aborigines. He pointed out that already an important work had been performed in getting phonographic records of some of the old aboriginal songs and speeches by the late Mrs. Fanny Smith. He hoped that permanent casts of these records would be made, so that they could be preserved indefinitely.

Dr. Noetling thought that Mr. R. M. Johnston's suggestion that the records of Mrs. Fanny Smith's songs and speeches should be preserved, was a most excellent one.

Mr. Bernard Shaw said that he would bring the question of getting permanent copies of the Fanny Smith records before the Council.

The Chairman said it was a matter of regret that so little was really known of the early history of the Tasmanian natives. No attempt had been made to record their language until it had become to some extent corrupted by contact with Europeans and others.

NOVEMBER 16, 1908.

The Monthly General Meeting of the Society was held at the Museum on Monday evening, November 16, 1908.

His Excellency the Governor, Sir Gerald Strickland, K.C.M.G., President, in the chair.

Mr. Bernard Shaw offered the President the hearty congratulations of the Royal Society on his safe return to Tasmania. He had received numerous congratulations from various public bodies since his return, but none more heartily joined in them than the Fellows and Associates of the Royal Society.

The President, in reply, thanked the Fellows present very heartily for their kind welcome, which reminded him of the welcome extended to him by Mr. Morton upon his arrival at

Colombo, when first on his way to Tasmania. He had then telegraphed to assure them of the interest he would always take in the proceedings of this Society, and he could further assure them that this interest would continue as long as he had the honour to serve His Majesty as his representative in Tasmania.

The Rev. E. H. Thompson, the Rev. A. H. Mitchell, and Lieut.-Colonel E. T. Watchorn were elected Fellows of the Society.

REPORT.

The report of a Committee appointed to consider the question of a possible reduction in the rate of subscription of Fellows was read by the Secretary to the Council. In this report the Committee trace the history of the Royal Society for the past sixty years as gathered from the records in the Library. In 1848 the number of members was 123, and the subscription £1 per annum. In 1853 the number of members was 236, with a corresponding increase in the amount of subscriptions paid. In 1854 the subscription was raised to £1 10s. per annum, and this at first considerably increased the income of the Society, but in the succeeding years the records show a gradual falling off, until in 1861 the number of members, now called Fellows, is reduced to 106, the amount realised being £159 10s. In this year, at the Annual Meeting, a motion is submitted for a return to the original rate of subscription, but this is negated by the casting vote of the Chairman. The report traces in detail the gradual declension in the next twenty years, the minimum being reached in 1880, when the number of Fellows was 68, and the income from subscriptions £102. The subsequent records of number of Fellows and amount of subscriptions were too incomplete to enable the Committee to trace the financial history of the Society in detail, but the tables recently compiled by the Honorary Treasurer give the receipts and expenditure for the four years from 1904 to 1907. They came to the conclusion that the main cause of diminished membership and income was the increase of the subscription in 1854. The Committee report the receipt of remarks and suggestions from Fellows resident in Launceston and its vicinity, who point out that all they get in return for their subscriptions is the publication of volumes of the Proceedings of the Society at uncertain intervals, and that the long delay in the publication of original papers places all authors at a serious disadvantage. They would favour a general reduction in the amount of the annual subscription as soon as it could be safely done, and an immediate reduction in the case of country members. They also suggest that balance-sheets of receipts and expenditure should be published in an improved form, and that the get-up of the annual volumes should be greatly improved; but these suggestions had been anticipated by the Council, and are already taking effect.

The report concludes with the following recommendations:—

1. That the rate of subscription for all Fellows resident beyond a radius of 15 miles from Hobart be reduced from £1 10s. to £1 per annum.

2. That the utmost economy be observed in regulating the expenditure already authorised, and that no additional expenses be incurred without the sanction of the Society.

3. That any balance available out of the income of the current year be expended on the binding of the Library set of annual volumes for the last nine years, on the binding of other important publications now useless for purposes of reference, and on the purchase of recent works in various branches of science, so far as may be found practicable.

4. That Fellows be requested to use every effort to so far increase the membership of the Society as to make it possible to effect a general reduction in the rate of the annual subscription at the end of 1909.

Mr. T. Stephens, as Chairman of the Committee, moved the adoption of the Report, to give Fellows present an opportunity of expressing their opinions on the recommendations.

Mr. R. M. Johnston thought that original papers read should see the light of day as early as possible. He would like to have an opportunity of looking into the report at his leisure, and for that reason moved that it be laid on the table. The motion was seconded by Mr. Brettingham Moore, but was subsequently withdrawn.

Mr. Stephens said that the Council had now made ample provision for the publication of original papers, and no such trouble as had occurred in the past was likely to happen again.

The President said that the immediate question before the meeting was whether the Fellows and others interested in the Society should be given an opportunity of carefully considering the report and arriving at a decision thereon after deliberation. So far as he was concerned it would give him pleasure to be present at a special meeting at which this report might be fully considered. It was, no doubt, a very important decision that the Society was asked to give, and should, if possible, be unanimous. This Society had survived for two, and very nearly three generations. That was a great record for things Australian. It fulfilled a real need in the community, by offering a non-political, non-sectarian, and genuinely scientific centre where original thought could find a sympathetic atmosphere. They could not expect that original thought would be forthcoming with the regularity of blackberries in autumn, and there must be ups and downs in the volume of interest, both as regards the readers of scientific papers and those who wished to listen to them. It should be their object not only to keep the Society alive, but to keep it alive in accordance with the spirit and needs and claims of the times. The amount of subscription was certainly a factor in that co-ordination, and he observed

with great pleasure that the financial tone of the report now before them was on a plain and satisfactory basis as to the difficulties that were referred to when they last met to discuss financial questions. The position was very clear, and, he would venture to say, more hopeful. Although the annual income was very small, the difference between it and the annual expenditure was a negligible quantity. Although there was no reserve fund, they had not to deplore any funded or floating debt, and they might refer with satisfaction to their assets, which consisted not merely of the library, and the position they held in having the right to use these premises, but also in the good will and position which the Society enjoyed. It was merely a question of using these valuable assets to the best advantage.

The first recommendation was put to the vote:—"That the rate of subscription for all Fellows residing beyond a radius of 15 miles from Hobart be reduced to £1 per annum."

Mr. Bernard Shaw said that the Council of the Society was exercising the strictest economy. As Treasurer, he was able to express a hope that at the end of the year they would not find their accounts overdrawn.

Dr. Noetling said there were so few members outside the 15 miles radius that the total loss by the reduction proposed would not be more than £8. It was felt that if the subscription was reduced to £1 the probability was that the number of non-resident members would be largely increased.

Mr. Lyndhurst Giblin said that no previous notice had been given of a recommendation which proposed an alteration in one of the Rules of the Society. Was it competent for the meeting to agree to such a proposal without the previous notice prescribed by these Rules?

The President ruled that the objection was fatal, and, after discussion, the consideration of the report was deferred to a special meeting to be held on Wednesday, November 25.

THE FOLLOWING PAPER WAS READ:—

An Introduction to the study of the Aboriginal Speech of Tasmania. By Hermann B. Ritz, M.A.

The author says that the life of a population invariably assumed a form which largely depended on the climate and geographical features and the facility of intercourse with the denizens of other lands. To the observing ear of the scientist the remnants of the feasts of the aborigines, their implements, and the scanty records of their words and doings spoke in a language of their own of those whose places we had taken for good or ill. It was to the words, the records of the actual songs of the voice that was still, that he would confine their attention, and their present purpose was to clear the ground and mark out the foundation for constructing a scientific reproduction of the language of the aborigines of Tasmania. As far as he was aware, the work done in that direction had not hitherto

been extensive. After stating his attempt to simplify the spelling, Mr. Ritz compared three versions of an aboriginal song, accounting for every word, and explaining the meaning of the sentences. He said there was no sign of any accident. The words seemed invariable in form and widely applicable in meaning. The words were probably supplemented by gestures to define their exact meaning. In that respect a parallel was found in the sentences of the Chinese language. The fact that the song existed in different dialects made it most valuable. Quite probably the song was connected with some important tribal ceremonies.

The President asked if the half-castes on the Straits Islands retained any traces of the native language.

Mr. Ritz said that it was scarcely possible. Constant intercourse with the whites would cause them to neglect their own tongue, except as far as they wished to keep it for secret conversations.

Dr. Noetling and Mr. R. M. Johnston spoke in high terms of the value of the researches of Mr. Ritz, and hoped he would continue his studies.

NOTES AND EXHIBITS.

Mr. W. L. May presented to the Society a number of new species of shells, dredged by himself and Mr. Hedley from a depth of 100 fathoms off Cape Pillar. There were 80 species in all, many of which had been found at a depth of 100 fathoms off Sydney, and at a similar depth off the coast of South Australia. Amongst them were specimens of Pteropods, free swimming organisms, which lived on the surface, but whose shells fell to the bottom when they died.

Mr. R. M. Johnston said that Messrs. May and Hedley had performed a very notable feat in presenting to the Society one-eighth of its molluscan fauna at one time.

NOVEMBER 25, 1908.

A Special General Meeting of the Society was held at the Museum on Wednesday evening, November 25, 1908, for the purpose of considering a proposed modification of Rule 16, and for other business.

His Excellency Sir Gerald Strickland, K.C.M.G., President, in the chair.

Mr. T. Stephens said that a Committee had been appointed to consider the question of reducing the annual subscription, and other matters, and had brought up the following recommendations:—

1. That the rate of subscription for all Fellows resident beyond a radius of 15 miles from Hobart be reduced from £1 10s. to £1 per annum.

2. That the utmost economy be observed in regulating the expenditure already authorised, and that no additional expenses be incurred without the sanction of the Society.

3. That any balance available out of the income of the current year be expended on the binding of library set of annual volumes for the last nine years, on the binding of other important publications now useless for the purposes of reference, and on the purchase of recent works in various branches of science, so far as may be found practicable.

4. That Fellows be requested to use every effort to so far increase the membership of the Society as to make it possible to effect a general reduction in the rate of annual subscription at the end of 1909.

He moved that the recommendations of the Committee be adopted.

Mr. Bernard Shaw seconded the motion, which was agreed to.

Mr. R. M. Johnston said that the Fellows of the Society were indebted to His Excellency the Governor for giving up his time, which was so much taxed in every way, to attend the meeting. He wished His Excellency and the Lady Edeline Strickland and family a Merry Christmas and a Happy New Year.

His Excellency, in reply, said that it was always a great pleasure to him to attend the meetings of the Society, and he wished it continued prosperity and renewed vigour.

NOTES ON A CHIPPED BOULDER FOUND
NEAR KEMPTON. (PL. I. AND PL. II.)

BY FRITZ NOETLING, M.A., PH.D., ETC.

(Read May 11th, 1908.)

It has rather been a problem whence the Tasmanian Aborigines obtained the material for their implements. The discovery of certain localities where the rock suitable for implements occurred in situ, and which were unquestionably worked by the Aborigines, has partly solved the problem. It is unquestionable that the Aborigines obtained a certain amount of the raw material from these so-called quarries, but it is equally certain that a large portion was obtained from different sources.

One of the best-known "native quarries" is that situated on Coal Hill, near Melton-Mowbray. A careful statistic of the specimens collected by me around Melton-Mowbray gave the following results:—

Cherts of all kinds	80.7	per cent.
Chert from the quarry	6.1	„
Porcellanites	7.3	„
Breccia	0.7	„
Others not included under the above headings	5.1	„

The above figures conclusively prove that, though the quarry on Coal Hill was conveniently situated and easily reached from the camping grounds near the river, only 6.1 per cent. of the implements found were derived from it. Far the larger portion, that is to say 93.9 per cent. of the implements, were made from rocks which came from other places besides the quarry on Coal Hill. A priori one would assume that, with such a convenient place as the quarry on Coal Hill close at hand, the overwhelming majority of the implements would be manufactured from material obtained from

this place, but the above figures prove that it is not the case. I had already noticed this fact when collecting, but only after carefully sorting the specimens could I fully prove it.

Considering that the quarry on Coal Hill was so close to the camping grounds, and that, notwithstanding its situation 93.9 per cent. of the implements were made from a different kind of rock, we are forced to assume that the quality of the rock was the most essential feature when it was intended to produce an implement. Though unlimited quantities were available in the quarry on Coal Hill, the quality of this particular kind of chert was not such that it was highly treasured by the Aborigines as a suitable material for implements. They unquestionably preferred other kinds of cherts to that occurring on Coal Hill; but the question arises, whence did they procure the raw material, of which they consumed such large quantities in the manufacture of their implements?

From the study of the specimens I collected I had already come to the conclusion that the gravel deposits of the various creeks, but above all the gravel and conglomerate deposits of diluvial age, were the source from which suitable material was obtained. I noticed that numerous implements, usually of the less finished type, represent fragments of water-worn pebbles or boulders, the smooth, water-worn crust being still preserved. It is, however, not till a find I recently made on a camping ground north of Kempton that this view was fully confirmed.

This camping ground is situated on the eastern slope of a low hill which stands out prominently from the surrounding flat country. It is a considerable distance away from any present watercourse, and about 200 feet, I should say, above the level of the River Jordan. Here I found the water-worn pebble, which forms the subject of this paper. I first discovered the core, and, as my attention was drawn to some fragments lying close about it, which seemed to be of the same kind of rock, I collected a few, and tried to fit them to the core. They were failures, but after repeated attempts I succeeded in fitting one to its original position, and, encouraged by this, I hunted for more, and eventually succeeded in

finding sixteen fragments which could be refitted and placed in their original position before they were flaked off.

I thus succeeded in restoring the greater portion of the original boulder, and, though a good part is still missing, and will probably never be found, that which has been preserved is of the utmost interest.

As it presents itself now we can distinguish three different parts, two of which are preserved, while the third is missing, but its shape can easily be reconstructed. These parts are—

1. The core (Nucleus).
2. The spalls or fragments falling off when the pebble was worked.
3. The fragment used as an implement.

1. THE CORE.—This part measures about $7 \times 5 \times 4$ inches, and weighs 5lbs. 10oz. at cap. It is somewhat irregularly oblong in shape, and the lower side in particular shows the surface of a well-worn water pebble. The upper side has been subjected to a good deal of work, and, if merely judged by the planes of fracture, at least seven flakes, one of which has not measured less than $4\frac{1}{2}$ inches in length, have been struck off.

If nothing more were preserved than this specimen we could at once recognise it as a core—that is to say, the remains of a larger-sized pebble from which suitable pieces have been struck off, and which was rejected as being without further use. The size, the weight, and the absolutely unsuitable shape are entirely against the assumption that this specimen might perhaps have been actively used as an implement—a hammerstone, for instance. Even without the flakes being found, the even planes of fracture would prove conclusively that this specimen has been submitted to a passive and not too active treatment, in other words, that it is a Nucleus, which, after the desired object had been attained, was rejected.

The whole surface, including the planes of fracture, are covered with a thick patina of yellow-brown colour,

which is, however, somewhat lighter on the planes of fracture than on the original crust.

2. THE SPALLS.—I collected altogether 39 fragments, weighing 2lbs. 14½oz. in the aggregate, which apparently were struck off this core; and 34 could be replaced in their original position. It is very probable that the remaining 5 flakes belong to the same specimen, but too much is missing to permit them to be fitted together with the others. However that may be, the fact that 34 flakes, weighing 2lb. 12½oz., could again be replaced in their original position, is of the greatest interest.

The flakes vary, of course, in size and shape; but on the whole they are of a lamelliform character—that is to say, of comparatively small thickness. Most of them show a fine bulb of percussion, and it may be said that almost every one of them could have been used as an implement. I select only two—the largest and the smallest—for description. The largest measures 5 inches in length, and exhibits a fine, smooth pollical face; its general outline is somewhat triangular, the base broad, and pointed at the opposite end. The two lateral edges are sharp; the indical face shows a good deal of flaking; the smallest flake measures about 2¼ inches, and is of irregular circular shape; the edges are very sharp; the pollical face shows a fair bulb of percussion; the indical face is flat, but shows no traces of chipping. Weight, 8oz.

3. THE FRAGMENT WHICH WAS USED AS AN IMPLEMENT.—Unfortunately this is missing—in fact, it can hardly be expected that this were preserved, as it was evidently the desired object and in whose manufacture the pebble was broken. By refitting the fragments to their original place, the general outline of this missing fragment could, however, be obtained by filling up the empty space with plaster of Paris or any other suitable material. This showed that the flake, which was apparently desired for an implement, was of triangular shape, and rather thin. It measured about 4 inches by 2½, was broad at the base, and sharply pointed at the opposite end. The lateral

edges were sharp and cutting, the pollical face smooth, the indical face showing a median ridge (1).

One of the fragments is broken, and the fracture shows that the material is a dark black chert of very fine texture. The outward appearance of neither the core nor the flakes, which are covered with the same patina of light, yellowish-grey colour; would indicate that the actual colour of the rock is dark black. The comparative thickness of the crust of weathering proves, however, that the core and flakes must be of considerable age, because such a thick patina as exhibited by this specimen is not formed in a few years.

The specimen here described is unique for Tasmania, and we can only wonder at the chain of lucky circumstances that made its discovery possible. The find of the core, with a large number of spalls falling off during the manufacture of the desired object, all lying close around it, proves conclusively that the working took place exactly at the spot where it had been found. Nothing disturbed the core or the flakes since the day when they were struck off from a waterworn pebble, weighing probably not less than 10lb. Yet, as proved by the thickness of the patina, a considerable time must have elapsed since this pebble was broken. It would rather be rash to assume that the very last Aboriginal who visited this camping ground left core and spalls behind, perhaps in a hurried flight. On the

(1) Since the above was written I re-visited the place where the above specimen was found. Not only did I succeed in finding 19 more flakes, 17 of which could be fitted to the core, but I actually succeeded in finding the missing flake, the object of breaking the pebble. This had been carried away about 50 paces to the north from the place where I found the nucleus and its fragments, and there it had been dropped. It is the exact counterpart of the cast, and I must confess that, had I not recognised the likeness with the cast I had made, I would have probably left the specimen behind. It appears, as it was surmised, that this piece was taken away to be used, but, as it was apparently not suitable, it was simply rejected, and the whole work of breaking this large pebble was in vain. The edges of this flake are broken, and it may perhaps have been used, but there is no marginal chipping, and the specimen was apparently rejected exactly as it was when it had been obtained after so much labour. This is perhaps the most interesting discovery of all, inasmuch as the missing specimen was traced and actually recognised from the cast, representing its likeness.

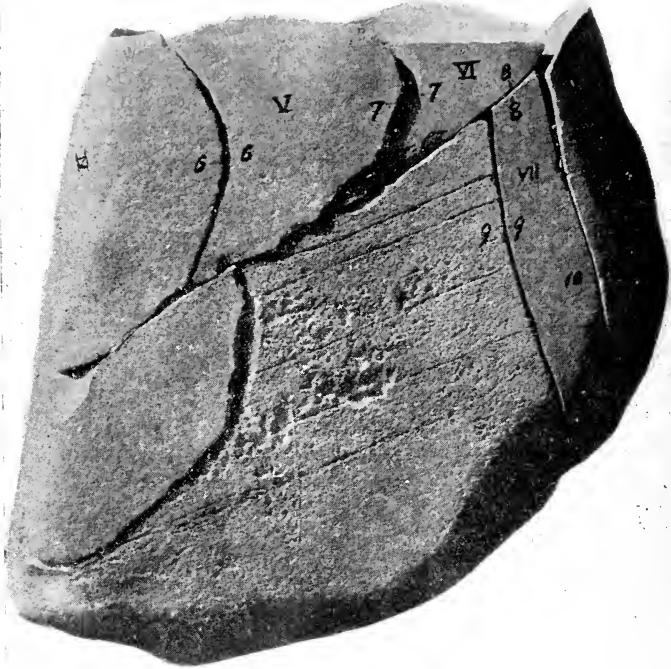
other hand, if we assume that core and flakes had been lying for any length of time at the place where they were found it would be surprising that they were not disturbed by later generations visiting this place. The only way to account for it is that soon after core and flakes had been produced the drifting sand covered it entirely, thus preserving it almost completely as it had been left. Only of late, when the sand had shifted, it was exposed again. Lucky it was that the plough had not gone over this spot, otherwise it would have been impossible to collect such a large number of fragments belonging to one and the same core.

A number of interesting facts and questions arise from the study of this specimen. Though not completely restored to its entire shape, we can state with absolute certainty that the original was a pebble or boulder, well worn and smooth all over its surface, of deep black colour, weighing not less than 10lb. As there are no gravel deposits or conglomerate anywhere near the place where it was found, it must have been picked up at a considerable distance, and been carried to the camping ground to be used for the manufacture of implements.

The Tasmanian Aborigines have been described as a lazy lot, and it is therefore hardly probable that the Aborigine who found this pretty heavy boulder carried it for a long distance to his camping ground unless he valued the material. If he valued the material it is surprising that he used so very little of it; the size of the core proves that it contains the greater portion of the bulk of the original pebble. The fragments prove that one, perhaps two, flakes have been turned into implements. That fragment which probably has been turned into an implement seems to differ very little from those that have been rejected. In fact, considering the very crude flakes that have often been used as implements, it is astonishing to find that the two specimens which have been here described, and which are distinguished by a fine smooth pollical face were not used as tools.

It is very difficult to find a suitable explanation. If the rock was of the valued kind, why is it that so much waste was left behind? If not, why should the lazy Aboriginal trouble to carry the heavy pebble for a long

distance from the place where he found it to his camp? Can it be possible that it was desired to produce nothing but an implement of a certain size and weight, and that all other flakes, however useful they may otherwise have been, were rejected till the desired object was obtained? If this be the case, and I can see no other satisfactory explanation derived from the evidence of the core and the rejected flakes, we have to consider all the archaeolithic implements used by the Aborigines as a produce of the moment, manufactured then and there for the purpose for which they were required, and, having served their end, to be rejected without being applied to further use. This would to a certain extent explain the rather astonishing number of archaeolithes we find on the camping grounds, some of which seem to be very serviceable still.

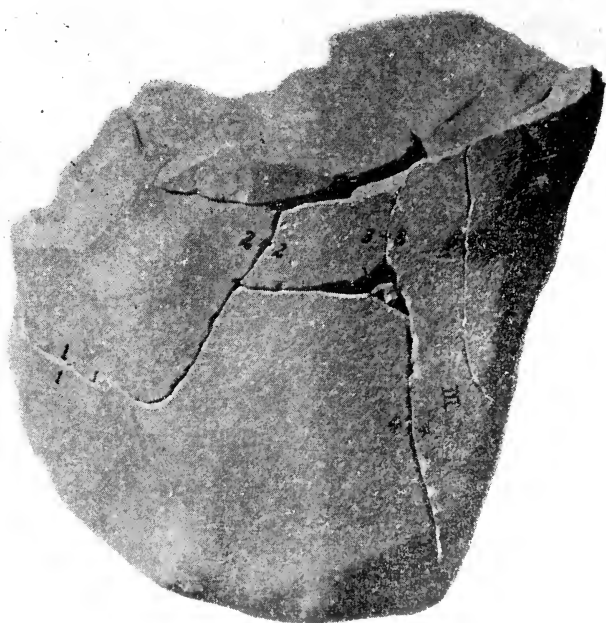


Dr. Noelling, Photo.

CORE AND FLAKES, Kempton.

Roy. Soc. Tasm. 1908.

PL. II.



Dr. Noetling, Photo

CORE AND FLAKES, Kempton.

STATE BORROWING, AND SINKING FUNDS
FOR THE REDEMPTION OF STATE DEBTS,
REGARDED FROM AN ECONOMICAL
POINT OF VIEW.

By R. M. JOHNSTON, I.S.O., F.S.S
(Read June 16th, 1908.)

PART I.—STATE BORROWING.

The success of young colonies, such as those of Australia, has, in a large measure been due to the sacrifices which the earlier pioneers made, from time to time, in making timely provision for the opening up of Australia's vast virgin lands, by means of roads, railways, bridges, jetties, harbours, etc., in advance of actual occupation or settlement.

To any thoughtful person it is obvious, at the initial stage of a colony's history, it would be impossible to construct such costly undertakings without the aid of foreign capital.

Since the year 1842 the six states of Australia have practically entered into partnership with foreign capitalists in this important work of providing railways, roads, bridges, harbours, in advance of further settlement, and in no other way would it be possible to have succeeded in making the outlay of £240,149,727, in a period of 64 years, or at the rate of £5,024,000 per annum.

The following is a brief statement showing how this large amount of borrowed capital was invested:—

HOW BORROWED CAPITAL WAS INVESTED BY THE
STATES.

INVESTED IN	AMOUNT £.	PER CENT.
Railways and Tramways	141,271,521	58·83
Telegraphs	3,752,942	1·56
Roads, Bridges, Lights, Harbours, etc.	25,387,083	10·57
Water Supply and Sewerage	30,093,318	12·53
Defences	2,409,893	1·01
Other Public Works and Services	28,093,589	11·74
Unexpended balance	9,041,381	3·76
	<u>£240,149,727</u>	<u>100</u>

Has Australia benefited by this Borrowing of £240,149,727, or, what may be more properly termed—Taking into Partnership a Foreign Capitalist in a profitable undertaking?

The best answer to this query is to contrast the year 1870 with the year 1906-7, within which time the bulk of the Debt was contracted, as shown in the following table:—

PARTICULARS.	1870	1906-7	INCREASE.	ANNUAL RATE.
Population	1,652,000	4,197,038	2,543,038	2'55
Ex-Australian Ex-ports	£26 253 000	69,794 000	43,541,000	2'75
Sheep	41,639 000	83,798 893	42,159,893	1'96
Cattle	4,278,000	8,636,360	4,358,360	1'97
Railways—				
Miles Open	994	14 067	13 073	7'63
Invested Capital	£9,829,000	£140 707 404	130 878,404	7'63
Profit on Working per head	5s. 7d.	30s. 1d.	24s 6d.	
Interest on Debt per head	17s 2d.	41s 10d.	24s 8d.	
Taxation per head	47s. 8d.	66s. 7d.	18s. 11d.	
Taxation, less profit on Working of Railways	42s. 1d.	36s 6d.	5s. 7d.	
Public Debt	£28,328,000	£240,148,727	£211,820,727	6'11
Income of the People—				
Estimated Annual Value Mil. £'s.	72'32	193'90	121,58	2,77
Capital Value Mil. £'s.	2,066'28	5,540'08	3 473'80	2 77
Ditto after deducting the whole of Public Debt Mils. £'s.	2,037'95	5,299'93	3,267'91	2'70
Ex-Australian Trade—				
Total Imports and Exports Mils £'s.	36'09	114 52	78'43	3'26

A careful study of the contrast in the conditions of the Six States of the Commonwealth between the years 1870 and 1906-7, covering a period of 36 years in all, should convince all pessimistic observers that the past policy of entering into partnership with foreign capitalists to the extent of 240 million pounds, instead of being a mistake or a hindrance to Australia's financial and industrial development and progress, has been the principal means whereby our present conditions, con-

trusted with the former period, has in every way so markedly improved.

It may be of advantage to summarise some of the features which have led to this most satisfactory result:—

SUMMARY OF RESULTS.

POPULATION.—The population has increased from 1.65 millions to 4.19 millions, or 2.59 fold.

TOTAL EXTERNAL TRADE.—The total Imports and Exports (Ex-Australian) has increased from 36.09 million pounds to 114.52 million pounds, or 3.17 fold.

RAILWAYS:—

MILEAGE WORKING.—The miles open of Railways in the six States has increased from 994 miles to 14,067 miles, or 14.15 fold.

CAPITAL INVESTED.—The capital invested in construction and equipment of State Government lines has increased from 9.82 million pounds to 140.70 million pounds, or 7.63 fold.

PROFIT ON WORKING.—The profit on working all State Railways has increased from 5s. 7d. per head to 30s. 1d., or 5.39 fold.

INTEREST BURDEN ON STATE DEBTS.—The interest burden on all State debts increased from 17s. 3d. per head to 41s. 10d., or 2.43 fold.

INTEREST BURDEN ON ALL STATE DEBTS, LESS amount from profit on the working of State railways alone, increased from 11s. 7d. per head to 11s. 9d., or increase of 2d. per head.

Notwithstanding that Total Interest Burden on all State debts has increased by 24s. 8d. per head, such has been the increase in the profitable working of the State railways alone—viz., 24s. 6d. per head—that the total interest burden connected with the Total Debt of 240.14 million pounds has only been raised by 2d. per head. That is, the profits to the State Treasuries from working railways (apart from the immeasurable material benefit of opening up the lands by the cheap and rapid mode of transit and communication have already almost wholly wiped off the taxpayers' interest burden on the

whole of the accumulated unredeemed Debt of 240.14 million pounds.

The fundamental error in the views of certain critics, who lack expert knowledge of matters pertaining to the economics of State finance as applied to the Australian States, is the evident common failure to appreciate the scope of the functions of the general governments of the various States of Australia as compared with those of the United Kingdom, and fail to discern the important distinction between debts incurred for purposes of protection or aggressive warfare and capital investments (also bearing the name Public Debt) incurred and expended in improving and permanently enhancing the value of the Public estate by means of railways, roads, and harbours. In the self-governing States of Australia, the scope of general government—owing to the peculiar conditions of lands thinly populated with vast undeveloped areas—embraces many functions which, in the earlier stages of development, would be impossible to resign either to local bodies or to private enterprise as in the older more densely-populated countries.

Unless this fundamental distinction of the scope of the general government in old and new countries be thoroughly considered and allowed for, all comparisons relating to the proportion and Cost of Public Services and public debt between countries so differently conditioned would be worse than useless. In the United Kingdom the greater part of these services (70.89 per cent.) is left to private enterprise (railways) and to local government.

Only 29.11 per cent. of the Total Debt for all such purposes in the United Kingdom comes directly within the scope of the revenue and expenditure of the Imperial Government. In Australia as much as 93.74 per cent. of such functions come directly within the scope of the responsibility of the general government of the various States.

This is best appreciated by contrasting the proportion of Loans or Capital expenditure incurred under the general functions of government in respect of special public works and services in Australia and the United Kingdom, as in the accompanying corporation table:—

PUBLIC DEBT IN THE UNITED KINGDOM AND IN THE SIX STATES OF AUSTRALIA.

Illustration showing the Scope of the General and Local Government of the Six States of Australia, contrasted with similar function discharged and variously distributed in the United Kingdom under the control of General and Local Government, and among Private Railway Corporations.

PUBLIC DEBT INCLUDING INVESTMENTS IN RAILWAYS.

CONTRACTED OR INVESTED IN.	PUBLIC DEBT INCLUDING INVESTMENTS IN RAILWAYS.				Capital Investments per year during last five years	
	General Government (000, £'s omitted).	Local Government (000, £'s omitted).	Private Railway Corporation (000, £'s omitted).	All. (000, £'s omitted).	Per Head	Annual Rate p. Cent.
UNITED KINGDOM, 1905-6—					£ s. d.	...
Railways and Tramways .....	...	...	1,344,821	1,344,821	30 16 0	...
Other Public Works & Services .....	...	540,401	...	540,401	12 7 7	...
Undefined (Imperial Debt)	774,164	...	...	774,164	17 14 8	...
Total United Kingdom.....	774,164	540,401	1,344,821	2,659,386	60 18 3	29 9 3.75
Total per Cent. to Total ...	29.11	20.32	50.57	100	...	...
Total per Head	£17 14 8	£12 7 7	£30 16 0	£60 18 3	60 18 3	29 9
SIX STATES OF AUSTRALIA,						
1906-7—						
Railways and Tramways.....	141,271	...	...	141,271	34 5 9	...
Telegraphs	3,752	...	...	3,752	18 5	...
Roads, Bridges, etc.	18,397	...	...	18,397	4 9 4	...
Harbours, Rivers, Lighthouses	6,989	...	...	6,989	1 13 11	...
Water Supply and Sewerage ...	30,093	...	...	30,093	7 6 2	...
Defences	2,409	...	...	2,409	11 8	...
Other Public Works & Services	28,202	16,000	...	44,202	10 14 7	...
Unexpended Balance.....	9,036	...	...	9,036	2 3 11	...
Total Six States Australia	240,149	16,000	...	256,149	62 3 7	5 17 0 2 30
Total per Cent. to Total ...	93.74	2.26	...	100	...	...
Total per head	£58 6 0	£3 17 7	...	£62 3 7	£62 3 7	...

SUMMARY.

General and Local Public Debt, less Capital invested in Railways—	Thousand	Per Head.
	£'s.	£ s. d.
UNITED KINGDOM.....	1,314,565	30 2 3
SIX STATES OF AUSTRALIA	114,878	27 17 10

GROWTH OF POPULATION, AND CAPITAL INVESTMENTS IN RAILWAYS AND OTHER PUBLIC WORKS IN THE SIX AUSTRALIAN STATES AND IN CORRESPONDING CAPITAL INVESTMENT IN THE UNITED KINGDOM IN THE PERIOD 1801-1906-7.

SIX STATES OF AUSTRALIA

Period.	Population at close of each Period.	Increase within each Period.					Population at close of each Period.	Period.	Increase within each Period.				Average Annual Increase, Per Cent.	Average Annual Increase, Per Head.
		No.	No. of Yrs.	Per Cent.	Per Cent. to 1,119,481.	Average Annual Increase, No.			Annual Rate.	No. of Yrs.	Per Cent. to 43.65 Mts.	Increase Mts.			Annual Rate, Per cent.
1801.....	6,058	...	...	0.15	...	...	(1821).....	...	...	...	...	...	...	...
1801-1871.....	1,668,367	1,662,359	70	40.35	23,748	8.36	1821-1871...	20	89	...	11.59	0.82	0.23	...
1871-1891.....	3,183,237	1,514,850	20	36.77	75,743	3.28	1871-1891...	31	78	50	6.25	0.91	0.31	...
1891-1901-2...	3,883,079	698,842	10	16.95	69,984	2.01	1891-1901-2	41	45	10	3.72	0.95	0.37	...
1901-2-1906-7...	4,119,481	236,411	5	5.74	47,282	1.19	1901-1906...	43	65	5	2.20	1.04	0.44	...
1905-6-1906-7...	4,119,481	67,051	1	1.63	67,051	1.63	1905-1906...	43	65	1	0.43	0.95	0.43	...
1801-1906-7....	4,119,481	4,113,423	105	99.85	38,850	6.35	1825-1906...	43	65	85	22.76	0.87	0.27	...
				100										

UNITED KINGDOM.

CAPITAL INVESTMENTS.

Period.	£	£	No.	Per cent.	£	Per cent.	Period.	Mil. £'s	No.	Per cent.	Mil. £'s	Per cent.	Mil. £'s	Per Head.		
1842.....	45 900	...	...	...	...	...	1861.....	110.0	...	5 83	...	...	...	...
1842-1871.....	30,139,889	30,093,980	29	...	1,067,000	25.08	1861-1871.....	552.6	1023.48	412.6	17.49	...	41.26	...		
1871-1891.....	155,117,773	124,977,893	20	...	6,248,844	8.54	1871-1891.....	933.0	2020.18	380.4	...	19.02	...	...
1891-1901-2..	214,253,000	59,135,227	10	24.67	5,913,523	3.28	1891-1901-2...	1220.4	1015.56	293.4	...	29.34	36.3	10.0 †		
1901-2-1906-7	240,149,727	25,896,727	5	10.78	5,779,345	2.31	1901-2-1906-7	1885.2	5.25	26	664.8	...	132.96	33.6	14.10 †	
1905-6-1909-7	240,149,727	1,722,727	1	0.72	1,722,727	0.72	1905-6-1906-7	86.20	1	4	57	...	86.20	28	10.62	6 †
1842-1906-7..	240,149,727	240,103,827	64	99.98	3,752,000	13.32	1861-1906-7...	1885.2	45	1775.2	6.52	8.4	39.6 †	
1871-1906-7..	240,149,727	210,009,847	35	72.40	6,000,252	6.11	1871-1906-7...	1885.2	35	64.84	1332.6	0.57	38.08	

* Six States U.K. s. d. s. d.

* Exclusive of Imperial Debt Investments.

† Does not include Local Government Capital Investment.

‡ Includes Local Government Capital Investment.

R. M. JOHNSTON.

Government Statistician,
Tasmania

Hobart,
May 25th, 1908.

It does not require much knowledge of industrial economy to realise the fact that the wealth of any country is greatly multiplied by the introduction of machinery, which facilitates the fresh creation of products or diminishes the cost of production or transport. All the hopes of economists for the amelioration and improvement of the material condition of a people depend upon such agencies increasing at the initial stage at a greater ratio than population, and even at a later stage, as in the United Kingdom, the investments in extending its railways and other public works of local bodies during the last four years increased from £1,623 to 1,885.2 million pounds, or at the rate of £65.5 million pounds per year, equivalent to 30s. 8d. per head per year. Australia, which is still in the initial stage of development, has, in similar investments, only increased during the same period from 222.87 million pounds to 240.14 million pounds, or at the rate of 4.31 million pounds per year, equivalent to 24s. 8d. per head per year. Taking all these matters into consideration, it is clearly demonstrated that Australia's Capital investments in Railway construction and other Permanent Public Works are, in relation to her initial stage of development of an area nearly as large as Europe, and also in relation to her population, progressing at a much slower rate than the United Kingdom, which long ago had advanced to a high stage in all equipment of this nature.

THE IMMEASURABLE INDIRECT BENEFITS OF RAILWAYS.

It is also a very common fallacy to assume, as some do, that the only object which the several State Governments of Australia had in view in opening up the country by means of railways was confined to the direct profit which they might possibly receive into the State revenues from the net receipts of the railways, themselves regarded as private undertakings; that is the only view they can take of the vast wealth-producing influence of railways to a country is restricted to the petty consideration as to how far the extension of Railways benefit the Railway carrier, as such. If the mere receipts from freight cover working expenses and the

interest on borrowed or invested Capital, the Railways, according to this restrictive view, are productive; if the working receipts fail immediately to wholly cover both charges, they are deemed to be unproductive, a loss to the country, and a menace to its financial stability. This reasoning is obviously faulty.

To the Country as a State, or to its Producing Industries or Consumers, the whole of the freight charges of a Railway, regarded as an item of State revenue—even though covering working expenses and interest on Capital—form the merest fleabite as compared with the actual immeasurable indirect value, added to the country's wealth-producing industries.

The principal additions to the wealth of the country due to Railways are derived as follows:—

- (1). By the saving of time and of cost of transit.
- (2). By giving commercial value to vast natural products hitherto lacking value, owing to lack of cheap modes of transit.
- (3). By the impetus given to the creation of fresh wealth in areas formerly barren or unproductive.

To estimate the "Wealth of Exchange" added to any country—especially a State with vast areas of virgin soils—would be a difficult matter. We may know this wealth to be great in itself, and vastly of greater importance than the possible revenues of the Railway in itself as an undertaking, but we have no direct means of ascertaining its value quantitatively. Items (2) and (3) can only be vaguely guessed at. But the wealth and other advantages gained by saving time and labour (1) through the improvement in means of transport can be very closely approximated.

The gain from this hidden cause, although of necessity not seen in the receipts of the Railway regarded as an undertaking, becomes at once apparent when we try to realise the difference in cost of transport as between the Railways now in operation and the more imperfect means in common use on bad roads prior to their introduction.

Prior to the opening up of the States' lands and the Loans expenditure on Roads, Bridges, and Harbours, the expenditure of time and labour in effecting the necessary transport between points of production and centres of population and ports of trade was very great. Even in the limited areas when macadamised roads existed, the cost of transit formed a heavy tax upon either reproducer or consumer, or both, accordingly as the product was intended for foreign or local consumption.

This aspect of the case was carefully investigated in Tasmania by the writer soon after its first Railway (the Launceston and Deloraine Railway) was opened for traffic in February, 1871. It was found that prior to regular daily timed service, and the consequent reduced carriers' freights forced upon the latter by the Railway competition, the average for carriers and coaches throughout the State averaged as follows:—

	Carriers & Coaches prior to 1870. d.	Current Charges (Govt. Rys.) d.	Decrease. .	
			d.	per cent.
Average Fare per Passenger per Mile	2·92	1·06	1·86	63·70
Average Freight per Ton per Mile of goods of all Descriptions	10·00	1·82	8·18	81·80

The true interpretation of this remarkable reduction in cost of transit within a very brief period is simply this: that for every £1 now obtained as gross receipts, there is a hidden value saved to either producers or consumers of the country of at least £2, apart from the actual profits of the Railway as an undertaking.

Let us now make an estimate of what this hidden value of railway speedy and cheaper transits means to the States of Australia from the working of State railways in the year 1906-7.

In this year there were open for traffic 14,232½ miles of railway, whose Capital Construction and Equipment amounted to £140,707,474.

		Per cent to cost of Construction.
(1) The Gross Receipts were	£14,455,451	10.27
(2) The Working Expenses were	8,519,110	6.05
(3) The Net Profit on Working was	5,936,341	4.22
Less Interest on Loans Capital	5,055,063	3.59
Net gain to State Revenue for the year	<u>£881,279*</u>	<u>0.63*</u>

If we now take into consideration the saving in time and cost of transit as a hidden value to the States, which was shown to be not less than £2 for every £1 gross receipts, we arrive at the conclusion that, apart from all other indirect advantages specified elsewhere, its value represents in the year 1906-7 a sum of £28,910,902, equivalent to a present capital value of as much as £826,000,000.

The whole of the States' indebtedness of £240,149,000 seems a small affair alongside of this bona fide, though hidden, State benefit.

A study of these significant figures should give pause to all superficial or interested critics who may venture to discuss the wisdom or otherwise of the policy of the Australian States, which, notwithstanding errors in the practical work of carrying out the functional policy of the State, has resulted in giving room and a productive field of work to a population of 2.55 fold the number of 1870; and, after deducting the share of our co-partners—our creditors if you like (that is, the nominal debt of £240,148,727), we have a balance of the people's income in our favour, whose present capital value exceeds that of 1870 (when there was only a debt of £28,328,000) by a sum of £3,473,000,000, besides a valuable asset in our 14,067 miles of railway, whose effect in saving of cost of transit alone is estimated in the year 1906-7 to be equivalent to a present capital value of £826,000,000 sterling.

And further, let it be noted that, notwithstanding the Interest Burden on Australian State Debts has increased since 1870 by 24s. 8d. per head, such has been the increase in the direct working profits of the State

*Note.—This item alone represents a present capital value of £25,179,371, or as much as 17.89 per cent. of the total value of Capital invested in construction.

railways alone—viz., 24s. 6d. per head in the year 1906-7, that the total interest burden on all State Debts, amounting to £240,149,727, has only been raised by the insignificant sum of twopence per head of the population.

This means (apart from the immeasurable material benefit of opening up the hitherto waste lands by the cheap and rapid mode of transit) the surplus profit to the State Treasuries from railway profits alone now practically has wiped off the taxpayers' interest burden on the whole of the existing unredeemed Public Debt of £240,000,000.

The question now to ask of all panic-struck pessimists, or "foes of our own household," is, Would the present population, with its relatively high standard of living and its vastly increased wealth, have existed had the "retrenchment and ruin" scare of the year 1870 succeeded in forcing upon the Colonies at that time the retrograde cry of "No borrowing" and "Retrenchment"?

Those who answer this question in the affirmative are, indeed, dangerous advisers on financial and economic matters affecting the State.

PART II.—THE WRONGFULNESS OF CHARGING PRINCIPAL OF COSTLY ORIGINAL WORKS OF CONSTRUCTION TO THE CONSOLIDATED REVENUE, AND THROUGH IT UPON THE TAXPAYERS EXISTING IN THE YEAR WHEN SUCH HEAVY EXPENDITURE WAS CONTRACTED.

The injustice to the taxpayer of the day, and the utter impossibility of the Government of the day to continuously adjust its schemes of taxation to suit the revenue needs of each year, as a consequence of any attempt to charge the Principal Original Costly Works of Construction, Expenditure such as Railways, Jetties, and Harbours, is best illustrated by comparing the effect upon the taxpayers of each year in Tasmania, were the burden of original cost wholly concentrated upon the Consolidated Revenue of the year, instead of, as was done, THE INTEREST BURDEN OF THE AGGREGATE CAPITAL INVESTED. This method alone enables a Government to spread the burden of the capital over present and future taxpayers equitably, in proportion to the benefits they respectively derive yearly, arising from the valuable assets created by the original capital investments which are continuously preserved in their pristine condition by the yearly maintenance renewals and repairs, which, with other ordinary working expenses are, and should alone be, a legitimate charge upon the Consolidated Revenue of the year.

THE PUBLIC DEBT OF TASMANIA.

The public debt of Tasmania on 30th June, 1906-7, amounted to £9,528,933. £7,528,000, or nearly four-fifths, was created since 1881, in a period of 25 years. Within this period the larger original outlays upon Railways, Roads, Bridges, Jetties, and Harbour were mainly incurred during five particular years—viz., 1884, 1886 and 1889, 1890 and 1891.

The following comparative table illustrates how disastrous and how unjust it would be to the taxpayers of those five years, if it were at all possible to defray the contracted capital expenditure of such necessary public works by a charge of the Principal, instead of interest thereon, upon each year's Consolidated Revenue Fund:—

GROWTH OF PUBLIC DEBT OF TASMANIA AND EFFECT UPON TAXATION AND INTEREST BURDEN.

BY R. M. JOHNSTON, I.S.O., F.S.S.

YEAR.	ABSOLUTE DEBT.		RELATIVE (PER HEAD).					
	Amount. (000 £'s Omitted).	(Mode A.) Charging Revenue with Interest only Actual.	(Mode B.) Charging Revenue of Year with the Principal.		C. Increase or Decrease in Taxation of each Year if Method (B) had been adopted.		D. Actual Total Taxation in Each Year.	E. Probable Total Taxation if Mode (B) could have been adopted.
			s.	d.	Increase.	Decrease.			s.	d.
1881	£ 2003	...	...	...	...	...	59 2	...
1882	2050	23 1	...	...	...	...	62 1	...
1883	2385	23 9	38 2	14 5	...	...	63 7	78 0
1884	3202	26 10	128 7	121 9	...	...	54 11	176 8
1885	3357	28 2	23 11	...	4 3	...	57 1	52 10
1886	4026	28 11	101 9	72 10	...	...	57 6	130 4
1887	4109	31 11	10 1	...	11 10	...	56 2	44 4
1888	4390	31 4	40 9	9 5	...	...	59 2	66 7
1889	5019	34 1	88 4	54 3	...	...	60 3	114 6
1890	6432	34 6	194 8	160 2	...	...	63 3	223 3
1891	7110	35 5	88 9	53 4	...	...	67 5	120 9
1892	7399	40 4	38 2	...	2 2	...	57 4	55 2
1893	7645	43 3	32 7	...	10 8	...	52 0	41 7
1894	7779	43 8	17 5	...	26 3	...	55 9	28 9
1895	8180	42 6	51 8	9 2	...	...	60 2	69 4
1896	8251	41 6	8 10	...	32 8	...	59 3	26 7
1897	8390	39 10	16 10	...	23 0	...	61 3	38 3
1898	8412	38 5	1 8	...	36 9	...	64 11	28 2
1899	8395	37 2	1 11	...	39 1	...	64 2	25 1
1900	8511	37 2	13 4	...	23 10	...	74 7	50 9
1901-2	8854	37 3	39 5	2 2	...	...	61 9	63 11
1902-3	9228	37 9	42 3	4 6	...	...	50 6	55 9
1903-4	9318	38 4	10 0	...	28 4	...	58 3	29 11
1904-5	9471	38 4	10 4	...	28 0	...	61 2	33 2
1905-6	9693	39 4	25 1	...	14 3	...	64 2	49 11
1906-7	9884	40 5	20 7	...	19 10	...	69 6	49 8

The illustration given in the foregoing tabular comparison is most eloquent in demonstrating three most important ethical and economical truths, viz.:—

- (1). The injustice and impossibility, if attempted, of collecting from the people of the year a tax of, say, 114s. 6d. to 223s. 3d., as would be the case in the years 1884, 1886, and 1890, if the method were adopted of charging the principal of new costly works to the revenue of the year in which the enterprise was contracted. The tax in 1890 by this method would exceed the highest yearly tax ever collected in Tasmania by 148s. 8d. per head.
- (2). The impossibility on the part of the Government to construct new large costly works necessary to the proper development of a new country by such equitable yearly instalments as would do justice to the taxpayers of each year, if charged with principal instead of the interest thereon.
- (3). The utter impracticability, if not impossibility, of any Government to devise fresh yearly schemes of taxation, if the principal instead of interest thereon were charged to the year in which expenditure was to be contracted, owing to the frequency of its extreme and eccentric fluctuations.

We can more easily realise the force of these conclusions if we ask ourselves the questions—What would happen if the directors of a large corporate body, such as the London and North-Western Railway Company of England, in the projection of a new branch of extension, proposed to the shareholders of the moment (whose individuality is ever changing hour by hour, like the taxpayers of a State) to charge the principal of cost of construction and equipment to the existing shareholder (individuals!), either by an abstraction from their rightful profits from the earnings of the original system's working, or by mulcting them in a heavy outlay which, on purchasing stock of the company, was never contemplated nor allowed for by them in the selling price? Why, the shareholder would regard it as a barefaced robbery, and would at once depose the Board

of Directors who were mad enough to move such a proposal. When, in the United Kingdom, persons are found guilty of deceiving the shareholders and the investing public by secretly appropriating Capital, Loans, Money for new works of original construction, to credit of ordinary working revenue, and so doing a gross wrong to the unsuspecting investors; or, on the other hand, secretly charging working expenditure with the principal of new costly works of construction, and so robbing the shareholder of the year, the acts of such persons would be deemed by English law to be of the nature of high misdemeanour, and there are instances where guilty directors and guilty chief accountants of Railways have received sentences of 16 years' imprisonment for such an offence against law and justice.

PART III.—SINKING FUNDS FOR THE ABSOLUTE REDEMPTION OF EXISTING AND FUTURE STATE DEBTS.

Having already demonstrated that the Wealth of the People of the Australian States since the introduction of Loans has increased in a vastly greater ratio than either Population or the present aggregate capital value of the unredeemed State Debts; and also, that, owing to the consequent increase of population and the growing working profit of State Railways to State Treasury revenues, the burden of interest for State Debts of £240,149,727 in the year 1906-7 only exceeds by 2d. per head the corresponding interest burden for State Debts in 1870, when the latter only amounted to £28,328,000, it becomes an important matter to examine the question, now so frequently proposed, as to the absolute redemption of present and future debts by means of yearly appropriation from current States revenue accounts towards an absolute Redemption Sinking Fund within a given term of years from the present date as regards debts incurred in past years, and similar provision for freshly incurred debts from the date of their contraction.

There are many suggestions recently advocated by very able public men interested in the problems of State Finance for such a purpose.

But the real question is: How far should the taxpayer of the day burden himself, not only with his own share of burdens of the State for which he in his own time is responsible, but also with burdens incurred by a former generation of taxpayers, with the view obviously of giving a much lighter burden to future generations of taxpayers, who (having the same or a fuller benefit of the same Asset) by the natural increase of numbers, would be financially more able to bear such absolute weight of burden of interest on necessary State Debts than the taxpayers of to-day.

The suggestions made by many of such advisers, in promoting the idea of creating such Sinking Funds for the Total Redemption of existing and future State

Debts, within the limits of periods of, say, 40 to 60 years, though eminently prudent and economic from the standpoint of a private individual, may still be open to question or qualification when applied to the economics of a corporate body, such as a Railway, Joint Stock Company or modern Industrial State.

The policy for determining the extent, form, and duration of Public Loans, contracted for the purpose of investment in any advantageous scheme of remunerative or reproductive work or purpose, should differ widely in some important respects, accordingly as it affects the future outlook of the private individual, the corporate body, or the Industrial State, for the following reasons:—

The "Life-expectation" of an individual person is limited, and rapidly diminishes at every stage—say after the age of 20 years. In like manner his natural powers, physical and mental, gradually decline, especially so towards the close of the average individual life.

The average Breadwinner of the State may be taken as the Shareholder unit of the State, corresponding somewhat to the individual as the Breadwinner of the Family Circle. The average State Breadwinner's life, however, is practically interminable—never grows older with years—and, in the aggregate, whose individuality is ever changing in young prosperous States, the Breadwinners or Taxpayers at the end of a century are likely to possess fully five times the power and revenue-yielding ability possessed by the aggregate Breadwinners or Taxpayers of the same State at the beginning of the century, so far as any fixed amount of debt is concerned. Even if the present debt increased in the ratio of population, the latter, from the greater wealth producing asset, kept up to present value by current revenue for renewals and repairs, without any redemption of debts, would still be less burdened per head than the State Taxpayers of to-day.

The important distinction between the Individual Family Breadwinner and the corresponding unit—the Taxpayer of the State—is perhaps best illustrated by comparing the present capital value of £1 respectively of the annual incomes of the private individual and the State Taxpayer, as in the following abstract:—

- (1). An individual—say 20 years of age—possessing a fixed income, assumed to be terminable at death.
- (2). The average existing unit Taxpayer of the State, who may be regarded not only as possessing a practically interminable income, but, owing to the natural increase of the population, his present capital value, instead of diminishing, gradually increases from year to year. In this way a given fixed burden, which may at the beginning of a century in a State, with a population of, say, 4,000,000, demand a tax of 41s. 11d. per head, would only demand for the same burden a tax of 7s. 8d. per head, when the population then increased, probably, to over 22,000,000—that is at the close of the century.

TABLE SHOWING THE COMPARATIVE PRESENT CAPITAL VALUE OF EVERY £1 OF THE ANNUAL INCOME AT DIFFERENT PERIODS OF A SINGLE LIFE AND OF THE AVERAGE ANNUAL INCOME OF A STATE BREADWINNER RESPECTIVELY.

Column (A) indicates the year.

Column (B) indicates at each period the "Expectation of Life in Years of the Single Individual Life."

Column (C) indicates the relative increase of State Breadwinners at each period owing to the natural growth of population.

Column (D) indicates the Present Capital Value of every £1 of the fixed annual Income of a Single Individual terminable at death. The Individual is assumed to be of the age of 20 years at the year 1906. The present Capital Value gradually shrinks with the increasing age of the Individual.

Column (E) indicates the Present Capital Value of every £1 of the annual Income of the average Taxpayer of a progressive State. The life of the State Taxpayer may be regarded as practically interminable, and the Present Capital Value at each successive period increases in accordance with the natural increase of the population.

(A)	(B)	(C)	(D)	(E)
	No.	No.	£	£
1906	42.10	1	21.83	27.66
1916	34.73	1.17	20.00	30.95
1926	27.39	1.39	17.28	36.74
1936	20.27	1.64	14.21	43.60
1946	13.81	1.95	10.92	51.76
1956	8.49	2.32	7.24	61.45
1966	4.66	2.75	4.23	72.95
1976	2.31	3.17	2.20	84.03
1986	0.75	3.88	0.75	102.80
1996	nil	4.60	nil	122.10
2006	nil	5.47	nil	145.40

From such considerations the writer is of opinion that the State Taxpayers of the day stand, in relation to ever-changing individuality of the State Taxpayers of the past and the future, in exactly the same ethical and economical relation as do the existing Shareholders of a Private Railway Corporation to past and future Shareholders of the same concern; and, consequently (apart from the lack of any necessity to do so), there are neither moral nor economical grounds why either State Taxpayer or Shareholder of the day should, in addition to their own equitable share of burden mulct themselves in additional expense as by Sinking Funds for the purpose of relieving their future representatives of a portion of their own fair and equitable share of burdens. The latter, too, from increasing value of Loans, Assets, increasing number and financial ability, should be in a stronger position than their representatives of to-day to fully discharge all reasonable obligation falling naturally upon them.

In conclusion, I am strongly of opinion that Sinking Funds for the absolute redemption of Loans invested in Railways, Harbours, and other Public Works should be restricted to the portions of such Loans whose Assets are short-lived and, like the terminable life of Marine Vessels, cannot be permanently preserved in original pristine value and utility by the proper yearly contributions to Maintenance, Renewals, and Repairs from current revenue, by which means the whole Permanent Way, Machinery, and Equipment of Railways are ever kept up to their pristine value as State Assets.

NOTES ON THE RIVER GORDON AND ON THE
NEED FOR RESERVATION OF LAND ALONG
ITS BANKS.

BY J. W. BEATTIE.

(Read July 13, 1908.)

The River Gordon is about four miles distant from Sarah Island. Its entrance is narrow, with a bar, upon which there is a depth of water of about two fathoms, deepening almost immediately to 10 fathoms. The entrance to the river has now been well beaconed, and renders navigation safe. Approaching the Gordon, the surrounding mountain scenery is very grand. Away to the south the D'Aguilar Range and Mount Direction stand rugged and picturesque, the next in importance being the Elliott Range, its southern trend gently sloping until lost in the billowing ranges which separate it from the D'Aguilars, while its eastern extremity ends in high, broken abruptness.

Following the Elliott Range eastward, we next notice an elevated flat belt of open country, called the High Plain. Across this plain came Sir John and Lady Franklin and party, on their memorable overland journey from Hobart in 1842, piloted by the late Mr. James Erskine Calder, afterwards Surveyor-General of Tasmania. They reached the Gordon about 10 miles from its entrance, at a reach of the river called "Preservation Inlet," where the relief vessel the "Breeze" lay awaiting them. Following the High Plain are four fine-sized mountain peaks, called by Lady Franklin "The Craycrofts," after relatives. One or other of the Craycroft peaks shows nicely in some of the Gordon scenery. Directly eastward from the Craycroft Range the tops of the Engineer Range are just visible.

Entering the river, its extensive shallows on either side are broken by rushes and driftwood, forming pleasing foregrounds to the glorious panorama which stretches from north-east to west. This is a scene to be remembered, if caught under favourable conditions—a clear early morning and a dead calm. The great West Coast Range, terminating here, shows Mounts Jukes, Darwin, Sorell, and Strahan, grouped up in great grandeur, while farther westward the harbour is closed in by Grummet and Sarah Islands, and the distant background of the wall-like ranges terminating at Table Head.

The general scenery of the Gordon represents high gorges, densely wooded to the water's edge, with long reaches and beautiful bends. There are stretches of open country in parts, but for 24 miles, until the River Franklin is reached, it retains the character I have indicated.

There is a fine outcrop of limestone at Limekiln Reach, 12 miles from the river entrance, which in the early days was quarried and burned by a party from the Sarah Island establishment.

About two miles further along brings us to Butler's Island, a peculiar rock close to the eastern side of the river. It received its name from the officers of the Sarah Island establishment, Captain Butler, of the 40th Regiment, being one of its best and most energetic commandants. The high rock to the west of the island I named Cuthbertson's Head, after Captain Cuthbertson, who was the first commandant of Sarah Island, and who was drowned at the entrance to the River Gordon.

Pining, as carried on in the Gordon and vicinity today, is mostly confined to the creeks and small rivers which flow into the main stream. All the pine timber which grew so abundantly at one time along its banks, and in the adjacent flats, has been worked out years ago, and it will take a century at least for the young forest trees to mature and be fit for use.

Among the surroundings of the higher waters of the River Franklin, in the vicinity of the Frenchman Range, where the country is excessively steep and rugged—roads are quite out of the question, and the work of pining is both difficult and dangerous, most of the pine

being found on the top and sides of the precipitous hills. When felling is completed the tree is trimmed and barked, head cut off, and end pointed, ready for "shooting." Jacks of the Trehwella pattern are used to start the tree down hill, when it "shoots" into the river bed below, and there awaits the winter floods to carry it onward to the Gordon. The Franklin is navigable for twenty miles from the Gordon for small boats, and in that distance there are 150 rapids, some very high and dangerous, and in surmounting them the boat has often to be carried on shore round them before progress further can be made. In view of the annually increasing scarcity of suitable timber for the world's requirements, it would appear to be a matter deserving of great attention at the hands of the Government to endeavour by every means within its power, not only to conserve the existing forests, but to take every step possible to increase the supply of so valuable a timber, with possibilities in the future of considerable magnitude.

Gould's Landing, a well-known Gordon landmark, is 20 miles from the river entrance, and about one mile above Butler's Island. The river is fairly open from the island to the landing, which is situated on a river flat, but to this point from its junction with the Franklin the Gordon flows through fine gorges, and is very impressive. Gould's Landing may be said to mark the limits of safe navigation for large craft, although the river can be navigated as far as the first rapids, one and a-half miles above the landing. Here is the first obstruction to the safe navigation of the Gordon. Two groups of heavy rocks lie across the river, separated some little distance from each other. They are known as the first and second rapids. These once negotiated, the river continues unobstructed to the junction of the Franklin, about two miles distant. The River Franklin junctions with the Gordon at 24 miles from Macquarie Harbour. At its entrance is Pyramid Island. The Franklin takes its rise from Lake Dixon, near Lake St. Clair, and from its source to its junction with the Gordon waters is very confined, rough, and dangerous. Floods in this river are exceptionally severe, the water rising during the heaviest floods as high as 60 feet above normal level, ordinary floods reaching 30 feet. The flood waters develop a tre-

mendous velocity, racing to the Gordon at 20 miles an hour.

Returning now to the Gordon. Above the Franklin the Gordon is obstructed by numerous rapids. For 10 miles its course is through low country, about fifty rapids being met with in that distance. Following up the river, deep gorges are met with up to the Wilmot Range, 25 miles from Gould's Landing, and expert boatmen are able to reach this point.

The source of the Gordon is in Lake Richmond, under the shadow of the King William Range, whence it flows through picturesque surroundings in the Rasselas Valley, making a long and graceful sweep round Mount Wright, which is known as "The Great Bend." From here its course is past the Thumbs Range in deep and rugged gorges to the eastern side of the Wilmot Range, 20 miles distant, the last few miles being through low button-grass country. From Lake Richmond to the Great Bend is about thirty miles, and the total length of the river from its source to Macquarie Harbour about 95 or 100 miles.

Floods on the Gordon occur in April generally, and are usually heavy. There is a break of frosty weather, in June particularly, then, from July to November, floods are always prevalent. In heavy floods the river rises to 30 and 40 feet, and in ordinary floods to 20 feet. These heights apply above Gould's Landing, where the river is narrowest. From the Landing to the mouth of the river, the flood waters reach the height of from 16 to 8 feet. Below Gould's Landing the current attains a speed of approximately 8 to 10 miles an hour, although in the narrower parts the velocity is very much greater. At the second rapids, for instance, where the river is narrow, and has an acute bend, as the waters career down they dash into the bank at this bend, producing a scene of the wildest confusion.

Apart from the aesthetic side of the Gordon's attractions, its scientific aspect, as contributing a unique display of our West Coast flora, must become apparent to all, and should alone warrant beyond question its rigid protection against axe and fire. It is necessary that urgent measures be taken in bringing about this protection, for already whispers of the erection of a saw-mill are in the air, and this, if once established without

restrictive precautions, would undoubtedly mean the "beginning of the end" to the beauty of the Gordon. Surely we must see to it that such a menace should not for one moment be allowed.

Some attempt at protection has, I believe, already been made, the Government having reserved a strip of land five chains wide on each side of the river, for a distance of 16 miles from the entrance at Macquarie Harbour. This is totally inadequate to fully protect the river from the depredations of the timber hunter. The area must be greatly extended, and my proposition is that all the hillsides immediately fronting the river should be reserved, allowing five or ten chains on the flat parts of the river, reservation to commence from the Macquarie Harbour entrance, and end at one milè beyond the Franklin River Junction, which would give a total length of 25 miles, and would effectually protect the whole of the beautiful scenery of the river. This reservation cannot interfere with the pine industry, no pine being available now on the banks of the river, nor would timber-getters suffer inconvenience, as their sphere of labour, would lie outside the reserve.

The economic value of this reserve to the state, apart from aesthetic or scientific considerations, may be regarded as practically "nil," the land being worthless for settlement or agriculture, and no minerals have, I believe, been discovered within the proposed area of protection, so that, under such circumstances, the Government lose nothing by its reservation, but, on the contrary, would gain, now and in future years, the approbation and esteem of all right-thinking people of this state.

The preservation of scenery in other parts of the world is receiving the greatest attention, and even in England a society has been formed for the preservation of Swiss scenery. How much greater is the necessity existent in a country like Tasmania, relying so much upon her tourist traffic, to preserve by every means within her power attractions without which such a traffic would diminish rather than increase, to the serious loss of the state. One hesitates to put this selfish aspect of the case before a learned society, but "necessity knows no law," and, after all, a public awakening may be better aroused by a proposition in this form rather than from a more scientific standpoint.

A NATIVE BURIAL GROUND ON CHARLTON
ESTATE, NEAR ROSS. (PLATE V.).

BY FRITZ NOETLING, M.A., Ph.D., ETC.

(Read August 10th, 1908.)

The customs observed by the Aborigines in disposing of their dead relatives and friends have been most carefully described in Ling Roth's book on the Aborigines of Tasmania (1). But in perusing this compilation anyone must be struck by the rather conflicting accounts given by different observers.

The earliest, and probably the most trustworthy description of a native grave is given by Peron (2). The corpse was burnt, the ashes covered with a layer of grass arranged in connective rings, forming a low cone, and this was held in position by small wooden wands crossing one another at the top of the cone, their ends being pushed in the ground and held in position by a large flat pebble. Above this was erected a curious tetragonal pyramid of wooden poles, covered with bark and tied together at the top. This structure covered a quantity of ashes, and Peron is most explicit to explain how he extracted the bones from this grave.

Peron's description is accompanied by a sketch, copied in Ling Roth's book in which three graves are seen—a complete one, another opened in front, and a third one showing only the central cone without the outer pyramid of bark.

As Peron states that "the monument," as he calls it, was the only one found by him, it is obvious that the sketch is not an exact representation of what he has observed, but rather a reconstruction based on actually observed facts.

Peron's description is rather emotional, attributing to the Aborigines feelings that he, the sentimental Frenchman of the 18th century, may have had, but

(1) Ling Roth, *The Aborigines of Tasmania*, 2nd ed., Halifax (England), 1899, pp. 116-122.

(2) Peron and Freycinet, *Voyage de Decouvertes aux Terres Australes*, Paris, 1807-1816.

which it is safe to say were hardly those of the Aborigines of Tasmania. This touch of sentiment rather mars his otherwise clear description, and he has on account of this probably overlooked certain facts which would be of the greatest importance to us were they recorded.

The account given by A. Cottrell (1) refers rather to the customs observed than to the grave itself. According to him the corpse was burnt, and the relatives, having collected the ashes, besmeared their faces with it, and tied the remainder up in a piece of kangaroo skin, which they wore about their person. According to West, the skull of an infant was taken up from the ashes, wrapped up in a piece of kangaroo skin, and worn by a female, probably the mother. There cannot be the slightest doubt that fragments of human bones, tied up in a bit of skin, were highly prized as amulets or charms by the Aborigines. However interesting that may be, it does not bear on the question at issue, viz., the disposal of the dead bodies.

It is certain that the Aborigines burnt their dead, but there is a considerable difference as to the disposal of the ashes. If the practice referred to by Backhouse, Cottrell, and West had been extensive, there would have been hardly any ashes left. On the other hand, Peron's statement is so explicit that it is safe to assume that always a considerable quantity was left, which was eventually covered in the way described by Peron. It is therefore very probable that it was customary to burn the dead, and some of the remains were worn as charms or amulets by the relatives, who probably besmeared their faces also with the ashes (3).

(3) I quote from Ling Roth. It seems that a good deal of G. W. Walker's statements are based on information given to him by A. Cottrell.

(4) This fact throws a curious sidelight on a custom referred to by the Bible—extreme grief was expressed by going in sack-cloth and ashes. It is natural to ask, why ashes? If we assume that this custom, used by later generations without knowing its real meaning, was based on the custom of early mankind to besmear their faces with the ashes of a deceased relative, we have probably the true explanation of anotherwise strange custom. To besmear the face with the ashes of the deceased expressed the greatest grief for its loss, and after mankind became more civilised they no longer used the deceased's ashes, but simply put any kind of ashes on the head.

Some writers also refer to the custom of placing a dead body in an upright position in a hollow tree. As far as I can see this was only done in cases of emergency, when there was no time to burn the body at once; but they were certainly subsequently burnt.

And now a very curious question arises: Did the Aborigines dispose of their deceased on the spot where death took place, or did they carry them to certain places habitually used for the purpose of cremation? It is pretty safe to assume that death mostly took place on the camping ground; some may have died while travelling, while others may have been killed at odd places in their internecine wars.

It is very strange to find that not a single one of all observers noticed whether the Aborigines had regular burial grounds or not. The only reference I can find is Braim (4), who states: "Whenever they approached places where any of their countrymen had been deposited, they would on all future occasions avoid coming near such spots, and would rather go miles round than pass close to them." The same authority states that "other tribes, again, when it was not convenient to carry off the dead body to some place of interment would put it into some hollow tree."

These two statements would imply (a) that there was a regular burial ground, (b) that the dead body was carried to it. Now, we know that the names of the deceased were never mentioned again by their relatives—in fact, they seem to have had a superstitious fear of the spirits of their departed, and from this fact alone we may conclude that the dead were not indiscriminately buried. It is hardly probable that if anyone died at a regular camping ground they disposed of the dead body then and there in the way described by Peron and others. It is more probable that there existed certain areas, well known and to be avoided, where the remains of the dead were deposited. The question, however, is, Do such burial grounds exist? As already stated, no author but Braim mentions a burial ground; but if they

(1) Braim, Thos. H., *History of New South Wales from its settlement to the year 1844*. II., p. 267. London, 1846. (I quote from Ling Roth, p. 62.)

exist, the traces left behind must be very fragmentary. It is evident that the wooden superstructure described by Peron cannot have stood for any length of time. It is equally certain that the grass covering soon rotted away; in fact, the second grave mentioned by Peron seems to have been in this dilapidated condition, and the first one, so minutely described, must have been of very recent origin. We can safely assume that after a few years nothing remained of the rather elaborate structure but a low earthy mound, in which a few stones were embedded, and even these relics were very perishable. We can only regret that Peron, led away by his emotions, did not make a closer examination of the two localities where he discovered the graves; if he had, the question whether the Aborigines used regular burial grounds or not would have been settled. Had he seen such little mounds of earth covered with a few stones, there could have been no further doubt that this place had been used as a regular burial ground.

A discovery which I lately made on Charlton estate, near Ross, seems to settle this question in favour of the existence of a regular burial ground. Mr. E. Cameron, of Mona Vale, informed me that a so-called native burial ground existed quite close to Charlton house. Following the fence behind the house in an eastern direction for about half-a-mile, we came on a most remarkable spot. The hill is apparently covered with sand, and right on the top the sand has been blown out for a length of about three hundred feet to a depth of over four feet. The remains of the covering layer of sand can still be seen towards north, and they are well marked in the photograph. The hill commands a fine view all round, and the photograph gives only a poor impression of the large area that can be overlooked.

On the loamy soil, about seventy to eighty little mounds of earth, irregularly covered with more or less rounded stones, can be seen. These mounds are about three feet in diameter, and very low; in fact, most of them are hardly raised above the ground. I opened several of them, but, except an irregular layer of whitish tenacious clay, covered by the ordinary reddish loam, I found nothing. There were not the slightest traces of bones. Fragments of stone implements were not un-

common, lying scattered about among the bigger stones.

Though no bones were found, I have not the slightest doubt that this place has been used as a regular burial ground by the Aborigines. There is no agency to which we could attribute the heaping up of a number of little mounds of earth in which large stones are embedded but to human beings. It is not very probable that these mounds represented fireplaces; if so, why should the whitish clay be invariably covered under a layer of red loam, in which rather heavy stones are embedded? The only way to account for these little mounds is to assume that they are graves of Aborigines, and, if this be so, they must be of great age. There is no doubt that these graves were some time ago covered by a deposit of blown sand, measuring not less than four feet in thickness, and in that way perfectly concealed. They became only exposed when the sand, instead of being deposited, was again blown away. Both the covering and the blowing out must have taken some time, and we know nothing about the length of the interval between, which may have amounted to a considerable number of years. It is therefore hardly surprising that no bones were found. The larger fragments had been taken away by the relatives; the smaller fragments, already much calcined by the fire, soon disintegrated into dust, and in course of time the ashes turned into a whitish clay.

The numbers of mounds exposed proves that this place was regularly used for the disposal of dead bodies, and this proves Braim's statement as to the existence of regular burial grounds to be correct.

We may assume that not too far from the regular camping grounds a spot commanding a good view was selected for depositing the remains of the dead, but it still remains an open question whether they carried the corpses to such places in order to burn them there, or whether they cremated on the place of death, and carried the ashes to the regular burial ground, where they were interred in the manner described by Peron.

Braim's statement, above referred to, seems to indicate that the bodies were carried to the burial ground;

but I feel inclined to think that this view is not correct. We know that the Aborigines shirked all kind of labour, and carrying a corpse, perhaps for some miles to the nearest burial place, would mean a good deal of hard work. Further, if this had been so, it would have been surprising that no such procession had ever been seen or witnessed by a European. We might perhaps assume that this was done during the night, but all accounts agree that the Aborigines had a great dislike for travelling at night, and this, coupled with their dread of the deceased, makes such an assumption very improbable.

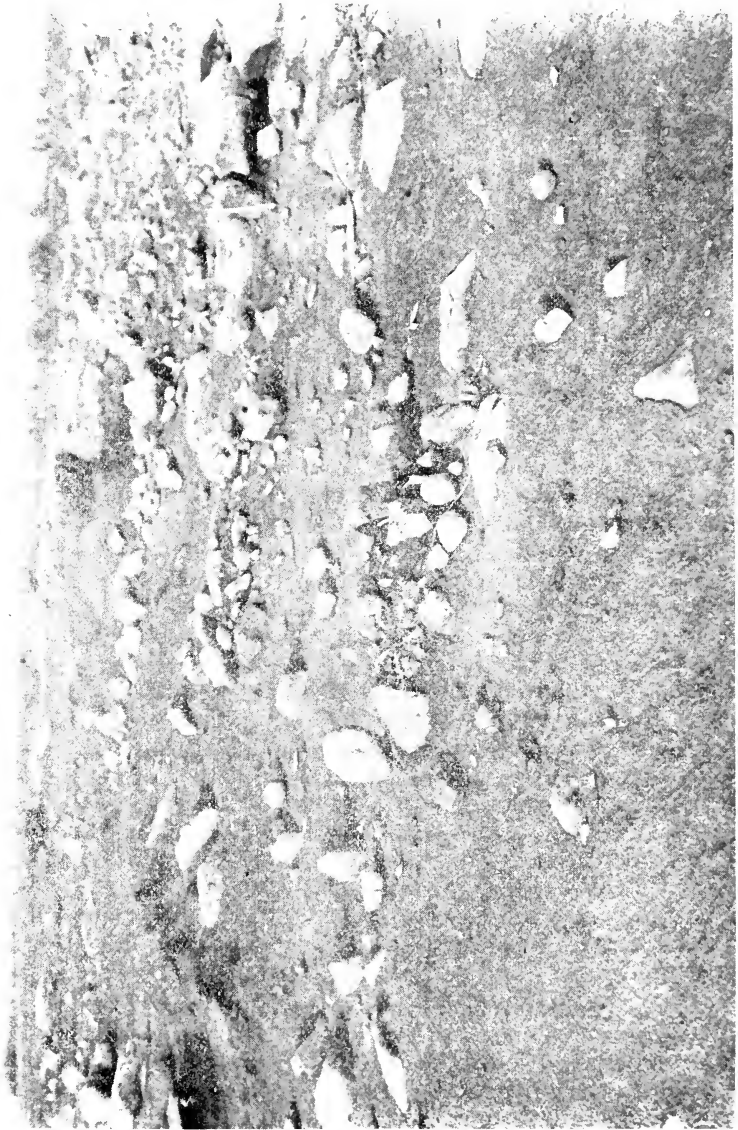
If we consider all the evidence that has been handed over to us, together with the evidence which the Charlton burial ground affords, we can form the following view as to the disposal of dead bodies.

When a death occurred, a pile was erected, and the body cremated on the spot. Probably while the burning was going on the relatives who attended to it used to smear their faces with some of the ashes, and, after the burning had been completed, the fragments of the larger bones were used as amulets or charms, wrapped up in a piece of kangaroo skin, and worn by the relatives or friends. The remainder of the ashes were scraped together, and carried, in a kangaroo skin (?) or a basket (?)—to the nearest burial ground, where they were deposited in a shallow hole scraped in the ground by means of a sharp stone (?). After being covered with a little earth, the grass cone and bark pyramid described by Peron were erected, and the place hereafter avoided as much as possible.

It would be very interesting to know whether similar burial places exist elsewhere in Tasmania. Mrs. Burbury, of Charlton, informs me that a similar, though much more extended place, exists near Fonthill, and Mr. Henry Foster, jun., has told me that another one is found on Darlington Park. As I have not seen either of these places, it is impossible for me to venture an opinion about them, but, to judge from the description given to me, they must exactly look like the Charlton burial ground. If this be so, the fact that the Aborigines had certain places set aside for the regular disposal of their dead bodies is beyond further doubt. The only

question which has not quite been settled yet would be whether the dead would have been carried bodily to the burial ground, or only their ashes. From all we know about the habits of the Aborigines, the latter view is more probably the correct one.

It may appear that I have gone at some length in discussing a rather trifling question. The conclusions we may, however, draw from this as to earlier history of mankind are of the greatest importance. We may conclude that early man disposed of the dead bodies by cremation, and that the custom of burying the corpse is of much later date. It is therefore not to be wondered at that the remains of diluvial and pre-diluvial human beings are so extremely rare. If archæolithic man died, his relatives disposed of his body by cremation, and only under such fortunate circumstances, when it was impossible to get hold of the corpse, which was also protected against animals, was there a chance that the remains would be preserved. The few remains of diluvial man, the famous Spy-Cro-Magnon race, have been found under circumstances which indicate that these former owners must have come to a rather sudden end while sitting in front of their cave, by being killed and covered by a sudden fall of rocks from above. If diluvial and tertiary man disposed of his dead bodies in a similar way as the Aborigines, and there is no reason to assume a different view, the old burial grounds must have long become entirely obliterated, and the same fate is certain to happen to the Tasmanian burial grounds before long.



NATIVE BURIAL GROUND, Charlton.

Dr. Noetling, Photo.

THE NATIVE QUARRY OF SYNDAL, NEAR
ROSS. (PL. III. AND IV.).

BY FRITZ NOETLING, M.A., PH.D., ETC.

(Read August 10th, 1908.)

In the monthly notices of this Society for June, July, and August, 1875, page 41, the late Mr. J. R. Scott describes the locality of a "native quarry" as follows:—

"It has long been desirable to fix upon a spot where the Aborigines obtained their flint or stone implements. I am now able to fix upon two places, viz.:—First, about 10 chains immediately in front and to the north-east of the stone hut in Stocker's Bottom, County of Somerset, Parish of Pell. The second is about one mile more to the south-west, on Lot 443, on a branch of Dismal Creek running out of Stocker's Bottom. These two places are about six miles distant from the Macquarie River."

I think the wording can only be interpreted in one way, viz., that the Aborigines obtained the rock which they used in the manufacture of their stone implements from two localities, about six miles from the Macquarie River, at a place called Stocker's Bottom. In other words, that there exists what is commonly called a "Native Quarry" at Stocker's Bottom. It is in this meaning that Stocker's Bottom has been quoted in Johnston's Geology of Tasmania and Ling Roth's Aborigines of Tasmania.

When visiting Mt. Morriston, in June, 1908, I was anxious to see this locality, but Mr. Bennett, of Mt. Morriston, informed me that the story of the native quarry at Stocker's Bottom was a myth. However, I thought it better to convince myself whether there is any truth in Scott's statement or not, and accordingly I set out, in company with Mr. Vere Pouillet-Harris, and

under the guidance of a man who knew Stocker's Bottom well, who had kindly been placed at my disposal by Mr. Eustace Cameron, of Mona Vale, to hunt up the native quarry at Stocker's Bottom. It was a long and tedious ride; but we found the stone hut right enough. "Ten chains immediately in front and to the north-east" we went, but there was not a sign of an outcrop of chert or any suitable rock, not to say of a native quarry. There was only black alluvial soil. We went further—20, 30 chains, half-a-mile—no sign of a quarry. We went in a wide circle round the hut; nowhere the slightest indication of even a small fragment of chert or a native implement. This careful examination of the locality which Mr. Vere Poulet-Harris and myself made, with the assistance of a man who knew almost every inch of ground, has conclusively proved that the native quarry near the stone hut in Stocker's Bottom is a myth. We then set out to hunt for the second locality, but, except a few pieces of dark chert on the slope of a low hill, I found nothing, and it seems pretty certain that there is no quarry at the place described by Scott.

It then struck me that another interpretation might be given to Scott's statement. Can it be that he discovered some outcrops of chert, and that he only wanted to say that he discovered two localities where rock suitable for the manufacture of Aboriginal implements occurs, leaving it an open question whether the Aborigines did exploit that locality or not? This view would in some way account for this otherwise inexplicable statement. However that may be, it is certain that there exists no native quarry in Stocker's Bottom, and this locality must therefore be struck off the list of places whence the Aborigines obtained the material for the manufacture of their implements.

Though disappointed in Stocker's Bottom, I had the good luck to hear of another native quarry which had been discovered by Mr. George Hutchison, of Beaufront, on Syndal Estate. Mr. Hutchison kindly showed me the place, and I feel greatly indebted to him, because it is doubtful whether I would have found this rather remote locality without his guidance. We proceeded from the road that leads from Ross to Trefusis in an eastern direction along the wire-netted boundary

fence between Syndal and Charlton Estate, till a hut near an artificial lagoon, which is somewhat north of the boundary fence, was reached. Passing it, we eventually reached a wire-netted cross fence running north and south, and, passing through the hurdle gate, we turned towards right (south), and, following the cross fence for about a quarter of a mile, we came on the slope of a low hill right on to the quarry. The run where it occurs is known as the "Front Shelves Run."

At first it did not seem very extensive; but further examination showed that it extended for at least half-a-mile in an eastern direction. The sight is really a remarkable one, and the photographs give only a very poor idea of it. Hundreds of thousands of fragments of rock are lying about, sometimes in large heaps, sometimes more scattered. No better comparison could be made than with a road recently covered with fresh broken metal, and every one of the fragments we see has once passed through human hands.

Unfortunately, the bush is rather dense, and this made a closer geological examination impossible. A short distance towards south-east there are sandstone cliffs, in which now and then a little cave has been hollowed out. The relationship of the chert which was used for implements and the sandstone is not quite clear; neither did I see any volcanic rock close to the outcrop of the chert. As far as can be made out, the chert forms a band of about 120 feet in width and half-a-mile in length, striking almost due east-west. Perhaps a closer examination will reveal more with regard to the geological features. For the present it is impossible to say anything more in particular with regard to the origin of the chert, whether it is metamorphosed or an original sedimentary rock. The extremely fine bedding would almost suggest that it is a true siliceous shale.

At the western part the chert is of dark blue colour, and of very fine grain; it is very evenly striated, and darker and lighter-coloured bands are irregularly alternating. At the eastern end, however, a chert of light greyish colour occurs. It would be interesting to see the passage of the dark blue into the grey chert; but I am afraid this is impossible without a good deal of digging and blasting. However, this occurrence proves

that there is no fundamental difference between the dark blue and the grey chert. It seems that this chert breaks up into irregular lumps of varying size, which are covered with brownish crust. These lumps have been broken by the Aborigines into irregular angular fragments, most of which were rejected; but suitable pieces were worked then and there into implements, while others were apparently taken to the camping grounds. All the specimens that have been handled by the Aborigines are covered with a whitish patina, which sometimes, particularly at the angles, wears off, disclosing the dark black colour of the rock.

It is very remarkable that only a small number of implements were found that show a considerable amount of chipping. Though there is an enormous number of angular fragments, I think that hardly one in a thousand is extensively worked. And there is another notable fact, all the specimens, which show either a well-worked indical face or careful trimming of the edges, invariably show a nice smooth pollical face. I already dwelt on this peculiar fact in my description of the Native Quarry on Coal Hill (Melton-Mowbray), and I can only account for this in one way. The quarries were not working places—they were quarries pure and simple—that is to say, places from which the stone used for implements was obtained. The Aborigines visited these places simply to obtain a supply of suitable flakes, most of which they took away in order to shape them at their camping grounds. Had they made their implements at the quarry, we might certainly expect a large number of unfinished rejects or broken specimens.

Another fact struck me also as very remarkable, and I may say that this equally applies to the Coal Hill Quarry. In my search for well worked specimens, I naturally turned over and examined a large number of fragments, and numerous of these seemed by size, shape, and sharp edges conveniently suitable for a cutting implement; yet they were apparently rejected. On the other hand, specimens which are well worked and trimmed appear to be much less suitable than the rejected fragments.

I already noticed, at the June meeting of this Society, a similar fact when describing the nucleus and the flakes struck therefrom; flakes that were very suitable were disregarded, and at last one, which does not appear to have more advantages than the others, was obtained, and further work was stopped. One can only wonder at the enormous waste of labour, and, as all the lower races are notoriously lazy, it is astonishing to note that they must have spent a vast amount of their labour in vain. It is very difficult to give a satisfactory explanation of this unquestionable fact; I can only suppose that every time when an Aborigine required an implement he wished it to be of a certain size. He commenced striking off flakes till one of the desired size was obtained, disregarding all the others that fell off, however suitable they might otherwise have been, because they did not have the size, or perhaps better said, the required weight. It cannot be the shape, because all Tasmanian implements are true amorpholithes—that is to say, devoid of all intentional form. It can therefore only be the size or the weight of the desired flake that came into consideration. If this view be correct, it would certainly account in a satisfactory way for the otherwise puzzling fact that numerous flakes which are evidently suitable for implements have been rejected, while others less suitable have been worked into implements.

At present a fairly thick bush grows all over the quarry, and the traces of a great bush fire are still visible. These bush fires had a remarkable result on some of the fragments; a large number are superficially cracked; as a further result, irregular splinters break off, and the originally smooth surface assumes a rough, jagged appearance. I have a most striking example of this action of the fire in a well-chipped specimen, from which a number of splinters have already been detached, while others are ready to break off at the slightest shock. It is obvious that if this specimen had been exposed for a longer time to the action of fire and rain, the originally well-chipped archaeolithe would have changed into an angular fragment, devoid of any signs of working, but perhaps showing still the cracks produced by fire.

In conclusion, it is advisable to give a revised list of the native quarries known up to date (2). These are—

1. A quarry on Coal Hill (1), near Melton-Mowbray (Johnstone's Quarry)—(Noetling, *The Native Quarry on Coal Hill, near Melton-Mowbray*, *The Tasmanian Naturalist*, 1907, Vol. I., No. 2, pp. 14-19). Chert-quarry.

2. Small quarry near the railway station of Pontville. Porcellanite-quarry. (Weston's Quarry.)

3. Quarry on Front-shelves run, Syndal Estate, near Ross. Chert-quarry. (Hutchison's Quarry.)

4. Quarry on the boundary line between Glenleith and Charles Hope Estates, River Plenty, about 2 miles from Plenty railway station. Chert-quarry. (Walker's Quarry.) (H. Ling Roth, *The Aborigines of Tasmania*, 2nd edition, 1899, p. 149.)

5. Quarry in the neighbourhood of the Great Lake, between Split Rock and the western shore of the Great Lake, according to the late Mr. Scott. This place is quoted in Johnson's *Geology* and in Ling Roth's *Aborigines of Tasmania*. Mr. Harold Bisdee has also mentioned to me that a quarry exists near the Great Lake, but whether this is the same locality as that mentioned by Scott I am unable to say.

6. It is certain that the Aborigines used the Breccia, which occurs in large, loose boulders on the beach of Droughty Point for their implements, though there is no regular quarry. The numerous implements picked up

(1) Only a few days ago Mr. R. V. Nicholls, of Melton-Mowbray, kindly informed me that he had found another quarry, about four miles to the west of the railway station. I have just seen this locality, and I can fully confirm Mr. Nicholls' discovery. The quarry is the largest and most extended I have hitherto seen, and I will describe it in a subsequent paper. I may only mention here that it is a chert-quarry, in which the treasured kind of grey chert was obtained. As there are now two quarries near Melton-Mowbray, and as the locality where this quarry is situated has no particular name, I propose to call it Nicholls' quarry, in honour of its discoverer, in order to distinguish it from the quarry on Coal Hill, which I now distinguish under the name of Johnstone's quarry.

(2) The number of quarries having increased, I think it advisable to distinguish each by a special name. Geographical names not being always suitable, I think it will be best to name the quarry after its discoverer.

on Droughty Point are, however, of the same kind of rock as occurs on the beach.

7. A quarry is said to exist on the road from Campbell Town to Swansea, near Lake Leak. As I have not visited this place, I am unable to say whether this is correct or not.

8. Hunter's Hill, Native Point, on the South Esk, near Perth. The name implies that it must have been a favourite resort of the natives. If I am right, Mr. Johnston has first discovered this place, but it does not appear to have been a regular quarry.

9. Pipe Clay Lagoon, South Arm (Johnston, *Geology of Tasmania*). Though there is no doubt as to the occurrence of metamorphosed rock, I do not think there exists a regular quarry.

10. On the Tamar River (Johnston, *Geology of Tasmania*). Nothing is known to me about this locality.

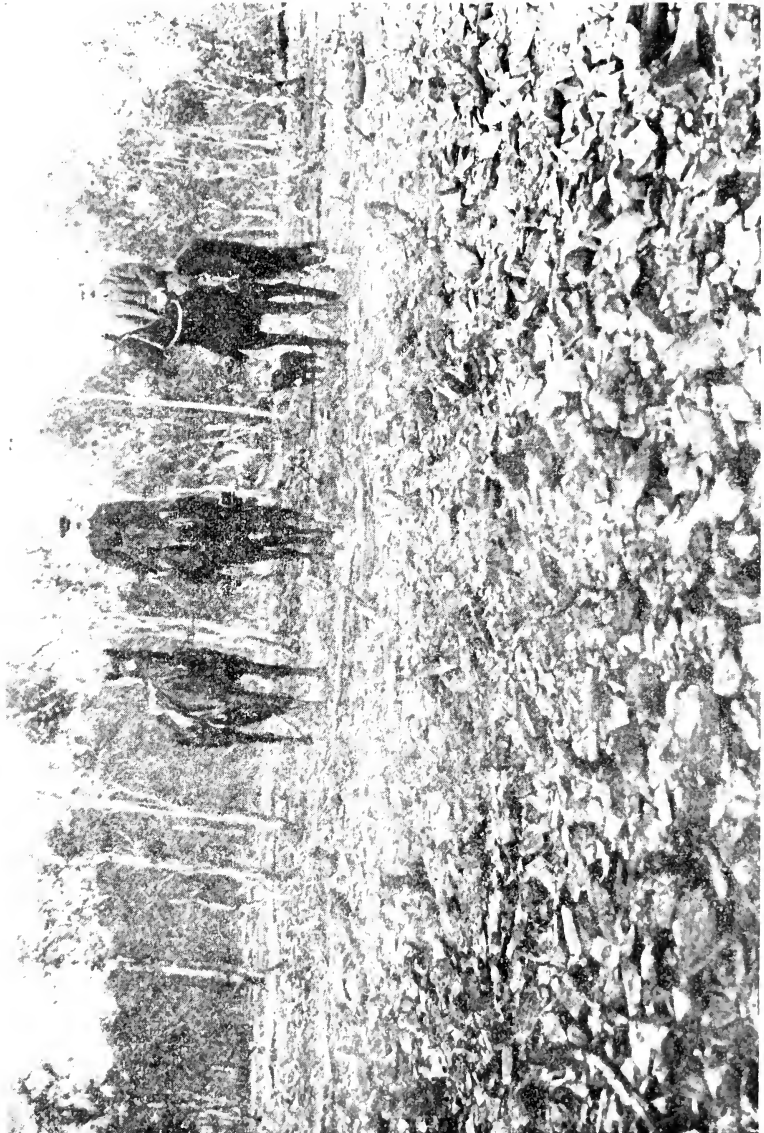
11. Mount Communication, Saltwater River, Tasmania's Peninsula (2). (Clark's Quarry.)

Out of this number we may take it that Nos. 1-5 and 11 are regular quarries—that is to say, localities frequented by the Aborigines, perhaps for a long space of time, in order to obtain suitable fragments of rock to be shaped into implements.

The locality near Droughty Point is not a regular quarry in the meaning of those above mentioned; it is very probable that Nos. 8, 9, 10 come under the same heading, though, not having seen these localities myself, I do not wish to express an opinion.

No. 7, the quarry near Lake Leak, will have to be included in the list of regular quarries, provided that the information is correct. I therefore leave it as doubtful for the present, but I hope that later on I shall be able to give more information about it. There are therefore up to date (November, 1908) seven places known in Tasmania which have been habitually frequented by the Aborigines in order to obtain the material for their stone implements.

(2) Since the above was written I have been able to examine this quarry, which is situated in a very remote place. Mr. George Clark kindly showed me the place, and I am greatly indebted to him for guiding me. I will describe this quarry, together with Nicholls' quarry, but I may mention here that it is of the chert type.

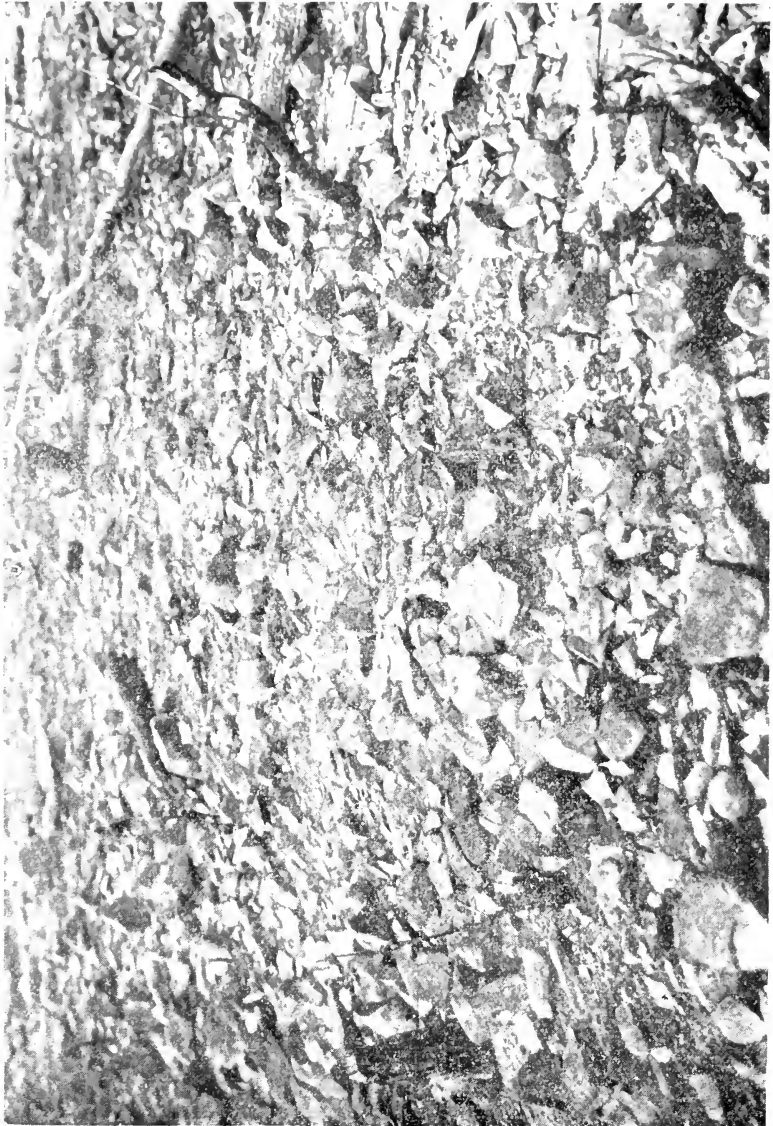


Dr. Noetling Photo.

NATIVE QUARRY, Sydal.

ROY. SOC. TASM. 1908.

PL. IV.



NATIVE QUARRY, SYNDAL.

Dr. Newling. Photo.

ADDITIONS TO THE TASMANIA MOLLUSCAN
FAUNA. (PL. VI.).

BY W. L. MAY.

(Read 14th September, 1908.)

Since the publication of Tate and May's Revised Census, in 1901, a considerable number of species new to the Tasmanian molluscan fauna have become known to me, and I think it is well to place the names on record. I also offer observations on several species, and take the opportunity to describe and figure what appear to be three species new to science. This paper does not in any way refer to the large mass of new material lately dredged off Cape Pillar by C. Hedley and myself.

List of new records, with habitat and remarks:—

FASCINUS TYPICUS (Hedley).—One juvenile example taken on the beach at Pirate Bay, and identified by the author, Coll. W. L. M.

MARGINELLA ANGASI (Brazier).—This has long been known to local collectors, but has been confused with *M. simsoni* (Tate and May). If I have rightly identified the species, then *M. halli* (Prit. and Gat.) is a synonym.

TEREBRA INCONSPICUA (Prit. and Gatliff).—One specimen. Storm Bay, 23 fathoms.

CLATHURELLA BICOLOR (Angas).—Not uncommon in Frederick Henry Bay.

TARANIS EDWINI (Brazier), *Clathurella*.—One specimen. Very similar to *T. minuta* (T. W.) in general appearance, but distinguished by its punctate pullus, which in *minuta* is spirally lirated. *Daphnella mimica* (Sowb.) is a synonym of the latter.

- DAPHNELLA CASSANDRA (Hedley).—Derwent Estuary. Many specimens.
- MITROMORPHA PALLIDULA (Hedley). Storm Bay.—Fred. Henry Bay. Rare.
- NATICA SHOREHAMII (Prit. and Gatliff), Storm Bay, 24 fathoms.—One example.
- SCALA VALIDA (Verco).—One living example, off Pilot Station, Derwent. Several fragmentary, from Fred. Henry Bay, in shell sand.
- CINGULINA DIAPHANA (Verco).—Three examples. Various southern localities, in dredgings.
- LITORINA PRAETERMISSA (May).—N. S.
- RISELLOPSIS MUTABILIS (May).—N. S.
- CYCLOSTREMA BASDOWI (Gatliff).—One example, Fred. Henry Bay, which seems a slight variety of this species.
- SCISSURELLA ROSEA (Hedley).—Fred. Henry Bay. Several examples.
- SCISSURELLA ORNATA (May)—N. S.
- GADINEA ANGASI (Dall).—East and North Coasts. Rare.
- GARI KENYONIANA (Prit. and Gatliff), Tellina.—Two valves, on beach at Adventure Bay. Coll. W. L. M.
- CIRCE ANGASI (Smith).—Several valves. Storm Bay, 24 fathoms.
- CUNA CONCENTRICA (Hedley).—Storm Bay, 24 fathoms. One valve.
- CONDYLOCARDIA PROJECTA (Hedley).—Fred. Henry Bay. One valve.
- CONDYLOCARDIA CRASSICOSTA (Bernard), Fig. 6.—This species was described from New Zealand, and is an interesting addition to our list. Under the belief that it was new, a figure was prepared by Miss West, which is here inserted for the benefit of Australian students. A few specimens taken in Frederick Henry Bay.

PHILIPPIELLA RUBRA (Hedley).—Many localities in the south.

MYTILUS CANALICULUS (Martyn), *Universal Conchologist*, 1784, Pl. 78. *Latus* (Chem), non Lamarck. *Tasmanicus*, Tenison-Woods. This novel synonymy is the result of a careful examination of our larger *Mytilus*, showing that the very large form named *Tasmanicus*, by Woods, is not conspecific with *M. planulatus* (Lamarck), but is identical with the New Zealand species *M. canaliculus*, which is distinguished—besides some difference in outline—by strong teeth in the hinge at the apex of the shell, and which are quite wanting in *M. planulatus*. The habitat is peculiar, it being nearly always found in deep water, and is occasionally obtained by scallop dredgers in the Derwent. I once saw two specimens attached to a tidal rock, Fred. Henry Bay, and also possess a fine example taken on the beach at Marion Bay, East Coast.

AURICULA DYERIANA (Tenison-Woods).—I now possess one of the type lot of the above species. In Tate and May it is made a synonym of *Cassidula zonata* (H. and A. Adams), but from a study of *C. Hedley's* figure of that species, in *P. L. Soc.*, New South Wales, 1905, p. 537, Pl. XXXIII., Fig. 30, and also from Port Jackson specimens I now have, I find they are quite distinct. I also find that *A. dyeriana* is an absolute synonym of *Cassidula nucleus* (Mart). As this is a tropical species, it is very unlikely to occur here, and Mr. Dyer told me that after taking the type lot he could never find it again, although he searched very carefully. I therefore consider it to have been an accidental introduction, and that the name should be expunged from our list.—Sandford, July, 1908.

In the *Records of Australian Museum*, Vol. IV., No. 7, 25th August, 1902, H. L. Kesteven erected a new genus, *Risellopsis*, for Hutton's *Fossarina varia*. I now describe a second species, which is quite distinct from Hutton's, whilst still fulfilling the conditions necessary to place it in the genus.

RISELLOPSIS MUTABILIS (May), Figs. 1 and 2.—Shell depressed of three whorls, rapidly increasing, umbilicate; aperture large, descending in front, angular above; suture somewhat canaliculate. Two prominent keels divide the shell into a superior, a peripheral, and basal area. The lower keel is considerably the stronger. There is a low ridge on the base of the shell, and beyond it a small, sharp keel, exactly defining the umbilical area, which latter is whitish, whilst the rest of the shell is a dull purplish black. Lip sharp and simple, somewhat angled by the persistence of the peripheral keels, which, however, have become nearly obsolete. Columella arched, and slightly expanded over the umbilicus, which is ample and perspective. Shell almost smooth (often corroded), but very finely striated by lines of growth. Height, $2\frac{1}{2}$; greatest diameter, $3\frac{1}{2}$ mill. Habitat.—Most of my specimens, including the type, are from Fred. Henry Bay, Tasmania. It occurs in Victoria also (C. Gabriel, F. H. Baker).

Individuals may vary, by the keels—especially the upper one—becoming almost obsolete, giving the whorls a more rounded appearance. One example is highly turretted, giving it a trochiiform appearance. Another has the last whorl partly detached. The colour may also become reddish, mottled with white, or there may be yellowish patches on a black ground. From the New Zealand species (*R. varia*), it differs in being less round and without the keels on the base and upper part of the whorl, and in wanting the coarse striation. Type to be placed in the Tasmanian Museum, Figs. 1 and 2.

The following note on the Genus *Litorina* was communicated by my friend, Charles Hedley, of the Australian Museum, Sydney, whom I also have to thank for kind assistance in the preparation of this paper.

“LITORINA (Menke), 1828, non *Littorina* Ferussac (1822), nomen nudum. Ferussac (Tabl. Syst. des Anim. Moll., 1822, p. xxxiv.), casually wrote Litto-

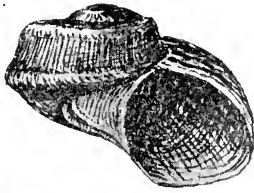
NOTE.—This species was wrongly figured in Tate and May's Census, Pl. xxiii., fig. 9, as *Fossarina Funiculata* Tenison-Woods.

rina among a long list of genera without giving a type definition or other means of identification; his name must therefore be discarded as a *nomen nudum*. Then Menke (*Syn. Meth. Moll.*, 1828) introduced *Litorina* with a classified list of species, their synonyms, and references to literature. It is on Menke's work that the genus is based. I have not access to his first edition, but in the second edition (1830) the genus is given on p. 44."

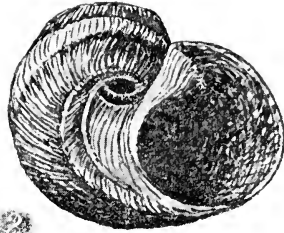
LITORINA PRAETERMISSA (May), N. S., Fig. 3.
 —Shell globose turbinate, umbilicate; whorls, six rounded, rapidly increasing, the last very large; mouth pyriform, columella arched, flattened, and expanded over a narrow but deep umbilicus, which is frequently covered, and so not a constant feature. The interior varies from light to dark purplish-brown; umbilical area white. Operculum sub-spiral. Within the anterior end of the columella is a pale band, margined by narrow dark lines. The whole shell is girt with fine spiral impressed lines—about 12 on the penultimate—and strongly and frequently very coarsely ridged by lines of growth. Ground colour greenish white; the purplish-brown colour pattern varies considerably in different examples, but usually consists of undulating and zigzag bands more or less broken up. The apical whorls are brown—lighter towards the top. Very variable in size. Dimensions of the type:—Length, 15; breadth, 11 mill. Figure 3. It differs from *L. Mauritiana* (Lamarck) chiefly in the globose form and colour markings, which seem very constant, but is connected by the impressed spirals and light band in the mouth. It was listed by Tenison-Woods in his census as *L. undulata* (Gray), and perhaps comes nearest to *L. cincta* (Quoy and Gaim.), from New Zealand. Habitat.—Widely distributed, and in the same positions as *L. mauritiana*, but not so universally present as that species. Type to be placed in the Tasmanian Museum.

SCISSURELLA ORNATA (May), N. S., Figs. 4 and 5.
 —Shell minute, obliquely discoidal, strongly ribbed and spiralled; whorls rounded, but somewhat angled by the canal; mouth large, roundish, oval, and a small

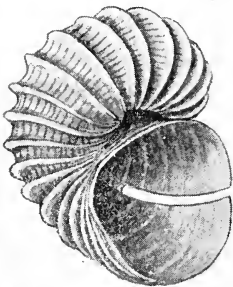
but deep umbilicus. The canal forms a deep furrow, bordered by sharp, raised edges, the whole raised on a distinct ridge, which surrounds the shell about midway between the suture and the periphery; on the lower side there is a smooth, depressed area. The strong sharp ribs begin below this area, and continue round the whorl to enter the umbilicus. Above the furrow raised curved ribs roughly correspond to those below; they continue uninterrupted from the central ridge to the suture. The spaces between these ribs are cancellated by six to eight spiral keels, much smaller than the ribs, and not passing over them. These spirals continue between the lower ribs, passing over the upper part of them, there giving them a crested appearance. All these spirals are irregularly spaced. The apex of $1\frac{1}{2}$ turns is squared by a beaded ridge, and is sunken below the level of the adult whorls. The mouth is well defined by a continuous narrow margin; the slit is open, deep, and of moderate width. Whorls two, exclusive of the apex. Colour, yellowish white. Greatest diameter, $1\frac{1}{2}$; least, $1\frac{1}{4}$; height, 1 mill. Habitat:—Frederick Henry Bay; a few specimens in kelp roots. It has a superficial resemblance to *Schismope beddomei* (Petterd), but the ribs are more numerous and continuous, and with strong spirals, and it is a larger shell, and a true *Scissurella*. *Scissurella coronata* (Watson), Challenger report, page 114, seems a near ally. Figs. 4 and 5. Type in Tasmanian Museum.



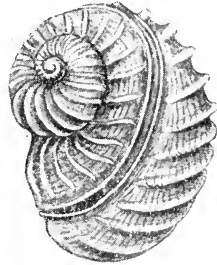
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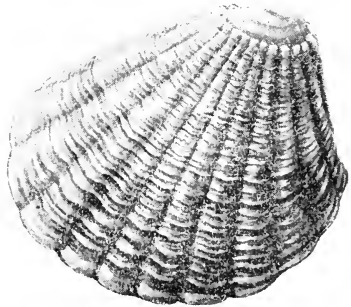
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1, 2. *RISELLOPSIS MUTABILIS*, May.
3. *LITORINA PRÆTERMISSA*, May.

4, 5. *SCISSURELLA ORNATA*, May.
6. *CONDYLOCARDIA CRASSICOSTA*, Bernard

THE ABORIGINAL DESIGNATIONS FOR STONE IMPLEMENTS.

BY FRITZ NOETLING, M.A., Ph.D., ETC.

(Read October 12th, 1908.)

Quite in the commencement of my studies of the stone implements manufactured by the Tasmanian Aborigines, I noticed that the Southern tribes had a special word for that particular rock which is generally, though wrongly, called "Black Flint." Considering the popular, though wrong, use of the word "Flint," by which the word originally applied to the rock from which a stone implement is made is used to designate the implement made therefrom, the question naturally arose whether this particular native word meant the implement or the substance (rock) from which it was made. At the first glance this seems immaterial and hair-splitting; but on closer examination it will be seen that the question is a most important one. If this particular word is only used to describe a special implement, it would conclusively prove that the Aborigines intentionally manufactured implements of a certain shape, which they distinguished by a special name from all the others. If, on the other hand, this word represented the designation of a particular kind of rock only, the above inference cannot hold good, and the conclusions derived from the morphological study of the implements—namely, that they are devoid of all intentional shape—is fully confirmed.

The vocabulary of Aboriginal words is, unfortunately, very limited. Calder (1), whose compilation is

(1) Language and Dialects spoken by the Aborigines of Tasmania. Parliamentary Papers, 1901. No. 69.

probably the most comprehensive, does not enumerate more than 1135 words, some of which are unquestionably adopted (2). It is more than probable to assume that, however limited the vocabulary of Aborigines may have been, a fair number of words have not been handed over to us. However that may be, a combination of the results of mineralogical and morphological studies, together with a careful examination of the vocabulary, has led to some very interesting results.

In the first instance, however incomplete the vocabulary may be, it is certain that the Tasmanian language had no special word for some of the most important implements in the economic life of the human race. These implements are:—

1. Knife.
2. Axe or Hatchet.
3. Saw.

To which we may add

4. Bow.
5. Arrow.
6. Spear or Lance Head.

It may be taken as granted that the Tasmanian language had no distinguishing words for the above-mentioned six implements. Consequently it is certain that the civilisation of the Tasmanian Aborigines did not know these implements, because, if it had, there would have certainly been words to designate them, and if such words had existed we would find them in the vocabulary, because it is improbable to assume that those who compiled the vocabulary of the Aborigines could have overlooked the words for these all-important implements had they existed and been used by the Aborigines.

Scott, who was probably the first who made a study of the Tasmanian Archaeolithes, designates them as follows (3):—

Flint or a knife = teroona, trawootta.

(2) For instance it is obvious that the Tasmanian word "backalow" or "bacala" for bullock is derived from the English, considering that no cattle existed in Tasmania previous to the arrival of the Europeans.

(3) Letter on the Stone Implements of the Tasmanian Aborigines. Papers and Proceedings, Royal Society of Tasmania, for 1873-1874, page 24.

Plain and simple as this appears, it is by no means so. In what sense is the word "flint" used? Does it mean to express the mineral flint, or does it mean an object made from flint? I think that the latter view is the correct one, because Scott adds, "or a knife."

We may therefore conclude that any cutting implement manufactured by the Aborigines was called
terooona or trawootta.

At the first glance it might appear that these are two absolutely different words, but I shall be able to prove that they are practically the same.

If we look up Milligan's vocabulary of the Tasmanian language, we find under the heading of flint the following words:—

Tribes about Mt. Royal, Bruny Island, Recherche Bay, and the South of Tasmania—North-West and Western Tribes.

Mungara (Flint).

Mora trona (Flint), black.

Tribes from Oyster Bay to Pittwater—

Trowutta (Flint).

It is obvious that the words trawootta (Scott) and trowutta (Milligan) are identical. We have, therefore, the following words to designate the Tasmanian stone implements:—

1. Trowutta.
2. Teroona.
3. Mungara.
4. Mora trona (black flint).

It is evident that the word "trona" is exactly the same as "terooona," and, if we write the word trowutta like this—

trowa-tta

we see that we have apparently the same root, because it can be taken as certain that the words

Teroona,

Trona,

Trowa,

are the same. The different spelling may be due to dialects or other reasons, but the main fact that they are identical remains.

“Black” flint is designated as “mora trona,” and, of course, if “mora” would mean “black,” the interpretation would be quite simple. But this does not seem quite certain.

Milligan states that the eastern tribes used the word “mawback” or “mawbanna,” the southern tribes the word “loaparte” for black, and, though there is perhaps a certain likeness between “mora” and “mawbanna,” I would not consider this as an established fact. However that may be, we have therefore a—

1. Trona (teroona),
2. Mora trona,
3. Trona-tta (trowutta).

If my interpretation be correct, the rock or the mineral from which the implements are manufactured was called

Trona (=teroona=trowa),

and a special kind of this rock, the fine-grained, dark blue, or black variety, was called “mora trona.”

The implements manufactured from this “trona” were called

trona-tta=trowa-tta, and, if my interpretation is correct, the suffix “tta” or “ta” means “made from” or “manufactured from.”

There still remains the word

Mungara,

as used by the Southern tribes. For the present I am unable to offer an explanation for this word, which, for all we know, may be only a corrupted mora trona.

So far everything seems plain enough, but Ling Roth publishes a vocabulary compiled by the Rev. Norman, in which neither the word “flint” nor “knife” is mentioned. But under the heading “stone” the following words are enumerated:—

1. Teewartear.
2. Larnar.
3. Peurar.
4. Noenar.

It is a peculiarity of this vocabulary that almost all the words end either "er" or "ar," and that, though the spelling is very curious, the first word is no other than the word "trowutta," of Scott and Milligan. We have therefore the well-known word for stone implement; but, besides this, three new words, of which it is impossible to say whether they may mean different types of implements or different varieties of rocks.

Now, if we refer to Ling Roth's second vocabulary, Appendix B, we find under the heading "a stone" the following words:—

1. Loine (Dove, Jorgen-Jorgensen, and Brain).
2. Lenn-parena (Gaimard).
3. Peora (Scott).
4. Nannee (Dove, Jorgen-Jorgensen, and Brain).
5. Nami (M'Geary).
6. Loine (Peron).
7. Lennicarpeny (Dove, Jorgen-Jorgensen, and Brain).
8. Longa (dO).

That is to say, quite a number of words, among which we can only identify "peora" with Norman's "peurar." As it is, however, certain that "loine" and "loine," as well as "nami" and "nannee," and "lenn-parena" and "lenni-carpeny" are identical, the above list is reduced to four new words, and we would therefore have, including Normans three new words, seven words for "a" stone.

A reference to Milligan's vocabulary proves, however, that this list is less formidable than it appears. Under the heading "stone" he gives the following words:—

Tribes about Mount Royal, Bruny Island, Recherche Bay, and the South of Tasmania—North-West and Western Tribes.

Loinah, Louna, or Loine, Noanyale.

Tribes from Oyster Bay to Pittwater.

Loantennina.

This proves that the words

Loinah, loine, loine, louna, longa,

and probably also larnar, are identical, and simply meant a stone of any kind in the dialect of the Southern tribes.

Further, it may be taken as pretty certain that the words

Loan-tennina,

Lenn-parenna,

Leni-carpeny,

are identical, and that these words meant "a stone" in the dialect of the Eastern tribes. The relationship between this word and the word "loina" is unquestionable, inasmuch as "loan," "lenn," "leni" represent probably the same word. Could we prove that in the dialect of the North-West and Western tribes the "l" is turned into "n," the word "noanyale" would more correctly spell "loanyale," and therefore contain the same root, "loan" or "loina," as the other words.

We have therefore ten words, viz. :—

1. Loine.
2. Loiné.
3. Loinah.
4. Louna.
5. Longa.
6. Larnar.
7. Loan-tennina.
8. Lenn-parenna.
9. Leni-carpeny.
10. Loan (noan)-yale.

There can be no doubt that the first six words are identical, and simply mean a stone (of any kind). It is difficult to say whether the last four words have the same general meaning as "loinah." To me it seems more probable that they represent certain kinds of rocks. We know that the Aborigines called freestone "poningalee." The iron glance from which they made the red ochre was called "latta-winne," and the red ochre was "lalla-winne." These composite words seem to prove that the four words above-mentioned represent certain kinds of rocks, and this view is generally strengthened

by the fact that in the word for freestone the last word, "galee," is the same as that in l(n)oan-yale. The most conspicuous rock of Tasmania, even more so than the freestone, is the Diabas, and, if there existed a word for freestone, it is more than probable that there was also a word for Diabas, and that one of these four words stands for Diabas. Next to the Diabas comes the mudstone, and for the Eastern tribes the granite. If freestone was "ponin-galee," is it too rash to assume that the closely-connected mudstone was "l(n)oan-galee (yale)"? The other words stand either for Diabas or for Diabas and granite.

There remain, therefore, three words—

1. Peurar = peoora,
2. Nannee = nami,
3. Noeena(r).

If we consider the very different spelling of Norman's words, I only need to refer to a comparison of the words teewartear (Norman) and trawutta (Milligan and others). It is not very improbable that the word "noeena(r)" really means "loina," and, if we further consider what has above been said about the change of the letter "l" into an "n," the words "nannee" and "nami" originally spelt "lannee" and "lami." These last two words have therefore most probably to be included under the above list, meaning nothing else but "a stone."

We have therefore arrived at a probable very accurate view as to the meaning of all these words except the word

Peurar = peoora.

Mr. Ritz has kindly told me that in his opinion this word should represent something spherical. In many languages, as Mr. Ritz tells me, the "bl" or "pl" means something round or spherical (1). There is no doubt that the word "peura" can be pronounced in such a way as to closely resemble the primitive root, and I think that Mr. Ritz's suggestion is probably correct. We can practically divide the whole group of Tasmanian implements into two classes—the chipped tronattas and the spherical pebbles—represented by the

(1) For instance the word "ball."

sacred stones. It is not only probable, but pretty certain, that the water-worn, rounded-off pebbles, which were turned into sacred stones, were distinguished by a different word from the ordinary tronatta, and Mr. Ritz's hypothesis comes probably very near the truth.

The result of these somewhat lengthy considerations may be condensed as follows:—

The words

1. Loine, loine, loinah, louna, longa, larnar, noenar mean a stone (of any kind).
2. Loan-tennina, lenn-parenna, leni-carpeny, noan-yale probably represent special kinds of rocks, such as granite or Diabas.
3. Peurar, peora probably means a pebble, perhaps a sacred stone.
4. Trona, teroona is the word for the rock from which an implement is made.
5. Mora trona means a peculiar variety of trona, distinguished by a bluish black colour and a fine conchoidal fracture.
6. Tronatta, trowutta, trawootta, teewartear is the name for the implements which were manufactured from trona or mora trona.
7. Mungara, meaning unknown; perhaps corrupted from mora trona.

The main and most important result of this investigation is the establishment of the fact that the Tasmanian language knew perhaps two, but most probably only one, word for the implements which were produced by working certain classes of siliceous rocks.

I particularly wish to point out that the fact is fully corroborated by the results of the morphological examination of the tronattas. These examinations proved that the tronatta is a kind of universal implement which was indiscriminately used for chopping, cutting, scraping, boring, and hammering. The Aborigines did not manufacture an implement which, for instance, solely and exclusively served the purposes of a knife, or a chopper, or a scraper. Any suitable fragment of rock could be used for any of these actions above-mentioned, and we must take it as granted that the Aborigines never manufactured special implements to serve special purposes only.

ON DR. NOETLING'S CONCLUSIONS RESPECT-
ING THE ABORIGINAL DESIGNATIONS
FOR STONE IMPLEMENTS.

BY HERMANN B. RITZ, M.A.

(Read October 12th, 1908.)

Dr. Noetling's conclusions are that—

- (a) There were two classes of stone utensils—one consisting of round, water-worn stones, called *pe-ura*, and used for religious ceremonies; the other of clipped, sharpened stones, called by various names, and used for cutting;
- (b) The Aborigines had perhaps two words, but probably only one, for siliceous implements;
- (c) The Aborigines did not manufacture special implements for special purposes.

The arguments he adduces from the aboriginal vocabulary are so cogent that his conclusions are almost inevitable. It seems to me that only some of the details are arguable, and I shall confine myself to these.

When we investigate the language of the Aborigines we meet at the outset with serious difficulties. In the first place, the records are very meagre, and then, even these were made by men who had no special training in philology. Still, a careful collation of the vocabularies will enable us to arrive at a greater amount of positive knowledge than would at first be suspected.

Subject to correction, I would conclude from my investigation that—

- (a) The number of words in the aboriginal vocabulary is very small—much smaller than the lists drawn up by Calder, Milligan, Ling Roth, and others would lead one to expect;

- (b) Many words, apparently different, are really identical;
- (c) The apparent differences are due to a faculty the Tasmanians seem to have had, in common with the South Sea Islanders—namely, that of interchanging the members of certain sound groups, for instance, the liquids “l,” “m,” “n,” “r;” and, again, the dentals “t” and “n” and “l.”
- (d) The vowels seem to have been particularly subject to variation. Of course, this phenomenon is, like the one just mentioned, also found in the Indo-European languages.

These points are illustrated by the evidence adduced by Dr. Noetling, and we may now proceed to the discussion of his paper.

He states that the aboriginal vocabulary contains no word for knife, axe, saw, bow, arrow, spear-head. I could not find any of these myself, for the word for spear-point—poyeena, poyeenta—bears a remarkable likeness to the English “point”—perhaps, in the former case especially, assimilated to “pe-na,” an aboriginal word, to which we shall refer again.

Still, there are words for “gun” or “musket”—“le rina,” “le langta,” “pawleena” (pawl-lina); but these, when dissected, mean simply “swift weapon,” “long or far-reaching weapon,” “round or powerful weapon.” Indeed, it is these very words that gave me what I think is the clue that will enable us to find a way out of the apparent confusion of the aboriginal vocabulary.

Next, Dr. Noetling discusses the word “trowatta,” which denotes a chipped implement. It consists of two parts—“tro” and “atta.” He offers the conjecture that “tta” is analogous to the “t” in ama-t-us (Lat.), ly-t-os (Gr.), gelieb-t (Ger.), love-d (Eng.), and denotes something finished or made. The abruptly-ending sound of “t” would seem to support this view.

On the other hand, when we examine the vocabulary, we find the “t” or “n” (with the Oceanic epithetic vowel, in practically all the nouns. For instance,

we have *liem-e-na* and *lim-ete* (abscess), *lie-ta* and *ne-na* (sharp), like a knife; thus, "atta" may be a mere noun-suffix, though even then it might indicate a state of completion.

This leaves "tro" to account for. Dr. Noetling conjectures it to mean rock or stone.

I agree with this, but would go further back—viz., to "hard," as we have "tera-na," "teri-na" for bone, "tra-mu-ta" a pebble, rolled quartz, where "mu" is perhaps round, as in "ma-bea," to turn round (with verbal suffix "bea"). "Teru-na," a cutting flint, and "tro-na," flint, seem to be forms of the same word. Thus "trow-atta" would mean a hard thing finished (by chipping).

In "mora trona" (black flint) we have "mora," not black, but heavy; thus, the heavy, hard thing.

"Mungara" presents some difficulties. It might be a compound of "muna" and "ga-ra." Now, "muna" means wood, fog, therefore, perhaps, dense, solid, and is very near to "mura" (heavy). "Ga-ra" may have affinity with the second part of "ponin gale" (freestone), "noan yale" (mudstone), where "ponin" may be connected with "pona," white (cloud), while we find "noan" to be the western equivalent of "loina" (stone), or, rather, sharp instrument. "Gale" or "yale" may be connected with "ya-na" (teeth), the natural knives.

We mentioned the cognates "lie-ta" and "ne-na" as meaning "sharp cutting." The significant part is "li" or "ne." This we find again in the following words for "stone," mentioned by Dr. Noetling:—"Loi-ne," "le-nni," "na-nni," "noan gale," and we may strengthen the conjecture of the identity of "li" and "ni" by some analogous cases. We find the following words for "woman"—"lowa," "loa-le," "noa-lia," "nowa-lia;" for "bird," "lae-re-ne," "nia-rana," "nierri-na;" for "swift," "lung-a-na," "mung-a-na" (to fly like a bird); "lang-a-na," "lag-a-na," "dog-na (foot);" "nung-a-na" (boat), for "running thing;" "lug-a-na" (river water); "nug-e-tena (rain, with double suffix to indicate multitude of drops); "nug-a-ra" (drink).

We find "li" or "ni" also in the form "ri. We have "li-e-na," "le-na," "re-na" (kangaroo); "re-na" (water rat); "re-ne" (to run); "li-a" (water); "li" (weapon).

All these meanings are comprised in swift or speedy. An edged stone will be speedier in its work as a tool than a blunt one, and the characteristic of a living animal, a running stream, a boat, a foot, a bird, is motion.

I agree with Dr. Noetling that "loan-tennina," "lenni-parenna," and "leni-carpenny" are words of the same meaning. Analysing them, we find the first parts, "loan," "lenni," and "leni," meaning "stone suitable for sharpening." Stones seem to have had no meaning and no name except in so far as they were found useful. "Tennina" may be akin to "tenine" (a finger or toenail), "something that scratches." "Parenna" seems to be a form of "pe-re-na," where "pe" would mean "pointed, sharp," as in "pe-na" (a lance or spear), and "re" would be "cutting." "Carpenny" may be composed of "kaw" (teeth), "pe" (sharp), and the suffix "ny" or "ne."

The round stone, presumed to have been used for religious ceremonies, was called "pe-ura." The explanation of this word is specially difficult, as we do not know the exact pronunciation of it. If the "r" is harshly trilled—as it evidently was when the recorders wrote the same word as "prena" and "perina," "trona" and "teruna"—it is quite possible that "peura" was but another form of "palla" (round), as we find it in "pala" (sun, star), "pala" (man), "pula-tula" (eye), "pul-bena" (frog), perhaps a bull-frog, "poira" (round shell). This presents a suggestive analogy with "ball," "bull-et," "bowl," "bill-et," "pill," "barrel," "pear," "berry," "apple," "malum."

Another conjecture is that "peura" is a form of "pe-una," where "pe" would have the meaning of to hurt from "pena" (spear), and "una" means fire. In support of this we have "mungara puna" (scar), such as would be caused by wounds inflicted during religious ceremonies, and cauterised to preserve the marks, and at the same time prevent mortification. Of conjectures there is no end, but there is at any rate a beginning:

and in the dissection of the aboriginal words and the collation of their parts, a scientific process is begun which may lead to more satisfactory results than are attainable to-day. Conjectures there must be, for we cannot seek unless we know what we hope to find.

In conclusion, I desire to lay stress on the fact that the available records are in a very unsystematic form. As a curious illustration, I would mention the translation of the first chapter of Genesis, attributed to Mr. Thos. Wilkinson. Ling Roth's book gives a very different rendering from that contained in the J. B. Walker Memorial volume, although G. W. Walker's MS. Journal is quoted; and, again, even that quotation is different from its counterpart in the Memorial volume.

Further, not only does Ling Roth mention some records which have apparently disappeared—viz., those of Wilkinson and Sterling—but it is quite probable that other manuscripts exist which are of no other than sentimental value to the present possessors, and would no doubt be obtainable for transcription. If the Royal Society were to make a public appeal for the gift or loan of such records, some valuable material might be saved from oblivion.

I would finally mention that I have heard that there exist some phonographic records of the actual aboriginal speech; if these could be found, they would be of the greatest value. As far as I am able to advance the study of that speech I shall do my utmost, and feel confident that the Royal Society will encourage my efforts.

AN INTRODUCTION TO THE STUDY OF THE ABORIGINAL SPEECH OF TASMANIA.

BY HERMANN B. RITZ, M.A.

(Read November 16, 1908.)

As far as I am aware, the work done hitherto with regard to philological studies of the Tasmanian language has not been extensive. Ling Roth gives in an Appendix to his book on "The Aborigines of Tasmania" an apparently full bibliography of the subject. Among the works mentioned there as dealing with the Speech of the Aborigines, we find the following:—

CALDER.—Language of the Aborigines of Tasmania.

JORGENSEN.—The Aboriginal Languages of Tasmania.

LATHAM.—Elements of Comparative Philology.

MILLIGAN.—Vocabulary of the Dialects of some of the Aboriginal Tribes of Tasmania.

MILLIGAN.—On the Dialects and Languages of the Aboriginal Tribes of Tasmania, and on their Manners and Customs.

MULLER.—Grundriss der Sprachwissenschaft.

J. B. WALKER.—Notes on the Aborigines of Tasmania, extracted from the manuscript Journals of G. W. Walker.

There are, besides, vocabularies by Norman, Dove, Braim, Cook, Gaimard, La Billardiere, McGeary, Peron, Roberts, Scott.

Ling Roth has evidently made use of all these sources of information, and embodied the result of his researches in his book; but though very valuable for its suggestiveness, his work is not that of a trained philologist, and it will be necessary to verify and re-examine his references.

In Appendix F, he states:—"As all the vocabularies handed down to us are English-Tasmanian, and none are Tasmanian-English, it was suggested to make a compilation of one Tasmanian-English vocabulary from all the vocabularies. The initiative is due to Mrs. E. B. Tylor. In preparing this vocabulary, I have attempted to simplify the spelling as follows, where I have felt that I could safely do so without impairing the integrity of the word."

Then follow the phonetic letters proposed to be employed. They are, as far as the vowels are concerned, analogous to the Italian "u," "i," "e," "ia." "C guttural" is to be written as "k." No other letters are mentioned. Duplicated consonants are simplified, and "th," "ch" are to be left unchanged, being doubtful.

When we examine this Tasmanian-English vocabulary we observe that—

1. There are words in it not contained in the English-Tasmanian vocabularies given in the same book. For instance, "abri," arm; "arpu," yes. It would seem that Ling Roth used other vocabularies as well, or else did not give the whole of the vocabularies he names; or permitted misprints to remain. He quotes "alree" for "arm," from Dove's list. How is a reader to know whether "alree" or "abri" is a misprint? At all events, this work will have to be done over again.

2. There are many words taken from the French vocabularies, in which the French phonetic spelling is retained, instead of being transliterated according to Italian phonetics.

In Appendix C we find Milligan's vocabulary of various tribes. This, apart from some printer's errors, is almost, but not quite, identical with that quoted by Calder in the Parliamentary Paper which Sir Elliott Lewis caused to be compiled in 1901. Here, again, verification is necessary.

A curious discrepancy exists in connection with portions of the Book of Genesis, translated by Thos. Wilkinson at Flinders Island in 1833. One specimen of it is given by Ling Roth in Appendix D; another is in the J. B. Walker Memorial Volume, and is evidently an extract from Geo. W. Walker's Journal.

Now, we should expect transcripts of the same text to be practically identical; but these two specimens differ essentially from each other.

In the first place, the spelling is quite different. A few examples will suffice to show this: Walker gives "pomleh" for "made;" Ling Roth, "pomable." Walker gives for "darkness" "lywerreh;" Ling Roth, "lewara." For "said," Walker gives "kany," Ling Roth "carne."

Walker states that Thos. Wilkinson translated three chapters of Genesis, and also composed a considerable vocabulary of words. If the rest of the translation and that vocabulary could be found, they would be most serviceable for the study of the language.

In Appendix E, Ling Roth transcribes fairly accurately the "Popular Song" from Walker's Journal, and refers, for the purpose of comparison, to a version of the same "song" by Milligan, in Appendix C, but overlooks the version quoted by himself in Appendix D, from Davies.

These three versions of the same song are very interesting, and may prove very important.

To compare small things with great, we might notice the curious analogy with the Rosetta stone, and its inscription in three languages, which enabled Champollion and Young to find the key to the hieroglyphics of Egypt; and also with the trilingual rock inscriptions at Behistan, which led Rawlinson to discover the secret of reading the ancient languages of Persia, Babylon, and Assyria.

Of course, our own task is not so difficult, nor is its importance so great; still, the trilingual record of the same meaning should lead us to some definite result in our quiet backwater of human life.

Let us then compare the three versions of our song, and see what conclusions we can deduce from them. Omitting mere repetitions, as not pertinent to our present purpose, we quote from Ling Roth:—

Milligan's version:—Pappela rayna 'ngonyna; toka mengha Leah; lugha mengha Leah; nena taypa rayna poonyna, nena nawra pewillah, pallah nawra pewillah; pellowah!

Davies' version:—Ne popila raina pogana; thu me gunnea; thoga me gunnea; naina thaipa raina pogana; nara paara, poivella paara; ballahoo! Hoo!

G. W. Walker's version:—Poppyla-renung, onnyna; temingannya, lemingannya; taukummingannya; nyina tepe rena ponnyna; nyina nara pewilly para; nara pewilly pallawoo!

This version is slightly different in the Memorial Volume:—Instead of temingannya we have lemingannya. It is probable that temingannya is a misprint for lemingannya, or vice versa.

On analogy with the rest of the song, it is more likely that lemingannya should be repeated than that another word, however similar, should be used. Still, temingannya will also give an appropriate sense; and we shall refer to it again in that light.

For convenience of reference, we shall denote Milligan's version by M., Davies' version by D., and Walker's by W.

Looking at the whole text, we at once notice that practically all the words end in "a," "ah," "na," or "ne." We may safely assume that these endings have no essential meaning, whatever meaning they may have had originally. We find the same phenomena in many other languages. For instance, the ending "a" indicates the feminine gender in all the languages of the Indo-European family; "s" is most commonly the sign of the masculine gender, as we find it, e.g., in Aeneas, dominus, eques, visus; in "res," etc., the "s" is really borrowed from the masculine nouns, and the word is akin to mensa.

In Icelandic, we have a still more striking instance in the addition of the sound "r" to nouns and adjectives; in verbs this is softened to "a." We have, comparing the Icelandic words with their English equivalents, kongr for king, hundr for hound, vikingr for viking, grar for gray, langr for long, blindr for blind.

To get at the chief meaning of the words, therefore, we must cut off these excrescences; but this must be done judiciously, for we may not know at first whether in rayna, for example, the "n" belongs to the root or to the ending.

Our merit in trilingual interpretation is very much diminished by the fact that we possess already fairly complete lists of the words used by the Aborigines. We are not to expect in their case a vocabulary as copious as that of a race far more remote from the "simple life," and the words we have are, comparatively speaking, quite numerous enough to supply all the needs of communication that may have been felt by the primitive minds of our predecessors. The word "predecessor" is singularly appropriate in this connection. It means "One who has stepped down before," "One who has pre-deceased," "One who has done before our time what ourselves shall have to do before long—that is, stepped down from the eminence of being the lord of all he surveys."

Now, Milligan tells us that our song was sung in praise of a great chief, one who has been high in power and glory, and has stepped down and is now forgotten. The very fact that this song was, as Walker tells us, used by all the Aboriginal tribes, must have had a melancholy interest for the temporary recipient of the honour, if ever he realised that, after all, he was not the very first in power and glory.

From these hints, we may conclude that the song probably indicated the reasons for conferring special honour on a man. Now, in their simple lives, there was not much scope for the display of excellence; their needs were few, consisting almost exclusively of food and protection against enemies; and the best man would be who was best able to procure plenty of food, and security in the peaceful enjoyment of it. Their hero

would be a man strong of body and swift of foot and arm; and the song in his honour would lay stress on these qualities, and express admiration for their possessor.

Resuming our scrutiny, we find in D. the first word "ne," which does not occur in M. and W. We know that "ne-na" means "sharp;" it also means "you," and "no," and "that" (the probable meaning of the ending "na"), and "lo!" or "pay attention!"

We may take all these meanings together in the idea of "separate from me." The significant sound "n" is formed by closing the mouth and parting the lips; with the "sharp" teeth pressing on the tongue, the outer world is shut off from the speaker. As the joining of the lips inwards forms "m," and refers to the speaker as "me," so the exclusion implies the "not-me," the "you," "that," "no," the object of our attention.

We may therefore take "ne" in D. to mean Lo! The real beginning of the song is *pappela*, *popila*, *poppyla*. Ling Roth gives us *pawpela* and *papla* as "big," "large."

Here we notice first the reduplication of the "p," which indicates emphasis, as implying greater energy in pronouncing the initial sound of the word. Ling Roth gives several examples of this—e.g., *kana*, to talk; *kakana*, to talk loudly; *mura*, heavy; *mumura*, tree.

This leaves "pel" as the chief part, and in it we find the echo of *pill*, *ball*, and the Tasmanian *palla*, "man" and "sun," and *peura*, "round." To the Aboriginal mind, muscular development or roundness was an indication of strength; a lean man would not have the same strength as a stout one. In confirmation of this, we need only refer to the Japanese and Turkish wrestlers, who are usually very corpulent.

Thus we get for *popela* the meaning "very strong." We have not taken any notice of the vowels, and that for two principal reasons. In the first place, vowels in all languages are very subject to variation, and secondly, the uncertainty of the accuracy of the phonetic representation of the vowels given in our records makes it unsafe to rely on it for an argument.

The next word is given as rayna, raina, renung. In W., it is almost certain that the letters have been wrongly apportioned, for M. gives the following word as 'ngonyna, which is confirmed by gunnea in D.; so that the second word in W. should be rene, and the third, 'ngonnyna.

Thus we get in each case rene, which means "speedy," "to run."

The third word in common is 'ngonyna in M., 'ngonnyna in W., and three words farther on D. gives us gunnea. These are evidently identical with 'ngune, "fire." We note that the D. version gives words of simpler and more guttural sound than those of M. and W., so that it is quite in accord with the general character of the D. version to have gunnea as equivalent of 'ngonyna. D. alone gives here pogana, "man." We shall find other words for "man" farther on, in the three versions.

Next we have—

In M., toka mengha leah, lugha mengha leah.

In D., thu, me gunnea, thoga me gunnea.

In W., lemingannya or temingannya, taukummin-gannya.

To begin with, we must split up the long words in W. We get le mi 'ngannya or te mi 'ngannya, tauku mi 'ngannya.

Now, toka means "heel," and lugha, "foot."

We recognise toka again in thoga in D., in tauku in W., and in the shortened form thu in D.; while lugha appears in the short form of le in W., and toka in the same version as te, as alternative. Thus it is possible that both lemingannya and temingannya are right; at all events, the analogy between lugha, le, and toka, te is striking.

The word lia means "speedy" (like a spear).

There remain the words mengha, me, mi. In me, mi, we see the short forms of mena, meaning "I," "me," or "my;" but mengha requires further consideration. It occurs in M., and, when we turn to Milligan's

Phrases in Ling Roth, we find the explanation. There we get, in the first ten lines, the following words for "give":—tyenna, teang, teany. From this we may deduce several conjectures.

If Milligan got those phrases from the same individual, the words were liable to variation at will, within certain limits. If he got them from individuals of the same tribe, there was the same liberty of variation given to each speaker. As Milligan published his work in 1858, he got his information perhaps at second hand, or else from the Aborigines after their banishment from the mainland. In the latter case, tien, tian, and tiang might represent different dialects.

The variation of tian and tiang is of a type very common in various languages. A man of Flanders is in French called Flamand, and in the marshes of England, Fleming. An English chamberlain becomes in France a chambellan, and at the Vatican a camerlengo; while the Latin minus is in elegant Italian meno, and in the popular speech, mingo.

The next verse of the song is:—

In M., nena taypa rayna poonyna;

In D., naina thaipa raina pogana;

In W., nyna tepe rena ponnyna.

Ni-na is common to the three versions, though in D. it appears as nena. Ni means thou or you, and the different vowel in D. suggests that the dialect of D. bears to that of M. and W.—for these seem to be practically the same, except in the phonetic rendering—a relation analogous to that between Doric and Ionic Greek, or between North Britain and South Britain English.

Taypa, thaipa and tepe are evidently the same word, meaning "come," or, rather "here." Ta means "stop," and is an echo of the "thud" heard when one thing strikes against another. In pa or pe we recognise the word of denoting "activity;" pe-na means "spear," the symbol of effective activity, and the syllable be or pe is characteristic of verbs—i.e., words of activity.

Rayna, raina, rene we know already.

Pogana, in D., we know to mean "man."

Poonyna or ponnyna means "bird," literally active, speedy, as ni, like li and ri, means "moving."

The next line is—

In M., nena nawra pewillah, pallah nawra pewillah, pellowah.

In D., nara para poivella para; ballahoo! Hoo!

In W., nyna nara pewilly para; nara pewilly, pallawoo.

Nena, nyna, we know. Nawra, nara means "he," "that one," "the man."

Pewillah, poivella, pewilly, are evidently forms of the same word, and are connected in meaning, if not in derivation, with pallah, para, pellowah, pallawoo, ballahoo; all mean "man."

Ling Roth misprints poivella for powella.

Pe means "active;" wila means "wood," therefore "hard," "tough," "strong;" so that pewila would denote one who was active and capable of resistance, and therefore "a man in his strength." Palla is either, as we have noted before, "round," and therefore "strong," or it is an abbreviation of pewilla—unless, indeed, the latter is an enlargement of palla, by the insertion of the syllable we, which is akin to pe and be, and means "active," and may therefore be used to indicate emphasis. We find such "infixes" frequently in other languages, from "induperator" for "imperator" in Lucretius, to the very modern "In the Sweet (in the sweet) By-and-by."

Thus pallawoo would be just a variant of pawila, with the additional emphasis of the final "hoot," which is repeated in D. as Hoo!

The only remaining word is para, and this is in all probability a variant of palla; the interchange of liquid consonants, "l" and "r," "m" and "n" is a very common phenomena everywhere. For instance, many Chinese will pronounce ring as ling.

Thus we have accounted for every word of the song—truly, I hope, plausibly at all events.

We have yet to establish the meaning of the groups—that is, we have to explain the sentences.

The key to this meaning is contained in the “Phrases” quoted by Ling Roth from Milligan and others.

In these phrases, we observe that there is no sign of any accident. The words seem invariable in form and widely applicable in meaning, as we have already seen. The order of the words, supplemented, probably, by gestures, would define the exact meaning.

In this respect, we find an interesting parallel in the syntax of the Chinese language. We cannot now enter into this subject, except so far as to give a few specimens.

Take the sentence, “I will not give you any water.”

Milligan gives for this:—Noia meahteang meena neeto linah; literally, “Not me give you stop water.” In the Chinese Mandarin speech, the sentence would be:—Ngo moo ki, ki gni shoey; literally, “Me not give give you water.”

In Milligan, the group meahteang meena is interesting; it is, taking the roots only, mi tien mi, and seems analogous with “he gives,” where “he” and the final “s” in “gives” have the same meaning. The Indirect Object is expressed in different ways. In Tasmanian we say “you stop,” that is, “my giving stops at you.” In Chinese, we use the word “give” itself as the index of the object to whom any action applies. “I sing to you” would be rendered “me sing, give you” (the benefit).

We may now proceed with our own English version of the song in its three forms:—

M. is literally,—mighty, run, fire, heel, my, speedy, foot, my, speedy, thou, come, run, bird, thou, very, great man, man, very, great man, hero!

In plain English, “With might runs the bush fire; my heel, too, is speedy, and my foot is swift. Come thou, and run with the speed of a bird! Thou art a real warrior, a man indeed, a warrior, a hero!”

D. would be, in plain language, "Lo! with might runs the man; my heel is swift like fire, my heel indeed is swift like fire. Come thou and run like a man; a very man, a great man, a man who is a hero! Hurrah!"

W. is in meaning a combination of M. and D., thus:—"With might runs the fire; my heel is like fire, my foot is like fire; come thou, run like a bird; thou art indeed a great man; a man indeed, a great man, a hero! Hurrah!"

Milligan says that these verses were sung as an accompaniment to a native dance, in honour of a great chief.

This explanation was very helpful in my search after the meaning of the song. The rhythm is clearly marked, and the repetitions are very suggestive.

Walker says that this song was popular among all the Aboriginal tribes, but that he had not obtained its meaning, as it was by them involved in some mystery.

The fact that the song exists in different dialects makes it most valuable to us. It is quite probable that this song was connected with some important tribal ceremonies, and would not be willingly explained to strangers.

May it not rather have been the "Popela Song," "The Song of the Mighty One," than a "Popular Song"?

Davies says, "I cannot translate it, nor, could I do so, is the subject very select?"

This presents a charming specimen of sly humour. See how neatly he escapes any inquiry as to the meaning of the song, by suggesting that it would not be quite proper to speak of such things in polite society!

We, at all events, have avoided any impropriety in our rendering, and seem to have reconstructed one scene of the life of Old Tasmania; in imagination chiefly, and with a due sense of the defectiveness of our knowledge; but still, in the hope that we have found the way that will, in time and after arduous and sympathetic efforts, enable us to hear once more "The sound of a voice that is still."

REPORT
OF THE
ROYAL SOCIETY
OF
TASMANIA
FOR THE YEAR
1908.



Hubart.

Printed at "The Examiner" Office, Patterson Street, Launceston.

1909.

REPORT.

The Council of the Royal Society have the honour to present their Report for 1908 to the Annual General Meeting of the Society.

Nine Monthly General Meetings and one Special General Meeting were held during the year. Eleven Ordinary Meetings and four Special Meetings of the Council were held during the same period.

Twenty-seven Fellows and three Associates were elected, and fifteen Fellows allowed their membership to lapse during the same period, and the deaths of three Fellows were recorded.

Three vacancies in the Council occurred through the retirement of Mr. A. G. Webster, Colonel Legge, and the Right Rev. Dr. Mercer (Bishop of Tasmania), and were respectively filled by the election of Dr. Noetling, Mr. E. L. Piesse, and Mr. A. D. Watchorn.

On the retirement of Mr. Webster, who had been a member of the Council for thirty-nine years, and Chairman of the Council for some years past, the Council expressed their appreciation of the services rendered by him during his long connection with the Society.

At a Special General Meeting on November 25, 1908, an amendment of Rule 16 was adopted, to the effect that the annual subscription should be reduced to £1 in the case of Fellows resident more than fifteen miles from Hobart.

The following papers were read during the Session of 1908:—

Notes on a Chipped Boulder from near Kempton, by Fritz Noetling, M.A., Ph.D.

On State Borrowing and Sinking Funds for the Redemption of State Debts regarded from an Economical Point of View, by R. M. Johnston, F.L.S., I.S.O.

On a Recent Visit to the River Gordon, illustrated by lantern slides, with remarks on the need of reservation of land along the banks of the River, by J. W. Beattie.

On the Native Quarry at Syndal, near Ross, by Fritz Noetling, M.A., Ph.D.

On a Native Burial Ground at Charlton, near Ross, by Fritz Noetling, M.A., Ph.D.

Additions to the Tasmanian Molluscan Fauna, by W. L. May.

The Aboriginal Designations for Stone Implements, by Fritz Noetling, M.A., Ph.D.

On the conclusions of Dr. Noetling respecting the Aboriginal Designations of Stone Implements, by Hermann B. Ritz, M.A.

An Introduction to the Study of the Aboriginal Speech of Tasmania, by Hermann B. Ritz, M.A.

Considerable time and attention were given by the Council to the questions of the printing of the Society's Papers and Proceedings, and of the avoidance of the long delays that have occurred for some years past in the publication of authors' papers. The negotiations were finally concluded for the necessary printing, and authors' copies of all papers read before the Society have now been published and distributed.

The Society is under obligations to a Committee of Fellows, who investigated the contents of the Library, and set apart a number of duplicates and miscellaneous publications unconnected with the objects of the Royal Society, so that they should be available for exchange or sale.

A Balance-sheet, duly audited, showing the receipts and expenditure for 1908, is appended.

THE ROYAL SOCIETY OF TASMANIA.

RECEIPTS AND EXPENDITURE, 1908.

GENERAL ACCOUNT.

RECEIPTS.		EXPENDITURE.	
	£ s. d.		£ s. d.
Balance from 1907	15 9 6	Balance of Salary late Secretary	3 3 4
Subscriptions—108 Fellows	162 0 6	Secretary to the Council—Salary	50 0 0
2 Associates	1 10 0	Assistant—Wages	6 0 0
2 Fellows in advance for 1909	3 0 0	Messrs. Davies Bros., Ltd.—Printing	57 4 0
Papers and Proceedings sold	0 7 6	"Tasmanian News"—Advertising	0 16 6
		"Daily Post"—Advertising	0 5 0
		Grant to Medical Section	12 0 0
		Insurance of Books	2 5 0
		Messrs. Lee—Use of Lantern	2 0 0
		Messrs. Tolman and Sons—Fuel	1 10 0
		Mr. Echlin—Auditor	2 2 0
		Messrs. Walsh and Sons—Books, etc.	7 8 9
		Bank Charges, Exchange, etc.	0 14 3
		Petty Cash, Postage, etc.	4 15 1
		Refreshments at Monthly Meetings	1 10 0
		Balance to 1909	£151 13 11
			30 13 7
			£182 7 6

LIFE COMPOSITION FEES.

	£ s. d.	£ s. d.
Subscription—One Life Member	15 0 0	14 0 0
Messrs. Whitesides—Book Cases		1 0 0
Balance to 1909		1 0 0
	£15 0 0	£15 0 0

MORTON-ALLPORT MEMORIAL FUND.

	£ s. d.	£ s. d.
Interest Received from Trustee	9 5 0	6 16 5
Debit Balance from 1907		2 8 7
Balance to 1909		2 8 7
	£9 5 0	£9 5 0

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Audited and found correct.

H. W. W. ECHLIN, Auditor.

BERNARD SHAW, Hon. Treasurer.

ANNUAL GENERAL MEETING.

The Annual General Meeting of the Royal Society of Tasmania was held in the Society's rooms, Museum, on Friday, 5th March, 1909. In the absence of the President (His Excellency the Governor, Sir Gerald Strickland), Mr. Bernard Shaw, on the motion of Mr. T. Stephens, seconded by Dr. Butler, was voted to the chair. A fair number of Fellows were present.

RE-ELECTION OF RETIRING MEMBERS OF COUNCIL.

There being no other nominations, the retiring members of the Council for the year, Dr. Elkington and Dr. Butler, and Messrs. E. L. Piesse and A. D. Watchorn, were re-elected.

ELECTION OF FELLOWS.

The following gentlemen were elected as Fellows of the Society:— Messrs. T. M. Donovan, L.R.C.S., J. D. Miller, H. M. Sich, and W. E. Shoobridge.

ANNUAL REPORT.

The Annual Report for 1908 was read by the Secretary to the Council.

The Chairman, in moving the adoption of the Report and Balance-sheet, said, in reference to the Committee of Fellows who had investigated the Society's library, that their work had been carried out in a most thorough manner, and the proceeds derived from the sale of books would go towards the purchase of new works.

In seconding the motion, Mr. T. Stephens said that the members of the Council who had drafted the Annual Report had been unable to gain any information about the Honorary and Corresponding Members of the Society at the present time. The latest particulars that they had been able to discover were in the Annual Report for 1891. It appeared from the records that at the Annual Meeting of 1902 it was resolved that the list of Fellows and Members should be annually published, in accordance with the original practice, but no trace of such publication has yet been discovered. In reference to the balance-sheet, which had been compiled with great care by their Honorary Treasurer, Mr. Shaw, he (Mr. Stephens) might say that, if there should be a moderate increase in the number of Fellows, and nothing extravagant was done in the way of printing, there was a fair prospect of the possibility of making a general reduction in the amount of the annual subscription at the end of the current year.

The motion was put to the vote and carried.

REPORTS OF SECTIONS.

The Report of the Medical Section was received, and read. It dealt with the progress of the medical branch during the year, and stated that its establishment had gone a long way towards creating a feeling of harmony in the medical ranks. Its popularity was evinced by the ever-increasing membership. Several new works had been added to the library, bringing it up to a most efficient stage. The ordinary meetings had all been well attended, and the members one and all evinced great interest in the Society.

On the motion of Mr. Stephens, it was resolved, "That the usual grant of £12 to the Medical Section of the Society for the purchase of medical works be continued for the current year."

APPOINTMENT OF AUDITOR.

Mr. Echlin was re-appointed Auditor, and the meeting closed.

LIST OF FELLOWS AND ASSOCIATES

OF THE

ROYAL SOCIETY OF TASMANIA.

* Fellows who have contributed Papers read before the Society.

† Life Members.

The Addresses of Members residing in Hobart are omitted.

FELLOWS:

AGNEW, L. E., MRS.

ALLWORK, F., L.S.A., New Norfolk.

ARCHER, WM. HENRY DAVIES, Longford.

ANDERSON, G. M., M.B., C.M., Franklin.

ARMSTRONG, HUGH, F.R.C.S.

ASH, PERCY.

ATKINS, W. A.

†BARING, REV. F. H., Orford.

†BAKER, HENRY D.

BARCLAY, DAVID.

*BEATTIE, J. W.

BENNETT, WM. HENRY, Ross.

BIDENCOPE, JOSEPH.

BRAIN, REV. ALFRED, M.A.

BROWNELL, F. LESLIE, New Town.

BURGESS, HON. WM. HENRY.

BUTLER, ARTHUR, Lower Sandy Bay.

BUTLER, FRANCIS.

BUTLER, HON. GAMALIEL HENRY, M.R.C.S., M.L.C.

BENNISON, THOMAS.

CAMPBELL, R. D., M.B.

*CLARKE, ARTHUR H., M.R.C.S.

CLARKE, REV. GEORGE, Moonah.

COUNSEL, EDWARD ALBERT.

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 †FOSTER, JOHN D.
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 †GRANT, C. W.
 GIBLIN, LYNDHURST, M.A.
 GIBLIN, W. W.
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 *GREEN, A. O., Bellerive.
 GOULD, H. T.
 HARRISON, E. J., Bellerive.
 HARRISON, MALCOLM.
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 *JOHNSTON, ROBERT M., F.L.S., I.S.O.
 KERR, GEORGE.
 *KINGSMILL, HENRY C., M.A.
 KNIGHT, H. W., Sandy Bay.
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 *MOORE, GEORGE BRETTINGHAM, C.E.
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 *McAULAY, PROFESSOR ALEXANDER, M.A.
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- MACFARLANE, HON. JAMES, New Town.
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 *MACLEOD, P. J., B.A.
- NICHOLAS, GEORGE C., Ouse.
 *NOETLING, FRITZ, M.A., Ph.D., Sandy Bay.
 NICHOLLS, W. MINCHIN.
- OLDHAM, E.
- PARKER, A. C., New Town.
 PARSONS, MISS S. R.
 *PIESSE, E. L., B.Sc., LL.B., New Town.
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 *RITZ, H. B., M.A.
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 *RODWAY, LEONARD, Sandy Bay.
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- TARLETON, JOHN W., Sandy Bay.
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 *TWELVETREES, W. H., F.G.S., Launceston.
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- WALCH, CHARLES.
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 WEBSTER, GEORGE A., M.B., M.R.C.S.
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 WHYTE, JAMES WILKINSON, New Town.
 WINTER, ALFRED.
 WISE, H. J.
 WOLFHAGEN, J. EDGAR, M.B., C.M.
 WOLFHAGEN, WALDEMAR, New Town.
- YOUNG, RUSSELL, New Town.

ASSOCIATES:

- BLACK, R. A.
 OSBORNE, JOHN, Junior.

PAPERS AND PROCEEDINGS

OF THE

ROYAL SOCIETY

OF

TASMANIA

FOR THE YEAR

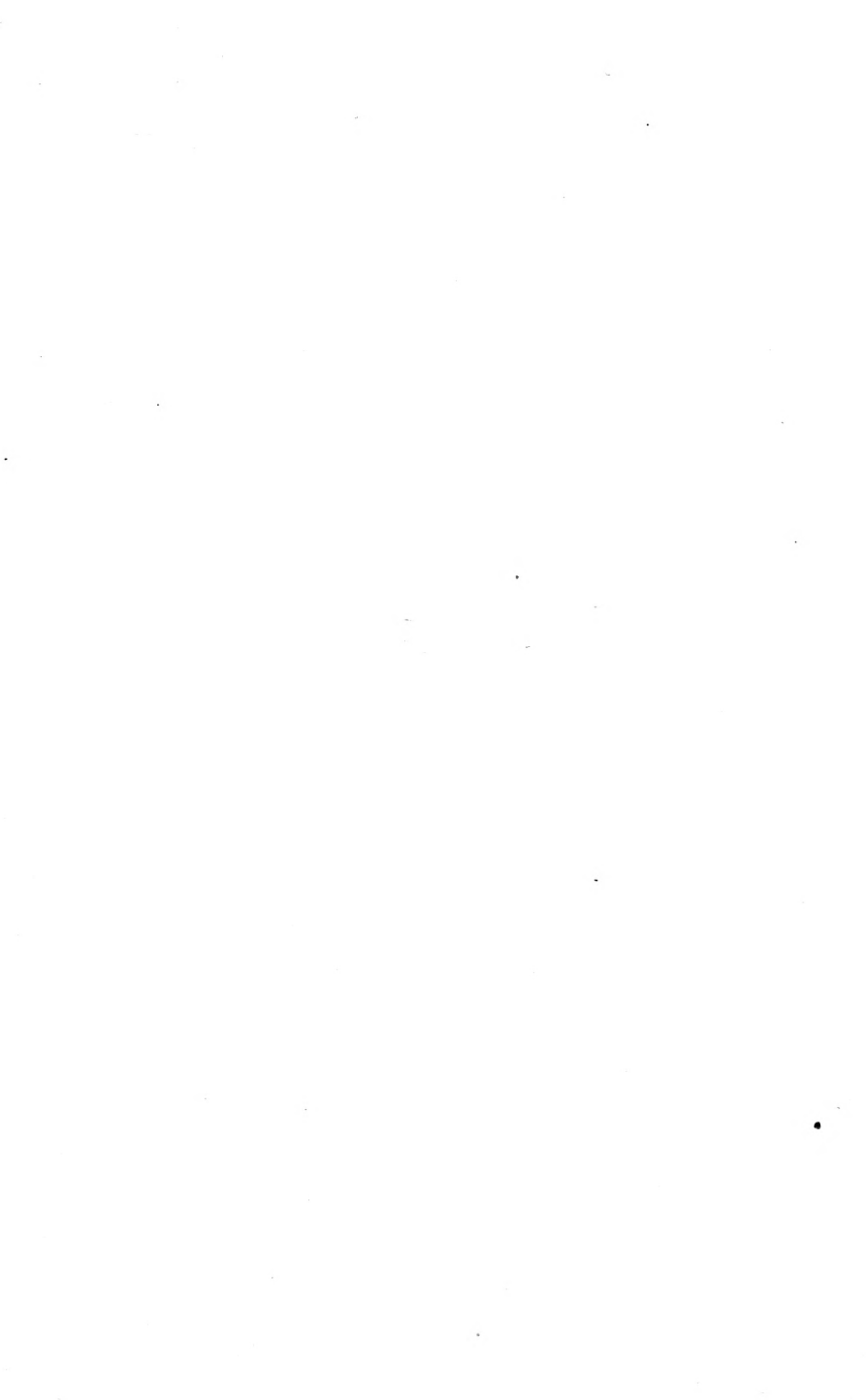
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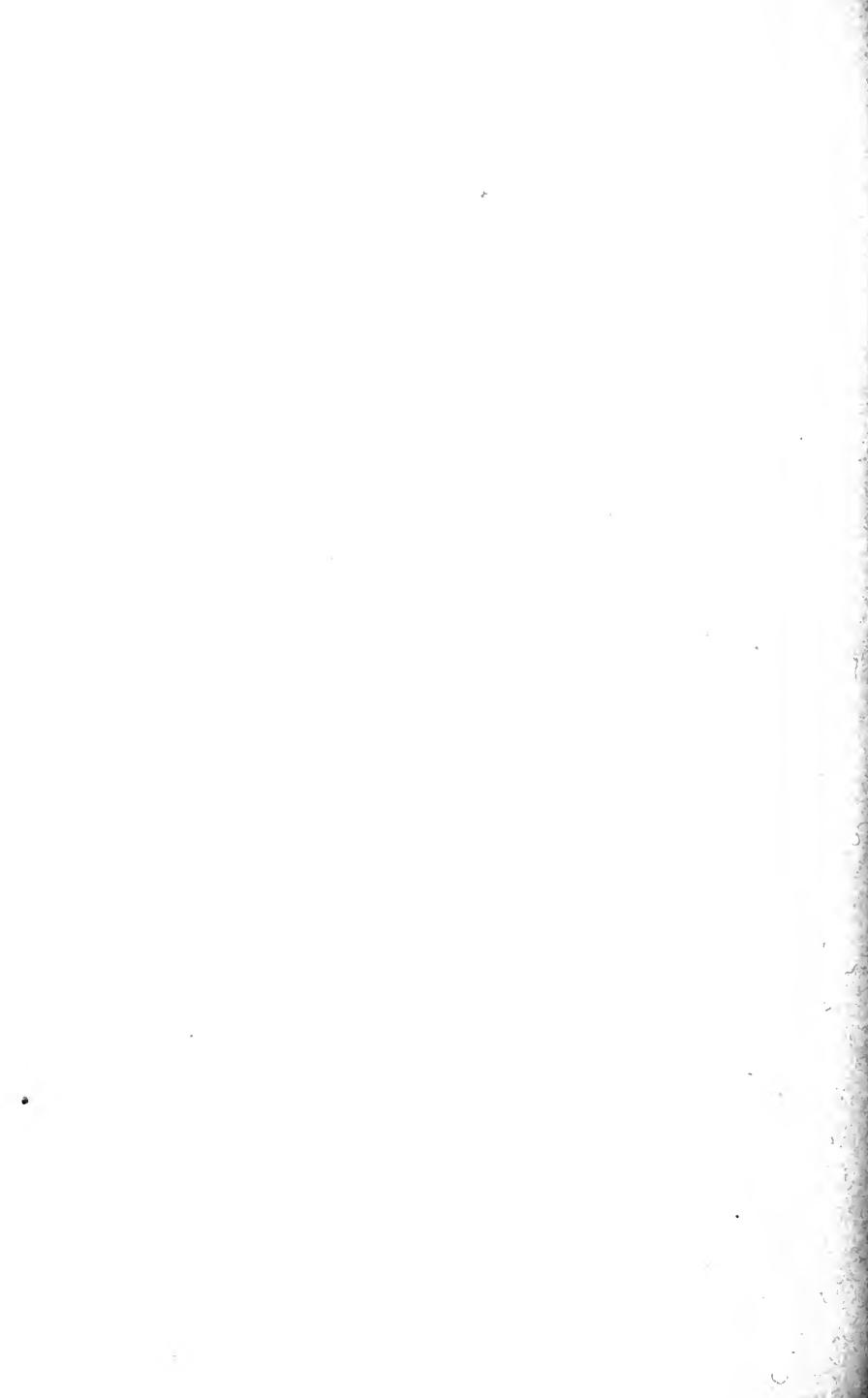


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