TRANSACTIONS

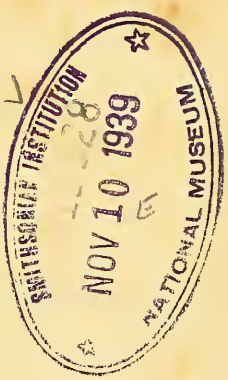
OF THE

ROYAL SOCIETY

OF

New South Wales,

FOR THE YEAR 1867.



VOL. I.

SYDNEY:
F. WHITE, MACHINE PRINTER, WILLIAM STREET.

1868.

ROYAL SOCIETY

OF NEW SOUTH WALES.

OFFICERS FOR 1867.

President:

HIS EXCELLENCY THE RIGHT HON. SIR JOHN YOUNG, BART, K.C.B., G.C.M.G. &c., &c.

Vice-Presidents:

REV. W. B. CLARKE, M.A., F.G.S.
G. R. SMALLEY, ESQ., B.A., F.R.A.S.

Honorary Treasurer:

EDWARD BEDFORD, ESQ.

Honorary Secretaries:

PROFESSOR PELL, B.A. | REV. WILLIAM SCOTT, M.A.

Council:

DR. ALLEYNE,
E. C. CRACKNELL, Esq.
DR. FORTESCUE.
GERARD KREFFT, Esq.
CHRISTOPHER ROLLESTON, Esq.
PROFESSOR SMITH, M.D.

FUNDAMENTAL RULES.

Object of the Society.

1.—The object of the Society is to receive at its stated meetings original papers on subjects of Science, Art, Literature, and Philosophy, and especially on such subjects as tend to develope the resources of Australia, and to illustrate its Natural History and Productions.

President.

2.—The Governor of New South Wales shall be *ex officio* the President of the Society.

Other Officers.

3.—The other Officers of the Society shall consist of two Vice-Presidents, a Treasurer, and two or more Secretaries, who, with six other Members, shall constitute a Council for the management of the affairs of the Society.

Election of Officers.

4.—The Vice-Presidents, Treasurer, Secretaries, and the six other Members of the Council shall be elected annually at a General Meeting in the month of May.

Vacancies during the year.

5.—Any vacancies occurring in the Council of Management during the year, may be filled up by the Council.

Fees.

6.—The entrance money paid by Members on their admission shall be One Guinea; and the annual subscription shall be One Guinea, payable in advance.

The sum of Ten Pounds may be paid at any time as a composition for the ordinary annual payment for life.

Honorary Members.

7.—The Honorary Members of the Society shall be persons who have been eminent benefactors to this or some other of the Australian Colonies, or distinguished patrons and promoters of the objects of the Society. Every person proposed as an Honorary Member must be recommended by the Council and elected by the Society. Honorary Members shall be exempted from payment of fees and contributions, they may attend the meetings of the Society and they shall be furnished with copies of transactions, and proceedings, publishedby the Society, but they shall have no right to hold office, to vote, or otherwise interfere in the business of the Society.

Confirmation of By-Laws.

8.—By-Laws proposed by the Council of Management shall not be binding until ratified by a General Meeting.

Alteration of Fundamental Rules.

9.—No alteration of or addition to the Fundamental Rules of the Society shall be made, unless carried at two successive General Meetings.

BY-LAWS.

1.—An Ordinary Meeting of the Royal Society, to be convened by Public Advertisement, shall take place at 8 p.m., on the first Wednesday in every month, during the last eight months of the year. These meetings will be open for the reception of contributions, and the discussion of subjects of every kind, if brought forward in conformity with the Fundamental Rules and By-Laws of the Society.

Council Meetings.

2.—Meetings of the Council of Management shall take place on the last Wednesday in every month, and on such other days as the Council may determine.

Contributions to the Society.

3.—Contributions to the Society, of whatever character, must be sent to one of the Secretaries, to be laid before the Council of Management. It will be the duty of the Council to arrange, for promulgation and discussion at an Ordinary Meeting, such communications as are suitable for that purpose, as well as to dispose of the whole in the manner best adapted to promote the objects of the Society.

Ordinary Members.

4.—Candidates for admission as ordinary members to be proposed and seconded at one of the stated meetings of the Society. The vote on their admission to take place, by ballot, at the next subsequent meeting; the assent of the majority of the members voting at the latter meeting being requisite for the admission of the candidate.

Non-Members to be notified of their Election.

5.—Every Member shall receive due notification of his election, together with a Copy of the Fundamental Rules and By-Laws of the Society.

Introduction of New Members to the Society.

6.—Every Candidate duly elected as Member, should, on his first attendance at a Meeting of the Society, be introduced to the Chair, by his proposer, or seconder, or by some person acting on their behalf.

Annual Subscriptions, when due.

7.—Annual Subscriptions shall become due on the first of May for the year then commencing. The Entrance fee and first year's Subscription of a New Member shall become due on the day of his election.

Members whose Subscriptions are not paid to enjoy no privileges.

8.—Members will not be entitled to attend the Meetings or to enjoy any of the privileges of the Society until their entrance fee and subscription for the year have been paid.

Subscriptions in arrear.

9.—Members who have not paid their subscriptions for the current year, shall be informed of the fact by the Treasurer. If, thirty days after such intimation, any are still indebted, their names will be formally laid before the Society at the first Ordinary Meeting. At the next Ordinary Meeting, those, whose subscriptions are still due, will be considered to have resigned.

Expulsion of Members.

10.—A majority of Members present at any Ordinary Meeting, shall have power to expel an obnoxious Member from the Society, provided that a resolution to that effect has been moved and seconded at the previous Ordinary Meeting, and that due notice of the same has been sent in writing to the Member in question, within a week after the Meeting at which such resolution has been brought forward.

Admission of Visitors.

11.—Every Ordinary Member shall have the privilege of admitting one friend as a Visitor to an Ordinary Meeting of the Society, on the following conditions :—

1. That the name and residence of the Visitor, together with the name of the Member introducing him, be entered in a book at the time.
2. That the Visitor does not permanently reside within ten miles of Sydney, and,
3. That he shall not have attended two Meetings of the Society in the current year.

The Council shall have power to introduce Visitors, irrespective of the above restrictions.

Management of Funds.

12.—The funds of the Society shall be lodged at a Bank, named by the Council of Management. Claims against the Society, when approved of by the Council, shall be paid by the Treasurer.

Audit of Accounts.

13.—Two Auditors shall be appointed annually at an Ordinary Meeting to Audit the Treasurer's accounts. The Accounts as audited to be laid before the Annual Meeting in May.

LIST OF MEMBERS

OF THE

Royal Society of New South Wales.

Adams, P. F., Surveyor-General.
Allen, George, the Hon., M.L.C., Toxteth Park, Glebe.
Allen, Gerge Wigram, Elizabeth Street.
Allan, A. Elizabeth Street.
Allwood, Rev. R., King Street.
Armstrong, Walter Dickinson, Macquarie Street.
Alston, Dr., R. A., Artillery Barracks.
Ashdown, A., Department of Works, Phillip Street.

Barnet, James, Colonial Architect.
Bedford, Edward, Macquarie Street.
Beg, Rev. Dr., Crown Street.
Beilby, E. T., Macquarie Street.
Belinfante, Dr., Wynyard Square.
Belisario, Dr. Lyons' Terrace.
Belmore, His Excellency the Right Hon., the Earl of
Berry, Alexander North Shore.
Boyd, Dr., Lyon's Terrace.
Brereton, Dr., Macquarie Street.

Cave, Rev. Cave Brown.
Campbell, Charles, Elizabeth Street.
Clarke, Rev. W. B., St. Leonard's, North Shore.
Cox, Dr. James, Phillip Street.
Cracknell, E. C., Telegraph Office, George Street
Cronin, J. D., Darling Street, Balmain.

Deffell, G. H., Elizabeth Street.
Docker, Joseph, the Hon., M.L.C., Australian Club.

Fairfax, John, *Herald* Office.
Fairfax, J. R., *Herald* Office.
Flavelle, John, George Street.
Forster, R. M., York Street.

Fortescue, Dr., Elizabeth Street.
Francis, Judge.

Gardiner, Martin, C. E., West Maitland.
Garran, Andrew, Phillip Street.
Goodlet, J., 124, Erskine Street.
Gowland, John, R. N., North Shore.
Goodchap, Charles, Civil Service Club.
Graham, Rev. James.
Gray, Samuel W., Wollumben, Tweed River, *via* Cassino.

Halloran, Henry, Colonial Secretary's Office.
Hill, Edward, Rose Bay.
Holden, G. K., Land Titles' Office.
Holt, The Hon. Thomas, M.L.C.
Hordern, A., Darling Point.
Hovell, Captain, Goulburn.
Hunt, Robert, Royal Branch Mint.

Jaques, T. J., Registrar-General.
Jones, Dr. Sydney, College Street.
Josephson, J. F., M.L.A., King Street.

Krefft, Gerard, Museum, College Street.

Lang, Rev. Dr., J. D., M.L.A.
Leibius, Dr. Adolph, Royal Branch Mint.
Lord, Francis, the Hon., M.L.C., North Shore.

Macarthur, the Hon., Sir William, M.L.A.
Mayes, Charles, 392, George Street.
McDonnell, William J., George Street.
McDonnell, William, George Street.
Metcalfe, M., Bridge Street.
Miles, Charles, Miles' Buildings, George Street.
Miller, F., Royal Branch Mint.
Mitchell, James, the Hon., M. D., M.L.C., Cumberland Street.
Mitchell, D. P., Cumberland Street.
Morehead, R. A. A., 30, O'Connell Street.
Moore, Charles, Director of the Botanic Gardens.
Morrell, E. A. Phillip Street.
Mort, Thomas S., Pitt Street.
Murnin, M. E., Exchange, Bridge Street.
Murray, T. A., the Hon., President of the Legislative Council.

Nathan, Charles, Macquarie Street.

O'Brien, Dr. Burwood.
O'Neil, E. H., King Street.

Paterson, Dr., Elizabeth Street, North.
Pell, Professor, Sydney University.
Phillips, Captain.
Prince, Henry, George Street.
Prout, Victor, Castlereagh Street.
Purcell, Captain, R.A., Artillery Barracks

Ramsay, Edward, (life) Dobroyd.
Reading, E., Phillip Street.
Roberts, J., George Street.
Roberts, Alfred, Castlereagh Street.
Roberts, Major, Double Bay.
Richards, Thomas, Government Printing Office.
Rolleston, Christopher, Auditor-General.
Ross, J. G., 193, Macquarie Street.
Russell, Henry, Sydney Observatory.
Reed, Howard, Pott's Point.

Scott, Rev. William, (life) Warden of St. Paul's College.
Scott, Montague, George Street.
Senior, F., George Street.
Smalley, G. R., Government Astronomer.
Smith, Professor, M.D., Sydney University.

Tebbutt, John, Junr., Windsor.
Tornaghi, A., George Street
Thomson, E. Deas, the Hon., M.L.C., C.B.
Thomson, Dr., Sydney University.
Thompson, James, Treasury.
Tooth, Frederick, Parramatta Street.
Tucker, William, Clifton, North Shore.
Twynam, E., Goulburn.

Ward, R. D., North Shore.
Watt, Charles, Burwood.
Walker, P. B., Telegraph Office, George Street.
Weigall, A. B., Head Master, Sydney Grammar School.
Williams, Dr. Macquarie Street.
Windeyer, W. C. M.L.A., Elizabeth Street.
Wyatt, Rev. A. H., Berrima.

Young, His Excellency the Right Hon., Sir John, Bart.

CONTENTS.

TRANSACTIONS

OF THE

Royal Society of New South Wales.

Inaugural Address to the Royal Society, delivered at its first meeting, 9th July, 1867, by the Rev. W. B. Clarke, M.A., F.G.S., &c., Vice-President.

Gentlemen of the Royal Society of New South Wales,—Before I enter upon the more important portion of the Address which I have been requested to deliver to-night, it appears to me only an act of propriety to explain the circumstances under which I have been selected for the duty which has thus been laid upon me.

Naturally, it was anticipated that we should have the privilege of listening to the more legitimate counsels of our Right Honorable President. For myself, I can only express regret that we shall be deprived of that privilege. The highly cultivated taste and learning, the tact and accomplishment which mark the public addresses of his Excellency Sir John Young, will find but a sorry substitute in the more humble style

and simpler expression of thought that can now be brought to bear upon the subject before me.

I regret this the more, because we are indebted to his Excellency's courtesy and kindly zeal in our behalf, for having obtained for us from the Queen her Majesty's gracious sanction and authority to carry on our future labours under the Royal patronage. And, in expressing my own regret, I feel assured that I only utter the united sentiments of all here present.

On learning that his Excellency was unable to accede to the the desire of the Council, an application was then made to the Senior Vice-President, requesting him to undertake the duty of opening the business of this Session. But here, again, we have had to suffer disappointment. The claims of the Legislature and of the high office of Chancellor of the University prevent us receiving the advantage which the scientific tastes and readiness to assist in the progress of social institutions, evidenced during many years by the Hon. E. Deas Thomson, would have conferred on our present objects.

In this emergency, the Council did me the honour of asking me to fill the place which I had hoped would have been so much more satisfactorily occupied.

I cannot, however, but be fully aware, that there are other members of this Society who could, more efficiently than myself, undertake what is proposed, and the Council can testify that I have not been anxious to occupy so prominent a position.

But, Gentlemen, as your favour has annually during a period of nine years assigned to me the honourable rank which I hold on the roll of the Society, it might seem, if I refused under a condition such as the present, that I exhibited a coldness and indifference to your interests, which would be in striking contrast with the readiness and diligence which, I trust, have always characterised my previous relations with you.

To claim your indulgence therefore, for what I may think it right to address to you on this occasion, respecting some important matters affecting our future career, as well as in relation to the past, will, I am convinced, be to obtain it, although I do not venture to consider you responsible for the opinions which I may be led to express.

The first suggestions which I would make are in relation to the change of designation from "Philosophical" to "Royal Society" of New South Wales.

Some persons may not see any advantage in this change: others may impute to its projectors some trifling ambition in propounding it, and may think that no true man of science or letters would desire to seek such a method of advancement as depends on an alteration of the kind. I am, however, quite sure that the advocates for the change had no such views as that.

Many members of the Society had long considered (and it must be confessed, I went with them) that we had been in the habit of admitting topics for discussion which cannot be considered as coming under the head of Philosophy. In our proceedings, both by act and by sanction, we have frequently ignored the title of the Society.

Its original Constitution provided that "*our meetings will be open for the reception of contributions and the discussion of subjects of every kind,*" if "*in accordance with our fundamental rules and by-laws:*" and it is stated in those rules, that "*the object of the Society is to receive at its stated meetings, original papers on subjects of Science, Art, Literature, and Philosophy.*" Further, in the new rules that have been framed since the change of title, you will find that that there is added: "*and especially on such subjects as tend to develop the Physical character of the Colony, and illustrate its Natural history and Productions.*

It is certain, therefore, that in neither class of rules have the founders or supporters of the Society really intended what, strictly speaking, the term "Philosophical Society" implies. Such a Society must be understood to imply an association of Philosophers, or one for the advancement of Philosophy; whereas, hitherto that department of enquiry has never received any recognition from us, and, perhaps, never will.

It is, also, quite clear that, whatever was actually intended was something not embraced by Science, Art, or Literature; for Philosophy was admitted as only one of a number of subjects and, apparently, as the least prominent among them.

It is not necessary to suppose from this conclusion, that it is intended by me to treat with undeserved disrespect any of the pursuits that may engage the faculties of mankind. But it is

one thing to admire what may be exalted in Philosophy, and another to admit it as a subject for discussion. It is one thing to respect the method by which a logical argument is to be maintained, and another to defend the introduction of investigations which, however interesting, are often based on conjecture, and are altogether speculative. We ought to be labouring for the development of the Physical character of the country we live in, and the illustration of its Natural History and Productions, since this appears to be now admitted as the *especial* object of our researches.

The title, therefore, which this Society has hitherto borne (as well as many others of like kind in Europe) is a misnomer.

Few who assemble here would, perhaps, claim the rank of Philosophers. Already wearied with the necessary occupations of their daily life, many would prefer the relaxation of their minds in less aspiring pursuits than in refined and difficult inquiries as to final causes, or the structure of the human mind. Already, perhaps, the word "Philosophical" has tended rather to the decrease than to the increase of our supporters. A discussion on a question which is capable of general comprehension, or which bears on the relations of Colonial Industry, is certainly more likely to gratify the public taste, at this early period of our history, than deep meditation on such a pursuit as Seneca describes, when he says of Philosophy: "*Animum format et fabricat, vitam disponit, actiones regit, agenda et omittenda demonstrat,*" a work which, in these days, is reserved for the Pulpit rather than for the Lecture-room.

Nor, if we seek in later times for a character of Philosophy, shall we meet with one which carries with it any high conviction of its usefulness. Locke himself tells us: "a man may find an infinite number of propositions, reasonings and conclusions in books of Metaphysical school-divinity, and some sort of Natural Philosophy; and, after all, know as little of God, spirits, or bodies, as he did before he set out."

And, if we consult Mr. Lewes, who has devoted his whole life to the study of Philosophy and has written a very able and searching Biographical history of all its systems from the beginning to the present tine, we shall find him declaring that Philosophy is "a Desert, whose only semblance of vegetation is

a mirage—the Desert without fruit, without flower, without habitation, and without horizon; arid, trackless, silent, but vast awful, and fascinating:" * adding, that "if we understand by Philosophy what all Philosophers consider it, Metaphysics, then to attempt to construct a science of Metaphysics is an impossibility." †

There can be no question that since the time of Bacon, this definition of Philosophy is the true one.

Surely, then, the title, "Philosophical Society," has been very suitably dispensed with: and there is a growing dislike to assume such a title in the formation of Scientific societies at home.

The former systems of what was called Philosophy have now passed away. Intellectual inquiry is pursuing a different direction. It is not now the employment of the Schools of learning to ascertain by the processes of Logic those invisible things which are beyond the attainment of reason, but rather to make discoveries in things visible, hoping thus to obtain an insight into that which mere Philosophy can never reach.

What risk may be run in even this method, may be in some degree perceived by a careful perusal of the chapters "On the objects of Physcial Science" in "Brown's Lectures on the Philosophy of the Human Mind," in which, by the way, he quotes a very witty illustration of the subject from De Fontenelle in his work entitled *Entretiens sur la pluralité des mondes.* (p. 12). "All Philosophy, I tell you, is founded only on two things, upon the fact that we possess an inquisitive mind and bad eyes. For, if you had better eyes than you have, you would distinctly see whether the stars are suns, illuminating so many worlds, or whether they are not; and if, on the other hand, you were less inquisitive you would not care to know, which would come to the same thing: but people wish to know more than they see—there is the difficulty. Even if that which they see, they saw correctly, something would so far be known; but they see quite the contrary of what really is. Thus the true Philosophers pass their lives in not believing what they see and in trying to guess at what they do not see, and this condition as it appears to me is not very desirable."

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* Vol. II, Page 224. † Vol. III, Page 4-6.

He then goes on to imagine an assemblage at the opera, of Philosophers, such as Pythagoras, Plato, Aristotle and those gentry that made such a noise in his days, who watch the stage operations, and look in vain for the contrivances by which they are carried on. He imagines Phaeton to be flying across, and then they discuss the mode of his motion, one advancing one theory and another another, so introducing all the various Philosophical guesses at what could be clearly seen, if they could only get at the back of the scenes. And then he says "to see Nature as she is, is merely to see behind the scenes of a theatre."

His pupil, a certain Marchioness, remarks,—"At this rate Philosophy has become very mechanical." To which Fontenelle replies:—"So mechanical that I think they will be soon ashamed of it."

Whether our expounders of the nature of things in the present day will ever be ashamed of their speculations on what they cannot see, or their interpretations of what they do see, must be left for the progress of development; but we may be sure of this that no human processes will ever discover answers to the grand questions:—Whence came the world? What is the nature of God? What is the nature of the human mind? Why is the universe formed as it is?

But, certainly, there is more ground to apprehend what is useful to man in his present state of existence, by observation and experiment, than in wild speculations and oftentimes incorrect propositions, which are found to end more commonly in sceptical than in theistic opinions. The present tendency of intellectual inquiry is an acknowledgment that the old modes of philosophising have been found insufficient for the attainment of truth. And, although, we may perceive even in the new method, that there is as much danger as in the schemes of metaphysicians, yet, if we keep in mind the fact that the visible universe is the creation of One whose existence and essence the old philosophers vainly sought to discover, though these will ever be "past finding out to perfection;" we may by examining its visible phenomena, arrive at a useful acquaintance with "parts of His ways," and come to a clearer comprehension of some of His attributes.

The term "Scientific Association" would, therefore, have been a better designation than Philosophical Society, as more suitable to the spirit of the age; and if, instead of one pursuit alone, which is the characteristic of a Geological, a Geographical, or an Entomological Society it is intended to permit investigations of the whole round of Physical Sciences (as this Society professes), then a more general and comprehensive designation, suitable on account of its undefined vagueness is an advantage. We cannot, assuredly, obtain a better than that which, at the same time, gives a sanction honourable to those who accept it.

This opinion is in agreement with the Report of a Committee appointed by the Council, and presented for adoption on the 26th July, 1865, to consider the propriety of the change of title.

To such as object to change, it may be said, that it will not prevent our cultivation of Science, Art, or Literature, in that "spirit of Philosophy" which a celebrated writer has said "is even more valuable than any limited acquirement of philosophy.

It need not, however, be pointed out, that the spirit in which truth is sometimes sought for in the present age is anything but philosophical; for having cast off the darkness of the past, men are sometimes found shutting their eyes against the only light of truth which they already possess.

There is, I hope, no need for apology in venturing to remark that there appears to me to be only one true Philosophy, that which is given to and not elaborated by man—"revealed," to use the words of Mr. Lewes,* who is not particularly bigoted in favour of the supernatural—"because inaccessible to Reason, revealed and accepted by Faith, because Reason is utterly incompetent;" nor will this proposition be disputed by any here, that if a Revelation of any kind has been given by the Creator, it will in the end be found not in contradiction to the works of His hand. And, although men may now be occupied in studying what are called the Laws of Nature, if the fallacies which are often uttered in relation to them, being as they are only the mode of creative action, are abjured, the Positive Philosopher will be led to see, that those very laws are not in opposition to, but the expression of creative will. We have not entertained as

* Vol. II, Page 223.

yet, and I hope we shall not entertain, at our meetings, any discussions on such abstruse questions as these.

We have, then, done well in following the example of the learned Societies of the sister Colonies. Let us now trace the coincidences. The Royal Society of Victoria sprang from the Philosophical Institute. The Royal Society of Tasmania rose on the pedestal of that useful Association, the Tasmanian Society, having adopted, for the addition "of Van Diemen's Land," the more euphonious and correct designation by which it is now known. As a humble Corresponding Member of the latter, I hail with pleasure, in the person of our present Treasurer, a late Fellow of the same.

The Royal Society of Victoria did not, however, advance so rapidly, *per saltum*, as did the Tasmanian Society. It went through three stages before it became full fledged. For, the Victorian Institute, the Philosophical Society of Victoria, and the Philosophical Institute of Victoria, all lent their aid towards the completion of the Society as it now exists.

Our own Society has had its changes also. At first, in the year 1821, it commenced as the "Philosophical Society of Australia," a very lofty title for its dozen founders and members. It then, in 1850, after a long interval of silence and inactivity, came out as the "Australian Philosophical Society," till in 1856, still contracting its territorial limits, it became represented by the "Philosophical Society of New South Wales," merging itself in that which now represents it, on the 1st May, 1866.

It has been said (an imputation to which I alluded before) that some of our members aspire to follow the example of the sister Society, and to assume the distinctive letters F.R.S. If that is our ambition, it is not one of a very high order. We must win our spurs before we wear them, waiting for a charter to confer that by right which ought not to be assumed without authority. Such a privilege, if it be supposed to confer any distinction (and without that it would be valueless), ought not to be made dependent on sufferance or merely on the payment of a guinea annual subscription.

We are, and have been hitherto, only a small Association.

May I venture to add that, being small, it would be well if our little hive contained only working bees; though, perhaps, our

Treasurer will assert, that philosophical drones cannot be dispensed with, since they bring in as much material support in one way, as do those who are foraging in the fields of research.

Nevertheless, it is incumbent on all to consider, that if we are supposed to gain by Royal recognition, we ought to be more than ever careful not to accumulate pabulum for the public use which may make Royalty ashamed of its patronage. The watchfulness of the Council will generally prevent mistake in this respect; and hitherto it may be allowed there has been no reason for the exercise of interference on that accouut.

So far as the Society has been the means by which *facts* of an interesting and useful kind have been collected,—so far as it has assisted in the advancement of *local knowledge* it has done its duty; and no contributor has had ground for complaint as to the reception which his individual endeavours have met with at the hands of the Council.

Here it may not be amiss to put in a word of warning by way of providing against the possibility of mischance.

We have now become a publishing Society, and it may be prudent to have a provision inserted in our By-laws by which the publication of Memoirs read before the Society shall be regulated, so as to do justice, on the one hand, to the authors, and on the other to the Society itself. This need not interfere with the discretion which the Council ought to possess as to the admission of what is to be read and discussed. Nor is such a regulation uncalled for on another ground.

So long as our funds are limited, it is needful that all due economy should be exercised The Government patronises Schools of Arts and Mechanics' Institutes at considerable cost to the revenue, and supports also the Australian Museum; but this Society which is patronised and upheld by the Governor and some high Officers of the Colony, receives no stipend, such as the Royal Society of Victoria has received for publication of its Transactions. We are thrown entirely on our annual subscriptions. It is, therefore, possible that the Council may be compelled occasionally to deny to authors of valuable contributions that which their ambition or their merits may claim, the full publication of those contributions to which the authors themselves contribute nothing beyond the annual guinea. It is possible to

obviate in part a difficulty of this kind by allowing Abstracts to be inserted, when a memoir is too long or of too impracticable a character. But in such a case the author should be permitted to draw up his own Abstract, which would prevent distortion of his views and opinions.

The first volume of our Transactions, published last year, was, in consequence of the cost of printing, deprived of illustrations which were actually required. The funds of the Society did not admit of them. A change of Title will not prevent even the dissolution of any Society which is indifferent to the condition of its exchequer.

If, therefore, we desire to make progress, we must endeavour to adjust the means of progression.

Dry as this discussion may be considered, it will, I hope be not found unprofitable. We must look, Gentlemen, to the consequences of our own acts.

The publication of our Transactions involves further considerations of a financial character. We profess to exchange our publications with those of other Societies, and we engage also to admit *ad eundem gradum*, or by honorary election, members of such Societies into our own ranks.

This is desirable on many accounts, and it is to be hoped the University will ere long act on the same principle.

But we cannot carry out this arrangement properly whilst we dwell *in nubibus*. We require provision for a "local habitation," as well as a "name." As at present constituted, we have no quarters of our own. Men who aspire to have an influence on Society ought not to be like Tartars or Gipsies, without a fixed habitation. We have not even a moveable tabernacle of our own. We assemble in rooms hired for the occasion. Now, if one of those eminent strangers from other lands, with whom we are anxious to be in social communication, come to this city—if he seek the house of the Society, or its Library, or, what it ought to have, its Museum—whither is he to be directed? If other Societies send us their publications in exchange, where are they to be found by our own Members? There are many books and memoirs at this moment belonging to us—where are they? Some are, I believe, in the charge of our Associate the Curator of the Australian Museum, but there are no regulations (such as apply

to the use of books belonging to the Trustees of that institution) by which they can be obtained without risk of loss, and we have no right to lay on the Curator work which it is not his to perform. They should be catalogued and placed where they can easily be found. What would be the compliment of enrolling visitors in a "nomade" institution, with no "*locus in quo*"—no spot of earth that it can call its own? This evil is just as great to ourselves as to others. It would be well if some remedy could be found for it. If, after all, we must patronise some sort of philosophy we had better not select that of Diogenes, even though he had a tub of his own.

From these remarks respecting our present state and future prospects, we have now to turn our attention to the past. It will be proper to start *ab ovo*.

It appears then, that in the year 1821, a company of gentlemen consisting of

Alexander Berry, Esq.
Henry Grattan Douglas, Esq., M.D.
Barron Field, Esq., Judge of the Supreme Court.
Major Goulburn, Colonial Secretary.
Patrick Hill, Esq., Colonial Surgeon.
Captain Irwin. XI. Bengal N.I.
Captain P.P. King, R.N.
John Oxley, Esq., Surveyor-General.
Charles Stargard Rumker, Esq., Astronomer; and
Edward Wolstonecraft, Esq.,

formed themselves into the Philosophical Society of Australasia, under the presidency of His Excellency Sir Thomas Brisbane, K.C.B., F.R.S.L., and E.

The only survivor of this group is Alexander Berry, Esq., still a member and the patriarch of our Society, and who yet retains, after a long and eventful life, much of the bodily vigour and all the intelligence that characterised him so long ago. It is an interesting fact, that, "*per varios casus per tot discrimina rerum*," this Society retains at least one link, to bind the present with the past, and which enables us to connect the scientific zeal of those days with that of our own.

This early union appears to have partaken rather of the character of a Mutual Friendly Association, than of that of a more formal

body. It was, in other words, a Scientific Club. At that time, there were no public libraries and scarcely a bookseller's shop in the Colony; but the members possessed books of their own; these were catalogued and lent by one to another, so that the use of them was reciprocal. The business of the Society was transacted at the dwelling-houses of the members in succession, where memoirs, prepared on an alternative of a fine of ten pounds sterling, were read and discussed, the only refreshment allowed being a cup of coffee and a biscuit, an arrangement still in vogue, I believe in England, and which was followed here in later times at the meetings of our Society in 1855-6.

I have not been able to discover more than four of the papers read by members, and these were preserved as a portion only of the Society's Transactions and edited by Judge Field in his "Geographical Memoirs of New South Wales by various hands," published by John Murray, of Albemarle Street, in the year 1825. These papers were the following:—

1. "On the Aborigines of New Holland and Van Diemen's Land," by Baron Field, Esq., read 2nd January, 1822.

2. "On the Geology of part of the Coast of New South Wales," (from the River Hunter to the Clyde), read in the same year by Alexander Berry, Esq.

3. "On the Astronomy of the Southern Hemisphere," by Dr. Rumker, read on the 13th March, 1822; and

4. "On the Maritime Geography of Australia," by Captain Philip Parker King, R.N., read 2nd October, 1822.

In Mr. Field's book, there are also papers by Mr. Oxley, and meteorological notices by Major Goulburn and Sir Thomas Brisbane. We have evidence, therefore, that at least seven of the twelve were working members.

Mr. Allan Cunningham, the Botanist (whose death I recollect at the Botanical Gardens shortly after my arrival in 1839), also contributed two papers, the one describing his traverse from Bathurst to Liverpool Plains, in 1823; the other, "On the Botany of the Blue Mountains," as observed in November and December, 1822.

As these last papers do not appear to have been read before the Society, it is probable Mr. Cunningham was not a member of it. But, without doubt, the actual members did good service

to the Colony. Of only one of their memoirs do I venture to form an opinion, and that is one which I expressed in 1860, in my book on the Southern Gold Fields, in the following words:— "In the year 1822, my respected friend, Alexander Berry, Esq., read a very interesting paper on the geology of the Clyde River, before the Philosophical Society of Australasia. At that early period, Mr. Berry had successfully made out all the prominent features of the district, as well as along the coast, and has pointed out the vertical strata of schist, the quartz, the trap, and the sandstone, with their order of succession. It gives me great satisfaction to mention this." (p. 45.)

Some of our members may have been unaware of the high claims which Mr. Berry, on account of his talents, enterprise, and acquirements, has on the respect of our Society. Probably, very few of ourselves will equal him in his years of membership, now amounting to nearly half a century.

The Philosophical Society which thus commenced with flattering promises of future usefulness, was destined to only a brief period of service. A question arose between the Government and some of the members which led to estrangement. The friendly meetings became fewer, and the fictitious variable value assigned to the dollar (the coin then current) was the cause of breaking up the little band who cultivated science for the love of it.

Judge Field thus speaks of that mishap, in connection with the seven memoirs before mentioned: "Such of them" (*i.e.* of the several documents in his book) as are parts of the Transactions of the Philosophical Society of Australasia are printed by permission of their respective authors; for, I am sorry to add, that the infant Society soon expired in the baneful atmosphere of distracted politics, which unhappily clouded the short administration of its President, the present" (*i.e.* the then) "Governor of New South Wales. Let me hope that it is only a case of suspended animation, and that our little Society will be resuscitated by the new Colonial Government."

This, Gentlemen, is all of much importance that I have been able to learn, after search in the publications of the period, and converse with my venerable friend Mr. Berry. My late friend Admiral King, did, however, inform me, that there were some other little grievances, besides the proceedings of Major Goulburn,

which prevented the early resuscitation spoken of by Judge Field. And I know personally that, at the time when the Australian Society was projected, there was such a difference between the gallant Admiral and the former Secretary as to prevent cordial working in behalf of that Society.

One other fact requires to be noticed here. The erection of the tablet of brass, which is affixed to Cape Solander, the southern head of Botany Bay, was the act of the Philosophical Society. The members—headed by their President, Sir Thomas Brisbane, —made an unsuccessful attempt to cross the Heads on the 13th March, 1822, but succeeded completely on the 20th March, in affixing the tablet 25 feet above the sea level against the rock on which Captain James Cook and Sir Joseph Banks first landed in 1770. And in the inscription itself it is expressly stated that the transaction occurred "in the first year of the Philosophical Society of Australasia."

It will be recollected, that this was discussed in the public journals not very long ago in connection with the names of Mr. Berry and Dr. Douglass, when an attempt was make to do further honour to the memory of Cook by the erection of a statue.

May it be asked, whether it would be unworthy of the present Society to assist in the completion of what was begun by its predecessor forty-five years ago? Perhaps, it might be more properly deferred till the centenary shall be complete, *i. e.*, if our Society be then in existence, three years hence or in A. D. 1870.

Incidentally referring to Judge Field's volume, I find in it many traces of the accomplishments of its Editor. His own labours were not confined to the more scientific memoirs, but he gives a narrative of voyages between England and New South Wales, to and fro; Journals of excursions to the Blue Mountains and to the Illawarra; a selection of poems, the "First Fruits of Australian Poetry;" and a brief Glossary of natural productions. In reading these, I came upon the mention of a fact which just at this time, when the flood of last month, which raised the Nepean or Hawkesbury sixty feet above its level, is so fresh in our memory, may be of use to speculators on the character of that visitation. The writer says, "It is this river, whether we call it Hawkesbury or Nepean, that is the Nile of Botany Bay; for the land on its banks owes its fertility to the

floods which come down from the Blue Mountatns, and which have been known to swell the waters nearly a hundred feet above their usual level; and these floods are uncertain and often destructive of the growing crops. I once thought that Government (if it is to farm at all) had better have kept the whole of this precarious garden in its own hands; since it is only public foresight that would provide against the loss of a harvest, and only public wealth that could support it."

This was written in October, 1822. Mr. Wentworth also states that in the early days of colonial history, the Nepean has risen 97 feet. I merely add to these notices, hoping to incorporate them and others in a paper on the subject which I propose reading at no distant day, that a deposit of drift pebbles, the work of ancient floods, has been traced by me on the low grounds and heights bordering the river, and for 80 miles, varying in level from the river bed to upwards of 400 and 700 feet above the sea, and these pebbles have been dispersed by more modern inundations. The present floods are, therefore, not in great excess of any former inundations.

To return now to our main subject. The interval between 1822 and 1856 was marked by a partial resuscitation of the Philosophical under the name of the Australian Philosophical Society, which was formed in the beginning of 1850, "for the encouragement of Arts, Sciences, Commerce, (otherwith Manufactures), and Agriculture in Australia."

Of this his Excellency Sir Charles Fitz Roy was Patron; the Honorable E. Deas Thomson, F.L.S., President; the Honorable, now Sir Charles Nicholson, Bart, then Speaker of the Legislative Council, Vice-President. A Council was also appointed, consisting of the following members:—

Arthur a'Beckett, Esq.
Alexander Berry, Esq.
William Bland, Esq.
Rev. W. B. Clarke, M.A., F.G.S.
Charles Cowper, Esq., M.C.
G. K. Holden, Esq.
Rev. R. L. King, B.A.
Francis Merewether, Esq., B.A.
Sir T. L. Mitchell, Knt., Surveyor-General.

Dr. Shanks, Head of the Army Medical Staff.
Samuel Stutchbury, Esq., Mineralogical and Geological Surveyor.
Rev. G. E. Turner, L.L.B.
R. G. Want, Esq.; with
R. A. A. Morehead, Esq., as Treasurer; and
H. G. Douglass, Esq., M.D., as Honorary Secretary,

to whom was afterwards attached the late A. Myles, Esq., Inspector of Police. Dr. Douglass ought to have the chief credit of the revival, though I do not know to what extent. I remember that I attended the first meeting, and several afterwards. But as in 1851, '2, '3, I was in the wilderness, exploring, I have only a general dim recollection of what took place during that period. As Mr. Douglass and Mr. Myles are no more, and Mr. Morehead is in Europe, I have not been able to obtain access to the official records of the Society, but I am informed by our Assistant Secretary that some time before the death of Dr. Douglass, application was made to him in reference to the records and papers; but they were not then in his possession, nor did he know what had become of them. Mr. Morehead's papers have also been searched for in vain. Since then, from Mr. Catlett's further search in the newspapers, at my request, a few data have been gleaned, which enable me to put on record now some of the proceedings.

The proposal to form an Australian Philosophical Society was made in January, 1850; on the 24th January the *Herald* newspaper introduced it by a leading article. Mr. Norton wrote an intended oration, which he published on the 14th February.

On 17th June, a paper by Sir T. L. Mitchell, "On the Undeveloped Resources of the County of Cumberland," was read by Dr. Douglass, and some discussion ensued on "dye woods," and "on the fossil bones of the New Zealand Moa," in which, I find, I took a considerable part.

On 5th September, papers were read by Sir T. L. Mitchell, on the natural fruits and grasses of the colony; by Mr. C. Lowe, on the "Argonauta, or Paper Nautilus"; on the Alpaca; and by Mr. Gee, on Dyes.

On 20th October, Mr. Edwin Hickey read "Observations on the alleged scarcity of Cedar in New South Wales."

On 11th January, 1851, Sir T. L. Mitchell read his paper on the "Bomerang propeller"; and on 23rd May, another "On the connection between Science and Art in a new colony"; which was followed by one "On the application of machinery as a means of saving hand labour," by Mr. Capper.

There are notices of gold medals offered, to be adjudged in 1851, for the production of Madder, growth of Cotton, Metals from Colonial ore, and Sugar. Whether these medals were ever adjudged, does not appear.

Nor is it shown what became of the Society, though it is probable its decay, after a period of great activity and intended usefulness, was brought about in the first instance by the excitement of the first rush to the gold-fields. The results of the labours that I undertook in consequence for the Government, do not form part of the work of the Society, but have been recorded elsewhere.

We come now to the period in which the Philosophical Society was restored in the year 1856; and it is but an act of justice to give the then Governor-General, Sir William T. Denison, credit for a very active share in its revival.

His Excellency became President, and the Hon. Sir Charles Nicholson, and the Hon. E. Deas Thomson, Vice-Presidents. But the first impulse was felt among the members of the Australian Society, who met at the Royal Hotel, on 30th July, 1855, and resolved to remodel the Society under the territorial title of New South Wales. The members of the Australian Society passed over without re-election, and the former Secretary and Treasurer were retained. The first meeting of the Philosophical Society was held in the Lecture-room of the School of Arts, on Friday, 9th May, 1856. Other meetings were held in this Hall, and in the Sydney Chamber of Commerce at the Exchange. From its commencement a minute book has been kept, and the business of the Committee and of the monthly general meetings has been recorded.

On the 19th December, 1860, the Society presented a Farewell Address to the Governor-General, who on the 15th May, 1861, was succeeded by our present Governor, the Right Hon. Sir John Young, Bart.

From the commencement of Sir William Denison's presidency

to this date, no less than eighty-three Monthly meetings have been held, besides an occasional Conversazione.

And in addition to brief notices, there have been read upwards of one hundred papers, some of considerable extent, by forty-two Contributors.

For the sake of convenience, I have classified ninety-six of them under the following sixteen distinctive heads:—

On subjects connected with	No of papers.
1. Agriculture	1
2. Anatomy	5
3. Antiquities	2
4. Arts and Scientific Processes	5
5. Astronomy	12
6. Botany	2
7. Chemistry	5
8. Engineering (including Railways, Roads, Telegraphy, &c.	17
9. Exploration	4
10. Geology and Mining	9
11. Magnetism	2
12. Manufactures (including Sydney Milk) *	3
13. Mathematics	5
14. Meteorology	7
15. Natural History	9
16. Statistics	8

This list proves very clearly that the design of the Society has been generally kept in view, for we find that Science, Art, and Literature, have been represented, though Philosophy itself as such, does not assert its existence, leading us to believe that "Philosophical Society" was really a "*lucus à non lucendo*" designation after all.

It is usual on such occasions as this, for the Annual Address to contain a kind of abstract of the work done in the previous year or years, or a discussion on some prominent memoir; but having myself taken part in the contributions of the last two

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* This was a very curious enquiry, to trace the source of the water employed in the adulteration of milk sold in Sydney, by the animalculæ found in it.

years, and on various other occasions, I consider myself properly restrained from entering on criticism.

Some of our papers have found a place in the Volume of Transactions, edited by our late Secretary, W. J. Stephens, Esq., who, in making his selecton did his best, finding it impossible from want of sufficient means to do more, and this has consumed three-fourths of the fund accumulated in former years.

The volume wants an Introduction and Index, and also what would have been useful, such a brief account of the Monthly and Committee meetings as would keep the members acquainted with the Secretary's and the Council's proceedings. Many useful and interesting facts, not of sufficient importance for a separate memoir, would be thus recorded. On the whole, it must be admitted that this volume proves the Society to be in working order. Of the twenty-six papers selected, half, at least, are dedicated to subjects expressly leading to develop "the resources of Australia and to illustrate its Natural History and productions," the very condition inserted in the fundamental rules of the Royal Society.

It would occupy too much time to-night to digress from these business-like details to a notice of the progress of Art, Science, and Literature beyond our own limits, otherwise I would have desired to make mention of the many public Engineering works which have been advanced during the last year;—the progress of the Entomological Society, which though standing aloof from combination with ourselves is doing very good work within the range of our pursuits; the exertions of the Acclimatisation Society; and the various Scientific matters brought under public notice by the N. S. W. Commissioners of the Intercolonial and International Exhibitions of 1867.

If time will not permit of such a disgression, much less can I glance even at the various interesting topics with which the Scientific Journals of the other hemisphere abound, and in which some of our active members would find more engaging subjects than those on which I have been compelled to enter this evening.

Before I conclude it will be proper to revert to them once more. Recalling, then, the facts which belong to the history of this Society—(creditable as they are to it)—it is but rational to ask, Why is the Society not in a more prosperous condition? Why, if it is as useful as it has been represented to be, is it now so feeble in its vitality?

It would not be right to close our present meeting without a moment's reflection on these allegations. An answer to these questions ought to be obtainable.

One of our most critical members—I mean Christopher Rolleston, Esq.—in a most valuable paper read on the 12th December, 1866, "*On the Condition and Resources of the Colony*," has shown very conclusively that, notwithstanding the fluctuations and interruptions of public prosperity, the mass of the people have continued to follow up their long-accustomed pursuits of costly enjoyment without diminution of expense. It must not, therefore, be asserted that our numbers have diminished because persons are unable to spend a guinea a year to support or to encourage such a Society as this. It is, then, to the want of Will to do so, that we must, in part at least, if not altogether, impute the languishing state of our affairs.

But why should there be this want of Will? The true solution is, perhaps, a complicated one.

In the pecular habit of the people there may be something of indifference to anything not of a visible or personally gratifying nature. It is to thousands a far more amusing employment, as also not exercising the powers of mind, to witness the extravagancies of the Stage, or to take part in the hilarities of the Ball-room, than to listen to the revelations of Science or to the descriptions of Physical phenomena. Others may stand aloof, because no material benefit is supposed to be derivable to themselves, or because there is no sufficient motive. Perhaps there are always comparatively few in any community who cultivate knowledge for its own sake. The masses prefer ease of mind and bodily indulgence, or such advantages in life as may be agreeable to them, to abstract studies which are wearisome and do not offer any appreciable reward.

Even where material pecuniary profits are in prospect, there is the same objection sometimes perceived.

This conclusion has been to a certain extent tested by the fact, that the "Australian Society" was devoted to "Commerce (or Manufactures) and Agriculture" as well as to Science and Arts. That, at least, had intimate relations with the profitable employments of our fellow-colonists. The failure of that Society cannot, therefore, be exclusively attributable to the abstruseness of sub-

jects discussed, nor to want of sympathy with the direct advancement of the community. A new Society solely devoted to Pastoral and Agricultural pursuits has now been announced, and we shall see how far it will succeed. Probably, it will not fare better than the "Agricultural and Horticultural Society" of 1833, which in later years was succeeded by another of the same kind.

Of the officers of that first Agricultural as of the first Philosophical Society, the only survivor is Alexander Berry, then Member of Council.

It is certain that we must not anticipate success for ourselves from persons whose leisure is generally given to the frivolities of ephemeral excitement, or whose mental occupation is only exercised by sensational novels or a railway literature. An excellent judge of this question not long ago, in the hearing of some here present, pointed out to the students of the University, that under the effects of undue attraction in a wrong direction, the knowledge of History, Poetry, and Polite Literature which formerly characterised the young people of our fatherland is rarely to be found among the rising generation of the present day. Such being the case, it becomes necessary to create a taste for these things and for higher pursuits, before we can expect that support which our lucubrations may deserve.

There may be also still another difficulty in our way. Mankind is gregarious, and clans are not confined to Kelts alone. General society in all nations is made up of clans, or "sets." This kind of segregation, is well known even in our English Universities and leading Associations at home; and it would not, therefore, be surprising to find this influence in any gathering of men from the mixed and amalgamated diversities of a Colonial population. But, if this influence has operated within the bounds of our limited horizon, it is probably owing rather to the diffidence of one class than to the arrogance of another. There are many persons in this community who could materially serve the objects of our Society if they would only lay aside a want of confidence and tell us what they have discovered in the way of mechanical or other practical arts which they cultivate with success. We ought all to be animated with a mutual desire to add as much as we can (even if the much be really very little) to the common stock of knowledge. Dissociation can never serve the purpose of Association.

And, if really it is the case that any distinctions are kept up in this room which militate against the well-being of the Society, it would be better for them to be laid aside, especially as no men are so little likely to forget the established relations of life as those, of whatever class, whose habits of thought have been nurtured by acquaintance with the order, distinctions, separate relations and combinations observable in nature.

It is, however, only just to recollect, that a jealousy of this kind has had no sanction from any proceedings which have come under observation. We can point with great satisfaction to the fact, that if not Patron, her Majesty's Representative has always been the President of our Society; that one at least of those high officers of State has worked in common with us and has submitted to us his own opinions for discussion; and that our present Governor has frequently attended meetings where he has not been always supported by the presence of those who ought to have attended him; and what is most significant, not one single contribution has been received from any member of the Society whose skill in art or mechanical contrivance would have gained him a hearty welcome, even if he be otherwise little known in social life.

It has been considered right to say so much on an unwelcome topic, in order to remove, if possible, a similar prejudice to that which once occasioned injury to the Institution in whose Hall we are now assembled, and which, if not met in a fair and candid way, may do injury to our cause.

This prejudice cannot, however, have any bearing on the reserve and distance of those highly educated men who, Members of of British Universities and of contemporaneous Associations, might have been supposed to have already gathered around a Society of this kind, as the friendly encouragers, if not the active instruments of its success.

Leaving these differences to follow their own course, it is to be feared, from the indications furnished to us, that unless a new spirit be infused, we must resign ourselves to the inevitable destiny of an unpopular Institution.

This ought, nevertheless, not to paralyse the exertions of ourselves in endeavouring to extend our field of usefulness; nor should it deprive those who are attached to our designs, of the pleasure which they themselves have found in turning their thoughts,

occasionally, for a time, from the every-day labours of professional employment to objects of a higher and more ennobling kind. Let no worker in this Association ever forget the words of Milton, which I once before quoted in this room on a less public occasion than the present—"Let me fit audience find, though few!"

If this Society, as constituted, is doomed to experience no great patronage and no universal sympathy, if the mass of those whose intelligence and capabilities, sagacity and acquirements, would be useful to us, prefer to withdraw from our fellowship, we must be content to remain a small, but we may still hope, a zealous body, anxious to turn to account for the public good such opportunities as may be afforded us.

Whilst not "wise above what is written," but humble searchers into the ways of Providence, we must be content to contemplate and examine the material things which we are allowed to explore; and, with an earnest wish to discharge the important duty which every man owes to his brother, we must, so far as in us lies, endeavour to point out that he also has his assigned position in the Universe, since every thing proves design and skill and universal goodness in the Creator, and nothing that is created is without an appropriate use and office.

Keeping this in mind, we shall not go far astray. The theories of such Philosophers as tell us, that "the material heavens do *not* declare the glory of God, but only the glory of Hipparchus, Kepler, and Newton," (which is the assertion of that Philosopher of the present day whose system is praised as perfect,) will have no influence on such as believe that man is not descended from brutes to whom reason was not given, but was "formed in the image of God," and will warn us against endeavouring to prove God to be only the image of ourselves. These will admit that all our merely human inquiries must in the end be found insufficient and vain, because no finite mind can comprehend the Infinite mind or find out God to perfection.

This being the aim of Philosophy, let us content ourselves with less presumptuous objects. Let us perform our own proper work, not caring whether we ever arrive at complete knowledge of the methods by which the Universe was formed and perfected—by which light is produced—how solid matter has resulted from gases—how attraction and repulsion are mutually balanced—how

elementary substances proportionably combine—how the marvels of crystallisation are brought about—or what is that lightning which we compel to bear our messages, as fleet as time through the air and under the ocean—because these things are beyond our grasp, and we cannot fathom with our scanty line of intellect the unfathomable depths of the All-providing and the All-wise. Our province lies on the outer boundaries of the region to which only partial success is permitted, but where there is yet sufficient to exercise our faculties and to occupy our attention.

Nor need we vex ourselves with the disputings of those who affirm that the works of the Creator contradict His word.

If human Philosophy, as is averred by those who know it best, is itself vain, leading nowhere but to antagonism with Theistic doctrine, it will be of little purpose to have pursued its logical processes except as an exercise of the mind, or as schooling it for higher enterprises than such doubtful disputations. Applied in another way they might be enabled to declare what we may firmly believe is truth, that there may be found in the works of nature by those who seek for it, a New revelation concordant with the Old. This is, no doubt, denied by some eminent writers of this time; e. g. Sir W. Hamilton, but we may, nevertheless, be permitted to believe it possible. A flood of light is streaming in upon us from every quarter—discoveries in all the branches of Physical Science, crowd upon us without reserve; and at the same time Traditionary history, and the records in which Antiquity found its consolation and hope, are being canvassed with an unsparing criticism that frequently puts "darkness for light and light for darkness." The Laws of Nature, as they are called, are set up as infallible and unchanging. And in this way the practical duties of religion, as well as the time-honoured belief of mankind are put in danger of extinction. But the study of the Universe, though it expands out views, ought also to limit our speculations respecting it. It should teach us to await with patience still further revelations of things concealed in the abysses of Creation. And, although it may seem unfair to some to seek illustration from such a source, yet, if we go to the writings of One who was more than a match for the Philosophers of Greece, we shall find that he declares the things seen are manifestations of the Unseen, and by them he refutes the doctrines of such as

denied the personal agency of One Universal First Cause. The fallacious reasonings relating to the Laws of Nature must eventually give way to a better system of interpretation than now widely prevails; for even the author of the "Vestiges of Creation" admits that they are but "the mode of action of the ever present and sustaining God," and one day, we need not doubt, these laws will be understood as the expression of His will.

In adopting these views, and in expressing these opinions, there is no intention to ignore the minutest facts that are brought forward by observers, nor the significancy of the testimonies that are being daily disentombed from the sepulchral archives of Time and Nature. The question is not of the existence of phenomena, such as those for instance which are made to bear on the epoch of man's appearance on the earth, but of the application of them. Nor is there objection to the statement of arguments relating to the Origin of Species, or the observations on which these arguments are based. Yet we ought not to be accused of nervousness as to the fate of Scripture, if we would wait for further evidences or for wider ranges of experiment. It may serve to express more clearly what is intended by these remarks, if we refer to the striking words of the present Dean of Canterbury:—"Nor has the Bible any reason to fear the utmost activity and the furthest extension of such pursuits. We have been, I am persuaded, too timid and anxious in this mattter. Let research and inquiry be carried forward in every direction and in a fearless spirit: and when their results are most completely established and firmly assured to us, then will it most undeniably be found, that Creation, Providence, and Revelation are the work of the same God:—then will the plainest light be thrown on the meaning of Holy Scripture, on all points on which such research and inquiry bear."

Should we meet with difficulties in such inquiry, let us remember the words of the great English reasoner, Bishop Butler, who urges that "he who believes the Scriptures to have proceeded from Him who is the Author of Nature, may well expect to find the same sort of difficulties in them as are found in the constitution of Nature."

If from these testimonies of logical theologians we turn once more to that of the Historian of Mental Philosophy, we shall be reminded that the state of Philosophy is very much akin in one

respect to the state of Sectarianism, each sect refusing to admit the doctrines of the rest. "Look," he says, "at the state of Philosophy. There is no one philosophy universally accepted: there are as many philosophies as there are speculative critics, almost as many as there are professors. The dogmas of Germany are held as the dreams of alchemists in England and Scotland; the psychology of Scotland is laughed at in Germany, and neglected in England and France. Besides this general dissidence we see, in France and Germany at least, great opposition between Religion and Philosophy pronounced or openly signalised."

Now hear his final conclusion: "This opposition is inevitable; it lies in the very nature of philosophy."*

Gentlemen, I have, I hope, now justified to you all I said of the little benefit it was to us to remain as a mere Philosophical Society.

In conclusion, whilst offering my apology for the length to which this Address has extended, I would crave your further patience for a few practical remarks.

We have seen that our province is not in the mysterious labyrinth of mental speculation. We need not, therefore, trouble ourselves with any questions of that class. We have before us in this Colony a vast region, much of which is still untrodden ground. We have, as it were, a new heaven for Astronomy and a new earth for Geology. We have climatical conditions of the Atmosphere, which are not to be viewed by us merely as phenomena interesting to the Meteorologist. We have facts to accumulate relating to Droughts and Floods which have a deep financial and social importance. We have a superficial area which may engage the attention of Surveyors, Agriculturists, and Engineers for years to come. We have unrevealed magazines of mineral wealth in which Chemists and Miners may find employment for ages after we shall all have mingled with our parent earth.

All that we have to trouble ourselves with, is the right interpretation and development of these physical riches, so bountifully spread around and beneath us for our investigation and use.

In such investigations there are rules which we should observe and follow.

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*Biogr. Hist. of Phil., iv., 246

We must strive to discern clearly, understand fully, and report faithfully; to love truth in things physical as in things moral; to abjure hasty theories and unsupported conjectures; where we are in doubt, not to be positive; to give our brother observer the same measure of credit we take to ourselves; not striving for mastery, but leaving time for the formation of the judgment which will inevitably be given, whether for or against us, by those who come after us; contented if we are able to add but one grain to that enduring pyramid which is now in course of erection as the testimony of Nature to the truth of Revelation.

If in this spirit we make progress, in this way our own mental enjoyment will be increased.

It is a work not only suitable to a Society of humble-minded men who profess to unite for this very end; but, if carried on earnestly, charitably, with simplicity and faithfulness, is one worthy not only of Royal Patronage, but of Universal Encouragement.

ART. I.—*On "Non-Linear Coresolvents," by the Honourable Chief Justice* COCKLE, F.R.S., *President of the Queensland Philosophical Society.*

[Read before the Society, 7th August, 1867, by Martin Gardiner, Esq., C.E.]

1. Let y denote the root of a quartic whereof the coefficients are regarded as functions of a variable x and let p and q respectively denote the first and second differential coefficients of y with respect to x, so that

$$\frac{dy}{dx} = p, \quad \frac{d^2y}{dx^2} = \frac{dp}{dx} = q \quad \ldots\ldots\ldots \quad (1, 2)$$

also let

$$\frac{p^2}{y} = \mathrm{P} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

and form the function F supposed to be such that

$$F = q^2 + 2(a p + A P) q + b p^2 + 2 \beta P p + B P^2 \ldots (4)$$

and wherein the multipliers a, A, b, β, and B are indeterminate.

2. We know that p, q and P can be expressed as rational functions of y, and by the theory of equations we also know that p, q, and P, and, consequently, F can be expressed as rational and entire functions of integral powers of y, none of which transcends the third power. We are therefore at liberty to write

$$F = \lambda y^3 + \mu y^2 + \nu y + \rho \ldots\ldots\ldots\ldots (5)$$

where λ, μ, ν, and ρ, are linear functions of a, A, b, β, and B. By means of the four conditions

$$\lambda = o, \mu = o, \nu = o, \rho = o \ldots\ldots (6, 7, 8, 9)$$

eliminate four of the indeterminate multipliers, say A, b, β, and B from the dexter of (4). Then, these four conditions causing F to vanish, we have a result which we may write,

$$q^2 + 2(ap + C P) q + D p^2 + 2 E P p + H P^2 = o \ldots (10)$$

and in which C, D, E, and H are now to be regarded as functions of the coefficients of the quartic and of the uneliminated indeterminate a. It will be remarked that this indeterminate a only enters linearly into C, D, E, and H.

3. Put (10) under the form

$$(q + a p + C P)^2 = (a^2 - D) p^2 + 2 (a C - E) P p + (C^2 - H) P^2 \ldots\ldots\ldots\ldots (11)$$

then the dexter of (11) will be a perfect square if

$$(a^2 - D)(C^2 - H) = (a C - E)^2 \ldots\ldots (12)$$

that is to say, if

$$D H - a^2 H - C^2 D = E^2 - 2 a C E \ldots (13)$$

But (13) is a cubic in a. Determining a so as to satisfy it, and then extracting the square root of either side of (11) we have

$$q + a p + C P = \pm \left\{ \sqrt{(a^2 - D)}\, p + \frac{a C - E}{\sqrt{(a^2 - D)}} P \right\} \quad (14)$$

whence we may obtain an equation which I shall write

$$q + I p + J P = o \ldots\ldots\ldots\ldots (15)$$

4. Had the equation in y been a cubic instead of a quartic, we might have dispensed with the term λy of F. Thus we should have had for the solution of (13) two disposable indeterminates, say a and b, in place of a only, and in such case (13) would have been capable of taking the form

$$N (a^3 + 3 L a^2 + 3 M a) = N Q \ldots\ldots (16)$$

wherein N is free from b, and b enters L linearly and M and Q to the second and third degrees respectively. Now if we use the arbitrary quantity b for the purpose of satisfying the condition

$$M = L^2 \ldots\ldots\ldots\ldots (17)$$

which is a quadratic in b then (16) after division by N may be put under the form

$$(a + \mathrm{L})^3 = \mathrm{Q} + \mathrm{L}^3 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (18)$$

and the determination of a depends on the extraction of a cube root only.

5. It follows that by solving a quadratic and extracting a cube root, the solution of a cubic may be connected with that of a non-linear differential resolvent of the form (15), and that by solving a cubic, the solution of a quartic may be made to depend upon a similar differential resolvent.

6. Replacing P in (15) by its value as given in (3) equation (15) becomes

$$q + \mathrm{I}\,p + \mathrm{J}\frac{p^2}{y} = o \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (19)$$

assume $y = e^{\int u dx}$ then

$$p = y\,u,\ q = y\,\frac{du}{dx} + y\,u^2 \quad \ldots\ldots\ldots\ldots (20, 21)$$

whence, substituting these values in (19) and dividing the result by y, we have

$$\frac{du}{dx} + \mathrm{I}\,u + (\mathrm{J} + 1)\,u^2 = o \quad \ldots\ldots\ldots\ldots\ldots (22)$$

or, dividing by u^2

$$\frac{1}{u^2}\,\frac{du}{dx} + \mathrm{I}\,\frac{1}{u} + \mathrm{J} + 1 = o \ldots\ldots\ldots\ldots\ldots\ldots (23)$$

Hence, if

$$\frac{1}{u} = -\,v \text{ and } \therefore \frac{1}{u^2}\,\frac{du}{dx} = \frac{dv}{dx} \quad \ldots\ldots\ldots (24, 25)$$

equation (23) becomes

$$\frac{dv}{dx} - \mathrm{I}\,v + \mathrm{J} + 1 = o \ldots\ldots\ldots\ldots\ldots\ldots (26)$$

a linear differential equation of the first order in v.

7. Thus in the case of cubics and biquadratics we have, through a non-linear, been conducted to a linear differential resolvent, the latter being, moreover, of the first order only. At a meeting of the Queensland Philosophical Society, held on Monday, July 30th, 1866, I read a Paper "On the Inverse Problem of Coresolvents," which was printed in the *Queensland Daily Guardian* of Tuesday, August 7th, 1866, and in which, after calling attention to the theoretical possibility of determining the foregoing resolvents, I suggested that further results might spring from the study of non-linear differential resolvents. Some three months ago I sent to England a Paper in which I pointed out certain conditions which, when satisfied, enable us by means of a non-linear differential resolvent, to obtain a linear differential resolvent of a quintic which is of the third order only. By the last (April 1867)

English Mail I transmitted what I believe will be found to be the most general mode of determining whether a proposed differential equation admits of finite solution, that is to say, of solution by means of indefinite integrals. My process applies successfully to the results obtained by Boole in the Philosophical Transactions for 1864.

" Oakwal," near Brisbane, Queensland, Australia,
Tuesday, April 23rd, 1867.

ART. II.—*The Vertebrata of Tasmania, recent and fossil by Gerard Krefft, F.L.S., C.M.Z.S., &c., &c., Curator and Secretary of the Australian Museum.*

[Read before the Society, 4th September, 1867.]

With much interest I have perused Mr. S. H. Wintle's paper: "A visit to the bone caves of Glenorchy" published in the first number of the "Colonial Monthly Magazine" at Melbourne and Sydney, in September 1867, and with greater interest, I have carefully examined the mammalian remains collected there on which I now report to the Council of the Royal Society of New South Wales as follows :—

All the bones submitted to me for inspection belonged to two species of Marsupial animals still living in abundance on the island—one the large Wallaby or Brush Kangaroo (*Halmaturus bennettii*)—the other the Sooty Opossum or Phalanger (*Phalangista fuliginosa*) and I have numbered these fragments from 1 to 45, in order that they may easily be identified.

HALMATURUS BENNETTII.

1. Portion of skull, left side, with the ear-bone and part of Zygoma.
2. Right ramus, lower jaw, with molar-like premolar and four molars, the last just cutting through.
3. Right ramus, lower jaw of another individual, with teeth in the same condition.
4. Another lower jaw as the one before.
5. Another, somewhat more fractured.

6. The left ramus of an aged individual, with perfect dentition. The premolar is about being shed, the first and second molars are very much worn, but the last two still show the folds of the crown. The *Halmaturus bennettii* is the largest of the "Wallabies," and in its size and habits much resembles the true Kangaroos; like *Macropus major* the permanent premolar is not retained till old age but is shed soon after the last molar has come into use.
7. The right ramus of the upper jaw of another aged individual with much worn teeth

7A. First dorsal vertebra.
8. The fifth lumbar vertebra.
9. The third caudal vertebra.
10. A lumbar vertebra much fractured.
11. The tenth
12. The eleventh } caudal vertebra.
13. The fifth
14. The last } lumbar vertebra of a half grown animal.
15. The third
15A. Last dorsal.
16. Portion of the right scapula of a very large animal.
17. Right humerus of do.
18. Portion of the left humerus.
19 Right radius of a very large subject.
20. Left radius of a large animal.
21. Right ulna.
22. Left ulna.
23. Fractured right ulna.
24.
25. } Three ribs.
26.
27. Left os. innominatum.
28. Right os. (fractured)
29. Portion of left
30. Portion of right } os. innominatum.
31.
32. } Left femur.
33.
34. Shaft of right femur.
34. Right tibia.
35. The same bone fractured.
36. Shaft of a right tibia.
37. The same.
38. and 39. Proximal portions of left tibia with part of shaft.
40. Left metatarsal bone.
41. and 42. Right metatarsal bone.
43. Shaft of a left fibula.
44. Left os calcis.

PHALANGISTA FULIGINOSA.

45. Portion of left femur.

These bones are no doubt of considerable age, but they cannot be termed "fossil" and if the examination of these caves is continued, remains of animals in a fossil state may yet be found.

Similar caves in New South Wales have yielded numerous fossil and other remains, some of which belong to animals now extinct, others, as those of the *Thylacine* and *Sarcophilus* at present restricted to Tasmania, and a few are referrable to still living species. Remains of the Dingo, of rats and mice, and of birds and small reptiles are also met with in the limestone caverns of this colony, and fresh discoveries will no doubt be made whenever these deposits (both here and in Tasmania) are thoroughly examined.

Being in a position to give a correct account of nearly all the vertebrata inhabiting Tasmania, I will now enumerate the animals found there.

Without the Whales common to our coast, the following species were collected for the Trustees of the Australian Museum by Mr. George Masters.

PLACENTALIA,

Producing their young in a perfect state and having no pouch or skin-fold for their protection:—

1. *Canis dingo*.....The Dingo, (now extinct).
2. *Arctocephalus lobatus*.....The Cowled Seal.
3. *Stenorhynchus leptonyx* .....Sea Leopard.
4. *Vespertilio tasmaniensis*.....Tasmanian Bat.
5. *Scotophilus microdon* .....Small-toothed Bat.
6. *Nyctophilus unicolor*.....Long-eared Bat.
7. *Hydromys chrysogaster*.....Golden-bellied Beaver Rat.
8. *Mus tasmaniensis*—(Kr.,) a new species of land-rat discovered by Mr. George Masters, on the banks of the Ouse River. Except this rat, all the animals mentioned are also found in Victoria and New South Wales.

IMPLACENTALIA.

Producing their young in a very imperfect state and having a pouch or skin-fold for their protection.

Section I.—*Marsupialia.*

WOMBAT FAMILY.

Phascolomys wombat .....The Tasmanian Wombat.

KANGAROO FAMILY.

Halmaturus bennettii .....Bennett's Kangaroo.
Halmaturus billardieri .....Tasmanian Wallaby.
Macropus major .....Great or Common Kangaroo.

Bettongia cuniculus.....Tasmanian Bettong.
Hypsiprymnus apicalis.....Tasmanian Rat-Kangaroo.

Bandicoot Family.

Perameles gunnii .....Gunn's Perameles.

Phalanger Family.

Phalangista fuliginosa .....Black or Sooty Opossum.
Phalangista vulpina .....Common Opossum.
Phalangista viverrina .....Ring-tail Opossum.
Dromicia gliriformis.....Thick-tailed Dromicia.

Dasyure Family.

Antechinus swainsonii .....Swainson's Antechinus.
Dasyurus viverrinus .....Common Dasyure or Native-Cat.
Dasyurus maculatus .....Spotted-tailed Dasyure or Tiger-Cat.
Sarcophilus ursinus .....Tasmanian Devil, } (fossil in N. S.
Thylacinus cynocephalus.....Tasmanian Tiger, } Wales.)

Section II—*Monotremata.*

Ornithorhynchus anatinus...Duck-billed Platypus.
Echidna setosa .....Hairy Echidna.

A second species of Thylacine recently obtained by Mr. Masters, and which I have described in the Proceedings of the Zoological Society of London as *Thylacinus breviceps*, must be added to this list.

This is a smaller animal with a shorter head, and much larger teeth than the *T. cynocephalus*, and was well known to many of the old residents of Van Dieman's Land who distinguished the two kinds, so Mr. Masters assures me, by the popular names of Grey-hound and Bull-dog Tigers.

Peculiar to the island are the following mammals:—

The Tasmanian Wombat
Bennett's Kangaroo.
The Tasmanian Rat Kangaroo.
Gunn's Bandicoot.
The Sooty Phalanger.
Thick-tailed Dromicia.
The Tasmanian "Devil."
The two "Tigers"; and
The Hairy Echidna or Porcupine Anteater.

With the exception of the "Devil" and "Tigers" all have closely allied representatives on the mainland.

A colder climate always modifies species more or less, and we find the Mammals of Tasmania generally more robust, of larger size, and provided with thicker and darker fur, than those inhabiting New Holland. In the structure, however, of the skull and

teeth, but little difference, (except in size,) is observable in Tasmanian specimens when compared with continental ones. Comparing the fauna of Tasmania with that of the Australian mainland, we arrive at the following result.

The Dingo is extinct,—the Seals and Whales are the same as on our own coast. The insect fauna of the island not being very rich, there are but few insect-feeding bats, three species only are known to our twenty or more *Cheiroptera*. For similar reasons (the absence of indigenous fruits) no Flying-foxes occur, though if these marauders once found out the richness of Tasmanian plantations, they would soon wing their way across the Straits.

The peculiar Australian Rodent, the Water-rat, or Beaver-rat, is represented by a single species to five on the mainland. Some four or five and twenty other rats and mice are known to inhabit Australia, and only one kind Tasmania. The marsupial order is richer, but here again many species common to our south coast are missing. There are but three *Halmaturi*, while some forty species inhabit the continent.

Our ten or twelve "Kangaroo-Rats" and "Bettongs," have two representatives in Tasmania, both of which, curious to say, resemble in a most remarkable degree two West Australian species, so much so, that the one can only be distinguished from the other by a close comparison of their skeletons.

One would naturally conclude that a mountainous island like Tasmania, would be the very paradise of "Rock-Wallabies," but none are found there. The absence of the "Koala," or Native Bear, and of all the species of "Flying Phalangers," common in Victoria, is also unaccountable, the more so as the allied "Phalangers," better known as "Brush and Ring-tail Opossums," which subsist on similar food and live in the same forests, thrive well, and attain a great size in that Island.

The small marsupial insectivora allied to the genera *Podabrus* and *Antechinus*, are represented in the latter by a single species, though probably a second kind exists, as I received a new form from one of the islands of Bass' Straits not long ago, which is perhaps also found in Tasmania.

The predominance of the large carnivora over all other animals. is most likely the cause of so limited a number of species; it is highly probable that many more kinds of Kangaroos once existed, and that they have been exterminated by the ferocious "Tigers" and "Devils" still plentiful in some of the wild districts; if so, their remains will tell whenever the bone-caverns are explored.

The monotremous section of the *Implacentalia* is represented as in Australia, by the well known Platypus, and by an Echidna or Ant-eater which appears to differ from our own in nothing but the shorter spines and more hairy fur.

The birds observed amount to one hundred and sixty-two species, as follows:

ORDER—RAPTORES.

Family Falconidæ.

Aquila audax .....Eagle Hawk.
Ichthyaëtus leucogaster.....White-bellied Sea Eagle.
Pandion leucocephalus.....White-headed Osprey.
Falco melanogenys .....Blacked-cheeked Falcon.
Falco lunulatus .....White-fronted Falcon.
Hieracidea berigora.....Brown Hawk.
Astur novæ hollandiæ .....New Holland Goshawk.
Astur approximans .....Australian Goshawk.
Accipiter torquatus .....Collared Sparrowhawk.
Circus assimilis.....Allied Harrier.

Family Strigidæ.

Strix castanops.....Chesnut-faced Owl.
Athene maculata .....Spotted Owl.

ORDER—INCESSORES.

Family Caprimulgidæ.

Ægotheles novæ-hollandiæ .....Little Morepork.
Podargus cuvieri .....Morepork.

Family Hirundinidæ.

Acanthylis caudacuta .....Spine-tailed Swallow.
Hirundo frontalis .....Welcome Swallow.
Collocalia arborea .....Tree Swallow.

Family Alcedinidæ.

Alcyone diemensis.....Tasmanian Kingfisher.

Family Artamidæ.

Artamus sordidus.....Wood Swallow.

Family Ampelidæ.

Pardalotus punctatus .....Diamond-bird.
Pardalotus affinis.....Allied Diamond-bird.

Family Laniadæ.

Strepera fuliginosa .....Sooty Crow-Shrike.
Strepera arguta.....Hill Crow-Shrike.
Gymnorhina organica .....Tasmanian Crow-Shrike.
Cracticus cinereus.....Cinereous Crow-Shrike.

Family Campephaginæ.

Graicalus parvirostris .....Tasmanian Graicalus.
Pachycephala glaucura .....Grey-tailed Thickhead.
Pachycephala olivacea.....Native Thrush.
Colluricincla selbii .....Whistling Dick.

Family Muscicapidæ.

Rhipidura albiscapa.....White-shafted Fantail.

Family Saxicolidæ.

Erythrodryas rhodinogaster.....Pink-breasted Wood Robin
Petroica multicolor .....Scarlet-breasted Robin.
Petroica phœnicea .....Flame-breasted Robin.
Petroica fusca .....Dusky Robin.

Family Maluridæ.?

Malurus longicaudus .....Blue Wren.
Stipiturus malachurus.....Emeu Wren.
Sericornis humilis .....Sombre Sericornis.
Acanthiza diemensis.....Tasmanian Acanthiza.
Acanthiza magna .....Great Acanthiza.
Acanthiza chrysorrhœa .....Yellow-rumped Acanthiza.
Calamanthus fuliginosus.....Striated Calamanthus.

Family Motacillidæ.

Anthus australis .....Australian Pipit.
Sphenœacus gramineus .....Tawny Grass-bird.

Family Fringillidæ.

Estrelda bella.....Fire-tail.

Family Merulidæ.

Cinclosoma punctata.....Spotted-Grained Thrush.
Oreocincla lunulata.....Mountain Thrush.

Family Corvidæ.

Corvus australis .....White-eyed Crow.

Family Meliphagidæ.

Meliphaga novæ hollandiæ .....New Holland Honey-eater.
Meliphaga australasiana .....Tasmanian Honey-eater.
Glyciphila fulvifrons .....Fulvous-fronted Honey-eater.
Ptilotis flavigula .....Yellow-throated Honey-eater,
Anthochœra inaurus.....Wattle Bird.
Authochœra mellivora .....Brush Wattle-bird.
Acanthorhynchus tenuirostris.....Cobbler's Awl.
Melithreptus validirostris..... Strong-billed Honey-eater or Cherry-picker.
Melithreptus melanocephalus .....Black-headed Honey-eater.
Myzantha garrula .....Miner.
Zosterops cærulescens .....Grey-backed Zosterops.

Family Cuculidæ.

Cuculus inornatus .....Plain Cuckoo.
Cuculus cineraceus .....Grey Cuckoo.
Chrysococcyx lucidus.....Bronze Cuckoo.

Family Psittacidæ.

Cocatua galerita .....Common Cockatoo.
Calyptorhynchus xanthonotus .....Black Cockatoo.
Callocephalon galeatum .....Gang Gang Cockatoo.
Platycercus flaviventris .....Green Parrot.
Platycercus eximius.....Rose Hill Parrakeet or Rosella
Euphema chrysostoma .....Blue-banded Grass-Parrakeet.
Euphema aurantia.....Orange-bellied Grass-Parrakeet
Pezoporus formosus.....Swamp Parrakeet.
Lathamus discolor .....Swift Parrakeet.
Trichoglossus swainsonii .....Blue Mountain Parrakeet.
Trichoglossus concinnus .....Musk Parrakeet.
Trichoglossus pusillus .....Small Parrakeet.

ORDER—RASORES.

Family Columbidæ.

Phaps chalcoptera .....Common Bronze-wing.
Phaps elegans .....Brush Bronze-wing.

Family Turnicidæ.

Turnix varius .....Painted Quail.

Family Perdicidæ.

Coturix pectoralis.....Pectoral Quail, Stubble Quail
Synoicus australis .....Brown Quail.
Synoicus diemensis .....Tasmanian Partridge.

ORDER—GRALLATORES.

Family Struthionidæ.

Dromaius novæ hollandiæ .....Emu.

Family Charadridæ.

Hæmatopus longirostris.....White-breasted Oyster-catcher
Hæmatopus fuliginosus .....Black Oyster-catcher.
Sarciophorus pectoralis .....Black-breasted Plover.
Squatarola helvetica.....Grey Plover, or Sand Piper.
Charadrius orientalis .....Golden Plover.
Hiaticula monacha .....Hooded Dottrel.
Hiaticula ruficapilla.....Red-capped Dottrel.
Hiaticula inornata .....Allied Dottrel.
Hiaticula bicinata.....Double-banded Dottrel.

Family Recurvirostridæ.

Recurvirostra rubricollis.....Red-necked Avocet.
Limosa uropygialis .....Barred-rumped Godwit.

Family Tringidæ.

Schæniclus australis.....Marsh Tringa.
Schæniclus subtorquatus.....Curlew Sandpiper.
Schæniclus albescens.....Little Sandpiper.
Strepsilas interpres.....Turnstone.

Family Scolopacidæ.

Gallinago australis.....New Holland Snipe.

Family Tantalidæ.

Numenius australis.....Australian Curlew.

Family Ardeidæ.

Ardea novæ-hollandiæ.....Blue Crane.
Botaurus australis.....Australian Bittern.

Family Rallidæ.

Porphyrio melanotus.....Red-bill.
Tribonyx mortierii.....Native Hen.
Rallus lewinii.....Lewin's Rail.
Porzana fluminea.....Spotted Water Crake.
Porzana palustris.....Little Water Crake.
Porzana immaculata.....Little Swamp Hen.

ORDER—NATATORES.

Family Anatidæ.

Cygnus atratus.....Black Swan.
Cereopsis novæ-hollandiæ.....Cape Barren Goose.
Casarca tadornoides.....Mountain Duck.
Anas superciliosa.....Black Duck.
Anas punctata.....Teal.
Spatula rhynchotis.....Shoveller.
Malacorhynchus membranaceus...Pink-eyed Duck.
Nyroca australis.....White-winged Duck.
Biziura lobata.....Musk Duck.

Family Laridæ.

Larus pacificus.....Pacific Gull.
Xema jamesonii.....Jameson's Gull.
Lestris cattaractes.....Spua Gull.
Sylochelidon strenuses.....Caspian Tern.
Thalasseus poliocercus.....Bass' Straits Tern.
Sterua gracilis.....Graceful Tern.
Stemula nereis.....Little Tern.

Family Procellaridæ.

Diomedea exulans.....Wandering Albatros.
Diomedea cauta.....Shy Albatros.
Diomedea culminata.....Culminated Albatros.

Diomedea chlororhynchos.....Yellow-nosed Albatros.
Diomedea melanophrys.....Black-eyebrowed Albatros.
Diomedea fuliginosa.....Sooty Albatros.
Procellaria gigantea.....Giant Petrel.
Procellaria conspicillata.....Spectacled Petrel
Procellaria hasitata.....Great Grey Petrel.
Procellaria macroptera.....Great Winged Petrel.
Procellaria atlantica.....Atlantic Petrel.
Procellaria solanderii.....Solander's Petrel.
Procellaria leucocephala.....White-headed Petrel.
Procellaria mollis.....Soft-plumaged Petrel.
Procellaria leucoptera.....White-winged Petrel.
Procellaria cookii.....Cook's Petrel.
Procellaria cærulea.....Blue Petrel.
Procellaria glacialoïdes.....Silvery-grey Petrel.
Puffinus brevicaudatus.....Short-tailed Petrel.
Daption capensis.....Cape Pigeon.
Prion turtur.....Whale Bird.
Prion ariel.....Fairy Whale Bird.
Prion banksii.....Bank's Whale Bird.
Prion vittatus.....Broad-billed Whale Bird.
Thalassidroma nereis.....Grey-backed Storm Petrel.
Thalassidroma wilsonii.....Wilson's Storm Petrel.
Thalassidroma melanogaster.....Black-bellied Storm Petrel.
Thalassidroma leucogaster.....White-bellied Storm Petrel.
Puffinuria urinatrix.....Diving Petrel.

Family Pelecanidæ.

Pelecanus conspicillatus.....Australian Pelican.
Phalacrocorax novæ-hollandiæ.....Australian Cormorant.
Phalacrocorax leucogaster.....White-breasted Cormorant.
Phalacrocorax melanoleucus.....Little Cormorant.
Sula australis.....Australian Gannet.

Family Podicipidæ.

Podiceps australis.....Diver.
Podiceps poliocephalus.....Grey-headed Diver.
Podiceps gularis.....Black-throated Diver.

Family Spheniscidæ.

Eudyptes chrysocome.....Crested Penguin.
Spheniscus minor.....Little Penguin.
Spheniscus undina.....Fairy Penguin.

Of the above list, forty-three are roaming sea birds, only twenty-six kinds are peculiar to the island, and six of these are very doubtful species, so that we cannot put down more than twenty birds, so limited is their habitat.

The most interesting of them are the large Gill-bird, *Anthochæra inauris;* the Tasmanian Parrakeet, *Platycercus flaviventris*; the large Quail, *Synoicus diemensis;* and the great Water-hen, *Tribonyx mortierii.*

The reptiles, as might be expected from a cold climate, are few in number. I do not think that Tasmania furnishes more than two or three species to the Australian fauna. The well known *Hiunlia whiteii*, the peculiar *Omolepida casuarinæ*, a *Grammatophora*, two small species of *Hiunliæ*, and a *Cyclodus*, (*Cyclodus nigroluteus*) allied to our "Sleeping Lizard," are all the saurians known to exist there.

No tortoise inhabits the Tasmanian streams. Snakes abound, but the number of species is limited to two highly venomous kinds, and a small one, venomous but not dangerous. Not a single innocuous snake has as yet been discovered.

All the snakes belong to the peculiar Australian genus *Hoplocephalus*, and are local varieties of continental forms. They go under different names in Tasmania however, such as "Black Snake," "Carpet Snake," and "Diamond Snake."

The first two are varieties of our "Brown-banded Snake," *Hoplocephalus curtus*, and named "Black Snake" if of a dark color; and "Carpet Snake," if light, with the cross-bands visible. The Museum is indebted to Mr. Masters for a fine series of both, and having taken thirty-five young (some black, and some with visible cross-bands) from the same mother, the identity of both is sufficiently proved.

The term "Carpet Snake" is not well chosen, and leads to frequent mistakes here and in Tasmania, as our own "Carpet Snake," (*Morelia variegata*,) belongs to the Python tribe and is not venomous.

The second dangerous snake is *Hoplocephalus superbus*, the "Tiger Snake" of Victoria, known to Tasmanians as the "Diamond Snake," another popular name which leads to confusion if we bear in mind that the "Diamond Snake" (*Morelia spilotes*) of the south-eastern coast of New South Wales is a member of the Python family and harmless.

The third venomous snake is the *Hoplocephalus coronoides*, or "Black-bellied Snake," of small size and wide range. This snake, even when handled, seldom, if ever offers to bite, and the wound caused by it is not as bad as the sting of a bee.

Two other small snakes (*Brachysoma bimaculatum*, and *B. calonotos*), discovered by Mons. Verreaux in 1844, are mentioned by Messrs Duméril and Bibron, as inhabitants of Tasmania; since then no more specimens have come to hand from the same locality, and we may fairly conclude that the habitat given by M. Verreaux is erroneous.

The Tasmanian frogs are also few in number. The *Hylæ*, or "Tree Frogs," represent three species, viz., the common "Golden Tree Frog," *Hyla aurea*; "Ewing's Tree Frog," *Hyla ewingii*; and a kind, which I consider to be identical with *Hyla verreauxii*, all of which are common on the mainland of Australia. Of Swamp-Frogs, we find the widely distributed *Limnodynastes tasmaniensis*, a *Pseudophryne* discovered by Mr. Masters and probably new, *Pterophrynus tasmaniensis*, and *P. lævis*, the two latter much infected by the larvæ of a small fly of the Genus *Batrachyomya*, (Macleay,) which insects are also found on allied species in Australia.

These are all the species of frogs known from Tasmania, up to the present time.

The fishes, such as inhabit fresh water only, are also limited. No *Eleotris*, known here as the "Gudgeon," is as yet recorded, though the genus exists in Australia, New Zealand, and South America; of the *Galaxidæ*, the so called "Black-fish," appears to be most common in the Tasmanian streams; this is Richardson's *Galaxias truttaceus*; we also have specimens of the *Galaxias attenuatus*, from the Ouse River, collected by Mr. Masters; the "Common Eel," *Anguilla australis*, and the well known "Fresh-water Herring," *Prototroctes maræna*. I wish I could have added the Salmon, but at present no authenticated specimens exist in any of our colonial museums. Competent judges state that the Salmon has been duly acclimatized and has been frequently observed in the Derwent, it is therefore much to be regretted, that no specimen has yet been caught, if only to prove beyond doubt the success of one of the greatest experiments of modern times.

In summing up the whole Vertebrata of the island, leaving out the extinct Dingo, Seals, Whales, and Marine fish, we find there are

26 Mammals
162 Birds
6 Lizards
3 Snakes
7 Frogs, and
4 Fresh-water Fishes.

Together 208 Vertebrata

about thirty-seven of which may be considered as peculiar to Tasmania.

ART. III.—*On the Auriferous and other Metalliferous Districts of Northern Queensland, by the Rev. W. B. Clarke, M.A., F.G.S., &c., Vice-President.*

[Read 9th September, 1867.]

In prefacing what I have to say upon one of the more immediate subjects of the present communication, it may be well to call attention to the striking fact that the great Western interior of this continent is bounded to the Eastward by a series of generally high insulated ranges which preserve a nearly meridional direction on either side of the 140th degree of longitude.

Such is the great mass of the South Australian Ranges to the westward of that meridian, and such are the less lofty but rocky fastnesses of the Barrier and Grey Ranges of Sturt to the eastward of it; and such also are the ranges at and above the head of the Cloncurry River of Burke and Wills, and that great Range to the eastward of the latter, which was discovered by M'Kinlay, and which bears his name. This Range is, in all probability, connected with the Barrier and Grey Ranges of Sturt, as it is in direct prolongation of their strike.

The whole of these mountain masses is made up of metamorphic ancient rocks of metalliferous character, and is surrounded by tertiary and post-tertiary deposits, which are partially auriferous, the detritus or drift having received its gold from the disintegration of the quartz veins which intersect certain portions of the older formations.

These ancient masses rise like fragmentary relics of Islands (which, undoubtedly, they were in Tertiary times) out of the present levels of the surrounding Deserts, through which the drainages of the still more eastern Cordillera of New South Wales and Queensland diverge to S.W. and N.W., transverse to each other in direction, but yet rudely parallel with the respective lines of the Eastern and North Eastern coasts, which may be said, for convenience, to meet, as the general trends of the Cordillera do, between the 28th and 29th parallels of latitude. As the Western coast of York Peninsula, though extremely low, is nevertheless well defined, and does not very considerably deviate from the general boundary of the South Australian masses along Spencer's and St. Vincent's Gulfs,—we may consider Eastern Australia to be a distinct and well-defined division of the Continent; especially as we now know that the most western waters, which reach Spencer's Gulf to the South-West, and those which pass to the South-Eastern corner of the Gulf of Carpentaria,

rise very near to each other,—countenancing an idea, which is not, however, yet established, that there was once a communication between those localities.

A careful inspection of the chart of Australia—now gradually but, nevertheless, rapidly being filled in—will show that the coast lines also rudely follow the strike of the Main Cordillera, and that a series of lines drawn in their direction will divide the country into mathematical figures of a tolerably regular shape; in fact, no country is in this respect better defined than Australia.

Another feature of the physical conformation of Australia is the persistency with which certain of the older formations follow a geological strike along the meridian or within certain angular deviations from it; so that they recur in the same direction, where the denudation of younger overlying deposits exposes them to an outcrop, and this is most distinctly the case along the extension of the Cordillera to the westward nearly throughout Victoria.

It was this and other collateral facts which very much guided me in pointing out many years ago certain auriferous tracts not only in New South Wales proper, but in Victoria and Queensland, which both at the time belonged to this territory.

This enabled me also, in conjunction with another geological feature (viz., the undulation of the beds in the selected formations, the dips of which are reversed so producing synclinal depressions and anticlinal ridges), to expect a recurrence of similar outcrops to the eastward or westward of an assumed meridian such as that which defines the position of the great gold-fields north and south of Mount Alexander.

This class of observations also induced me to infer that a gold-field would be found near Peak Downs, and led me to point out in 1851 a tract of country within certain definite limits of latitude and longitude (viz., between 32 and 34° S., and 146 and 149° E.), which have since been found to include not only the gold-fields of Forbes and Young, but the more recently developed district of Emu Creek. So, in the case of Canoona and other localities at the back of Port Curtis, about Rockhampton, and along the Burdekin River, my indications have not failed, because they were founded on the knowledge of the concurring data of direction, geological age and other conditions which have successfully been brought into play elsewhere.

These statements are not made in order to claim individual credit, but merely as proofs, that any success which may have attended my inspection and study of this country has been the result not of mere conjecture and rash conclusions, but of a careful comparison of the features of the general physical and geological structure of the Continent, particularly in reference

to certain fixed points, where the Meridian is coincident with the mountain strike, or where points of divergence in drainage are coincident with well marked geological structure; and of these there are several distinct examples observable on the chart. According to these views, then, it was to be anticipated that, (as I have frequently stated, and as is generally known), a considerable Auriferous region would be found to exist near or about the 144th and 145th meridians, and from about the 17th to the 19th parallel, because in that region the Geological structure and the other physical features of the country point to a combination of circumstances of a convincing kind. In 1861, in reporting to His Excellency Sir G. Bowen on the collection made in Mr. G. E. Dalrymple's expedition to ascertain the mouth of the Burdekin River, I especially mentioned the country along the 147th and 148th meridians.

It is chiefly of the more Westerly portion of these tracts that I have to speak this evening, and in so doing I propose to lay before the Society the results of an examination of a considerable part of them, communicated by a friend who fully enters into my views, and whose reputation and long experience entitle him to the highest respect. I mean Mr. Richard Daintree, lately employed on the Geological Survey of Victoria.

Under the date of 23rd July, he addressed me in the following terms:—

"As news of the progress of Northern Queensland gold-fields must have a special interest with you, their first prognosticator, I will endeavour to give you an idea of what is going on; and if you think it worth printer's ink, 'interpolate' and publish it with your own remarks."

This is my justification of the present paper, and of my mode of dealing with the communications of my friend Mr. Daintree.

In reply to inquiries of various correspondents and applicants in person relating to the Peak Downs district, I long ago advised them to carry their investigations towards the North-West, into and beyond the scrubs of the Suttor River, under the conviction that between that river and the heads of the Lynd there would be found an extension of the auriferous region. And this advice has been found to be in accordance with the results.

It may be proper to give a general Geological sketch of the structure of that part of the country which is under discussion.

It will, then, be seen that in about 18° S. and between 144° and 145° E. the Burdekin and Lynd rivers of Leichhardt head in a granitic range striking about N.N.E., the latter flowing to N.W., and the former South-Easterly. This river flows through a tract of country occupied by granite, pegmatite, gneiss, talc slate, mica slate, and limestone, with quartz veins, porphyry, and basalt; being overlain by deposits of conglomerate and sandstone, which

are intruded into, broken, contorted and altered by igneous rocks. The basalt, which seems to me so far as I have examined it, to be as recent as that which forms the upper rock of that name in Victoria, occupies a plateau at the head of the rivers, and so far to the south as the Clarke River, in which it assumes in places the lava-like character which distinguishes much of the country near Melbourne.

Leichhardt and Gregory both describe the occurrence of these formations, and both speak of streams of lava. There can be no doubt then, that it is a region of disturbance; the older formations being also highly inclined and the newer horizontally bedded, these being also occasionally hardened and tilted.

From an examination of collections made by Leichhardt, Gregory, M'Kinlay, and other explorers, I could have no hesitation in believing that gold would exist in that region, otherwise so much in accordance with physical facts elsewhere observed.

Since Gregory's journey, the discoveries of Burke and Wills, and (in search of them) Walker's, M'Kinlay's, and Landsborough's, and still more recently the explorations of Jardine and Daintree have added much to our geological as well as geographical knowledge of the region between the 141st and 145th meridians. The courses of the new rivers Norman and Einnasleigh, which latter flows to the Staaten of the Dutch, have been discovered, and adjustments of the Lynd and Gilbert have taken place somewhat in advance of Leichhardt's arrangement of those waters. We know now also that the waters of the Thomson, to which the Barcoo of Mitchell appears to be a tributary, and the Flinders rise in the same ranges, not more than from 170 to 200 miles from the Burdekin, and about 200 or 240 from the Cape River which was discovered by Leichhardt as a tributary of the Suttor, and which it enters not many miles from the junction of the latter with the Burdekin.

Within the limits of these boundaries, which by the Suttor is connected with Peak Downs, and then on to Broad Sound, Canoona, Rockhampton, Gladstone, the Don, the Mary, and Brisbane, we have various tracts of greater or less auriferous promise, these tracts cropping out amidst surrounding deposits of Middle and Upper Palæozoic, and Secondary formations and overlying areas of Tertiary and Post-pliocene age. The range of country here indicated cannot be less than 900 miles in length from S.E., to N.W., and although some of the auriferous spots may not be more rich than the immediate vicinity of Brisbane, yet there are others of a more important character, and even more so than any yet fully developed in Queensland.

If, again, we take into account the Fanning River, Keelbottom Creek, Star Creek, and others, westward and eastward of the Burdekin, there must undoubtedly be a vast amount of gold yet

to be discovered, though, probably, at wide intervals. In this brief summary I do not mention with much expectation the abundant occurrence of such gold as was discovered by me in the quartz pebbles of the Secondary fossiliferous rocks of Fitzroy Downs, because that fact may merely testify to the derivation of the quartz from auriferous reefs in Secondary times (a very important deduction on another account); and recently an exploration by prospectors of the country 150 miles N.W., of Roma, on the Fitzroy Downs, has not resulted in any discovery of alluvial gold, probably because that whole country is of Secondary age.

If, however, we include Talgai and other places near the northern boundary of New South Wales, and some mentioned in my own reports, we shall see that Queensland offers ground for great expectation of auriferous wealth. With her Coal-fields on the Isaac, the Mackenzie, the Bowen, and at Hervey's Bay, on the Bremer and the Brisbane, the Dawson and the Condamine, she becomes connected with similar coal deposits on the Clarence River, in New South Wales, and by her abundant wealth in Copper and Iron, bids fair to balance the present superior advantages of our own territory in Coal and Gold.

The occurrence of Copper with gold in some localities in Queensland is also very remarkable. In other places the copper is so rich as to rival the wonderful masses of Lake Superior, the lodes being made of little else than Native copper, without any trace of gold. Whilst in other localities, again, the copper occurs distinct from, but in close proximity to an auriferous area. Such appears to be the case about Mount Wyatt, near the junction of the Burdekin and Suttor, as gold is scattered in the drift all the way to the Belyando.

This leads me to the Cape River Gold-field.

The Cape River is merely at present indicated on the charts, as entering the Suttor; but it has lately been explored, where practicable, to its head, and stations are occupied between its junction and Hughenden, on the head of Jardine Creek, which is the Macadam River of Walker, and forms one chief source of the Flinders.

From the head of the Flinders, gold may be found in small particles for some distance down the river, though Jurassic and Cretaceous rocks cover the older formations over a large area as proved by the abundance of fossil shells, &c., and by remains of reptiles, as for instance, at the base of Bramston Range, at Marathon, on Richmond Downs, on O'Connell Creek, and elsewhere. These rest upon the underlying Palæozoic or older deposits which extend to the Burdekin and Suttor.

It is remarkable that Sir Thomas Mitchell should have turned back from the Belyando River, which would have led him to the Suttor, Cape, and Flinders' Rivers, and have given him his long

desired approach to Carpentaria. Mr. Gregory did not see the Junction; but he tells us, what is most significant, that he passed over great abundance of drift, and of such a character as seems to be indicative to a certain degree of a gold region. Leichhardt also states that the ridges were covered with pebbles. Trap and porphyry occur not far off, and the rocks are often highly inclined.

It has been already stated, that Gold has been found at the head of the Flinders. Mr. Daintree reports to me that about forty miles from the head of the Cape, and from ninety to a hundred miles (direct, I presume) from the junction with the Suttor, on a tributary called "*Betts's Mistake" Creek*, the Cape River diggings are situated. He goes on to say:—

"The source of this branch of the Cape is from Mount Three Heads, so called from the fact, that a tributary of Fletcher's Creek and Oxley Creek (a tributary of the Flinders) have their sources from the same hill. From Hann and Co's cattle station on Fletcher's Creek, Mount Three Heads is distant 8 miles S. 38 W. Running down Oxley's Creek from its source to its junction with the Flinders about 15 miles, gneiss, mica and hornblende slate, with interstratified beds of quartzite are found to occupy the whole distance."

"On the parallel and more northern tributary of the Flinders called the 'Walker,' the gold-bearing metamorphic slates pass under the basaltic table lands and are hidden from sight. The lower 'Walker' may thus be assumed to be the north-western boundary of the Cape River series of auriferous rocks easily available to the miner."

"Looking from Mount Three Heads, towards the South-east a broken country of hill and valley presents itself, a line of higher and more abrupt ridges marking the water shed. The creeks and gullies of this range, whether tributaries of the Cape, Flinders, or Betts's Mistake Creek, will I believe, all be found to be auriferous and many of them payable. The range itself follows nearly the strike of the metamorphic rocks of which it is composed, and especially at the south-eastern extremity. The dip is south-westerly. Between the upper Cape and Fletcher's Creek, the ranges are of Syenite." [I may mention here, that this rock is a very good indication of Gold. I have found it so in various parts of this Colony, and in the part of Queensland under notice it is a prominent rock. Leichhardt noticed Syenite at the head of the Lynd and on the Burdekin, (in the hills below Mount M'Connell), which he thought was of Domite; but Mr. Dalrymple has informed me it is granite. Mr. Gregory says that the summit of Mount M'Connell is marked by cliffs of porphyry, which also occur on the right bank of the Suttor. These differences may be all reconciled, for Syenite occasionally puts on a porphyritic appearance.]

"At the junction of Oxley Creek and the Flinders, on the east bank of the latter, cliffs of horizontal sandstone and conglomerate mark the boundary of what is called the 'desert country,' [Whether these rocks belong in part or at all to a Carboniferous formation, Mr. Daintree does not state; but I have in my collections a coarse ferruginous quartz grit from the Table-land between the Cape and Flinders, and specimens of *coal* from the junction of Jardine's Creek, and fossilised wood from the delta of the Cloncurry and Flinders. These were brought to me by Mr. J. Atkinson. There is, therefore, a probability that Coal-bearing beds do exist (a point on which Mr. Daintree expresses a doubt) below the fossiliferous secondary strata about O'Connell Creek, Walker's Creek, and Richmond Downs.]

"The cliffs above alluded to run parallel with the Cape Range, and form the Southern boundary of the Auriferous belt under discussion.

"The area thus to be worked as "Cape Diggings" will be 70 miles long by from 10 to 15 broad."

"It is bounded on the N.W. by the lava of Walker's Plains; on the North by the Syenite between Fletcher's Creek and the Cape; on the South by the Sandstone and Conglomerate of the desert. The South-eastern boundary is not yet determined; but it will be in that direction, that deep leads will have to be looked for, the country being in that region flat, as far as the junction with the Campaspe and the Cape, a distance of 50 or 60 miles.

"There were in the middle of July, about 100 miners at work in two gullies called Specimen and Golden. The former of these rises in Mount Remarkable, an isolated hill at the south-eastern formation of the Auriferous range which extends from Mount Three Heads.

"The character of the precious metal found in this gully is of low standard, pale in colour and very little waterworn, particles of the matrix adhering to nearly all the nuggets and to much of the fine gold. This matrix is semi-transparent quartz, from quartz leaders, quartzose gneiss, quartz and felspar, felspar and brown oxide of iron.

[Here we have a remarkable agreement with the characteristics of gold in some of the Syenitic and Granitic gold fields of New South Wales, especially in one species of gold, which metal, so far as our experience has gone, is found to become of lower standard value as we proceed northwards. The tables compiled by the officers of the Mint and published in the Exhibition Catalogues, will establish this remarkable fact.]

Mr. Daintree says: "I am under the impression that no true '*fissure reefs*' will be found on the Cape, the rocks being chiefly Metamorphic, and their mineral matter having been concentrated

in the thin quartz filaments attached to the planes of foliation in the rocks themselves, retaining a smaller proportion." [Here, again, we have a parallel to what we may see in New South Wales.] "Rolled pebbles of Sulphide of Antimony and Micaceous and Titaniferous iron are also found in the drift.

"The depth of the sinking is from five feet downwards though deeper ground exists, which will be left for future trial.

"Golden Gully affords metal of a higher standard, more water-worn, coarser, rarely of the specimen class; it is worked in a ravine, where the depth of the drift is seldom more than eighteen inches.

"The mining population are working at their present camp, owing to the supply of water being more abundant than elsewhere. Payable gold has, however, been found, and dirt has been stacked in several other gullies along the range; but no sufficient trial can be made until a rainfall takes place.

[I have learned from another quarter, more recently than the date of Mr. Daintree's communication, that a satisfactory report has been made by some recent prospectors, and that several hundred ounces of gold have been obtained, and that the field is likely to turn out well.]

"Many years ago," says Mr. Daintree, "you pointed out the Clarke River as a probable gold-field, basing your assertion respecting it partly on the examination of specimens brought down by Augustus Gregory from the junction of that river with the Burdekin.

"So far as relates to that portion of the Clarke, a limited patch of the Auriferous series is to be found there, but the drifts are so light that it is questionable if payable gold will be met with.

"Higher up the Clarke two more recent formations prevent these rocks appearing at the surface.

"I believe the one to be Upper Silurian, the other to be Upper Devonian, such as that on the Star Creek, where Lepidodendron occurs imbedded.

"On the Broken River—a tributary of the Upper Clarke—a few miners are collecting gold in the so-called Upper Silurian area. In this series the rocks represented are massive Conglomerates forming natural bars; thick coralline limestones likewise forming bars; with red, blue, and grey fissile and rubbly slates. The limestones are full of Corals, imperfect Shells, &c.; the blue slates also occasionally yield fossils.

"It is in a ravine at the back of one of these bars (or barriers) of limestone which crosses the Broken River that payable gold has been found; but as the shale and mudstone are so greatly in excess of quartz, it is doubtful whether there will be profitable employment for the miner, unless the interstratified Conglomerates prove to be the storehouses of the much-desired metal.

The first patches of gold worked on the Broken River certainly followed the line of strike of one of these conglomerate beds. There may be true fissure reefs worked here for gold; but I have only observed very small ones myself.

"In the Broken River itself, I have found large boulders of Sulphide of Antimony mixed with Limestone and one piece of Galena, but failed to find any lode."

[Galena was brought to me in August, 1861, from the vicinity of Mount Wyatt. The minerals of this district must, therefore, be widely diffused. From the fossils determined, it appears that the Upper Silurian exists there covered by Upper Devonian and upper Carboniferous formations. In the former occur the copper and gold. This is repeated on the Broken River.]

Mr. Daintree goes on to say: "I anticipate that as the country becomes more known, valuable metallic ores will be found in the Broken River and its tributaries. As the name implies, it is a difficult country to travel over, and as the Aborigines in it yet hold their own, it is unsafe for individual prospectors.

"The strike of the Upper Silurian is from N. to N.E, nearly at right angles to the Metamorphic slates of the Cape."

Writing of this country in his account of his first visit to Northern Queensland, Mr. Daintree says (in the *Yeoman* of 29th August, 1863),—"Mr. Clarke has long ago pointed out this district as a future gold-field. The fulfilment or otherwise of this prophecy is at hand." It is, therefore, satisfactory to me that Mr. Daintree should himself be the means of verifying the truth of my prognostication in four years' time, and I am greatly obliged to him for enabling me to establish it. In that article in the *Yeoman*, Mr. Daintree, after confirming some other views of my own, gives a brief statement of the occurrence of Silurian rocks in Queensland. His opinion is that the Upper Silurian forms a belt from Brisbane to Broad Sound, extending to Maryborough and Rockhampton, the dip being at a high angle to N.E., and the strike parallel with the coast. Somewhat lower come in the Canoona and other gold-fields S.W. of Maryborough, where the same Upper Silurian beds occur. On Perry's Range, Upper Burdekin, the dip is to S.W. These occur on the horizon of the Canoona field, and represent the Western side of an anticlinal, the summit of which has gone to form a portion of the enormous Carboniferous formation, and, as proved by the quartz in my fossiliferous Wollumbilla and Fitzroy Downs' auriferous calcareous rock, a portion of the Secondary formations, that cover and conceal vast masses of the lower Palæozoic or even older series of formations.

The only apparent difficulty in reconciling the age of the Silurian of the Broken River with that of the coast, is that the strike is there N. to N.E., whilst to the South-eastward it is to N.W. This

difficulty may be overcome, if we regard the formation as mantling round a granitic axis. The slates of the Cape are represented as striking north-west, which ought to place them in the same category as the Silurian of the coast; the Broken River slates assume a more meridional direction.

II. I come now to a discovery by Mr. Daintree himself, in the extending of the northern gold-fields to the head of the Gilbert River. He says—"Although the area of the auriferous rocks is considerable both on the Cape and Clarke Rivers, still it is small compared with the extent of the old metamorphic gold-bearing slates of the Upper Gilbert.

"The eastern tributaries of the Copperfield River, the western tributaries of M'Kinnon's Lynd, the western and eastern tributaries of Jardine's Einnasleigh River, all run through the mica schists and other metamorphic formations."

This is in close confirmation of the brief geological notices of Gregory and M'Kinlay.

The former speaks of granite, porphyry, quartz, and black slate in the drift of the river, with Iserine and minute garnets one hundred and sixty miles below the head. Eighty miles higher these rocks form low hills, the slate being contorted and nearly vertical, and striking north and south, all much disturbed and hardened by contact with porphyry; quartz rock occurs in beds or veins in the granite, also trending north and south. The river sand contained Titaniferous iron; Trap was also very abundant, the dip of the slate is given at from 60 to 80° E. by S., on the upper bank of the river. The older formations are crested by horizontal sandstone. To the eastward the formations are chiefly gneiss, porphyry, trap, and granite, with fragments of slate, and other named rocks imbedded in the porphyry. Portions of these, so far as I have examined, are a *breccia*—very similar to what occurs in the upper part of the Peel River, and in alluvia on the Lachlan in New South Wales. The height of the Dividing Range between the Gilbert and Lynd is about 2500 feet. The poryhyry summits are described as fissured vertically in columnar divisions. M'Kinlay, however, says the *sandstone and conglomerate* take the same forms, a little more to the westward. I suspect the rocks are identical. M'Kinlay describes this region as "*fearfully grand and terrible.*" He had, he says, never dreamt of such a rough country. He speaks also of granite on the head waters of the Lynd, in advance of the well-known lava streams of Leichhardt. From the dividing range to the Burdekin, the surface presents decomposing slate and sandstone, and is strewn with quartz pebbles of various colours. Mr. Dalrymple, on his traverse from Rockingham Bay to the Valley of Lagoons, collected facts relating to the existence of the formations mentioned

by me, which are in the fullest agreement with the previous notices of Leichhardt, Kennedy, Gregory, and others.

Now, regarding the features just enumerated, it would naturally be expected that gold should exist in this region, and therefore I long ago marked it on the map as an auriferous region.

The strike of the rocks in this region appears to have a trend to the eastward, according to the observations of Mr. Gregory; and this is confirmed by Mr. Daintree, who remarks as follows:—"The watershed between the Einnasleigh and the Burdekin, with several of the upper Burdekin branch creeks, afford rock sections similar in every respect to the Cape diggings. As the main strike of the formation is north-easterly, and mica schists are said to crop out on the coast at Endeavour River, and again on several parts of the Louisiade Archipelago, I think that we may safely infer that auriferous tracts are continuous throughout, sometimes hidden by basalt, sometimes by large tracts of a horizontal sandstone series of unknown age, as on the upper portions of Leichhardt's Lynd."

Perhaps these inferences may be modified; but I have always expected another gold-field in the north, about the 144th meridian, on the heads of the Mitchell waters, and the Kennedy River: nor is it unlikely that at the back of the east coast there are patches of Auriferous country as far as 13° S. Mr. Dalrymple writes in 1860:—"During my expedition last year I found considerable tracts of country in the neighbourhood of Leichhardt's and Robey's ranges, bearing auriferous indications of a very marked description. . . . The appearance of the country to the south-west and south of port Denison leads me to anticipate auriferous indications in that neighbourhood also. The Rev. W. B. Clarke has long pointed to this region as the seat of the future gold-fields of the north, and my observations certainly give additional probability to the speculation, that here will the future develope the principal Auriferous deposits of Queensland."

The formations about Endeavour River are grey granite, schist, talc slate, with quartz and flinty slate abutting on the granite; hornblendic granite occurring in the Turtle Islands, off the coast, and in Lizard Island; whilst to the North of Endeavour River, west of Cape Flattery, a table-land comes in, with a trend to S.W. by W., and from 500 to 600 feet high. The coast about Cape Grafton consists of grey granite and a tourmaline rock of granitic character. Northward, in Trinity Bay, contorted talc schist with quartz veins occurs, dipping 60° to S.W. This gives a strike about N.N.W. Mica slate, contorted, occurs in the Barnard Islands to the South. Granite also occurs at Cape Melville and at Cape Direction, with flinty rock at Cape Sidmouth, and trap between it and the mouth of the Kennedy, both occurring with granite. Quartz also occurs abundantly in the neighbour-

hood of Cleveland Bay, at the back of which gold has been found. The general character of the coast of the York Peninsula to the 13th parallel is, therefore, in agreement with the country six degrees more south, and to the east of the Burdekin. I have not been able to have any of the rocks in the region just named subjected to assay; but with respect to those of the Louisiade Archipelago, certain of them, especially the quartz, were assayed for me at the Mint some years ago, but without finding any gold in them. They consisted of slate, porphyry, &c.

Mr. Daintree goes on to say:—"I have not Leichhardt's work to refer to as to the geology of Kirchner's Range, but since it lies in the strike of the Gilbert mica-schists, it is probably a schistose barrier."

On making reference I find Leichhardt does not distinctly state what is its formation; but he mentions Talc schist to the south-east of it with Syenite passing into Hornblende rock and with scattered quartz crystals. To the north-westward, Granite and Pegmatite occurred. The trend of the ranges on the east bank of the river appears to be north-easterly and easterly.

I suspect that there are two divisions of the old Palæozoic rocks in the region under review, and that some of the supposed "metamorphic" rocks are transmuted Lower Silurian or perhaps Huronian. If so, gold will, probably, be hereafter found.

Supposing that the preceding observations have been founded on sufficient data, then, regarding the general trend of the *divisio aquarum* from the granitic Bellenden Kerr Hills above Rockingham Bay, south-westerly through the heads of the Lynd and Gilbert to the ranges of Burke and Wills at the head of the Cloncurry, where quartz reefs are known to exist, I would venture to anticipate, hereafter, a development of Auriferous country also in the neighbourhood of M'Kinlay's Range, and to the westward especially as Wills points out a quartz reef, and as on Landsborough's country along the Gregory and O'Shanassy Rivers, which also head along the previously indicated water-parting, there is abundance of Basalt, which not only occupies a similar prominent position at the head of the Lynd, but also occurs in the Bramston Range, on the Flinders, and near to the head of the Barkly River, in an extensive table land.*

III. I have now briefly to notice the occurrence of Copper in Northern Queensland.

Independently of the well-known Peak Down or Mount Drummond mines, Copper occurs at the Dee Mountain and in various other localities. Mr. Daintree, however, has added a fresh locality on the Lynd River of M'Kinnon. Of its occurrence there, he remarks as follows:—

(* See p. 46)

"Copper lodes occur in both the Upper Silurian and the Matamorphic series; in both apparently due to porphyritic intrusion, as the Mount Wyatt outcrops of copper ore in fossiliferous Upper Silurian are associated with dykes either of Porphyry or Hornblende rock.

At the junction of the Lynd and Copperfield River, I have taken up a copper lode exposed on the bank of the river; its upper and lower walls are Mica-schist; its thickness, where it is cut through in a drive at thirty feet from the surface is twenty-three feet. At this depth the ore is chiefly spongy metallic copper.

"On the east bank of the river, within ten chains of the main outcrop, a mass of porphyry crosses the metamorphic schists nearly at right angles to their strike, and on examination I found iron and copper pyrites not uncommon constituents of the porphyritic mass.

"This dyke is continuous about five miles on the eastern bank of Jardine's Einnasleigh; it then crosses that river, and I have followed it about fifteen miles westerly from that point. It resembles very much the porphyry of Buchan River, in Gipps's Land, with which district you are acquainted."

I have now, in dealing with these researches of my friend Mr. Daintree, discharged, I hope, a duty to all who are interested in the prosperity of Australia. The discoveries of Gold and Copper and other metals are not merely valuable to individual explorers, but belong to all the colonies in general. Those who work them, and those who profit by them, are of no particular section of the community, nor of any given member of the Australian provinces. I trust it is in fulfilment of that which we so recently announced as a chief object of the Royal Society,* that I have brought these discoveries before the Society to-night, "incorporating" Mr. Daintree's remarks according to his own expressed desire in my own paper, which I wish to be considered as a kind of progress report on the older rocks of Queensland. I cannot conclude, however, without drawing attention to the Photographs which I now exhibit of the Lynd copper country, taken by Mr. Daintree, as explaining, in a clear manner, some of the picturesque geological scenery of that very distant locality, at least 1200 miles to the north of us by direct measurement.

I would especially call attention to the outlines of the rolling porphyritic range beyond the Alligator Pool in the Copperfield River; it is the exact representation of numerous ridges of the same kind in our own gold-fields. Those who have seen the Araluen Range, or the Harnham Hill at Salisbury, near the Uralla gold-field, in New England, will at once be struck by the resemblance. Again, in the view of M'Kinnon's Lynd River we

(* See p. 26.)

have placed before us an interesting junction of old metalliferous sedimentary rocks with basalt.

Such representations of physical occurrences are always interesting and valuable.

IV. I have also to exhibit some drawings and photographs of another vast display of metallic wealth, not on the Lynd but in a different direction quite as far off, but still in association with the large region which I have been discussing, though in a richer field (as I believe) of copper and iron, than has as yet been found in Australia. The localities in question are next the intersection of M'Kinlay's route with that of Burke and Wills, and for full a hundred miles of country along the M'Kinlay Range.

The copper itself, I may say, is very extensively developed; and iron still more so. The latter metal is, we already know, extremely abundant in Queensland, and magnificent specimens of ore from the neighbourhood of Port Curtis were exhibited in Paris at the first French International Exhibition. There are also in New South Wales vast masses of iron of a more solid character than the Fitzroy ore: and such I found in the explorations I made through the colony fifteen or sixteen years ago.

There is a near approach to those masses which are depicted in my friend's sketches (not this time by Mr. Daintree) in those which Captain Sturt has mentioned, and one of which "*Piese's* Nob," forms an illustration in the 2nd Vol. of his Central Australia (p. 127).

In that case, as in the one before us, the ore is chiefly *magnetic*.

As to the Copper from this new locality, the Mint assay, with which I have been obliged, gives a proportion of nearly 95 per cent. of pure copper and a little silver. There are green carbonates also producing upwards of 58 per cent. of copper.

Looking at the whole of the phenomena represented by the features of the region, it is certain that Nature has been there in a very active state producing great combinations of galvanic, magnetic, and chemical forces. The iron also forms solid hills and cliffs rising out of a desert to 50 and 60 feet in broad ridges, and appearing under most picturesque forms. Imagine an explorer passing a night in a cavern in the very heart of a cliff of iron! But the most interesting fact which I have to notice is that the cliffs of magnetic iron on the Cloncurry are in exact conformity with cliffs of the same ore on the Godamully River in the Territory of Madras.

Comparing the photograph which I have had made from the sketch of the Australian locality by my friend Mr. Henry, with the lithograph given in the 4th vol. of the *Memoirs of the Geological Survey of India*, (part II, pl. 1), there appears to be a most remarkable identity in the scenery and appearance of the cliffs in both districts; and reading the description in the Memoirs given

by Messrs. King and Foote, (ch. vi.) I am induced to believe that the age of the formations is nearly, if not actually, the same, judging from the collections that have been made for me by various recent visitors to the Cloncurry district.

The copper before us seems very much akin to that which occurs on Lake Superior, in North America. Its lead is to the West; that of Peak Downs is to the South, and that of Daintree's Lynd mine to E. 30° S. Inferences from what has been said in relation to the age of the formations in which these deposits occur may be drawn respecting the new finds.

The Lake Superior copper rocks are, however, Silurian. It is probable that the new Copper mine in question may belong to a lower stage, perhaps as low as the Cambrian (or Huronian) itself. In each case eruptive rocks are present. Granite and mica slate, with quartz veins holding epidote micaceous iron and pyrites are common rocks in the vicinity.

As showing how generally Copper exists in the interior, we may notice that M'Kinlay mentions his having found copper during his journey through the wilderness.

A final remark must be added for the benefit of persons in search of Copper. Through an example offered by specimens on the table, we see how easily the eye may be deceived. Often have I had to disappoint the expectations of persons who have come to me with what they called indications of Copper because their specimens had a tinge of green, arising as it often does from an ore of iron; but it was not altogether a disappointment, when I stated to the bringer of certain specimens now before us (also from Queensland, Kilkeven, on the left bank of the Mary) that they did not indicate a Copper lode, because it was believed by me that they belonged to what my friends at the Mint afterwards proved it to be, a Gold lode; the assay assigning to all the highly cupriferous tinting only from 4 to 5 per cent. of Copper, whilst the proportion of Gold was from 1 to 3 ounces per ton, and that of Silver from 16 to 19 dwts.

In bringing before the Society a very extensive subject, it has of necessity been laid upon me to be as brief as possible; but enough has been said on this occasion to show that our sister colony of Queensland has every reason to anticipate for her Northern districts a future of success in the development of the Metalliferous riches with which she has been endowed.

In conclusion, it is perhaps only a natural feeling to express some degree of satisfaction at having been enabled on this occasion to bring under notice a region of Eastern Australia, which together with Dr. Rattray's paper read by me before the Philosophical Society some time ago, on the Geology of Cape York, has not only enabled me to connect my previous researches with the geology of that distant territory, but has also supplied me with

the means of supplementing my own personal labours in other parts of the Colonies, and completing to a certain moderate extent my researches, investigations, and speculations on experimental grounds, over many not inconsiderable areas of a region (including those parts of Tasmania which have fallen under review) which is represented by twenty-eight degrees of latitude and fifteen degrees of longitude. Upon the most important portions of this vast territory, either by individual occupation in the field or by aid of the evidence of friends who are engaged in similar studies, I have now been enabled to complete the outlines of a general sketch of the Geology of nearly all Eastern Australia, and of pointing out or illustrating the chief of those Auriferous and other Metalliferous districts which Providence has scattered over the length and breadth of the Australian Continent, as incentives for the fulfilment of the command to "replenish the earth and subdue it." In the present essay, the chief practical value as relates to the Cape River Gold-field, is due to the careful researches of Mr. Daintree; but there has been left to me the duty of bringing his researches, and those of other field-investigators, into public notice in a connected form.

And even if our expectations be found, hereafter, of less real importance than has been assigned to them, the matter now condensed into a brief discussion, such as the present, is not without results of another kind.

———o———

P.S. It may be proper to record here, that the preceding paper has led to very important results, inasmuch as, it having attracted the attention of the Parliament and Government of Queensland, a correspondence with the author ensued, and on his recommendation, the colony has been divided into two districts, of which the southern has been placed in the charge of Mr. Aplin, and the northern has been allotted to Mr. Daintree. In due time, it is hoped the whole will be surveyed and described.

May, 1868.

ART. IV.—*On the re-appearance of Scurvy in the Merchant Service, by E. P. P. Bedford, Esq., F.R.C.S.*

[Read 9th of October, 1867.]

In the *Lancet* of the 7th of April, 1866, is the following passage:

"There seems little reason to doubt, that a serious amount of Scurvy exists in the Mercantile Navy, and that this amount has a tendency rather to increase than diminish. The account given by Mr. Leach, the resident Medical officer of the "Dreadnought," the hospital which receives the largest number of Scurvy cases, shows a steady gradual rise in the number admitted. Thus in the last quarter of this year there were 39 cases, while in the corresponding quarter of the last three years there were 22, 20, and 15, respectively.

Provincial reports of the disease are equally unsatisfactory—one ship arrived lately at Bristol with a crew of 22, and 11 cases of Scurvy; another at Hull, with a crew of 28, and 12 cases of Scurvy. North country ships have a discreditable reputation for Scurvy as compared with London Ships."

From this time public attention in England has been directed to the increase of Scurvy among Merchant seamen; investigations took place and measures were introduced into parliament having regard to the health of seamen.

Sydney being the sea port of New South Wales, many vessels arriving here from long voyages—several of the colonists employed as seamen—the merchants of Sydney being much engaged in shipping interests, the health and well being of seamen is a question here of practical importance, and should stir up the duty imposed upon us, from higher considerations, to improve by every means, the health of a body of men whose useful employment exposes them to special dangers.

The disappearance of Scurvy from the British Navy is so nearly complete that many naval surgeons have passed the whole period of their service without being called upon to treat one case of Scurvy.

It is said to have been absent from the transportation service, but this is not correct. From documents in my possession I find that from October 1831, to August 1836, there arrived in Tasmania, in summer months, 10 vessels containing 2336 convicts, of whom 2 died of diarrhœa, and six of other diseases soon after arrival; that 2 in one ship had died of Scurvy, and 16 of other diseases, during the voyages. In spring months, 11 vessels arrived

containing 3122 convicts, of whom 3 died of Scurvy, 4 of dysentery, and 2 of diarrhœa, and 8 of other diseases, shortly after arrival, and that 1 died of dysentery, and 12 of other diseases during the voyage. In the autumn months, 9 vessels with 1909 convicts arrived, of whom 1 died of Scurvy, 1 of dysentery, and 1 of diarrhœa and 4 of other complaints, shortly after arrival, and 13 died of Scurvy, 1 of dysentery, and 19 of other diseases during the voyage. In the winter months, seven vessels with 1778 convicts arrived, of these 1 died of Scurvy, 2 died of dysentery, and 11 of other diseases, shortly after arrival, and 2 died of diarrhœa, and 29 died from other diseases during the voyage.

I have notes of upwards of thirty post mortem examinations of persons dying in Tasmania from Scurvy—also, many dying from other diseases in their bodies, the effects of Scurvy would be detected.

From August 1836. to May 1846, out of upwards of 3000 admissions into the Colonial Hospital, Hobart Town, I find 52 admitted with Scurvy, and 8 of these died.

These hospital admissions, and the number of deaths, do not represent all the injuries produced by Scurvy in the periods referred to. No case of Scurvy was taken into hospital if the man's strength allowed him to be as an out patient, where his recovery was quicker. This accounts for the small number of admissions, and the larger proportion of deaths to the patients taken into the house.

It is clear from the records from the Dreadnought, and the facts I have stated, that whatever may be the state of the navy, as yet, the merchant service and transport service are not free from Scurvy.

It will not, therefore, be unwise for me to remind you, in a few words, of what has been the havoc committed by Scurvy.

The earliest account given of Scurvy was its appearance in the army of Louis 9th, in Egypt, in 1260.

Vasca de Gama lost more than 100 men out of 120 in his voyage. Of four ships that sailed from England in 1609, for the establishment of the East India Company, there were lost nearly three fourths of the crew before reaching the Cape of Good Hope. The Commodore's ship was not attacked, this arose from the daily issue of lime juice to the men. Yet, this remedy was neglected for 150 years afterwards.

Sir R. Hawkins states in his accounts of two voyages to the South Seas, in 1593, that upwards of 10,000 mariners had died under his own observation alone, during 20 years.

Larrey states that in 1801, during the siege of Alexandria, which was commenced in May, and ended in August, 3,500 scorbutic patients were received into the military hospitals.

In 1760, the British troops in Quebec, after its capture by the French, lost 1000 men from Scurvy.

From the most severe and best known examples taking place in Fleets, it was thought that salt provisions was the chief, if not entire, cause of Scurvy.

This opinion was not held from the time of of Lind, Cook, and Blake, but before their time, and since in the popular mind, the opinion was that salt provisions caused Scurvy.

In 1836 '7 and '8, Scurvy occurred in several gaols from the want of vegetables, and in 1836 it occurred among the troops at Adelaide, at the Cape of Good Hope.

In 1847 '8, and '9, it shewed itself in various parts of England, Scotland, and Ireland, depending for its cause on the potato blight.

In all these instances the sufferers had fresh provisions, but they had few, and in most instances, no vegetables, and their diet in other respects often inferior.

The above is but a sketch of the ravages produced by this disease, in its more marked forms, exhibiting those symptoms so characteristic of this complaint, and which are described in Anson's "Voyage round the World"; but it is not alone in these distinct cases that deaths and incapacity are produced, but in obscure forms, and by affecting internal organs, its victims have been numerous, and there has been, and no doubt now is, great destruction of health, in consequence of this insidious disease. Therefore the cause which produces Scurvy should be widely known, and the means of prevention not only known, but they should be carried out in every merchant vessel as completely as in a man-of-war.

In ships of war there are large numbers of men together, the diseases that take place among them are known to the authorities, and therefore the appearance and spread of Scurvy among them is not only seen but more easily remedied.

In merchant vessels the number of men is small, and this in fact conduces to their safety, but the amount of disability from illness, and deaths from Scurvy, is not easily ascertained.

There can be no doubt but that the absence of vegetables is the cause of Scurvy.

The best means of prevention is vegetables—fresh if possible—or sour krout, pickled onions, lime juice, and such articles of diet.

With a proper supply and use of these articles, Scurvy would never occur—whatever other form of disease migh attack a crew.

The account I have given of Scurvy among the convicts, though it shews that it prevailed, and to a considerable extent, yet, it was mild in its effects compared with the history of the navy one hundred years ago.

There is a circumstance connected with the convict service, which is deserving of notice.

The vessels employed were all inspected in London, the convicts were supplied with the same articles of diet, had the same amount of cubic space, and of clothing; the men and women were of the same class; they were medically inspected before embarcation; went the same voyage, under similar rules of discipline; and a medical officer of the Royal Navy in charge of each ship. Yet, they arrived in very different conditions of health, and this difference arose entirely from the character of the medical officer; if a good disciplinarian, he kept his men in cleanly habits, and had the between decks properly cleaned, the boards of the berths moved, and all wet and dirt kept away from the decks, and particularly the bedding, the convicts couched in a healthy state. I could tell when I knew the surgeon in charge if he had made more than one previous voyage, in what condition he would land his men. And I have known officers most anxious in their charge, and self-denying in their duty, fail in their efforts, entirely from want of knowledge of the necessity of attending to details respecting general health in warding off Scurvy.

The experience I gained from the result of my observation on the condition of convicts landed after a few months' voyage is, that without any special provision in the way of diet, even without vegetables, by strict attention to hygenic rules men might be landed free of Scurvy.

The combination of proper diet, and great attention to means of preserving health, which is carried out in the navy, has, I trust, quite put an end to Scurvy in that service, its more open forms are gone, and I hope its obscurer influences likewise.

There was even a still greater proof of the necessity arising for great attention to the condition of the ship and the habits of the men in preventing disease, shewn by the opposite states in which the crews of the English and French Antarctic expeditions arrived in Tasmania in 1839. The two English vessels, under the command of Sir James C. Ross, were in excellent health, not any man sick, the vessels in beautiful order—in one word, in that condition of great cleanliness in which we always see English vessels of war.

The two French vessels, under Admiral D'Urville, arrived full of sickness, and it became my duty to provide thirty with hospital accommodation on shore labouring under Scurvy and dysentery. These vessels were great contrasts to the English; they were not as clean as many merchant vessels, and the men had not a cleanly or tidy appearance. They were lounging about, and there was an absence of all that smartness and neatness about both men and vessels which had characterised the English ships and their crews.

And yet on board these French ships were medical officers of great attainments, and who devoted themselves most carefully

to the care of the sick, and none could have seen or known Admiral D'Urville without being convinced of his ability and kindness of heart.

The history of the French expedition was that of the English navy some years ago; the condition of the health of the English expedition is due to the system first thoroughly adopted and carried out by Captain Cook.

In the year 1776, Captain Cook was awarded the gold medal for his paper on the method taken for preserving the health of the crew of the Resolution during her voyage round the world.

After speaking of the use of malt made into sweet wort, which he thinks one of the best antiscorbutics, he alludes to the use of sour krout, portable soup or broth, fresh vegetables when procurable, and the use of the lob of lemons and oranges, which latter he states the surgeon found useful in several cases, and sugar instead of oil, and wheat instead of much oatmeal, he found good exchanges. The paper then contains the following passage:

"But the introduction of the most salutary articles either as provisions or medicines will generally prove unsuccessful unless supported by certain rules of living. On this principle many years' experience, together with some hints I had from Sir Hugh Palliser, the Captains Campbell, Wallis, and other intelligent officers, enabled me to lay down a plan by which all has to be conducted. The crew were at three watches, except on some extraordinary occasions, by this means they were not so much exposed to the weather as if they had been at watch and watch, and they had generally dry clothes to shift themselves when they happened to get wet. Care was also taken to expose them as little as possible. Proper methods were employed to keep their persons, hammocks, bedding, and clothes, &c., constantly clean and dry. Equal pains were taken to keep the ship clean and dry between decks. Once or twice a week she was aired with fires; and when this could not be done, she was smoked with gunpowder moistened with vinegar and water. I had also frequently a fire made in an iron pot, at the bottom of the well, which greatly purified the air in the lower parts of the ship. To this and cleanliness, as well in the ship as among the people, too great attention cannot be paid. The least neglect occasions a putrid and offensive smell below, which nothing but fires will remove; and if these be not used in time, those smells will be attended with bad consequences. Proper care was taken of the ship's coppers, so that they were kept constantly clean. The fat which boiled out of the salt beef and pork, I never suffered to be given to the people as is customary: being of opinion that it promotes the Scurvy. I never failed to take in water wherever it was to be procured, even when we did not seem to want it; because I look upon fresh water from the shore to be much more wholesome than that

which has been kept some time on board. Of this essential article we were never at an allowance, but had always abundance for every necessary purpose.

I am convinced that with plenty of fresh water, and a close attention to cleanliness, a ship's company will seldom be much affected with the Scurvy, though they should not be provided with any of the antiscorbutics before mentioned."

In a voyage of three years and eighteen days through all climates, only one man died from disease and that without any mixture of Scurvy.

In fact, Cook, in his paper of 1776, had not only shewn the way by precept, but he had followed it out in practice; his conviction has been fully borne out by the results in the transportation service, and the contrasts of the English and French expeditions to the south, also strongly prove the soundness of his views, the noblest proof of his correctness is the present state of the British navy.

Thus, the man to whose energy and enterprise England owes the possession of these colonies, is now speaking to us in words of wisdom and warning for the benefit of our commerce and our seamen, in words that require grave attention at this time.

To remove the cause of Scurvy, have vegetables; in their absence, or where the people have vegetables, follow out strictly Cook's plan for preserving the health of seamen.

Vegetables had only gradually, from Henry the Eight's time, become used in England; and it is no doubt to the greater consideration which had been bestowed upon meat as part of the ration, that the absence of vegetables as the sole cause of Scurvy was overlooked; and it required the numerous instances I have referred to, of Scurvy arising where no salt provisions were used to fix attention properly to the fact.

I have alluded to the breaking out of Scurvy at Victoria, in the Cape of Good Hope, where fresh rations were issued, but no vegetables. Dr. Murray, who was then the principal medical officer on that station, forwarded a report of his own with enclosures for medical officers under his orders; these reports contain not only an interesting account of Scurvy, under the peculiar circumstances in which it took place, but Dr. Murray had formed some theoretical views as to the nature of Scurvy; and at this station a new treatment for Scurvy was adopted—instead of high feeding with meat, and the use of stimulants, all stimulants were withheld, and bleeding, purgatives, light diet, with vegetables, were given, and with good results.

I can speak personally of this system of treating Scurvy, which depends for its success on giving that food, which having been withheld, had caused the disease. It is interesting in shewing that food in which but little nitrogen is given is best suited to

scorbutic patients—and thus agrees with what Sir G. Blane found, that white meal was best—and both Cook and Blane prefer white wheaten flour to oatmeal. This is not only useful in a curative point of view, but is valuable as bearing out what the history of the disease had shewn, that Scurvy has for its cause the absence of vegetables.

Blane is very decided in his opinion as to the superiority of wine over spirits as an article of the diet of seamen. I can offer no opinion of my own on this subject from experience; but I am induced to think it a very important matter, and while beer from its bulk cannot well be carried on long voyages for large bodies of men, I feel assured that colonial wine of good quality would be far superior to grog.

I have mentioned the obscure forms of disease produced by Scurvy. I cannot enter into a full description of these, but there is one, and in my opinion the most important of that obscure form of Scurvy which I desire to direct attention to.

In most of the fatal causes of Scurvy in which I made post mortem examinations, I found disease of the large intestines of greater or less extent, and they were found thickened, ulcers, and granulations of the mucous membranes; sometimes the ulcers perforating all the coats, and often patches of ecchymosis—numerous black dots, sometimes over considerable parts of the inner coat of the colon and rectum

In many of these cases there were not any external marks of Scurvy about the body, or in the jaws—often the health good during all the voyage. The first symptoms being of diarrhœa, in others, dysentery; many fatal cases had not any dysenteric symptoms, merely ordinary diarrhœa.

From having often seen in bodies of convicts who died some months after arrival, marks of healing of ulcers in the large intestines—from often seeing the same condition of bowel from men dying from other diseases shortly after arrival, I am convinced that a most common complication of Scurvy is this condition of the large bowels, and that it often is the only morbid appearance after death, and the only part affected with the local effects of Scurvy during life.

If reference is made to the histories of Scurvy, it is always accompanied by diarhœa and dysentery; and large numbers of the deaths under those heads were, I believe, really due to Scurvy, of which the diarrhœa and dysentery were only symptoms and complications. Read by this light, the deaths in convict ships from Scurvy, were more than those entered as dying from that disease, and its ravages in fleets and armies more than has been supposed

That the condition I have described as affecting the large intestines does arise from Scurvy, is borne out by other facts.

Dr. Menton, of Vienna, in 1776, in the philosophical transactions, describes cancrum oris with disease of the large intestines, produced by want of vegetables, and cured by their use.

Dr. Crampton, of Dublin, in 1818, descsibes exactly the same appearances in the large intestines, and 'the food of the poor was universally bad during the two preceding years, the potatoes wet, the wheaten flour musty.'

In the Orphan Schools in Tasmania, I had several cases of cancrum oris, which in fatal cases was connected with disease of the large intestines exactly similar to the morbid appearances seen by me so constantly in Scurvy among convicts, and as described as taking place at Vienna and Dublin.

I eradicated the dysentry, diarrhœa, and cancrum oris, at the Tasmanian Orphan Schools, by attention to diet; and vegetables were given in all such cases.

Dr. Browning, a naval surgeon, who made several voyages to Tasmania with convicts, in a small book, he published in 1842, says: "A youth was affected with a slight cough, and occasional diarrhœa—but neither of his ailments was I disposed to regard as connected with Scurvy. He was received as a patient into the colonial hospital, and in three weeks was laid in his grave. Nearly the whole of the (large) intestines, especially the liver, was covered with ulceration, and discovered other marks of Scurvy, very familiar to the medical officers of the colonial hospital at Hobart Town."

This was an example of many cases that fell in a similar way victims to Scurvy in its obscurer forms.

It was my practice with convicts recently landed, to keep them out of hospital if possible, as fresh air, moderate exercise, and the greater freedom acted beneficially on them; and I am sure many in that way recovered, whereas with the depressing influences of hospital restraint, on first landing, they would not have got well.

I was so fully impressed with the existence of severe diseases of the large intestines, of a scorbutic character, even without diarrhœa or dysentery, that if from any cause a purgative was required during the first month or so after landing, I only ordered the mildest and those that acted chiefly on the upper bowels.

That the ravages from obscure Scurvy have been great I am convinced; that they exist now far more than is supposed I fully believe—certainly in the merchant and transport service. I trust not in the navy.

But the remedies for the more declared and more obscure forms are one and the same—vegetables, the great means of cure; and on board ship, those means advised by Cook and Blane, for the preservation of the health of seamen, should be enforced if possible by law, for they will not only prevent Scurvy, even

without vegetables or antiscorbutics, they will prevent these diseases, as fevers, &c., which would arise if vegetables are issued, and, although the vessels were well supplied with stores of all kinds.

I trust I have given sufficient reasons for bringing this subject under your notice, and I hope that no time will be lost in putting the merchant vessels that trade out of, and to this port, in a condition, both of accommodation, dieting. and discipline, that the health of the seamen may be secured, and that Scurvy in every form which can be prevented, may never affect our seamen.

ART. V.—*On the Rates of Mortality and Expectation of Life in New South Wales as compared with England and other countries, by M. B. Pell, Esq., B.A., Professor of Mathematics in the University of Sydney.*

[Read 6th November, 1867.]

I HAVE undertaken the task of examining the reports of the Registrar-General, from the year 1856 to the present time, and the Census returns for the years 1856 to 1861, for the purpose of ascertaining and exhibiting, as exactly as the data will permit, the rates of mortality at various ages; so that a comparison may be made between this colony and England, so far as regards the effect of the climate and condition of the people upon the duration of life. Another object which I had in view in undertaking this investigation was the formation of a complete mortality table, to serve as the basis of exact culculations respecting Life Assurance, and Life Annuities. It is not my intention, however, to enter upon that part of the subject in this paper.

I have often heard the question asked, whether this climate is as favourable to the duration of life as that of England, and I have heard it answered in a variety of ways. I have heard it said that our climate is more than usually fatal to infants and young children, and that it is favourable to old age. To questions of this kind the published returns afford no immediate answer.

The death rate in England, determined from an average of seventeen years, is 22·31 per thousand of the population: and that in New South Wales, from an average of ten years, is 17·41 per thousand. A comparison of these rates would seem to lead to the conclusion that the climate of this colony is more favourable to life than that of England; or at all events, that the conditions on the whole are more favourable here than in the mother country. But, in reality, as will appear, the percentage of deaths is small, because of the comparatively small proportion of persons of advanced age living in the colony. The death rate is small, not altogether because the climate is healthy, but because the average age of the people is less than in England. Without taking into consideration the ages of the people living, and the ages at which they die, it is scarcely possible to draw any conclusions from the comparisons of the mere gross per-centages of deaths in different countries.

A very elaborate set of mortality tables, prepared at the Registrar-General's office, from the records of births and deaths during seventeen years, and from the results of two censuses, was published in England in the year 1864. In a country such as England, where the existing population is the result chiefly of natural increase, not much affected by emigration or immigration, the increase from year to year proceeds according to laws which remain almost constant during a considerable period; and of the population living at any particular time, the numbers at the several ages are connected by relations which may be considered almost invariable. It was possible therefore in England, from the results of two censuses taken at an interval of ten years, together with the records of deaths during the intervening years, to estimate with considerable accuracy, by the method of Finite Differences, the numbers of the population and their ages, at intermediate and subsequent years. In this colony, however, where so large a proportion of the increase of the population is due to immigration, which is variable and uncertain, the methods alluded to can scarcely be applied. The natural proportion also amongst the numbers living at different ages is entirely destroyed here by the large influx of persons of mature age. These causes, as well as the comparatively small total numbers, have rendered the subject more than usually difficult to deal with, and at the same time the results more uncertain than those obtained from a larger experience in more populous and more settled countries. The results, however, set forth in the tables appended to this paper are, I believe, as accurate a representation of the effects of the climate and circumstances of this colony upon the duration of life as the data at our disposal will afford.

My calculations are founded upon the returns of the Registrar-General from the year 1856 to the present time, and upon the

published results of the censuses of 1856 and 1861. In the census book for 1856, the numbers living at each age from 0 to 60, are given, and I was at first disappointed at finding that for the census of 1861 the numbers are given for periods of 5 years only, for ages above 15 years. I ceased, however, to regret the omission when I examined more particularly the return for 1856, for it shows most clearly that the particular numbers are not at all to be relied upon. It is evident that a large proportion of the people gave their ages in round numbers only. There is a large and indeed impossible preponderance of numbers at the particular ages 20, 25, 30, 35, 40, 45, 50. For instance, the number at the ages 39, 40, 41, are 2458, 8454, 1908 respectively. At ages 44, 45, 46, the numbers are 2143, 4158, 2116. We have thus excessive numbers at the ages 40 and 45, whereas it may be considered as almost certain that the numbers at ages from 40 to 45 would, if stated truly, differ very little from one another. I have been obliged therefore to ignore the particular numbers, and to take the totals for periods of five years, and I have reason to believe that the numbers so obtained may be relied upon as sufficiently near the truth. The English tables to which I have alluded were formed from similar data, the numbers at particular ages being found by interpolation.

I have good reason for believing that the returns respecting births and deaths may be relied upon. There is no doubt that most of the deaths have been registered, and the corresponding ages stated more accurately than at the censuses. Unfortunately, however, in the tabulated returns the exact ages at death are not stated for ages above 5 years, but for intervals of five years only. Thus the number of deaths each year between the ages of 40 and 45 is given, but not the numbers at the particular ages.

Table A in the appendix to this paper shews the percentages that die annually in New South Wales and in England of those attaining the ages stated. The percentages of deaths at ages under 5 years are given for every year of age. They were calculated from the returns respecting births and deaths during 9 years, and quite independently of the censuses. They may be relied upon therefore, as close approximations to the truth, although they shew results differing widely from those obtained in other countries.

The per-centages for ages above 5 years are given for periods of 5 years only. They were calculated from the results of the censuses of 1856 and 1861, and from the records of deaths during the intervening years. In order to test the accuracy of the results so obtained, I made the calculations otherwise by assuming the numbers determined by the census of 1861, to be the true average of the numbers living at the several ages, during a

period of ten years—five years before the census and five years after it, the average annual number of deaths being estimated from the records during the same period. This method is not altogether so satisfactory as the former, but the per-centages so obtained differ so little from those given in table A as to leave little doubt as to the general accuracy of the results there recorded. I have also performed the calculations separately for for male and female lives, and I find a greater uniformity and consistency amongst the results than I had expected in taking averages from such small numbers.

Table A shews that the rates of mortality during infancy and early childhood are much smaller here than in England. Of infants born in New South Wales, about 10½ per cent, die during the first year—in England nearly 15 per cent. Of those who attain the age of 1 year in New South Wales 4 8-10 per cent. die before attaining the age of 2 years—in England 6 3-10 per cent. The rates of mortality in New South Wales continue to be less than in England, but in a diminishing ratio, up to ages between 30 and 35, when the rates become nearly equal. Of 10,000 persons living between the ages of 20 and 25, 67 die annually in New South Wales, and 89 in England. Of the same number between the ages of 30 and 35, 101 die annually in New South Wales, and 107 in England. Above the age of 35 the mortality in New South Wales increases rapidly in comparison with England. Of 10,000 persons living between 50 and 55, 240 die annually in New South Wales, and 195 in England. Of the same number living between the ages of 70 and 75, the annual number of deaths are in New South Wales, 1511, in England, 1165. Above the age of 80, the numbers are 2573 in New South Wales and 1705 in England.

The comparatively low rates of mortality in New South Wales during infancy, childhood, and youth are due, no doubt in a great measure, if not entirely, to the general well-being of the people. A great number of infants and children die annually in England through the poverty and miserable condition of their parents, from the insufficiency of suitable food and the want of proper clothing and shelter; and in many cases where these causes do not prove immediately fatal, diseases are contracted which lead to premature death. There is no doubt, moreover, that the practice of sending children to work in the factories and the fields before their constitutions have become sufficiently developed to bear the confinement or the fatigue. has contributed largely towards increasing the number of deaths at early ages in England.

Whether the lower rates of mortality amongst children and young people here are due entirely to their more favoured condition, or partly to climate or other circumstances, we have no data for determining with certainty. It is possible that this warm

climate, independently of other conditions affecting health and life, may be more favourable at an early age than the climate of England, but not so well calculated for the development of a strength of constitution likely to endure to old age.

In all countries, so far as I am aware, for which exact mortality tables have been formed for the sexes separately, it has been found that on the whole females live longer than males, the expectation of life of a female being always greater than that of a male of the same age. It has been supposed that this arises partly, if not entirely, from the greater dangers into which the tastes and habits of men are likely to lead them, and their greater liability to death or deterioration of health from dangerous or unhealthy occupations. The English tables, however, prove most conclusively that this is not the true explanation, and seem if anything to shew that the habits and occupations of men, during the period when they are most likely to be actively employed, are more favourable to the duration of life than those of women. Of males born in England about 16 per cent. die in the first year, and of females about 13 per cent, in the same period. The rates of mortality of female children continue lower than those of males, but in a diminishing ratio, up to the age of about seven years when they become equalized. A similar difference between the rates of mortality of males and females at these early ages exists here, and was pointed out more than once by the late Registrar-General. It may, indeed, be considered as an established fact, depending in some way upon constitution, and not at all upon external circumstances, that boys are more difficult to rear than girls.

Above the age of seven years the rates of mortality of females in England become slightly greater than those of males, and continue so up to the age of about 40, when they again become equalized. At ages above 40, the rates of mortality become greatly in favour of females. As the period from the age of 7 to that of 40 includes that during which men are the most likely to be exposed to any dangers and unhealthy influences to which they may be considered more particularly liable, it is evident that their smaller average duration of life cannot be attributed to any such causes. The general conclusion to which these facts seem to lead, is that the constitution of women is naturally better able to resist disease and death than that of men, but that the habits and condition of women are less favourable to the duration of life than those of men.

In New South Wales, for the earlier ages, we obtain similar results. Of males born, 11 3-10 per cent. die during the first year, of females 9 8-10. The rates of mortality continue somewhat lower for females up to the age of 7 years, when they become equalized as in England. But from this point the New South

Wales table diverges considerably from the English in this respect, the mortality amongst females being very sensibly less than that of males from the age of 7 years upwards, the difference increasing almost continuously with the increase of age. In England the rates are nearly equal, but slightly in favour of the males during a period of thirty-three years. Here the rates remain nearly equal for a very few years, and then diverge with comparative rapidity. If there were anything irregular or fluctuating in these results, I might feel inclined to doubt them, and to attribute the marked difference in this respect between the rates here and in England, to some error in the data, or in the methods of estimation adopted; but the uniformity and certainty of the results precludes such a supposition, and leaves no doubt that there is, from some cause or other, a greater difference here than in England between the rates of mortality of the two sexes. It is to be observed also, that the period of life during which the rates of mortality of males and females are nearly equal in England, is the same as that during which, in this colony, the rates are most nearly equal. This is to some extent a confirmation of the truth of my results, and at the same time seems to indicate that the fact observed in England, that the rate of mortality of males, as compared with that of females is less between the ages of 7 and 40 than at other ages, results from some general law independently of local circumstances. The law seems to act here, but greatly diminished in its manifestations by some local cause increasing considerably the relative mortality of males between those ages.

Table B shews how many out of 10,000 persons born, die during each successive period, until they are all extinct, and also the number living at each age, both for New South Wales and for England. The numbers are given for each year up to the age of 5 years, and for higher ages at intervals of 5 years only. The earlier part of the table may be considered to apply to native-born children only, for of those living at earlier ages, the number born elsewhere must be too small to affect the results in any sensible degree. Of those living at the more mature ages, however, a large proportion were born out of the colony, and the rates of mortality at those ages apply to the mixed population as it exists. This table must, therefore, be considered to represent the rate according to which 10,000 infants born in the colony will probably die, upon the supposition, that as they advance in years the rates of mortality amongst them will be the same as they now actually are amongst the existing population, which contains a large number of persons of European birth, There are not at present any data available for determining how far, if at all, the rates of mortality of persons resident in New South Wales, but born elsewhere, differ from those of the native born.

It would appear at first sight, from Table B, that the rates of mortality here are greater than in England, for ages above 25 years. Between the ages of 30 and 35, for instance, 350 die in New South Wales and 317 in England; but this is not because circumstances generally here are less favourable to life at that age, but because the comparatively smaller rates of mortality at lower ages have left more alive at the age of 30. The per-centage of deaths here is less at those ages, as appears from Table A; but the total number of deaths is greater, as shown by Table B. And even where the per-centage of deaths is greater in New South Wales than in England, as between the ages of 45 and 50, it does not necessarily follow—and this is a good instance of the danger of drawing hasty conclusions from a mere comparison of figures—it does not necessarily follow that circumstances generally here are less favourable to life at those ages than in England. On account of the low rates of mortality at the earlier ages, of a given number born in this colony, a much larger number would attain the age of 45 than in England. Of these a considerable proportion would probably consist of persons of rather weaker constitution than the average, who in England would have died early, but have survived here, to swell the numbers of those living at the age of 45, but at the same time to diminish their average strength of constitution, and thus to increase the average per-centage of deaths amongst them. In fact, the people in England at the age of 45 may be subject to a less per-centage of deaths, not because climate and other circumstances in that country are more favourable to life at that age, but because the weak ones have been weeded out and the hardy ones alone survive. The argument in favour of this view of the case would have considerable weight if the bulk of the persons living in the colony, as well as those whose deaths have been registered, were native born; but as a large proportion of them were born in the British Islands, in much the same proportion is the argument weakened. And the question is pretty well set at rest by the results given in Table B. If the circumstances of the colony were really more favourable to life, even at the more advanced ages for which the per-centages of deaths is greater than for the corresponding ages in England, then of 10,000 born there would at every age, to the end of the table, be more survivors than in England, whereas we find that, although the numbers living at the several ages are at first greater in New South Wales, the difference becomes gradually diminished, until at the age of 65 the numbers living in the two countries become nearly equal; and beyond that age the number of survivors here becomes much less than in England, at the same time that the per-centage of deaths becomes greater. There is no doubt, then, that, under existing circumstances, the comparison is unfavourable to New South Wales; but there are

reasons which render it probable that in future years the rates of mortality amongst old people will not be found so excessive. The existing high rates are, perhaps, in some measure due to the habits and character of the class of which a large portion of the older inhabitants of the colony is composed.

In the Census Book for 1856, the total number only of those living above the age of 60 is given, without any classification as to age. I have been obliged, therefore, to distribute the total amongst the particular classes by estimation founded upon the more particular statements in the Census Book for 1861. This renders the results exhibited in my tables for ages above 60 less trustworthy than those corresponding to the preceding ages; but a comparison with the results obtained, as I have explained, from the census of 1861 alone, and which therefore are not affected by this possible source of error, shows that there can scarcely be any material inaccuracy—certainly none of sufficient magnitude to affect the truth of the general conclusions at which I have arrived.

Table C gives the expectation of life at several ages for New South Wales and for England, Sweden, and Belgium. As far as the age of 60 I have no doubt that the results are near the truth —quite enough for the purpose of general comparison with the corresponding numbers for other countries. I do not feel so much confidence in the results for ages above 60, but they are, I think, worth recording as first approximations.

I intend on some future occasion to lay before the society tables showing the rates of mortality in Sydney and the suburbs. The number of deaths per thousand of the population living, indicates a much greater mortality in the metropolitan than in the country districts; but it will probably be found that this is due, in some measure, to difference of proportion in the numbers of those living at particular ages, and not entirely to the superior healthiness of the country districts.

I wish that I could undertake to furnish some answer to the interesting question, whether the rate of mortality amongst the native born population is greater or less than amongst those born elsewhere—to foretel, in fact, whether the rates of mortality generally will increase or diminish as the proportion of the population born in the colony increases, and to ascertain whether a native of England increases or diminishes his expectation of life by coming to reside in New South Wales. I am afraid, however, that I shall not be able to obtain the requisite information. It exists in the Registry Office, but has never been collected and tabulated, and could not now be made available without considerable expense. Much other information, which, if brought to light, could be of great value, is buried in the same way.

There are, of course, important advantages resulting to the

community from a system of registration, quite independently of the statistical value of the information recorded. Many particulars however, which are recorded, can scarcely ever, I think, prove of any utility in individual cases, although if arranged and made available, they would be of great statistical value. Under the present system, however, the number of particular questions to be answered at the registration of a birth or a death serve only to irritate the applicants, some of whom, perhaps, do not like to be cross-examined about the past history of themselves or their friends, to increase the expense of the department, and to cumber the registers with a mass of detailed information, which, if it is to continue uncollected and unarranged, can scarcely ever prove of value for any purpose. I do not by these remarks intend to throw blame upon the Registrar-General or his predecessor, to whose zeal and ability the colony is much indebted. I have no doubt that they have done as much towards furnishing the Government and the public with statistical information as the means at their disposal would permit, and that they would have been glad to have rendered their tabulated returns more ample if it had been in their power to do so.

TABLE A.—PER CENTAGE DYING ANNUALLY OF THOSE ATTAINING EACH AGE OF THE CLASS SPECIFIED.

	New South Wales.			England.			
Age.	Persons.	Males.	Females	Persons.	Males.	Females.	Age.
0	10·58	11·30	9·82	14.95	16·36	13·47	0
1	4·82	4·85	4·80	6·31	6·43	6·19	1
2	2·09	2·07	2·10	3·54	3·55	3·54	2
3	1·58	1·61	1·54	2·40	2·38	2·42	3
4	1·13	1·17	1·09	1·78	1·78	1·77	4
5 to 9	·49	·49	·49	·95	·96	·95	5 to 9
10—14	·30	·33	·28	·51	·50	·52	10—14
15—19	·38	.43	·34	·65	·63	·66	15—19
20—24	·67	·73	·60	·89	·87	·90	20—24
25—29	·87	·91	·82	·98	·96	1·00	25—29
30—34	1·01	1·07	·93	1·07	1·06	1·10	30—34
35—39	1·37	1·42	1·29	1·20	1·20	1·21	35—39
40—44	1·49	1·64	1·24	1·37	1·40	1·34	40—44
45—49	2.08	2·22	1·84	1·60	1·68	1·51	45—49
50—54	2·40	2·62	1·93	1·95	2·14	1·76	50—54
55—59	3·33	3·66	2·66	2·60	2.78	2·41	55—59
60—64	4·03	4·50	3·11	3·60	3·80	3·38	60—64
65—69	7·28	7·73	6·39	5·23	5·52	4·94	65—69
70—74	9·13	10·06	6·79	7·82	8·23	7·40	70—74
75—79	15·11	16·97	11·79	11·65	12·22	11·08	75—79
80 and upwards	25·73			17·05			80 and upwards

This table may be read thus: Of 10,000 persons born in N. S. Wales, 1058 die before attaining the age of 1 year. Of 10,000 persons in N. S. Wales attaining the age of 1 year, 482 die under the age of 2 years. Of 10,000 males in N. S. Wales attaining ages from 5 to 9, 49 die before becoming a year older.

TABLE B.—OF THE NUMBERS LIVING AT THE AGE STATED, THE NUMBER THAT DIE BEFORE ATTAINING THE NEXT AGE.

	N. S. Wales		England.	
Age	Living.	Die.	Living.	Die.
0	10,000	1058	10,000	1495
1	8942	431	8505	537
2	8511	178	7968	282
3	8333	132	7686	185
4	8201	93	7501	133
5	8108	197	7368	343
10	7911	122	7025	179
15	7789	147	6846	218
20	7642	252	6628	288
25	7390	316	6340	303
30	7074	350	6037	317
35	6724	448	5720	334
40	6276	454	5386	357
45	5822	581	5029	386
50	5241	599	4643	432
55	4642	723	4211	513
60	3919	764	3698	608
65	3155	1001	3090	710
70	2154	819	2380	769
75	1335	747	1611	710
80	588	432	901	515
85	156	136	386	271
90	20	19	115	93
95	1	1	22	20
100	0	—	2	—

This table may be read thus: Of 10,000 persons born in New South Wales, 1058 die in the first year, and 8942 attain the age of 1 year. Of 7642 persons who attain the age of 20 in New South Wales, 252 die before attaining the age of 25.

TABLE C.—EXPECTATION OF LIFE.

Age.	N. S. Wales.	England.	Sweden.	Belgium.
0	45·58	40·88	—	32·2
1	49·91	46·98	42·95	—
2	51·41	49·11	44·92	—
3	51·50	49·90	46·11	—
4	51·32	50·12	46·78	—
5	50·90	50·02	46·79	45·7
10	47·11	47·32	45·07	43·9
15	42.81	43·54	41·64	40·5
20	38·59	39·88	38·02	37·3
25	34·81	36·56	34·58	34·7
30	31·25	33·28	31·21	32·0
35	27·30	29·99	28·03	28·9

Age.	N. S. Wales.	England.	Sweden.	Belgium.
40	24·07	26 75	24·66	25·8
45	20·75	23·41	21·61	22·7
50	17·77	20·64	18·46	19·5
55	14·74	16 94	15·53	16·4
60	12·00	13·93	12·63	13·4
65	9·28	11·16	10·10	10·8
70	7·41	8·73	7·72	8·4
75	5·16	6·71	5·91	6·4
80	3·58	5·09	4·28	5·0

This table may be read thus: Persons in N. S. Wales who have attained the age of 35 will, on the average, live 27 years and 3-10ths of a year longer.

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ART. VI.—*Note on the Geology of the Mary River, Queensland. By Rev. W. B. Clarke, M.A., F.G.S.*

[Read 6th November, 1867.]

ON the 4th of last September, I read before the Society a paper on the Auriferous prospects of Queensland. In that paper were enumerated certain localities (along a linear range of 900 miles) in which Gold was known to me to exist, or in which I anticipated it would be found.

At the extremities of this line were the country between the Mary River and Brisbane to the S.E., and that between the Cloncurry and the Albert to the N.W.

Since September both these extreme portions of the area discussed have been brought into public notice as producing Gold—Mr. Landsborough having reported Gold found at the head of the Leichhardt River, west of the Cloncurry; and a gold-field being now beginning to be worked at Gympie Creek, about fifty-five miles above Maryborough, on the right bank of the Mary River.

The latter locality will probably attract more adventurers than the former, and some persons may naturally inquire as to the structure of the country.

It may, therefore, be useful to state that the Auriferous region in that part of Queensland appears to be considerable, inasmuch

as there are various known Auriferous localities along the ranges between the Burnett River and Moreton Bay.

The Brisbane River and the Mary rise in an extension of the great Bunya Bunya Range, which sends down its spurs north and south, forming deep channels of drainage between them. These spurs do not belong to the main Cordillera which is there known as the Bunya Bunya Range, and trends north-westwardly, having however, its gold patches as well as the meridional ranges that diverge from it in direction along the Mary.

The whole of the broken region forming this area is composed of rocks eminently characteristic of an Auriferous district. And those who have studied the structure of such a district in New South Wales could not fail to anticipate the finding of Gold somewhere along the Mary.

Granite and Syenite, with other Hornblendic rocks, form the base of the system, supporting Chloritic, Talcose, Micaceous, and other Slates traversed by Quartz lodes, and showing on their flanks various members of the Carboniferous formation; such as Conglomerates and Sandstones above, succeeded by Coal and marine fossiliferous beds (as in New South Wales) on the lower portion of the river; good coal, in a thick seam appearing on Harvey's Bay, not far from the mouth of the Mary.

Besides the rocks before named, Diorites of various kinds form prominent summits, as at Boople, on the Range forming the easternmost boundary of the Ubi Ubi and Mary, and along the Bunya Bunya and branch Ranges.

This rock, by the way, is nearly identical in composition with that which forms the old Dioritic bluff at the south-western extremity of Prospect Hill, near Parramatta, having some of its varieties more like the rock of the bluff at Bowrell, or Gibraltar Gap, above the Fitzroy Railway Tunnel.

Basalt and Serpentine, with some Porphyry and Trachyte, also occur along the Mary (as at Widgee Widgee) and on the Brisbane, and north and south of their sources.

At Kilkiven, about thirty or thirty-five miles west of the Mary the slates are traversed by quartz reefs holding gold and copper, the proportion of the former being considerable. Iron ore also abounds in this region. The mineral district of the Mary is, therefore, one of considerable promise.

Probably from the physical features of this broken country, there are few wide tracts for the working of alluvial gold, which must be patchy; but so far as geological indications go, there is an extraordinary combination of such features as characterise a well-developed Auriferous region.

Mr. Davidson, the Gold Commissioner, reported on the 28th October, just nine days ago, that out of a small water channel in a ridge of Diorite strewn with quartz-drift, three men had collected in the preceding week, 180 ounces of gold.

In examining my collection of rocks from the basin of the Mary I find, as in many gold localities in this Colony, there is a great abundance of Sulphide of Iron, especially in the hardened Slates and Diorites. From this mineral there is, no doubt, a supply of small gold. But what may be the final result time alone can determine.

P.S.—March 1st, 1868.—Time has determined, by disclosing an abundantly rich field, with heavy nuggets, along the Mary, where now there is a population of many thousand persons.

ART. VII.—*On the Mutual influence of Clock Pendulums, by G. R. Smalley, Esq., Government Astronomer.*

[Read 4th December, 1867.]

THE remarks which I am about to offer upon the present subject were suggested to me by the perusal of one of the meteorological essays of the celebrated French Philosopher, Arago.

The essay in question is entitled "The Phenomena of Turning Tables;" and, had it been written by a less eminent mathematical philosopher, I should have hesitated before introducing this title in the present paper.

Without, however, expressing any opinion upon the *so called* phenomenon of "table turning," yet I think it will be useful as well as interesting if I give Arago's remarks, published in his "Meteorological Essays," in 1855, translated under the superintendence of General Sabine, with an introduction by Baron Humboldt.

Arago says—"Failures have never produced any discouragement in public opinion in matters supposed to relate to animal electricity. An example of this has shown itself in regard to the phenomena known under the name of turning tables.

"They were attributed unhesitatingly to a supposed faculty possessed by animated beings, of developing in most bodies a peculiar kind of electricity.

"I had to speak on this subject at the Academy, on the occasion of a communication from its correspondent, Monsieur Séquin,—known by the important invention of tubular boilers. It was my duty to speak as I did; but I cited old experiments by Ellicott, clockmaker, mentioned in the Philosophical Transactions, which made the greatest analogy with the admissible accounts given of turning tables.

"What is apparently most extraordinary and most difficult to explain in the phenomenon of the tables, is the circumstance that by means of, it may be said, infinitely small impulses, impressed by the finger on the mass of wood of which the table consists, a very considerable degree of motion should at length be imparted to the table. Well, then, I would remark that in Mr. Ellicott's experiments, two pendulum clocks, enclosed in separate cases, were suspended from a wooden plank affixed to the same wall, at a distance of $23\frac{1}{2}$ English inches from each other.

"At first, only one of these two clocks was going. The second clock was at rest. After a certain time, this second clock was found to have been set going by the *imperceptible vibrations* transmitted to its pendulum from the pendulum of the first clock, through the medium of the intervening solid bodies. A very singular circumstance is that, after a certain time longer, while the pendulum of the second clock (the one which had at first been at rest) vibrated in the largest arc which the construction of the clock would permit, the pendulum of the first clock, the one which at first was the only one going, had arrived at a state of entire rest.

"I will not enlarge upon the deductions which may be drawn, and which really have been drawn, from the facts just mentioned, because my object has only been to show that there already existed in science, instances of communicated motion analogous to those which have recently been presented by turning tables, and of which the explanation does not require any of those mysterious influences to which recourse has been had in the case of the tables."

I have quoted the foregoing Essay, which (with such an author) is certainly entitled to respect; not with a view to discuss or overturn an opinion upon the question of "table turning," but because it renders more complete and interesting the results of those investigations which I am about to present to you.

And here I may observe that my own experiments have been carried on without any knowledge of those made by Mr. Ellicott, beyond the reference made to them by M. Arago. Indeed, it is only since I completed my own experiments, that I succeeded in finding a detailed account of the others in the Philosophical Transactions for the year 1739, and it is remarkable that whilst the actual results arrived at in both cases are very similar, yet, so

far as I can gather, there is a considerable difference in the circumstances under which they were made.

Mr. Ellicott appears to have confined his experiments to a fixed medium between the two clocks, viz., the base on which they stood, or the fixed rail by which they were supported. I have conducted my investigations with media of different kinds and dimensions, varied as much as the limited amount of time devoted to them would admit of.

The balls of each of the pendulums employed by the former weighed 23 lbs.; the cisterns of mercury in my clocks weigh respectively 10 lbs. and $8\frac{1}{2}$ lbs; the clock-weights themselves are each of them 9 lbs. and the clocks are superior mean time clocks ordinarily employed in the work of the Observatory.

The total number of experiments is forty, and in making them, every care and precaution was taken.

For the sake of convenience I shall designate these clocks as No. 1 and No. 2, the latter being the one originally at rest; the former, the one set in motion by the hand.

The only foundation which, at the time, could be made available for the experiments was a stone slab, detached from the floor, on which the clock No. 1 usually rests. As there was not room enough for *both* clocks on this slab, a solid plank of well-seasoned cedar, weighing about 17 lbs., was placed on it, and the position of the clocks upon it so arranged that there was no unequal pressure on any part of the stone slab.

In detailing the experiments, I propose on the present occasion. to select one only from each of the important groups—considering that one as a fair type of the whole.

Exp. 1.—In the first experiment, clock 1 was placed on the stone slab, and clock 2 on the floor, but quite unconnected with the stone—the interval being about one inch. The pendulum of 1 was made to oscillate through an arc of 6 degrees. Clock 2 was watched for about 70 minutes, but there was no appearance of motion.

This experiment was instituted for the purpose of determining whether any effect was produced by the mutual attraction of the pendulums, independently of a connecting medium.

Exp. 2.—In experiment 2 the circumstances were as in the last case, only that clock 2 was brought into close contact with the stone slab on which clock 1 rested. There was no perceptible effect.

Exps. 3 and 4.—In experiments 3 and 4, both clocks were placed on the solid plank, as before described. The bases of the clocks were first placed about $\frac{3}{4}$ inch apart, and then brought into contact. In neither experiment was the slightest effect perceptible.

In all these experiments it will be observed that there was no upper medium.

I next made a series of experiments, all of which tended to show that the effects were greatly increased by the removal of the weight belonging to clock 2, I presume from the diminished resistance to so delicate a motive power as that under investigation. I think, therefore, I may fairly confine myself to those experiments in which the weight of clock 2 was removed.

Exp. 5.—In experiment 5 three slabs of solid cedar, whose entire weight amounted to 13 lbs., were firmly nailed together, and placed on the tops of the clocks, whose feet were placed at about $\frac{3}{4}$ inch apart. The pendulum of clock 1 was set vibrating through an arc of 6 degrees, and after an interval of about 16m., the hands of clock 2 were set in motion, the pendulum attaining a maximum arc of vibration of 3 degrees nearly. The pendulum of clock 1, whose oscillations had been rapidly diminishing, came to rest 14m. afterwards.

Exp. 6.—Experiment 6 was made under the same circumstances only that the three pieces of cedar board were placed loosely one upon the other, the nails being removed. In this case the maximum arc of vibration of clock 2 was only 1 3-10 degrees—thus showing plainly that the medium should be a rigid body.

In the subsequent experiments my time would not permit me to wait for the maximum arc of vibration of clock 2—though most of them had been previously made with the weight of clock 2, on, and with similar results.

I therefore contented myself with recording the arc of vibration of pendulum 2 at the expiration of 5m. after that of 1 was set in motion.

This arrangement is quite sufficient for our present inquiry.

Exp. 7.—The upper medium employed was a bar of light well-seasoned pine, 4 feet in length, and weighing 3 lb. 6 oz.

After an interval of 5 m. the arc of vibration of pendulum 2 was 30′ nearly.

Exp. 8.—In experiment 8, a bar of the same material, 2 feet long, weighing 1 lb. 12 oz. was employed. After 5 m. the arc of vibration of pendulum 2 was about 27′.

Exp. 9.—In experiment 9 there was a similar bar 1 foot long, weighing 12 oz. nearly. The arc of vibration was 26′ nearly.

In each of these three experiments, which are very important, the arc of vibration of pendulum 1 had been reduced from 6° to 5° 56′ nearly.

Exp. 10.—In experiment 10, a brass tube 3 feet $10\frac{1}{4}$ inches long, weighing 13 ounces, was employed as the upper medium, under the same circumstances as before. Here the arc of vibration of No. 2, after 5 minutes, was 32′ 2″—that of No. 1, 5° 35′

Exp. 11. –In experiment 11, a very light rod of wood, 2 feet

6½ inches long, weighing ¾ ounce, was employed. The arc of vibration of No. 2, after 5 minutes, was rather more than 6"—that of No. 1, 5°45′

Exp. 12.—In experiment 12, a brass chain, about 9½ feet long, weighing 5½ ounces, was found to produce no sensible effect.

Exp. 13.—In experiment 13, I employed a piece of Manila rope, about 14 feet 2 inches long, weighing 5¾ ounces. After 5m., pendulum of clock 2 showed an arc of vibration of 30′; that of clock 1 vibrated through 5° 40′

Exp. 14.—In the last experiment which I shall refer to, I used a bar of lead weighing 24½ lbs., about 18 inches long. At the expiration of 5m., the pendulum of clock 2 oscillated through an arc of 31′30"; that of 1 through 5°40.′

This is the heaviest upper medium we have yet considered: but the effects produced are very small compared with others of lighter material. In summing up the results of these experiments, I arrive at the following conclusions:—1st, that this observed phenomenon is *not* to be accounted for by any mutual attraction between the pendulums. 2ndly, that there is not sufficient evidence to make it probable that it is due to any direct statical ressure. 3rdly, that it may reasonably be accounted for on the supposition of "imperceptible vibrations" propagated through some connecting medium between the clocks, and that the extent of the effect produced, depends upen the nature of the medium employed.

The experiments appear to prove, that in order to ensure their success,it is necessary there should be a medium between the feet of the clocks as well as between the tops; and if we examine the results obtained by placing different media between the tops of the clocks, we perceive that they are not solely dependent upon the *weight* of the medium. We observe that the same three solid boards placed loosely one on the other, give different results when they are firmly secured together. We observe that this compact wooden mass produces much larger effects than a bar of lead nearly double its weight.

We observe that whilst a light deal rod weighing six ounces only, causes a perceptible effect on clock 2, none is produced by a chain of nearly the same weight; yet slightly perceptible effects are produced by a piece of rope of nearly equal weight.

The brass tube, weighing 13 ounces, causes larger oscillations than other media of greater weight; and lastly we observe that the three bars of pine whose lengths and weights are as the numbers 1, 2, 3, give nearly the same results, and that their magnitudes, though *not* proportional, yet appear to depend upon the length of the bars.

Whilst I think I have said enough to show that such phenomena as have been described do really exist, and that a more complete and elaborate series of experiments will be of great scientific interest as well as of high practical utility, yet I do not assert that the theory proposed is to be hurriedly admitted. I confess that my own convictions are strongly in favour of the theory of "imperceptible vibrations," for it appears to me not only the most simple and rational of any that can be advanced, but is supported by experiments, so far as they have been carried. Nor is it without analogy. Take the case of Sound for instance. We know that if a musical note be produced near stringed instruments, those strings capable of producing the same note, will immediately begin to vibrate. Again, we know that ever so slight a disturbance in a sheet of water will propagate undulations sufficient to produce motion, at a remote distance from the point where that disturbance was first effected.

I can perceive nothing more inconceivable in the dynamical solution of the phenomenon in question than in the existence of the phenomenon itself, and I think the chief matter of surprise is, that the fact is not more generally known; and that, so far as I can learn, 128 years have passed over without Mr. Ellicott's investigations having been systematically pursued.

ERRATA TO MR. KREFFT'S PAPER.

The common Bandicoot, *Perameles obesula,* and the forty-spotted Pardalote have been accidentally omitted, and the sheet sent to press without a final correction being made; I therefore ask the reader's indulgence, and draw attention to the following Addenda et Errata :—

At page 35, after *Pardalotus affinis,* to be added *Pardalotus quadragintus* Forty-spotted Pardalote.

page	33,	line	4,	after *Perameles gunnii* add		*Perameles obesula*	
,,	35,	,,	27,	..... for	*diemensis*	read	*diemenensis.*
,,	35,	,,	36,	..... ,,	*organica*	,,	*organicum.*
,,	35,	,,	39,	..... ,,	*Graicalus*	,,	*Graucalus.*
,,	36,	,,	12,	..... ,,	*diemensis*	,,	*diemenensis.*
,,	36,	,,	22,	..... ,,	*Grained*	,,	*Ground.*
,,	36,	,,	31,	..... ,,	*inaurus*.....	,,	*inauris.*
,,	36,	,,	32,	..... ,,	*Authochæra*.....	,,	*Anthochæra.*
,,	37,	,,	2,	..... ,,	*Cocatua*	,,	*Cacatua.*
,,	37,	,,	23,	..... ,,	*diemensis*	,,	*diemenensis.*
,,	37,	,,	26,	after Emu, *add* extinct; no specimens having been observed for thirty years.			
,,	37,	,,	36,	..... for	*bicinata*.....	read	*bicincta.*
,,	38,	,,	34,	..... ,,	*cattaractes*	,,	*catarrhactes.*
,,	38,	,,	34,	..... ,,	*Spua*	,,	*Skua*
,,	38,	,,	35,	..... ,,	*strenuses*	,,	*strenuus*
,,	38,	,,	37,	..... ,,	*Sterua*	,,	*Sterna.*
,,	38,	,,	38,	..... ,,	*Stemula*	,,	*Sternula.*
,,	39,	,,	44,	..... ,,	is	,,	in.
,,	40,	,,	3,	..... ,,	*diemensis*	,,	*diemenensis.*
,,	40,	,,	8, and 9 ...	,,	*Hiunlia*	,,	*Hinulia.*
,,	41,	,,	32,	..... ,,	26.....	,,	27.

According to some residents a species of Flying Phalanger is found in certain parts of the island, said to be introduced from Victoria; if this statement is correct, the animal should be included in the list. The *Dingo's* existence in Tasmania is doubtful, no settlers ever observed wild dogs.