Register

December 1884

THE UNIVERSITY OF ADELAIDE.

THE COMMEMORATION.

The annual commemoration in connection with the University of Adelaide was held in the Library of the University on Wednesday afternoon. There was a large and fashionable attendance. The proceedings took the usual form. A procession, consisting of the Council and Senate, left the Museum at a quarter past 3 o'clock and ascended to the Library, where they took the seats assigned to them. The members of the Council present were the Chancellor (the Hon. S. J. Way), Messrs. E. W. Way, M.B., C. Todd, C.M.G., J. W. Bakewell, M.A., H. Lamb, M.A., F.R.S., Ven. Archdeacon Farr, LL.D., Rev. W. R. Fletcher, M.A., Messrs. W. A. E. West-Erskine, M.A., W. Everard, J.P., A. von Treuer, LL.B., J. D. Thomas, M.D., the Right Rev. G. W. Kennion, M.A., D.D. The Chancellor presided, and there were also on the platform—Sir Thomas Elder, the Warden of the Senate (Mr. F. Chapple, B.Sc.), the Dean of the Faculty of Law (Mr. J. W. Bakewell), the Dean of the Professorial Board (Professor Tate), Professor Lamb, and the Registrar (Mr. J. W. Tyas). Amongst the other gentlemen present were the Minister of Justice and Education (Hon. R. C. Baker) and Sir Henry Wrenfordsley.

The Dean of the Faculty of Law and the Dean of the Professorial Board presented the candidates in their respective faculties to the Chancellor, who conferred the degrees on them in the usual way. The following are the names of the candidates, viz. :—

Candidate Bachelors of this University—LL.B. Degree: Thomas Hewitson (Stow Prizeman), James Robert Anderson, Robert William Hall, Clement Egbert Eppes Sabine, William Henderson, and Charles Grant Varley. B.A. Degree: James Westwood Leitch, University Scholar and South Australian Scholar; William Fleming Hopkins, University Scholar and John Howard Clark Scholar; and Frederick William Wilkinson, University Scholar.

Graduates of other Universities who are to be admitted *ad eundem gradum* :—

Doctor of Medicine.—Benjamin Poulton, M.D., of the University of Melbourne.

Master of Arts.—Edward Vaughan Boulger, M.A., of the University of Dublin.

Bachelor of Medicine.—H. Sanderson Lloyd, M.B. of the University of Edinburgh; Charles August Altmann, B.A. of the University of Melbourne.

Bachelor of Arts.—Richard T. Matthews, B.A. of the University of London.

The Dean of the Professorial Board then presented to the Chancellor the South Australian scholar for 1884, the John Howard Clark scholar, and the recipients of Sir Thomas Elder's prizes for physiology.

THE SOUTH AUSTRALIAN SCHOLAR.

The CHANCELLOR, in receiving the recipient of this scholarship, James Westwood Leitch, B.A., said—I congratulate you on your success in the recent examination. Your name will be presented to the Minister of Justice and Education as the South Australian scholar — the highest academical distinction which can be taken in this University — for the present year.

I hope we shall have the pleasure of hearing of your career in England. Young South Australians who have gone to England in years past without the advantages of a University education have brought back distinguished honours from the Universities in which they have studied, and I trust that as you carry with you the reputation of this University we shall have cause to be proud of your success. (Applause.)

THE JOHN HOWARD CLARK SCHOLAR.

This distinction was taken by Charles Ernest Robin, who was congratulated by the Chancellor.

SIR THOMAS ELDER'S PRIZES FOR PHYSIOLOGY.

The CHANCELLOR, in receiving Frederick William Gee and Mary Amelia Joyce, who take these prizes, said—I congratulate you most sincerely on your success in the examinations in physiology. The presence of a lady and of a gentlemen on either side as the winners of this scholarship is typical of the audience to which the University addresses itself. I am sure you will both value the honour you have achieved, all the more because the scholarship is given in the presence of the munificent endower of it.

THE STOW PRIZEMAN.

The Dean of the Faculty of Law presented to the Chancellor the Stow Prizeman, Thomas Hewitson, third year.

The CHANCELLOR—I congratulate you on being successful a second time in gaining the Stow Prize. It is only your forward position in having been engaged in your studies a year before the establishment of the prize that deprives you of the opportunity of competing with your fellow-students for the greatest honour in the Law Faculty, that of becoming the Stow scholar of the University. I understand from the Examiners in Law that the papers for the third year were exceedingly hard papers, and that you showed a very creditable knowledge of the subject, which must have been the result of careful study. I am informed that all the men of the third year displayed enthusiasm in their studies, and the honour you have gained is therefore all the greater, because it has been won from worthy competitors.

THE MATRICULATION EXAMINATION.

The certificates were then presented to the successful candidates in the matriculation and junior examinations. In the first list of names issued Leigh George Hancock appeared in the third class and Herbert William Moss in the second class. This was a mistake; Hancock is in the second class and Moss in the third class.

ADDRESS BY THE CHANCELLOR.

The CHANCELLOR then delivered an address. He said—The academical year which is now ended will always be an *annus mirabilis* in the history of the University of Adelaide, for it has been marked by the endowment of a Chair of Music, a School of Medicine, and a Chair of Chemistry. I am sorry that another engagement has deprived us of the presence of His Excellency this afternoon, because we should all have been glad to have welcomed His Excellency in the character not of a visitor only, but of a benefactor of the University. (Applause.) To His Excellency belongs the credit of having originated and given practical effect to the idea of founding a Chair of Music without any cost whatever to the University funds. Early in the year we had the pleasure of receiving from His Excellency a letter

enclosing a subscription-list amounting to the annual sum of £537 for five years, for the purpose of endowing the Chair. Mr. W. R. Cave, of Port Adelaide, who has taken a great interest in this matter, assisted His Excellency in collecting £107 of that amount, and our munificent founder, Sir Thomas Elder's name—(applause)—appears high on the list for £300 a year for the whole term of five years. (Applause). In fact the existence of this Chair may be traced to the South Australian scholarship which Sir Thomas Elder endowed in the Royal College of Music, for it was the examination for that scholarship that I believe first directed the attention of His Excellency to the desirableness of endowing a Chair of Music in this University. But His Excellency's exertions in this matter did not cease with the collection of the necessary funds. He has cheerfully placed his advice at the disposal of the Council in order to help us to frame the curriculum for the degree and to select a Professor. We determined to frame the curriculum for the degree of music after the pattern of Cambridge, and therefore there is a certain appropriateness in the appointment of Mr. Ives, who is a Cambridge graduate, to the position of Professor in Music. The high names of Sir George Macfarren and Dr. Stainer, who acted with Sir Arthur Blyth as the committee of selection, are a sufficient guarantee of the qualifications of Mr. Ives for the Chair. The University of Adelaide is the first of the Australian Universities which has established a Chair of Music after the pattern of the venerable Universities of Europe, and I have no doubt the instruction given from its Chair will tend very much towards creating a high tone of musical taste and of musical culture in the colony. One of the pleasantest surprises I have ever had in my life happened a few days after the last yearly commemoration. My friend Sir Thomas Elder waited upon me during a midday adjournment of the Supreme Court, with an apologetic air, as if he were coming to ask instead of to grant a very great favour, and made to me the altogether unexpected but very welcome announcement that he intended to endow a School of Medicine in this University with the sum of £10,000. (Applause.) I should not do justice to my own feelings, and I am sure I should not do justice to yours, if I were not to assure Sir Thomas that we welcome him most heartily for the first time at one of our commemorations. (Applause.) With characteristic modesty Sir Thomas Elder hitherto has been content to stand apart and watch from a distance, as it were, the ever-extending results of his wise liberality. On this occasion, however, he has yielded so far to our wishes as to honour us with his presence. (Applause.) It is not necessary I should remind any friend of the University of Adelaide that without Sir Thomas Elder the University of Adelaide would never have had an existence. It was in consequence of the two gifts of £20,000 each from Sir Thomas Elder and Sir Walter Hughes that the University Act was passed and the charter granting our incorporation was given. The Chairs for the advancement of learning which this great endowment has provided will be a most imperishable monument to perpetuate the memory, the patriotism, and the munificence of the donors. With his last gift of £10,000, as with his previous gift of £20,000,

the amount was handed over to us by Sir Thomas Elder without any condition whatever. The University Council, in endeavouring to give effect to Sir Thomas Elder's wishes, determined, as we have always determined, that we must keep up a high standard for our degrees. We were met at the outset with the difficulty that the body for registering medical qualifications in the United Kingdom requires that every subject, or almost every subject, of a medical course shall be taught by a separate Professor or lecturer. And so we soon found that large as the amount was which had been placed at our disposal, and even with the aid of the Government subsidy, we could not provide for a complete medical curriculum. We therefore decided to confine ourselves for the present to the first two years' study for a medical degree. If we rest there I am sure you will all agree with me that a great deal has been accomplished, because the first two years of a student's career are the most perilous time at which he can be emancipated from parental control, and from the influences of home. But I will not believe that we have yet reached finality in this matter. I trust that the noble example of Sir Thomas Elder will prove contagious, and that before two years have expired we shall be able to make arrangements for the completion of a whole four years' course for graduation in medicine. We shall be ready—and I state this for the information of those young gentlemen and ladies who have passed the matriculation examination—we shall be ready to start the Medical School in March—that is, at the beginning of the next term. These are the arrangements we have made. We have amongst us a gentleman who is a native of South Australia and a member of our own staff. He has distinguished himself in the Universities and Medical Schools at home, and he possesses precisely the scientific skill and enthusiasm which is required for the post of Lecturer on Physiology. I refer to Dr. Stirling, and I am glad to be able to announce that he has accepted that position. (Applause.) Dr. Stirling has gone to England for the purpose of seeing the latest improvements made in the Medical Schools of Europe in the teaching of his particular study of physiology, and of being present and taking part in the selection in England of the first Elder Professor of Anatomy. (Applause.) The Lecturer in Physiology, the Professor of Anatomy, and the Lecturer hereafter to be appointed in Materia Medica, and the other professors who will teach chemistry and natural philosophy, complete our teaching staff for the first two years of the medical course. When I had last the honour of addressing you from this platform I stated that the greatest want the University had at that moment was a Chair of Chemistry. That need was undoubtedly increased by Sir Thomas Elder's munificent gift, inasmuch as chemistry is a necessary part of a medical as well as an ordinary science course. To-day I have received a telegram, which I very much regret, informing me that our friend Mr. Angas, who was the founder of the Angas Engineering Scholarship, is unable to be present with us on this occasion. At the time of our last annual

commemoration I knew that Mr. Angas was turning over in his mind in what manner he could best further assist us in the work in which we are engaged, and therefore I was more gratified than surprised when in April last I received a letter from Mr. Angas intimating his readiness to endow a Chair of Chemistry with the noble sum of £6,000. (Applause.) I look upon this endowment of Mr. Angas's as complementary to Sir Thomas Elder's endowment of a School of Medicine, because it has enabled us to give a completeness which we could not otherwise have given to our curriculum in medicine and to our science course. And I am glad to inform you, as I dare say you have already heard through the Press, that we have found in Australia an accomplished chemist and an experienced teacher of science. Dr. Rennie, like Dr. Stirling, is a native of Australia, he is a distinguished graduate of Sydney University, and his scientific acquirements are further authenticated by his being the possessor of the degree of Doctor of Science in the University of London. (Applause.) The number of students we have had during the year which has just ended had been about the same as last year. We have had during this year 99 non-graduating students, as against 114 last year, and we have had 49 graduating students, as against 46 last year. It continues to be a matter of regret to us that there is not a larger number of students graduating in arts and in science; but still, in a practical, hard-working community like this, where young men have to carve out their own careers in life, it is not, perhaps, wonderful that those kinds of knowledge which qualify for a profession attract more students than the subjects which appeal only to those who love learning for its own sake. If I might venture to take advantage of the presence of the Minister of Justice and Education to throw out a suggestion, it would be that he could assist us further—as he has already assisted us by undertaking to appoint the Professor of Chemistry Government analyst — by departmental regulations, which would encourage candidates for the teaching profession to study for a degree in science and arts. That would be beneficial to the recipients of the degrees themselves, and to the community at large. (Applause.) A great many of the friends of the University are of opinion that its usefulness would be very much increased if we could establish evening lectures for the instruction of those students who are unable to attend our ordinary lectures, but are still anxious to gain for themselves a University degree. This is a subject which my friend Mr. Fletcher, the late Vice-Chancellor, has made his own, and which has engaged the anxious attention of the Council during the year. The proposal has also received the approval of the Senate. In determining the question two points have to be considered—the probable number of students, and the ways and means. The supporters of this scheme in the Senate inform us—and whether they are right or not I do not know —that over thirty students are willing to take advantage of these evening lectures should they be established. Now, if that be true, I think we are bound to try to begin. I am sure that in a work of this kind we should have the hearty co-operation of the Professors. During the past

year Professor Tate, the Dean of the Professorial Board, has delivered a course of lectures on the "Physiography of Australia," which, I hope, will find their way into a handbook on the subject. Professor Lamb has delivered a course of lectures on "Acoustics," with special reference to the studies of persons intending to qualify themselves for a degree in Music. Professor Boulger has delivered two courses of lectures one in "Elementary French," and the other in "French Literature." Professor Kelly proposes to deliver, during the ensuing year, an extra course of lectures in elementary Latin for the benefit of those students who have neglected their education in that branch of study. (Applause.) But we may make up our minds to this, that the teaching in the ordinary lectures and in the evening classes, whatever assistance we may get from the Professors, could not be overtaken by the same staff. These evening lectures mean an increased expenditure. I am sorry to have to tell you that with our added responsibilities the finances of the University are in such a condition that we cannot enter on any further expenditure. We have had to write off a sum of £3,000 for arrears of rent of the University endowed lands during the last year. Therefore if these lectures are to be started we can only hope that some generous friend will imitate the admirable example of Sir Thomas Elder and Mr. Angas, or that the enthusiasm of the supporters of the movement will induce them to present to the Council a list of subscriptions sufficient in amount to cover the extra cost, after the precedent set by the supporters of the Chair of Music. I have now touched upon the main incidents which have occurred during the past year, and I have taken you frankly into our confidence with respect both to our requirements and our aspirations. There is one requirement I have not thought it necessary to bring under your notice, and that is a larger hall in which to conduct our examinations and to hold these commemorations—a hall that will be of sufficient magnitude not to give those who take part in the proceedings the pain of seeing a number of ladies unable to find seats. Following the precedent established last year, and which we intend to follow in the future, an address is to form part of our proceedings. That address Professor Lamb, as the senior Professor, has consented to give. I am sure you will permit me to tender on your behalf our hearty congratulations to Professor Lamb on his recently having been made the recipient of the highest distinction which Great Britain can bestow upon a scientific man in his election to be a Fellow of the Royal Society of London. (Applause.) I am sure it is highly satisfactory to every one of us that Professor Lamb's original investigations in his own department of science have commanded the approval of those who are best qualified to judge of its value. I am sure, also, this distinction gives Professor Lamb additional pleasure, because it reflects lustre not merely upon himself, but upon the University, to the service of which he has devoted his career. (Applause.)

PROFESSOR LAMB ON ELECTRO-MAGNETISM.

Professor LAMB then delivered his address as follows:—Mr. Chancellor and members of the University—I take it to be of

the spirit of the arrangement by which annually one of your Professors is to appear before you, that he should speak of the things of which he is least ignorant, and on which, therefore, he has the best chance of saying something not unworthy of your acceptance. It is, perhaps, unfortunate that the task of inaugurating this arrangement should have fallen on one whose business lies among things which, though they have a soul of beauty, are at first sight somewhat repellent. I can hardly venture to take as my theme any of the lofty speculations of modern mathematics. Not that these are really so harsh and crabbed as is often supposed, but that I distrust my powers of doing them justice. My poor pipe is not fitted for such a lay. On the other hand, I would not willingly descend to the arts by which too often a distorted and sensational picture of physical science is drawn with the object of gaining cheap applause. In choosing as my subject the "Progress of Electromagnetism" I have endeavoured to strike a middle course. Whilst on the one hand it has important practical bearings which every one can appreciate, on the other it leads irresistibly to speculations as profound as have ever exercised the mind of man. The history of that particular branch of electrical science which we call electromagnetism begins to all intents and purposes with the year 1820, when Hans Christian Oersted, Professor of Physics at Copenhagen, discovered that an electric current affected a magnetic needle in its neighbourhood. For instance, if we have a vertical wire in which an electric current is flowing downwards the north pole of a magnet would be urged round the wire in the direction of the hands of a watch—a south pole in the opposite direction. Since every magnet has both a north and a south pole, the main effect in this as in other cases is a tendency for the needle to set itself at right angles to the wire. From the accounts which have come to us of the circumstances of Oersted's discovery it would appear almost as if he had stumbled on it by accident, just as Malus is said to have discovered the polarization of light by reflection while casually looking through a piece of spar at the image of the sun in one of the windows of the Luxembourg Palace which was opposite his lodgings. But such accidents, it has been said, do not happen except to those who deserve them, or, we may add, if they do they happen in vain. Be that as it may, no discovery has formed the starting point of a more imposing chain of consequences, both practical and scientific. It was at once seized upon by men of science as affording the most convenient and delicate method we possess of detecting and measuring electric currents. The instrument based on this principle, the now common-place galvanometer, has rendered incalculable service to physical research, and through the labours of Schweigger, Nobili, Weber, Helmholtz, and Thomson (to mention only a few of the leading names) has reached such a degree of delicacy that we are able, as Helmholtz puts it, to detect without difficulty a current so feeble that it would take a century to decompose a milligramme of water. Of the immense practical applications which Oersted's discovery has had in the electric telegraph it is needless to speak. The earlier

signalling instruments were in fact only slight modifications of the galvanometer. Proceeding with the history of our subject, we are next brought into contact with a most attractive personality. Andrê-Marie Ampère, born at Lyons in 1775, possessed that combined simplicity and dignity of character which have often been illustrated in the persons of great mathematicians. There are few things in literature more charming in their way than the extracts from his journal and correspondence given to the world only a few years ago, in which is told the simple, almost idyllic, story of his courtship, his marriage, and his too brief wedded life. But we have here to deal with Ampère at a much later period of his career, when his mathematical reputation had been established, and had secured for him the position of Professor of Analysis at the Ecole Polytechnique. Ampère heard of Oersted's discovery on the 11th of September, 1820, and at once set to work to develop it. He saw that if, as Oersted had shown, an electric current could act on a magnet, it was natural to expect that the magnet would react on the wire conveying the current, and, further, that two wires along which currents were flowing would act on one another. These anticipations were verified in the most complete manner by experiment. Thus Ampère found that two parallel wires attract one another if the currents in them have the same direction, and repel if they are in opposite directions. The first instalment of Ampère's results was communicated to the French Academy within a week of the above-mentioned date, but the further study of these phenomena occupied him for years, until finally a complete mathematical theory of the phenomena was embodied in his classical "Theory of Electrodynamic Phenomena," published in 1826. The brilliancy of Ampère's discoveries, the thoroughness with which they were worked out, and the power with which they were expounded have commanded the emphatic admiration of the most distinguished of his followers in this field, and the beautiful typical experiments which form the corner-stones of his mathematical theory will always retain their place in every physical lecture-room. One celebrated result of his investigations which must not be passed over is the proof that the action of any magnet can be perfectly imitated by means of a proper arrangement of electric currents, and the consequent hypothesis that magnetism is after all an electrical phenomenon, the magnetism of an ordinary bar-magnet, for instance, being due to electric currents circulating in the ultimate molecules of the iron, and having their planes more or less perpendicular to the length of the bar. It is impossible in the present state of science either to prove or to disprove this fascinating hypothesis. In the meantime it has served as a most valuable guide to speculation, and it is hard to resist the conviction that it is, though possibly not the literal truth, yet a very close guess at the truth. The *immediate* practical applications of the mutual attractions and repulsions discovered by Ampère have not been in proportion to their philosophic importance. A beautiful measuring instrument, based on this principle, the dynamometer, has in the hands of Weber and others done great scientific service; but its greater complexity of construction, combined with its inferior sensitiveness, has forbidden any rivalry with the

manifold applications of the galvanometer. It is worth noting, however, that this very inferiority in point of delicacy has lately brought it into favour for the measurement of the powerful currents furnished by modern dynamo machines. More directly fruitful, in a practical point of view, was the discovery, flowing as a natural corollary from that of Oersted, and made in fact immediately afterwards by Arago, of the magnetization of iron by means of an electric current. The electro-magnet—*i.e.*, a bar of soft iron surrounded by a coil of wire conveying a current—has long been a familiar object in the technical applications of electricity, ranging in point of size from the comparatively minute form which we meet with in the electric bell, through endless varieties of telegraphic apparatus, to the colossal specimens furnished by the dynamo-electric machines of Edison. In pure science, too, the electro-magnet has been a powerful addition to the resources of the physicist; it was, for instance, the instrument of some of the most memorable achievements of Faraday. After the discoveries I have related it became merely a matter of practical skill to turn them to account in the solution of the fascinating problem which at once suggested itself, viz., the construction of engines which should be driven by electric currents. This was accomplished in principle by Ritchie in 1833, but though since then such electro-magnetic engines have been constructed in manifold forms they have till quite recently remained little more than philosophic toys. It appeared, indeed, that the electro-magnetic engine might greatly surpass the steam-engine in "efficiency," that it could give out, in fact, in the shape of useful work a much larger proportion of the energy supplied to it. But the cost of supplying this energy in the form of an electric current by the only method which was for a long time practically available, viz., by the chemical action of a voltaic battery, was enormous in comparison with that of an equivalent amount of energy furnished in the shape of coal to the furnace of the steam-boiler. Of the recent revival of interest in these machines I shall have occasion to speak presently. A vast extension[1] was given to our subject by Faraday in 1831 by his discovery of the induction of electric currents. He found that currents could be produced in a conductor by the influence of currents or magnets in the neighbourhood. For instance, if we have two wires parallel to one another, which we will call A and B; then if by any means a current be started in A there is a transient current in the opposite direction in B, which ceases directly the current in A has become steady. Conversely, if the current in A is stopped there is induced in B a transient current in the *same* direction. Analogous effects are produced by the motion of A relatively to B, and again by the motion of a magnet in the neighbourhood of a conductor. To appreciate the startling character of these discoveries we must remember that up to that time there was no known method of producing a current in a conducting circuit except by means of some action in the circuit itself, as for instance, by including in it a voltaic battery, or by passing through it a discharge of statical electricity. The fact that similar effects could be produced by the mere motion of a magnet in the neighbour-