Advertiser 15.12.24

COMMEMORATION DAY.

Programme of Proceedings.

Particulars have been received of the annual commemoration of the University of Adelaide, which will take place in the Elder Hall (Bermondsey Street) on Wednesday. The Chancellor of the University (Sir George Murray) will preside, and the Governor (Sir Tom Bridges) will also be present. After the Chancellor and other dignitaries, and candidates for degrees and diplomas, have taken their seats on the platform, His Excellency will be received by the Chancellor, who will then open the proceedings. An address will be delivered by Professor Kerr Grant on "Things unattempted."

Conferring of Degrees and Diplomas.

The Dean of the Faculty of Law (Professor Coleman Phipson) will present the following candidates for degrees in law—Master Wilfred Bedwell, Robert Richard Bonython, Lester Ashton Cheal, Cecil Andrew Cleland, John Inez Holmes, B.A., Cecil James G. Loper Kelly, Patrick Joseph Kelly, Peter Paul McKechnie, Bernard Ryan. The Dean of Medicine (Dr. H. Swift) will present the following candidates for degrees in medicine and surgery—Charles Mervyn Chalmers, Hugh Ernest Fowler (First and and Elmslie Scholar), Ian Alfred Hamilton, Ernest John Keith Harrison, John Harris, Gordon Maxwell Hunt, Benjamin George Jacobson, Allen Dunstan Lemmer, Raymond Jack Lind, Frederick Reginald Lethlithgow, Neil Morris Mackay, Henry Ernest Leslie Nicholls, William Edwin Pelling, Cecil Thomas Piper (Everard Scholar), Mary Ethel Hayter Reed, Harold Mitchell Reed, Arthur Douglas Reid, Eric John Stephens, Thomas Wilson Tonkin.

The Dean of the Faculty of Dentistry (Dr. Scott) will present the following candidates for degrees in dentistry—Degree of Doctor of Dental Surgery—Andrew O'Donnell, Harry Johnston, Gertrude Teresa Lee, Eleanor Evelyn Beatrice Wemyss. Bachelor of Attendant Dental Surgery—George McNeil Beattie, Alec Holloway Coombe, Edward John Flaherty, Alfred Clarke Hitchens, Doris Hooker, Ludwig Lilienthal Lessing, Gordon Thomas Jeffery Mitchell, Lyndall Erica Morris, Flora Elizabeth Piper, Maudie Ignatius Pyle, Beatrice Mary Seymour, Ernest Edward Walter Tyler, Kenneth Ross Flower, Clifford Horace Kendall Dunn, Flower, Clarence Wilfrid Griggs, William Andrew Maycock, Paul Samuel Rosefeld, Ross Lindsay Masters, Jun. Wilfred Peirce, Alfred Andrew Rose. Bachelor of Science (in course graduates)—James Arthur Prescott, M.Sc. (March).

The Dean of the Faculty of Applied Science (Mr. T. W. Reid) will present the following candidates for degrees in engineering and diplomas in applied science—Howard Lucas Barnard, Thomas Albert Parrott, Alexander Theodore Krause, John Francis Kearney, Alan Pickering Clarke McKechnie, Christopher George Morton, William Barton Nelson, Tom Preston, Arthur Raymond Shepley, Gordon Sweeney, Alexander Maitland Tyler, Raymond Rudolph van Senden, Francis Henry Humphris, Sydney Clifford Robertson, James Wearing Scott. Diplomas in Applied Science Only—Frederick William Symons.

The Chairman of the Board of Commercial Studies (Mr. K. Russell Scott) will present the following for the Diploma in Commerce—Arthur Norris Baller, Doris May Dobbin (Fisher Medallist), George Harry Halliday, Ivy Ida Craig, Cuthbert Hewett Davidson, Kenneth Lorrigan Gibbs, William George Holt, Dora May Bailey, Ernest Frederick William Hawkins, Clarence George Lewis, John Stephenson, Henry Birrell Elliott (Fisher Medallist).

The Dean of the Faculty of Arts will present the following—Diploma in Education—Annie Serena Bennett, B.A.; Frances Winifred Berry, B.A.; Henry Bennett, B.A.; Norman Arthur Ireland, B.A. Diploma in Economics and Political Science—Edgar Willis Pritchard, Robert Thomson.

Scholars and Prizemen for 1924.

Faculty of Arts—Roby Fletcher Prize (logic and psychology)—Albert Wilfred Pearson; John Howard; Clark Prize—Phyllis Evelyn Linde, Tilline Scholarship—[illegible]

[illegible]

Faculty of Law—[illegible]

[illegible]

Faculty of Medicine—[illegible]

[illegible]

Faculty of Dentistry—[illegible]

[illegible]

Faculty of Applied Science—[illegible]

[illegible]

Faculty of Commerce—[illegible]

[illegible]

THINGS UNATTEMPTED YET.

Possibilities of Human Achievement.

Address by Professor Kerr Grant.

In the Commemoration Address at the University on Wednesday, Professor Kerr Grant indulged in speculations regarding the possibilities of human achievement and adventure, both in the near and the more remote future, and amazed his audience by his prognostications regarding future sources of energies and their control and application.

Professor Kerr Grant (professor of physics) held the rapt attention of the audience when he delivered the annual commemoration address at the University on Wednesday. In order that his remarks might be audible to all those in the Elder Hall, the acoustic properties of which are not good, he had produced and arranged for the installation of a loudspeaker and sound projectors, which distributed his voice all over the hall. His subject was, "Things unattempted yet," and he dealt with possibilities of human achievement in the application of science in the future.

In the earlier portion of his address he traced the development of applied science from the earliest time to the present day, and stated that when he was requested to speak he had been asked, what would follow next. In attempting speculations is partial answer to those queries, he said he first wished to draw attention to the crucial distinction between development and discovery, under which heading all advances made in science might probably be included. Perhaps a comparison with the growth of a tree might serve to elucidate the distinction. The growth could be likened to the bursting forth of a new sprout from some latent bud and development to the subsequent growth of that sprout. In the very nature, he said, it was clear that discoveries were unpredictable, or, rather, predict as they might, the unpredictable would from time to time burst forth in startling unexpectedness. Such a discovery was Roentgen's first observation of the photographic action of compounds of uranium, Roentgen's observation of the fogging effect of a Crookes tube with a photographic plate, Curie's chance observation of the negative charge on the wire in his incandescent lamp, the germ of the thermionic valve which made wireless telephony possible. Of discoveries in this true sense, neither do nor any man could foretell more than that as the unexpected had happened before, so it would happen again. Of developments in discovery, we might go more, and much with confidence. Sir John Monash, in his presidential address to the Australian Association last August, outlined in a lucid and bold and with no impeachable certitude the future developments of the vast electric power scheme based on the brown coal fields of eastern Victoria. So in the near future would make this corner of Australia one of the world's most populous and productive centres of industry.

The Will to Achieve.

In recent years the immense importance of the work of extending, deepening, and simplifying knowledge of the physical world by means of research, both theoretical and experimental, had been emphasised with such force and so often, that research had become a name for the governing bodies of universities to conjure with. In stressing the value of every increase to their present knowledge, scientists might not lose sight of the fact that knowledge by itself was barren of result. Equally requisite for achievement were the aspirations to achieve, enterprise to undertake, persistence in carrying out. Perhaps not the desire to lay greater emphasis upon research was due to an implicit recognition of the greater dangers to be feared from the activity of the scientist than from the ignorance than from the inactivity of the passive pedant. "Nothing is more terrible to contemplate," said the German sage, "than ignorance in action." It would not be profitable to observe that fields of science their present knowledge was adequate to the successful performance of much that was left undone. Only the will to do was essential motive-power to action, was lacking. If, he said, after the assent of competent medical opinion when he said that, given the public will to do it, many diseases could in a few years be wiped out, or reduced to negligible proportions, provided the people of the country were sufficiently desirous of that end to submit to the discipline—not necessarily rigorous—which expert opinion deemed necessary, and pay the unavoidable bill of expenses which might, perhaps, amount to half as much as was spent on the racecourse annually. But such a consummation will not be expected to arise until public opinion had a greater leaven of scientific knowledge than it at present possessed.

In giving some concrete illustrations of projects in human achievement, he said adventurous type, made possible by modern science as modern technology, he divided his illustrations into two classes. In the first the projects considered lay within the realm of immediate possibility, the one requisite to set them in operation being the will of the people to do so. In the second were comprised projects of a more ambitious type, which hypothesised for their accomplishment a discovery of immense importance in the realm of atomic physics, the imminence of which was at least presented by modern research in that field.

The Earth's Interior.

As his first example he took that bold project of the famous inventor of the steam turbine, Sir Charles Parsons—the sinking of an exploring shift into the earth to a depth far exceeding that of the deepest existing mine or bore. This proposal was first made by Sir Charles at the Cambridge meeting of the British Association in 1904, and revived by him twenty years later before the last meeting of the same body held in Toronto. It had recently received the influential endorsement of Mr. E. J. Riley, chairman of directors of one of the largest electrical manufacturing companies in the world, the General Electric Company of U.S.A. Sir Charles put a provisional limit of twelve miles to the depth of his shaft, which was less in proportion to the earth's diameter than is the thickness of the shell of an egg to the diameter of the egg. And it did appear somewhat doubtful whether a shaft twelve miles deep would afford more than a confirmation of conclusions already based with tolerable certainty upon observation made on existing mine shafts and bores, of which there were many exceeding a mile in depth, and upon information as to the excavation and nature of geological strata revealed in the exposures of these by denudation in mountain chains.

Sir Charles Parsons, in his original paper, discussed in considerable detail the nature of the technical difficulties of such a stupendous undertaking, and showed how such could be met by suitable plant, well plant and properly organised scheme of operations. He allowed ten years for the attainment of a depth of two miles and 25 years for 12 miles. His estimate of the cost in 1904 was £5,000,000, which in his Toronto address he had increased to a figure of £20,000,000, the increase being made, chiefly on account of the depreciated value of money. He justified this vast expenditure of time and money on the ground that it would lead to new and probably extremely valuable extensions of knowledge of the condition of matter in the earth's interior, and possibly of possible fresh sources of mineral deposits at economic value at great depth.

In extension and amplification of these considerations the lecturer said he would add two others. In the first place, it was unquestionable that the earth's interior was extremely hot. Where the whole interior of the earth might be looked upon as a vast reservoir of heat. If it were possible to tap this reservoir and bring the heat to the surface, they would have a source of motive-power to supplement the rapidly diminishing supplies of the coal and of hydro-electric, which they were now drawing so lavishly and so improvidently. Here this was a matter of vital interest to the future of civilisation, he proposed that bold and very speculative hypothesis which, as a result, should be highly neglected. Secondly, though it was not probable that there would be found as a residue of the first heat of the original molten mass, it was possible that a certain fraction of it might be produced by disintegration of unstable atoms, before presents of the radioactive type.

It might be suggested that the immense pressure of the superincumbent strata would tend to inhibit the process of disintegration. For although, under pressure hitherto attainable in the laboratory, no change could be produced in the activity of radium, it could be no means be safely predicted that this would continue to be the case under pressure of one hundred, or even one thousand times greater. Any proof that the stability of atoms was thus affected by pressure would carry with it important consequences, both for scientific theory and for practice. It must be admitted, however, that for a satisfactory test of this question it would be necessary that the pressure should be applied to depths far greater than that contemplated by Sir Charles Parsons. And though his project as it stood might now be considered practicable in the next two or two generations, they might be sure that those that followed would not rest content with its accomplishment.

Mount Everest Observatory.

During the last five years three separate expeditions organised by the Royal Geographical Society had sought to conquer the highest mountain of the world, Everest. Nevertheless, the mountain remained unconquered. Further attempts would undoubtedly follow. But if Everest was finally attained what, apart from the incidental increase to knowledge which came with every difficulty faced and overcome, would be the gain? Sir Charles Parsons had put forward as an extension of that scheme of conquest, worthy of consideration for the far greater results which would flow from its accomplishment, the establishment of a permanent observatory on the summit of Mount Everest. This project was entirely practicable even with their present resources, he said, if the difficulties were of a purely mechanical nature of access and assent. These affected not merely the actual attainment of the summit, but also the maintenance of permanent communication between the summit and the nearest centre of civilised population, the town of Darjeeling. In the second place the high degree of rarefaction of the air due to the great altitude would be very grave difficulty in obtaining adequate oxygen for the purposes of respiration. This oxygen-starvation produced a condition of extreme nervous fatigue, which would make solar and even mental exertion almost impossible. Given adequate financial support, which would be rendered in comparison with that of the Everest expeditions, the project of Sir Charles Parsons, dealt with above, these difficulties were not insuperable. It was obvious that the observatory and dwelling would be of steel, with asbestos fibre, and materials were available, transported in relatively small sections to the summit, and there assembled. The observatory and living quarters would be constructed in such a manner that the air pressure being maintained at a pressure such that the observers within could work with full efficiency. Such a project would probably correspond to a gratitude of the people of the world. It would be in no wise advantageous to endeavor to maintain it at sea-level value. The construction of such a building would offer little greater difficulty than the construction of the caissons for submarine work. An essential provision was a power supply for the purpose of working the air-compressors, heating, lighting, cooking, and perhaps best be obtained by generating electricity at the nearest waterfall; but the supply should be duplicated by wind motors, with stores of petrol as an emergency supply. While the commercial value of such an observatory there could hardly be a question. It would be unique among the observatories of the world. For the more obvious end of astronomical observation, it would never be Mount Wilson Observatory in California, or the Harvard Observatory at Arequipa in Peru, would perhaps not be sufficiently great to warrant the very much greater cost of erection and maintenance. But for the purpose of obtaining permanent meteorological records at high altitudes it would have a unique and immeasurable advantage over any observatory yet in existence, and their present knowledge of the upper air is in many respects so incomplete, its phenomena, aerodynamical, chemical, electrical, thermal, so various and of such dean interest that it would be a great loss that the scientific viewpoint a powerful reason for the prosecution of any scheme which would give aid in their solution.

Communication with the Moon.

They could not entertain the thought that the scientist, the explorers and adventurers of the future, the successors of Columbus, of da Gama, of Magellan, of Tasman, of Cook, having exhausted the geographical mysteries of the earth, should continue to gaze longingly at night after night at another planet as closely resembling our earth—if not indeed its very child—and in such immediate proximity to its without any means of intercourse. Admitting that a feasible method of inter-lunar transport offered difficulties of a somewhat formidable character, in the light of the present scientific and technical knowledge, it must again be insisted that there was no reason for believing that such difficulties were of a nature insurmountable in the light of that knowledge. Already, in fact, Professor Goddard, of Clark University, Massachusetts, U.S.A., had put forward in some detail a proposal for propelling a rocket through space beyond the earth's atmosphere. By experiment and by calculation he had satisfied himself of the feasibility of the project, the consummation of which he proposed to limit in the first instance to the exploration of the higher reaches of the earth's atmosphere, using a rocket carrying self-recording instruments. He regarded it, however, as a practical possibility to launch a rocket, driven forward by successive explosions of nitro-glycerine, from a cannon, the rocket carrying stored hydrogen and oxygen in liquid form, which would pass through the earth's atmosphere and, rightly aimed, traverse the inter-lunar distance and strike the surface of the moon, signalling its impact to observers on the earth by a flash of light.

While endorsing Professor Goddard's view of the feasibility of that method of propulsion they could still preserve an open mind in regard to the possibility of finding other and better methods of propulsion in various. In particular, the fact that reaction was possible between radiation and matter, no less than between matter and matter, made it not at all incredible that some form of "etherplane," propelled, like the tail of a comet, by light pressure from its own body, might be the means for a form of interplanetary locomotive. But the success of such a method of transit postulated the possession of supplies of energy of far greater concentration than those at present available in coal, oil, or any other form of chemical reagent. Was there prospect of such sources being discovered and made amenable to control, either in the near or in the more remote future?

Future Sources of Energy.

It was by the use of tools, in the widest sense of the word, and by the control of energy, other than that supplied by the muscles of man and his own body, that man had raised himself above the level of other animals, more his equal in the scale of being. The extent to which a nation utilised energy was indeed, perhaps, the truest test of its place in the scale of civilisation. Western Europe, relative to its size, was based upon the utilisation of solar energy stored in past ages in coal and oil. But all such natural sources of power would inevitably be exhausted. It was the hope of the scientist that it would be possible to find a key to unlock the stores of energy contained within the atoms of matter. The energy of combination, which was the source of power in chemical reagents, was due to forces drawing together atoms of different kinds, such as the atoms of oxygen and of carbon in coal and oil. The effective energy of combustion was more than the recuperation of the grey matter of the brain were affected by the conversion of the factor. In the atoms of radium, for example, the energy of the vibrations of energy was continuously and spontaneously generated. Such sub-atomic energy was, in the present state of knowledge, not available in the earth's crust, so that the only form of obtaining them in concentrated form was an extremely high initial cost on the part product.

Atomic Energy.

There were two ways in which intra-atomic energy might become of service as a motive agent. The first was by adopting a method of utilising the disintegration of atoms in much greater concentration than was possible by any method which had been tried so far. The most most widely used of present methods was that employed in the electric storage battery, as used to propel lorries for operation in the mine and in the city, as motive-power for starting the engine, and for lighting and similar purposes the battery had great industrial value. But the great disadvantage was that the energy of combustion which would permit of the energy being carried at the month of a motor-car or energy-unit was not available. The conversion of energy into electricity, its storage, expense of transport, and its comparative safety, in parts of the earth deficient in natural supplies of energy-units, to the place where it was required with the present, of efficiency of conversion, a source of electrical or mechanical power. Perhaps such agent was at present known. If it were discovered, it would be used, not by electric transformers, converting, as which occurred in great abundance into a metal-table form of higher energy content and of greater portability. If it had been effected—what would be more better, of converting any species of atom into a form and radioactive energy, yielding a substance of lower energy content? In nature, they might hope perhaps in this way the ideal energy units which they sought. During the present year two such transmutations had been effected by two men of science, Miethe, of Charlottenburg, in Germany, and Nagaoka, in Japan, they had succeeded in effecting just such an atomic transmutation, the case of mercury atoms, which by bombardment with electrons in vacuo, were changed and been converted into a form of gold, which was, of course, the transmutation which the ancient alchemists had sought to effect.

Turning Hydrogen into Helium.

The second and far more interesting alternative in regard to the utilisation of atomic energy was best illustrated by taking a specific instance, the transmutation of hydrogen into helium. The two elements lowest in the atomic table, the hydrogen atom had the simplest structure of all kinds of atoms, that of a single positive charge of electricity, the helium nucleus was almost exactly twice as much in mass to four hydrogen atoms, and there was general agreement that constituted of a light-packed system of negative charge of electricity, equal in amount to the amount of that energy. The result was that if a stream of hydrogen ions, with an appropriate addition of negative electrons, could be converted into helium, the amount of energy obtained would be equal to that which would be liberated by the combustion of 200 tons of coal. Thirty units of hydrogen would give sufficient energy to propel a 20,000-ton steamer from Sydney to England. The supply of hydrogen was not a problem, they could get it from the water in the sea, was for all practical purposes unlimited. They thus proved to be in the same position as regard with regard to the utilisation of the atom as they were in regard to the atom of radium, who, for want of a match, starved to death above a bed of coal." But the consequences to mankind, vast as they might be, of the discovery of the art of using and controlling such energy, were so unprepared for the results that would inevitably flow from a discovery of the means liberating the potential atomic energy contained in the atoms of matter, was an energetic transmutation of the mind.

A remarkably vivid picture of the consequences to mankind of such a second industrial revolution had been outlined by the author of the romance, Mr. H. G. Wells, in his romance, "The World Set Free." That such a revolution in the economic basis of industry and wealth must bring in its train the social and political revolution, he had no doubt, the economic, and political system which Mr. Wells described was perfectly clear. Were not the disorders of modern times due largely to the fact that many institutions, many beliefs, many institutions of feudal, or even of pre-feudal age, still survived in a trade, even if at times they conflict, disharmony with scientific views, the nature of man and his environment, with the present highly advanced state of industry. And if the substitution and scientific control of the natural power of coal and oil and water for the muscular energy of man brought this inevitable measure of disorder and dislocation in its train, it could not be but that the far greater transformation in social and industrial activities which would be wrought by the change in methods of transport, of manufacture, and of agriculture, resulting from the supersession of coal and oil power by an agency of energy merely increased potency, of which, it could be followed by a much greater and more serious dislocation of the whole fabric of civilised life.

As a final illustration of the kind which the possibility of atomic energy would enable us to realise, he took the topic of perennial and universal interest, namely, the weather. Man was at the high mercy of the elements. He was not that something should be done about it. The artificial power which they should day was so immeasurably greater than that which they had yesterday, they could, if they wished, make it rain, in tropic heat, or snow, in the mere suggestion of rain, even the slightest attempt at regulation, or control, would be regarded as madness. Those propositions perhaps, they might signal rain-makers. Yet it was only by tempering the torrid heat of the tropics that they could hope to make them habitable. It was perhaps not quite fanciful to Fuji many a berg was blown in the Pacific seen and made its appearance in the waters of the Southern Sea within a few thousand miles of Adelaide, while the icy swelltered in the hottest Indian Ocean, the result would be that a few million tons of ice in Mount Gambier would produce in the thermometer in Northbridge was quite appreciable. There was energy of a millionfold greater magnitude at their disposition the one would be very differing. It would be possible to add heat, or to extract heat, from the air, ocean, and the earth in quantities comparable with that supplied by the sun. The production of 700 h.p. for one day would be equivalent to the consumption of a pound of hydrogen-fuel, and, if the consumption of a thousand tons daily would permit of forty thousand square miles of country being fooled as effectively as by the present 40 days of rain. Obviously the pure regions would no longer be forced to human occupancy, with a very considerable measure of control, they could make the world habitable. Air to this the construction of artificial and and rivers, possibly mountain ranges and they could see that the climate of the world, and the earth, the control of the climate, would come within the scope of human power. But whether or not they would regard as in the sphere of human control the atomic energy to the way suggested above, all, he believed, would agree that it was this realm of atomic physics that they had to look for the next great field of discovery, and the most valuable exploration of physical science in the near future. The first fruits of research in this direction, the discovery of the X-rays, both, particularly the greatly improved form as improved by Dr. Coolidge of the research laboratory of the General Electric Company of Schenectady, U.S.A., and thermionic valve now were in millions for the purpose of radio-telephony, and countless other many other uses as a physical instrument.

In concluding his remarks the professor said as a hesitant and inexperienced guide he could only point to the direction of the way into that unknown country which lay beyond the present boundary of human achievement, and to point out one or two of the uncertain paths which it should explore if it re-resolved, might scale, some such he had selected as were discernible from the path, a physical, or chemical, or biological, or medical, or psychological, or even the sociological elements which showed themselves to the traveller on that path, and many more to those who, following the path, might be tempted to turn into the wilderness by workers in other spheres. Other paths doubtless lay unperceived, in the direction of the chemist, the biologist, explorer of the hidden track. Others, they could not doubt, lay beyond their present horizon. It was well that they should be ever on the alert for the discoveries of exploration. But in doing so they must not forget that the success of an expedition was not due merely to the leadership of the leader, but also to the men who supplied the equipment, in the workers workshop or the experimental laboratory, or behind the lecture, the laboratory, the workshop, the instruments, were designed, in the study, where the pioneer sitter and the pioneer of the practical applications of science were hewed and hewn