OPENING OF THE 1907 SESSION.

ABSTRACT OF PROCEEDINGS APRIL 29th, 1907.

INVENTIONS AND DISCOVERIES FOR THE YEAR.

The opening meeting for session 1907 of the Royal Society of Tasmania was held on April 29th. His Excellency the Governor, Sir Gerald Strickland, president of the society, occupied the chair, and was accompanied by the Lady Edeline Strickland, and attended by Mr. George Browne, I.S.O.

Apologies were read from the Mayor, Colonel Legge, and Mr. Bernard Shaw; also from the secretary (Mr. Alex. Morton), who, to the regret of everybody, is still laid up with illness.

Mr. R. M. Johnston, the acting secretary, feelingly alluded to Mr. Morton's absence. This was the first occasion, he said, on which Mr. Morton had been absent at the opening evening meeting of the session for twenty-four years. Not only this society, but kindred societies and institutions owed a great deal to Mr. Morton's great energy, skill, and noble self-sacrifice. (Applause.) He trusted their esteemed secretary would soon be restored to health to resume his noble work of the past 24 years for this and other institutions in the community. (Applause.)

The President's Speech.

The President, who was cordially received, said: —

Mr. Vice-President, Ladies, and Gentlemen,—

It is usual to open the annual session of the Royal Society of Tasmania by reviewing topics of scientific interest, which have deserved attention in the previous twelve months, and to inquire how far new discoveries in mechanics, engineering, and the arts, may have a special bearing on the future progress of this State.

At present the economic conditions of Tasmania are decidedly prosperous, not only on account of good agricultural returns from wool and apples, but largely on account of the continued high prices of metals. It has been suggested that the high price for all other metals necessarily involves a corresponding fall in the value of gold. This rudimentary proposition requires qualification; for example, in a country where all the currency is paper money, the economic law would not hold good.

Interest-bearing money has been current within recent history, and although such issues are theoretically reprehensible, there is evidence that a system approaching closely to interest-bearing paper money is looming large in our own times, under the guise of short-dated Treasury Bills, and of short-dated notes of railways or other commercial undertakings with current and established credit. The London County Council has indulged in this form of finance to the extent of some four or five million sterling, and paid interest as high as six per cent.

It is reported that already, for this year, in the United States, 165,750,000 dollars worth of short term notes have been placed with the public at rates varying from 4½ to 6½ per cent. The spread of this system of finance—and it is likely to last—accounts, probably, for the inflation of all prices, more than any superabundance of the stock of gold.

Moreover, operations in short dated paper on a large scale tend to show that titles or credit are taking the place of gold, to some extent, as the medium of exchange. These short dated notes are, in fact, for practical purposes almost equivalent to cash in the settlement of bank balances involving large transactions. They are indulged in because gold is scarce, and thereby the demand for gold, and for other metals, becomes more eager, and steadier; from this point of view the new development of finance enhances the future prospects of Tasmania's mining all round.

The great increase in the value of iron, and of iron ores, is also of good promise to this community. This rise has, possibly, come to stay, and we should lose no time in opening up our rich deposits of iron.

In the year under review, there has been great practical advance in continuous processes for the manufacture of iron and steel, and for the application of electricity to this object. An important factor in this general rise in prices of metals is the great prosperity which the leading civilised nations are enjoying in a period of profound peace; as an example of the connection between general prosperity, and the demand for metals,

would mention that, in America alone, 53,000,000lb. of copper is the estimated requisition for telephone extension by the Bell Telephone Company alone. For three office buildings in New York 2,450,000lb. of copper are required this year. Similar causes operate to keep up the value of lead, zinc, tin, and other metals. The very vigorous advance of the Japanese adds to the demand for metals. China is also really rubbing her eyes, and is almost awake. Africa is being civilised very rapidly. South America is more and more progressive, and is moving towards a general adoption of metallic currency, in place of a bank-note circulation. Under these circumstances the prices of metals are likely to continue on the upward grade, especially if wages do not alter appreciably.

Tasmania has not got an agricultural college, but we enjoy great indirect advantages from the training given to Tasmanians at the Hawkesbury College, in New South Wales, and in other similar institutions on the mainland; the benefits conferred by such institutions, which are most scientifically and practically managed, cannot be overrated. The Hawkesbury College has already been recognised as deserving of imitation by Japan and South Africa, and simliar colleges are fast growing up all over the world. King Victor Emanuel has given a private estate, worth £12,000 a year, for this work in Italy. Not only is accurate knowledge thus disseminated, but useful plants are discovered and improved, and, what is more to the point, these discoveries are ungrudgingly disseminated and exchanged.

The greatest recent scientific novelty for the benefit of agriculture is the successful extraction from the air of nitrogen and nitric acid, at prices which compete, commercially, with the nitrates imported from Chili, as a basis of artificial fertilisers. In this connection we may remember that Tasmania offers promising sources of water-power for the extraction of these nitrates by electricity.

It has often been a matter of dispute whether birds do more harm than good, from the agricultural point of view; to solve this problem, and distinguish the useful from the pernicious birds, systematic observations have been made of the contents of the stomachs of various kinds of birds. It has thus been ascertained which species live on fruit and grain, and which birds live on insect pests, at different seasons, in America. In order that such observations should be reliable, they should be repeated in Tasmania, for the protection of the friends of the orchardists, and to indicate winged pilferers that deserve extermination.

The dimensions of the great transatlantic steamers of the Cunard Company were brought to your notice last year; these great vessels are to enter on regular work this season, and there is reason to believe the guaranteed speed will be largely exceeded. These gigantic steamers interest Tasmania, inasmuch as they hasten the day when large turbine vessels will be coming south of the Line, and when their owners will realise that Hobart is the most suitable deep-water harbour to be their headquarters, as a centre of distribution.

Mr. Parsons has already proposed to follow up his success with a turbine vessel, for war purposes, of 80,000 horse-power, to achieve 44 knots on a displacement of 2,800 tons. A German company has given an order to a Belfast firm to build a steamer still larger than the great Cunarders.

The year under review has been remarkable for wonderful progress with internal combustion engines operated by oil or by gas made in producers attached to the engines. The small manufacturer and the agriculturist finds these handy prime motors to be of great assistance in starting new industries. New factories, making gas and oil engines have been springing up all over Great Britain; nevertheless, they have been overcrowded with orders. Traction engines have lately been built, carrying enough oil and cooling water for 24 hours' work. Portable gas producer plants, with engines on the same frame, are making headway, and traction engines on this principle are in contemplation.

The thermal efficiency of a recent gas engine is reported to have reached 42 per cent., which contrasts most favourably with the 10 per cent. efficiency of the steam engine.

A marine engine of 3,500 horse-power, to be worked by producer gas, is under consideration, and a battleship has been designed to be propelled by gas engines, so as to dispense with stokers, funnels, and smoke. High authorities have expressed the opinion that gas-driven turbines were unworkable on account of the destructively high temperature of operation; but M. Armengand and M. Lemale, in France, and Dr. Stolze, in Germany, have advanced the problem to a practical stage. There is now near Paris a 500 horse-power gas-driven turbine running, which promises developments likely to be most welcome in the waters of the Derwent and the Huon, where a supply of anthracite is being opened out, and where gentlemen are eager to run their own yachts, and where everything that simplifies transit on the water gives added life to trade, and greater resources to settlers. The gas turbine would reduce coal consumption by one-half at least.

Mechanical flight has been publicly achieved in Paris by M. Santos Dumont and by M. Fillippe. But the honour of being the first to solve this classical problem of mechanics belongs to the Wright brothers, of Drayton, in the United States of America. These brothers followed up diligently for years the gliding experiments of Lilenthal, which consisted in maintaining a balance soaring down a gentle declivity on a double-inclined plane. The Wright brothers thus acquired the art of controlling their equilibrium on a machine heavier than air, and, having thus diminished the personal danger of the experiment, they applied a motor to their aeroplane, and made six recorded flights, ranging from 11 to 25 miles. They are mechanics by profession, and, desiring to obtain a well-deserved pecuniary reward for their labours, they ceased experiments as soon as they had solved the steering problem, so as to evade the photographer and others who might interfere with their obtaining patents, or keeping their secrets.

The American Government appears to have stepped in, and prevented any offer of the invention to some foreign power, so as to retain the services of the Wright brothers, and their future inventions for national purposes. The Wright brothers have since constructed a lighter and more powerful motor, and it is hoped that they will compete for some of the prizes recently offered for the navigation of the air. The total of these prizes now aggregates between £60,000 and £70,000.

M. Santos Dumont only flew 680ft. at 22 miles an hour, but he has just completed a new machine with a 100 horse-power engine, and, if he knows how to keep his balance as well as the Wright brothers, he appears to have many great prizes within his grasp, as it is doubtful whether the American Government will allow the Wright brothers to compete.

The latest victory over the air, according to Reuter's Paris correspondent, is operated by diminishing the pressure over the curved surfaces of an aeroplane, using rotating wings above it, so that considerable weights are supported in the air with little effort. There is a feature in this development which is specially interesting to Tasmanians. Many months before this announcement appeared, Professor McAulay, of our University, in a scientific discussion on the problem of flight, expressed an opinion that the solution would be found precisely in the way in which M. Fillipe has made progress. This is not the first time that genius has worked independently, on the same lines, in different parts of the world.

But, the question suggests itself, How do flying machines affect the material progress of Tasmania? It is anticipated that these machines, in the near future, will not cost more than a first-class motor-car; they will, therefore, make it easy for the prospector for minerals, and for the surveyor looking after the interests of closer settlement, to begin his work with a survey from aloft, instead of cutting his way through dense bush; and when he has discovered something good, he will not find it so difficult to keep in contact with civilisation.

Wireless telegraphy concerns Tasmania, because we hope to see this means of communication become cheap, simple, and efficient, so that it may be extended to the outlying islands of this State without delay. Several new systems have been lately developed, and the difficulty of interference has practically been conquered.

A case is reported from Paris of a youth and a maiden using an extemporised private wireless installation for amorous correspondence, unknown to their parents, which, in France, was looked upon as more awful than it would have appeared in an Anglo-Saxon community. In Germany wireless telephony has been successfully accomplished at a distance of 20 miles. This fact is, however, of little, if any, practical utility. Photographs have also been transmitted or reproduced as line drawings by electricity.

Wireless telegraphy has been adopted in Brazil to maintain communication across tracts of bush country where the upkeep of telegraph lines would be expensive. A company in America has started wireless communication with Scotland. Its first high iron support for the aerial wire has been blown down, but the promoters have not lost heart, and are re-erecting it.

The development of motor traffic may be illustrated by an order of four thousand cabs to run in the streets of London. These will be provided with "taximeters," which will indicate at a glance the distance and the fare as they progress. The fare is now fixed at 8d. a mile.

In America motors have been applied for logging, a precedent which might, in some situations, be worthy of attention in Tasmania. The use of alcohol for driving motors and for other industrial purposes is now well established in America and in Germany. In the latter country denaturalised alcohol for such purposes is sold at 8d. a gallon.

In the construction of lighthouses, a novelty comes from America, where a lighthouse has been built on a massive iron foundation, which was towed to the spot, to be sunk there and filled with concrete. The method might be applicable to some localities on our coasts where breakwaters are required.

The demands on the Niagara Falls for electric power have been increasing, and have developed a curious problem with regard to the current transported across

the Customs border, between the United States and Canada, a strong agitation having arisen to charge duty on the current for the protection of local industry. Power has been carried all the way from Niagara to Toronto. It is proposed to carry power from the Zambesi River, some 700 miles to the gold mines of Johannesburg. We should inquire why Tasmania does not develop her water-power?

The earthquakes in San Francisco and Jamaica have given prominence to the advantages of "ferro-concrete," or structures of light iron framing, carefully proportioned to resist tensile strains, embedded in well-made and properly-seasoned concrete, so as to withstand compression strains. This combination, if properly designed, is both fireproof and earthquake-proof, and, by reason of its fire-resisting properties, it is receiving attention all over the world.

A great bridge, 2,800ft. in length, has been built over the St. Lawrence, at Quebec, in Canada, with a central span of 1,800. This is the greatest span yet attempted. A generation ago few would have dreamed that it would ever be wanted. It would about represent a connection over the Derwent from Queen's Battery to Montagu Point.

In no part of the world are the ocean waves so long as in Australian seas on account of the large unbroken expanse of deep ocean facing our shores. It is, therefore, interesting to record some accurate measurements that have been made of ocean waves by M. Bertin. The longest wave measured was 2,500ft. from crest to crest, and its period 23 seconds. The depth of this wave was estimated at 50ft. Waves longer than this may be met in the southern seas, but they are rare, and the common span of a long wave is about 500ft., and the period 10 seconds. When a wave coming from deep water strikes an elevation in the sea bottom its character is quite altered, and green seas are known to have risen to the height of 100ft.

A great engineering work has just been completed by English contractors in Mexico — a railway with harbours at either end across the Isthmus of Tehuantepec. This line is about 190 miles long, from the Pacific to the Caribbean Sea. It was projected when the cutting of the Panama Canal seemed abandoned, and it has been completed, with the object of direct competition, by low freights, against the Panama route. The use of the most modern appliances for transhipment has been adopted at the terminal harbours. This enterprise is of interest to Tasmania, because it opens the wealthy gulf ports of the United States to the Tasmanian apple trade, and it facilitates carriage to the whole Atlantic seaboard, pending completion of the Panama Canal.

The work undertaken by the United States on the Isthmus of Panama has been under the personal care of President Roosevelt. The difficulties and disappointments already encountered would have discouraged almost any other living man, but now the work is really progressing, and the engineers working on the Isthmus feel confident that success is within sight. The plan finally adopted is for a canal with locks at a level of 85ft. above the sea, and at a cost of £30,000,000 sterling. It is estimated that the work will require eight years. A canal at sea level would possibly have required twice the time and double the money. The completion of this canal is most important for the supremacy of the Anglo-Saxon race in the Pacific.

With regard to railway construction, the popularity of the motor coach appears established. In Germany, it has suggested the convenience of stopping along the railway at customers' residences along the line, as a tram would do. This system, called the "Halte system," has much to recommend it in new countries in course of development. The construction of railway carriages for express service, made entirely of steel, has proved to be a great protection against the results of railway accidents, these vehicles being proof against fire, and almost proof against any break up.

In naval construction, the British Dreadnought has marked a new epoch, and placed all former specimens of naval architecture almost out of date. She carries ten 12in. guns, and can steam at least 21 knots. A cruiser has just been launched, of the "Invincible" class, to steam 25 knots, and carry eight 12in. guns; she will probably steam 26 knots, or more.

Against such craft, torpedo boats and destroyers will be of little use. A torpedo boat has, even at night, to overhaul such a fast cruiser before launching a torpedo, and, at 2,000 yards, an 18in. Whitehead (with all the gyroscopes in the world) is only running at 22 knots. The chance of a stern chase is, therefore, very small indeed.

The new American 21in. torpedoes, with turbine machinery, can do 36 knots at 1,200 yards; but even at that speed the fast cruiser would only be vulnerable if approached at close range. It, therefore, appears that, except for attacks on battle fleets at anchor, or against ironclads crippled after an engagement the submarine, or submersible boat, has already taken the place of the destroyer for up-to-date coast defence.

The gun trials of the Dreadnought are reported to have shown that, in her design, the extreme offensive power obtainable with 12-inch guns has been reached, so that the new English battleships are to

carry 13½-inch guns, throwing a shell of 1,250lb., and weighing 85 tons.

When we remember that the Dreadnought was only commissioned some six months ago, and that it is only a year and a half since the commencement of her building, we may realise how soon a warship becomes superseded, and how easy it is for money to be wasted on naval construction.

At the German military manœuvres there was a great display before the Emperor of armoured motors carrying field guns. They negotiated ascents of one in seven and a half, and proved able to go over any but the most difficult country.

In conclusion, I venture to congratulate Tasmania on the interest which the press of this State, both North and South, has been showing in scientific subjects. The numerous articles and paragraphs which are constantly and periodically appearing are selected and reproduced with great judgment, and in a manner to command general interest with students of nature and of mechanical invention.

The Royal Society may justly ascribe to itself some credit for having made attention to scientific subjects both popular and practical in this island. I trust this career of usefulness may long continue, and that in this noble and elevating work the most valuable and devoted services of our secretary, Mr. Morton, may long be spared, and that his recovery may be rapid and complete. (Warm applause.)

Mr. G. E. Moore, M.H.A., in the discussion which was invited, said that the reason why Tasmania did not use her water-power was that she had no waterfalls, though she had sufficiently large bodies of water but, in places, waterfalls might be constructed. The discovery of making nitrogen from the air might be developed here with cheap water power. Ten thousand horse-power might be developed in one part of Tasmania that he knew of.

Mr. Clemes said he was intensely interested in the speech. The production of nitrogen from the air referred to in the address was an extremely interesting subject, and was calculated to effect wonders in connection with the cultivation of the land. There was sufficient material in the address for hours of discussion. (Applause.)

Senator Mulcahy refrred to what the President had said respecting iron production, and mentioned that in Tasmania, on the Blythe River, there was what experts pronounced to be one of the finest iron ore propositions in the world, and no doubt, sooner or later, it would lead to extensive iron and steel manufacture in Tasmania. As to water power, there were in Tasmania large bodies of water at high altitudes, which, according to reports of hydraulic engineers, might easily be tapped, namely, in the Lake districts. He believed that when the value of cheap water power was better understood in Tasmania, the State would become one of the best manufacturing States of the Commonwealth. (Applause.)

Mr. A. G. Webster moved a hearty vote of thanks to His Excellency for presiding, and delivering such an interesting address on scientific progress and speculation during the year.

The motion was passed with applause, and His Excellency briefly acknowledged the compliment.

Mr. R. M. Johnston proposed a hearty vote of thanks to lady members of the Hamilton Literary Society for kindly providing the refreshments, which would be served at the close of the meeting, and this was passed with acclamation.

The proceedings then terminated, and those present adjourned to the main hall of the Museum building, where the ladies of the society already named very nicely served refreshments.