

this stand, where the 120 h.p. engine entered by the Green Engine Co. for the Military Aeroplane Engine Competition is mounted on a tilting test bed, together with a Heenan and Froude dynamometer. It is around this that interest will principally centre, but the parts of a dismantled engine are well worthy of examination.

On the same stand is the Green-Mackie wireless set shown in the accompanying illustration, in which a 2½ h.p. Green engine is seen coupled to a Mackie alternator. The engine is of similar design to that used for many years on motor cycles and is self-contained, that is to say, the combined radiator-jacket are integral parts of the engine, an additional tank for increased supply of water being fitted over the dynamo. An Amac carburettor and Bosch magneto are used. Particular attention is directed to the coupling between the engine and the generator, and to the method of starting up. As regards the former, a flexible leather disc coupling, L, is employed, the disc being secured to the flange on the crank-shaft at its periphery and to the dynamo shaft, nearer the centre. For starting the engine a pulley, B, is secured to the dynamo shaft, and a spring-controlled leather belt, D, is mounted upon one of the trunnions supporting the unit. To start the engine, the belt is threaded round the pulley and jerked smartly—should the engine fail to start, any number of attempts can be made in rapid succession by alternately pulling on and releasing the belting, which is provided with a handle at the end.

**The Isaacson Engine Co. (STAND 70.)**

THE 18-cylinder 200 h.p. Isaacson Engine shown on the Eastbourne Aviation Co.'s stand is worthy of close examination, since it is the result of a large number of years of patient development.

The model exhibited is of the rotary air-cooled type, the cylinders, 120 by 150 mm., being grouped in two sets of nine around the steel crank-case, which is supported at both the front and the rear on



## THE INAUGURAL LUNCHEON AT OLYMPIA.

SIMULTANEOUSLY with the opening of the doors of Olympia to the public for the Aero Show, after the King had made his minute inspection of the Exhibition, a Press Luncheon was held. Mr. S. F. Edge, President of the Society of Motor Manufacturers and Traders, under whose auspices, combined with the Royal Aero Club, the Exhibition is held, presided, supported by Mr. J. E. Hutton, Chairman of the Aero Committee of the Society, and Mr. J. Maughfling, Chairman of the Marine Section, and a representative company, including the following:—Admiral Sir W. R. Kennedy, G.C.B., Maj.-General R. M. Ruck, C.B., R.E., Col. H. C. L. Holden, C.B., F.R.S., Maj.-General H. T. Arbuthnot, C.B., Sir J. I. Thornycroft, LL.D., F.R.S., Mervyn O'Gorman, M.I.Mech.E., Major J. D. B. Fulton, C.B., R.F.A., Dr. R. T. Glazebrook, C.B., F.R.S., Engineer-Commander H. S. Garwood, R.N., F. P. Armstrong, Commander C. R. Samson, R.N., F. W. Lanchester, Col. H. S. Massy, R. T. Gates, Max Worms, T. C. Pullinger, F. W. Shorland, A. Picard, Basil H. Joy, C. Marston, Howard Wright, Capt. J. Sealy Clarke, S. Straker, W. M. Letts, J. S. Stafford, H. A. Blackie, T. O. M. Sopwith, C. Grahame-White, F. R. Simms, H. E. Perrin, Warwick Wright, G. Holt Thomas, Capt. H. T. Wood, T. Thornycroft, E. Manville, M.I.E.E., J. E. Thornycroft, Bertram G. Cooper, P. Grace, A. McCormack, J. S. Matthew, E. M. C. Instone, Stanley Spooner, H. M. Hobson, F. May, G. Green, Lieut.-Col. A. F. Mulliner, J.P., V.D., J. Cates, H. White Smith, G. Stanley White, F. F. Thurstan, H. J. Thomas.

The first toast, "British Aviation," was in the hands of the Marquess of Tullibardine, who, after thanking the Society through the Chairman for all the good they had done for the development of the aviation industry, gave a brief *résumé* of the evolution of flying, and pointed out the great gain shows of the Olympia description were as educational factors. He said that we heard a good deal about the degeneracy of the race, but we need not despair so long as we had men of the calibre of the British pilot—men ready to take their lives in their hands in the defence of their country, men who, as soon as a comrade fell, came forward cheerfully to take his place, men determined that Britain should not fall behind in the race for air supremacy. Neither should we forget, he continued, in connection with the sacrifices which had been made, the magnificent examples set by the mothers and relatives of those whose lives were lost for so magnificent a cause, referring specially to a case in which, in the hour of her great loss a message was sent to the nation by a noble lady urging others to continue to do their duty without a falter.

The response was in the hands of Brigadier-General Henderson and Capt. G. M. Paine.

General Henderson said he desired to explain that the absence of Col. Sykes, Commandant of the Military Wing of the Royal Flying Corps, and of other officers of that Corps, was due to the fact that they were at the moment paying a last tribute to two of their

ball-bearings. A special point of interest is that starting holes are drilled in the flanges of the end-plates to the crank-case, so that by inserting grub screws these plates may be readily removed without damaging the metal, which the use of steel wedges for this purpose might cause. The cylinders are screwed at the inner extremity with a tapered thread, which fits in and is locked by the two halves of the crank-case, which are bolted together. The automatic inlet valves are placed in the piston, and balanced for centrifugal force, whilst the exhaust valves in the cylinder heads are operated through push rods and rocking levers. The helical springs used for closing the latter are not directly attached to the valve itself, but disposed between the end of the rocker and the crank-case. All the valve operating gear is at the propeller end of the crank-case, and is so assembled that it can be withdrawn as one complete unit, so that the engine can be dismantled without disturbing the valve timing. Two Bosch magnetos are fitted and the carburettor—of a special float-feed type—supplies the cylinders through the crank-case, *via* the hollow crank-shaft. The lubricating pump discharges through three separate leads, one of which is taken to the timing gear, and the other two to the two sets of cylinders. A Bosch easy-starter is fitted together with a special contact breaker, so arranged that when using the coil and accumulator, as at starting, the spark occurs about 2 or 3 mm. past the dead centre, thereby preventing any possibility of back fire. The engine exhibited develops its rated horse-power at a speed of 1,200 revs. per min., and its weight is 465 lbs.

This firm also manufactures three other models of a similar type, as well as radial engines, the number of cylinders being seven, nine and fourteen. A 60 h.p. motor fitted to a Flanders biplane has been doing continuous service for some months past at Brooklands aerodrome, as recorded regularly in recent issues of FLIGHT.

comrades whose lives had been lost in the performance of their duty. Continuing, he said that the practical employment of aviation in these islands was for the present largely confined to the Naval and Military services, but he felt that the science of aerial navigation must have other phases of utility apart from those highly specialised ones. The first duty of those concerned with Government aeronautics was the defence of this nation. The current Exhibition revealed an enormous advance made in British aviation. From time to time they made attempts to put forward certain of the requirements of the Naval and Military services. There had been misinterpretation, however, on some of those occasions. For example, if a degree of required performance was indicated, it did not mean that that performance was the whole of what they wanted. On the contrary, such a specification of requirements meant that no machine which could not fulfil those minimum conditions would be of any practical use for whatever purpose was in question. This applied also in regard to engines. They did not mind what degree of merit beyond that specified any individual manufacturer cared to reveal by his product; the higher the better. It was very difficult for them, however, to judge by specifications the precise degree of suitability of any given flying machine for war service. The only proof of utility came from the practice of the members of the Royal Flying Corps on whatever machines were in question. They must remember, moreover, that they could not separate aeroplane and engine, since the one was of no use without the other. He submitted that there was an enormous advance in the science of designing aircraft, also that it had not yet been proved that the advance in connection with the production of aerial motors had been equal to that achieved in regard to aeroplanes. He thought, however, there was every prospect that before long they would have the engines they wanted produced in this country, and, he hoped, designed here. Let it be borne in mind that they did not want a record-breaking motor that could do 14 or 24 hours' run without a rest. They wanted manufacturers who could produce whole series of engines, each of which could be relied on always to fly, say, for three hours at a spell.

Anyone who took up in the proper spirit this proposition would, he was satisfied, find it a very profitable field indeed. He did not think there had been such a degree of advance during the past year as far as aeroplanes were concerned in any country equivalent to that in this country, whilst all the time they had been watching very carefully other countries which had taken up the science seriously. We could now, he said, not only equal, for our particular service purposes, anything that could be made abroad, but we were able to surpass all that had been produced elsewhere, and he congratulated the constructors to whose genius such a position was entirely due upon the soundness of their designs.

Capt. Paine said that enormous strides had been made since last year, but it must be remembered that aviation was still in its infancy. So many people expected to get absolute perfection in