Motor Ship for Southampton and Cowes Service

" Carisbrooke Castle "

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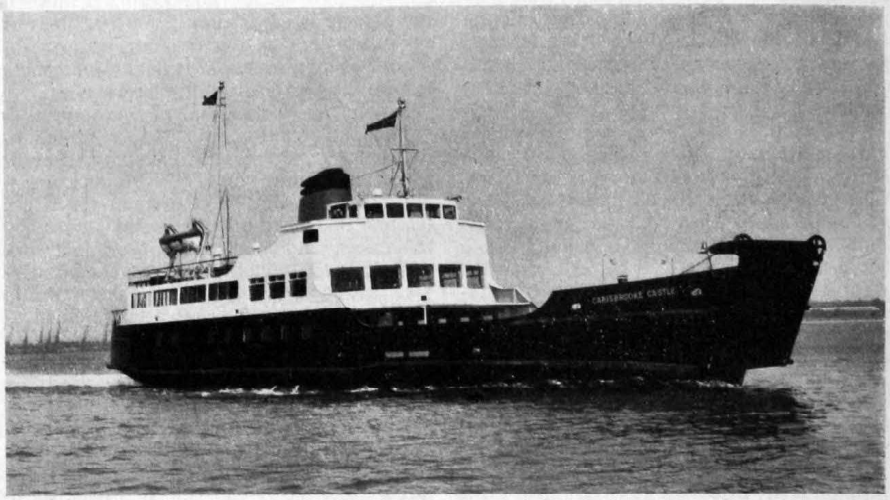
The " Carisbrooke Castle," illustrated here, is designed to augment the transport facilities for motor vehicles and passengers between Southampton and Cowes. There is accommodation for forty-five vehicles and 500 *passengers. The ship was built by John I. Thornycroft and Co., Ltd., with a tonnage of* 671 *gross and an overall length, including ramp and fender, of* 191*ft. Two* 900 *h.p. Crossley engines give a service speed of* 14 *knots.*



FOR close on a century a service has been maintained between Southampton and Cowes by a company boasting the longest name of any British steamship line—that of the Southampton Isle of Wight and South of England Royal Mail Steam Packet Company, Ltd., but now colloquially known as Red Funnel Steamers, Ltd. This company was incorporated in 1861, and for seventy years the service was maintained by paddle steamers, of which the largest and fastest was " Balmoral," a vessel of a tonnage of 471 gross, and capable of a speed of 20 knots. She, however, was mainly engaged on excursion work. In 1931, a revolutionary step was taken in that hitherto all vessels serving the Isle of Wight, both railway and privately owned, had been paddle steamers, a twin-screw motor vessel was delivered to the company. " Medina " (Fig. 1) is a ship with the following principal dimensions :—Length, 143ft ; breadth, 28·1ft ; depth, 8·7ft ; tonnage, 342 gross. She was driven by oil engines delivered to the builders, John I. Thornycroft and Co., Ltd., by L. Gardner and Son, Ltd.; she had two sets of oil engines, each having six cylinders with a diameter of 11in and stroke 13in. They were two-cycle, direct-reversible, compression-ignition, airless injection type. She was re-engined in 1953.

Although a paddle steamer, " Gracie Fields," was added to the fleet in 1936, she was a war casualty, and the next vessel to appear was " Vecta," an interesting example as she was driven by Voith-Schneider propellers, which enabled her to move laterally without forward or backward movement. In spite of the advantages it was found that her propellers developed defects and maintenance costs were high, and she was converted to diesel-electric drive with normal screw propellers, her main engines being undisturbed. Her speed on trials had been 15·45 knots, but after conversion her trial speed was 14·92 knots. So satisfied were the company with her that in 1949 a new " Balmoral " was added to the fleet. She was somewhat fully described in a former number* and is a vessel very similar to " Vecta," but slightly larger, having a tonnage of 688·1 gross. In the light of experience gained, the deck arrangements were different, the space reserved for cars being forward, and the dining saloon aft.

At the beginning of the present year the passenger fleet consisted of the three motor ships already mentioned and the paddle steamer " Princess Elizabeth " (Fig. 2). She was built in 1927 by Day Summers and Co., of Southampton, her principal dimensions being : length, 195ft ; breadth, 24·2ft ; depth, 8ft ; tonnage, 388 gross. Her paddle wheels are driven by two-cylinder steam engines, with cylinder diameters of 23in and 48in, and a stroke of 51in. She has always been noted for her smart appearance and spick and span engine-room, and many will regret her passing.

The company also possesses a car ferry " Norris Castle." She is a converted tank-carrying craft, and, in addition, there is also a fleet of twin-screw tugs, both steam and diesel, some of which have been described in these pages.†

The increase in the number of cars being taken to the Island decided the company to modernise and increase facilities for car transport, and a new vessel was ordered from John I. Thornycroft and Co., Ltd., which was launched last November and named " Carisbrooke Castle." She is of similar dimensions to " Balmoral " and " Vecta," these being : length, overall (including ramp and fender), 191ft 2in, on waterline 180ft ; breadth, moulded, 40ft ; depth, moulded to main deck, 10ft 7in ; draught, amidships, 6ft ; tonnage 671 gross. The vessel has been built to Ministry of Transport Class IV and Lloyd's classification A1 for service between Southampton and Cowes. She incorporates a number of modern developments and will maintain a regular service to both West and East Cowes. Vehicle loading and unloading are effected not only by means of an articulated ramp (Fig. 3) at the extreme fore end of the vessel, but also side loading is catered for. Sliding

* THE ENGINEER, November 25, 1949, page 606.

† THE ENGINEER, June 1, 1956, page 604.

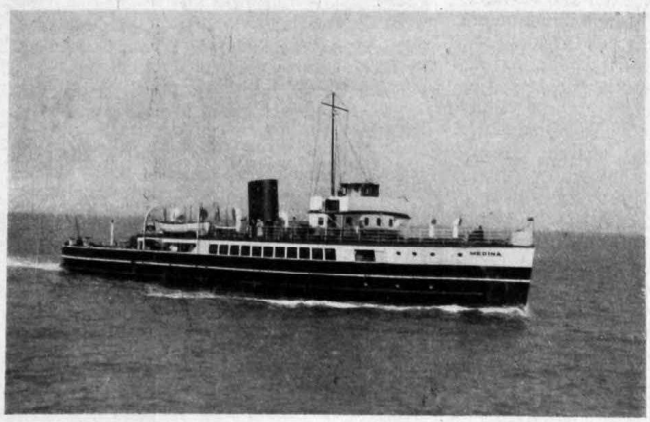


Fig. 1—" Medina," the first motor-driven vessel for Isle of Wight services

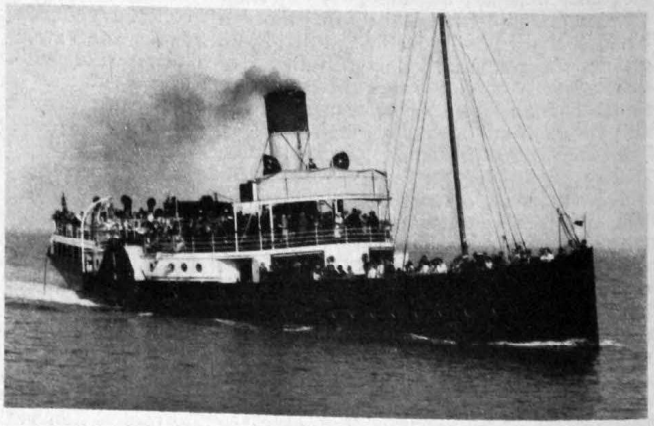


Fig. 2—" Princess Elizabeth," the last of a long line of paddle steamers

ship side doors give access to the sheltered car deck, and hinged bulwark doors forward are for larger vehicles. To assist in the stowage of vehicles a turntable with a diameter of 13ft is fitted flush into the after end of the car deck to enable vehicles to be stowed advantageously. Forty-five motor-cars and commercial vehicles can be carried, as well as about 500 passengers, whereas, if used exclusively for passengers and mails, 1200 can be taken.

The general layout of the vessel is as follows: on the boat deck forward is the spacious wheel-house, with modern aids to navigation, and immediately astern of this is the captain's cabin, behind which is an open deck for passengers, supplied with seats. Two 16ft lifeboats, mounted on Schat high-level davits, are fitted on the boat deck. On the promenade deck forward is a large observation lounge with specially large windows affording an uninterrupted view, with a buffet bar, and adjoining it a saloon with another bar. Seating on this deck is protected from the weather by glass windows at the sides. There is adequate toilet accommodation and a ladies' rest room. Separate cabins are provided for the chief engineer, second engineer, mate, and chief steward on the main deck, where there are officers' mess and crew's mess rooms on the same deck, the crew being accommodated on the lower deck. It might be mentioned that all exposed passenger decks are covered with ⅜in thick deck composition.

The deck machinery is of the hydro-electric type, and consists of one cable lifting and warping capstan on the starboard side and one warping capstan on the port, both being fitted forward, and two ramp hoisting winches placed in machinery houses port and starboard forward and one warping capstan fitted aft. The steering gear is hand and power electric hydraulic, the motor, rams and pump being positioned in the steering compartment coupled to twin spade rudders, the bridge control being by telemotor gear. Solid rubber side fenders are fitted over the entire length of the ship.

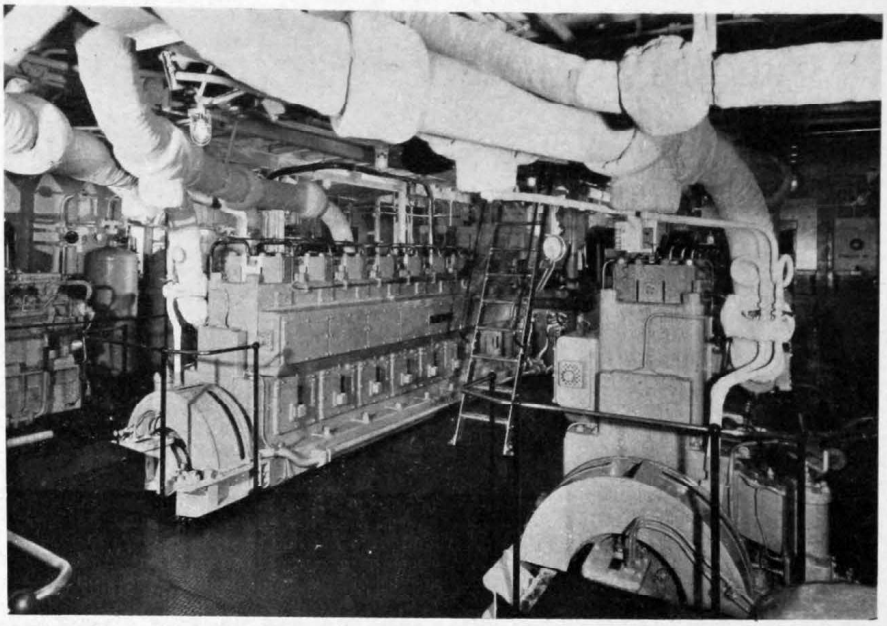


Fig. 4—Engine-room looking forward

The main propelling machinery (Fig. 4) was supplied by Crossley Brothers, Ltd., Openshaw, Manchester, and consists of two type HRN 8/45 vertical two-stroke cycle direct reversing marine diesel engines, each engine having eight cylinders with a bore of 10·5in and a stroke of 13·5in giving a continuous rating of 900 b.h.p. at a speed of 450 r.p.m., the total brake horsepower being 1800. The line shafting runs in "Michell" plummer blocks, and the propeller shafts run in oil bath stern tubes, with "United States" rotary metallic packings fitted at both the inboard and outboard ends of tubes. The propellers are three-bladed of manganese bronze, designed and manufactured by the builders. A mean speed of 14·7 knots was obtained on trials, the required service speed being 14 knots.

A specially designed "Thornycroft" funnel prevents the exhaust gases from coming on the deck, and in it are housed the silencers. The main engine controls are centralised inboard at the forward end of the engines.

The auxiliary machinery consists of three 50kW, 220V diesel generating sets, one diesel-driven compressor set, one electrically-driven compressor set, two electric bilge and general service pumps, two electrically-driven main engine fresh water cooling pumps, one electrically-driven domestic fresh water supply pump, one shore supply motor generator set, one main switchboard, one fuel oil transfer pump electrically driven, one electrically-driven fire pump, two oil-fired automatic hot water and heating boilers, one 25in diameter axial flow supply fan, electrically driven, and one 10in diameter electrically-driven reversible fan. Both main and auxiliary engines are arranged to work on a closed fresh water cooling system, the necessary Serck heat exchangers being fitted.

Electrical power at 220V d.c. is normally supplied by the three 50kW diesel generators, but as certain services are required to run through the night a 5kW motor generator set is fitted to operate from a shore supply. As this supply differs at the two terminal ports, being 415V three-phase at Southampton, and 480V single-phase at Cowes, a transformer has been incorporated in the motor generator set so that it may run from either. The switchboard is of the open marine type designed and constructed by the shipbuilders. There is a public address system for the passengers and crew, with separate loudspeakers for mooring orders. A sound-powered telephone provides communication between the wheelhouse and engine-room, and a Pye "Ranger" v.h.f. is fitted to work in conjunction with the port information service.

This ship would appear to be admirably suited to the work it will be called on to undertake, and from the point of view of the passenger is the most comfortable vessel plying between the mainland and the Isle of Wight. At the same time it is sad to think that her advent knells the doom of "Princess Elizabeth" and in a lesser degree the interesting conversion "Norris Castle."

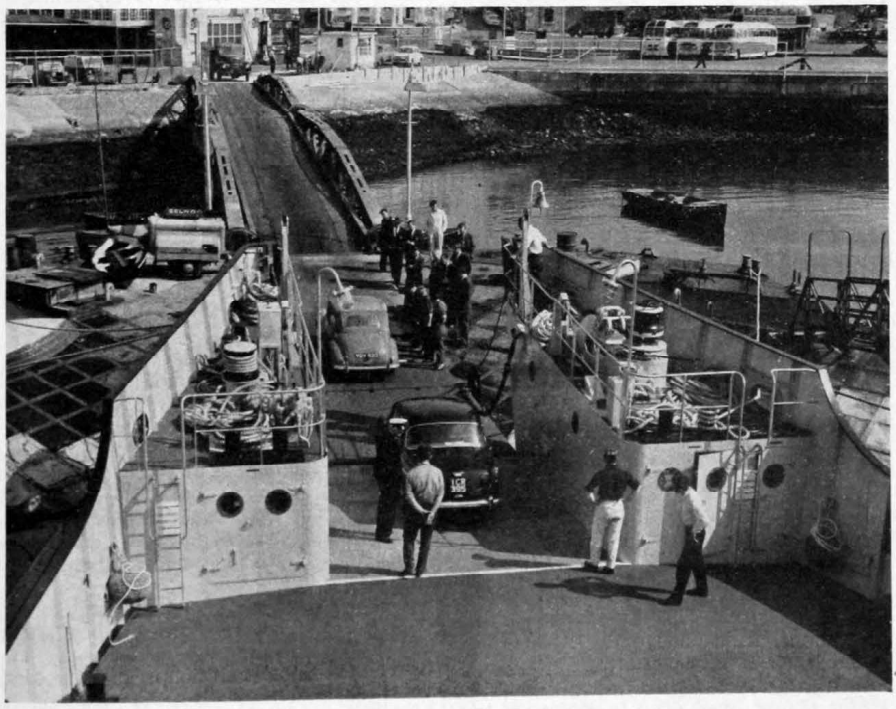


Fig. 3—Car ramp in down position

Electrical Research Association

The annual report of the Electrical Research Association for the year ended December, 1958, was presented at the annual general meeting of the Association on May 6. Some of the lines of research described in the report are briefly referred to below.

Insulation.—Research work on dielectrics has been in the forefront of the Association's effort for a number of years. The results of much of this work are generally more important than spectacular, the end product being, usually, a new or revised British Standard. Of the thirty-five British Standards relating to insulating materials nearly three-quarters were drafted by E.R.A. committees. Typical of the new reports is one assessing test methods for evaluating thermal endurance of varnished fabrics. Reports on better methods of testing the impact strength of solid insulating materials are being issued. The Norwegian tracking test for such materials has been assessed and a substantial improvement in the whole technique of tracking tests is likely to follow the successful design by the E.R.A. of an automatic tracking tester, which materially reduces the manpower needed for what is, at present, a tedious task.

In basic research on breakdown of liquids carried out at Queen Mary College, London, and partially supported by E.R.A. results more amenable to interpretation than is usual in this subject have been obtained with liquid argon as an experimental material. One discovery springing from this work is the unexpectedly large influence of the anode material ; another is the importance of trace quantities of oxygen in solution because of its high electron attachment coefficient.

Electric Arc and Switchgear.—Recent E.R.A. work on the formation of discrete cores to an electric arc is now being supplemented by a study of the equally important arc boundaries, with the help of a lenticular plate high-speed camera giving 100,000 frames per second. Continuous review is being made of means of the accurate measurement of high temperatures in arc and pinch discharges. To give more information on the nature of circuit severity an experimental method has been devised in which circuit constants before and after current zero can be made to differ. Preliminary results indicate that circuit severity is not necessarily simply related to restriking voltage.

Work on vacuum switching has already yielded results of practical importance on certain medium and low-power ranges and is being continued. The main concern however has been with explorations at high power where the release of gas from surface monolayers raises crucial problems. This work is being supplemented by a contract from Harwell for the switching of very heavy field currents in connection with the thermonuclear research programme of the U.K. Atomic Energy Authority.

A short investigation has been done to show the feasibility of the synthetic test method proposed by the E.R.A. and other bodies. Up to a single half-cycle of current no difficulties have been met. Work has also been done to determine whether it is possible to devise criteria for assessing the efficacy of any given synthetic test, by making measurements of current and voltage around the current-zero period. However the extension of this work into the practical range is stated to be severely hampered by the limited power available at the Perivale establishment. When switchgear research moves to Leatherhead (the lease on the Perivale premises expires in 1963) a much larger generator or generators will be needed to provide the short circuit test capacity demanded by modern electricity systems. The existing small machine will eventually be transferred to Leatherhead for use as an auxiliary but the cost of the new machines is not likely to be less than £250,000.

A new problem in protection against lightning is posed by the use of transmission voltages above 200kV. During thunderstorms the performance of these lines is worse than would be expected from methods of forecasting which have proved satisfactory for lower voltage lines. An investigation of the reasons for this discrepancy has been started by the E.R.A.

On flameproofing it was reported last year that, as a result of E.R.A. work, it was possible to obtain a certificate for intrinsically safe circuits used in an atmosphere of ethylene. Now the necessary research has been done to enable three other gases—carbon disulphide, isohexane, and butadiene—to be subject to the same treatment. Improved research techniques have shown that the safe gap for hydrogen is appreciably greater than the hitherto accepted value. It should now be possible to design flameproof apparatus for use in hydrogen and some of the other Group IV gases.

Magnetic Materials.—Work on magnetic materials includes studies at the British Iron and Steel Research Association, on the influence of impurities on the magnetic properties of silicon iron transformer sheet. Nitrogen has been shown to be much more deleterious than carbon and two methods of minimising the effect of nitrogen are being examined. In the first method transformer laminations are coated with a thin film of aluminium before annealing and substantial reduction in hysteresis loss has resulted ; experiments are now being done on full-size transformers. In the second method the modifying influence of titanium is exploited : high purity alloys containing about 0·03 per cent titanium can tolerate the presence of about 0·006 per cent by weight of nitrogen without a significant increase in loss. Accordingly, provided that titanium can be introduced commercially without increasing either the inherent nitrogen content or the risk of oxidation, this method may successfully reduce the effect of nitrogen.

Steam.—Research on the properties of steam up to 750 deg. Cent. and 15,000 lb per square inch is being continued at the Imperial College of Science and Technology, London. About 200 results are now available in the first range of the programme up to 750 deg. Cent. and 3500 lb per square inch. The results are being evaluated and early publication is expected. The second part of the programme, from 3500 lb to 15,000 lb per square inch is now being started.

Steels for High Temperatures.—Rupture testing is now being done in fifty creep test units in the E.R.A. Leatherhead laboratory, to complement the creep facilities of the National Physical Laboratory at Teddington. Plans are in hand to extend the E.R.A. creep laboratory.

Work has been completed on the properties of a Mo-V steel rotor forging in the normalised and tempered condition and a final report on this subject is being drafted. Examination of this material in the hardened and tempered condition shows superior properties in shorter time tests, but in long time tests this advantage may not apply. A Cr-Mo-V-W steel which is used for small rotor forgings is being examined after a heat-treatment which should simulate the cooling rate of a 40in diameter rotor.

Typical welded steam pipe joints in 2¼ per cent Cr, 1 per cent Mo, Mo-V and 18/12/1 austenitic steels have been supplied by the pipe-makers for rupture tests on pieces cut axially across the weld. Bursting tests under creep conditions of thick-walled pipes of carbon, 2¼ per cent Cr, 1 per cent Mo and 18/12/1 austenitic steels have begun at the E.R.A. The rigs at Brimsdown power station for tests on steam pipe welds have been modified by the addition of an electrical steam superheater to improve the temperature distribution.

On Mo-V pipe, 2¼ per cent Cr, 1 per cent Mo pipe and tube, and 18/12/1 austenitic pipe and tube steels, creep tests are being continued to times exceeding 30,000 hours, or to rupture if the times appear reasonable.

Work has started on the relaxation testing in creep of bolt steels which have been restrained to simulate the retightening given to turbine bolts periodically. After appreciable straining there are indications of falling off in strength, but at operating temperatures this may not start until useful service has been given.

In addition to the work on corrosion in flue gases undertaken by the joint B.I.S.R.A.-E.R.A. Steelmakers' Panel, a test plant is being installed by the E.R.A. in a C.E.G.B. power station to compare the corrosion rate of a number of pipe steels in steam of normal power station quality. Also a sample of the 6–8 per cent Cr-Mo-Ti steel, which has shown satisfactory creep resistance in experimental melts, has been inserted in a power station superheater to test its corrosion resistance.

The creep and relaxation properties of a number of austenitic steels, which are in current use for steam power plants, are being determined at temperatures greater than 1050 deg. Fah. (565 deg. Cent.).

Rural Electrification.—Growing interest is being shown in the work of the E.R.A. Shinfield station, which is largely concerned with electricity as a means of influencing plant and animal environment. This work is done in co-operation with Reading University. Field tests of the effect of flash illumination on laying poultry have shown that the time of application of the flash (that is, in effect, " Reveille ") has more influence on egg production than do the duration or number of flashes or their intensity. First indications of the effect of various light regimes on the rearing of young pigs (in air conditioned cabins at Lane End Farm) are that there is no significant difference between batches of pigs reared in total darkness, in total light or with intermediate illumination treatments.

Experiments on artificial illumination for bulb growing have yielded the interesting conclusions that tungsten filament lamps are better than fluorescent lamps, that the total wattage is more important than the number of lamps and that there is no advantage in raising the lamp position as the plants grow.