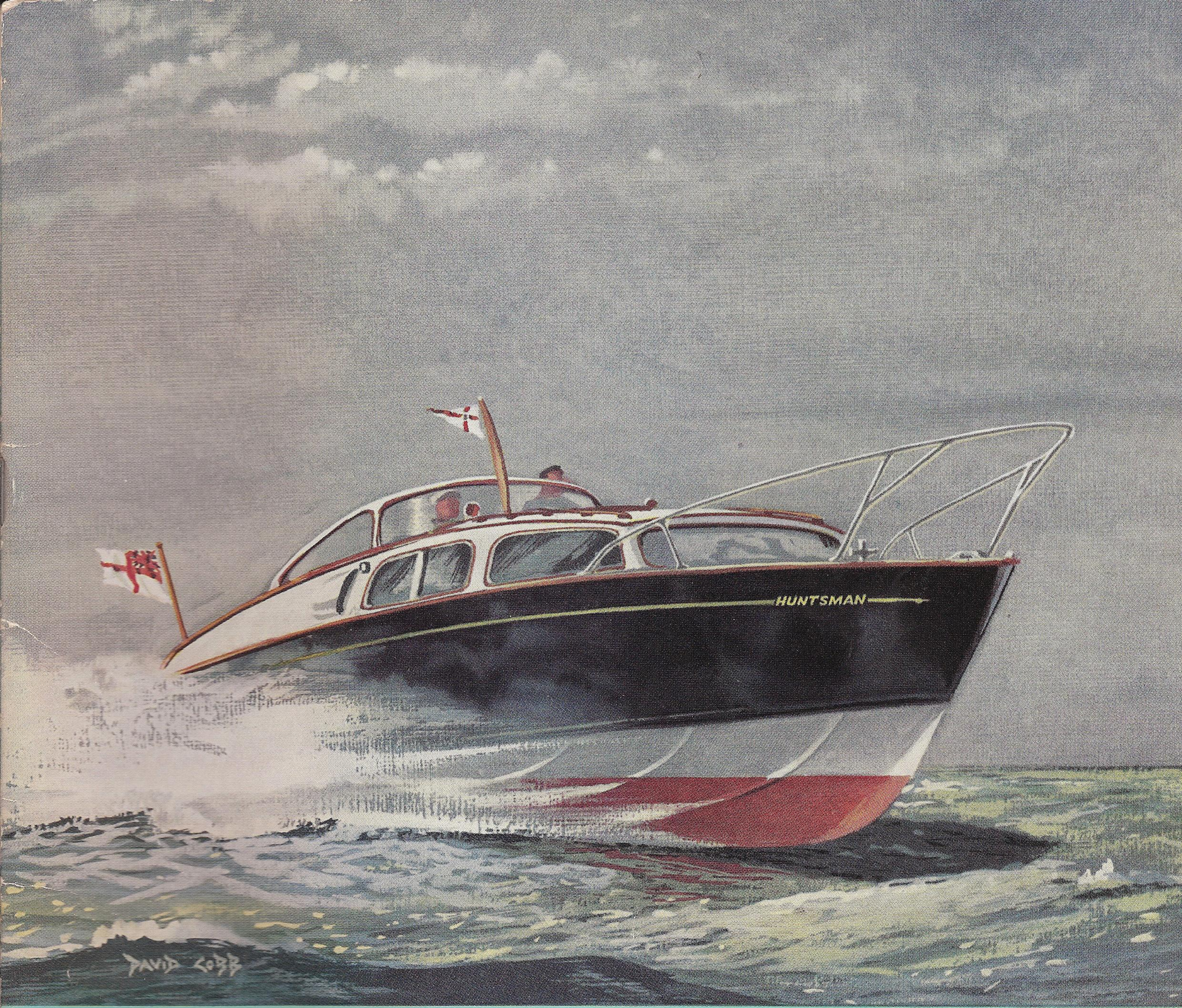

FAIREY REVIEW

VOL 3 · NO 4 · DECEMBER 1960

THE JOURNAL OF THE FAIREY GROUP OF COMPANIES

We wish our readers
a Merry Christmas and a Happy
and Prosperous Year

THIS MONTH'S COVER

Artist David Cobb captures the verve and dash of Huntsman 28, Fairey Marine's new twin-engined sea-going cruiser which will be making its first public appearance at the National Boat Show at Earls Court in January.

FAIREY REVIEW

VOL 3 · NO 4 · DECEMBER 1960

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Editor: Derek O. Thurgood

The New Fairey Subsidiary

FEW PEOPLE driving along the Kingston by-pass between Tolworth and the Ace of Spades are aware that beyond the railway embankment on the left there is an establishment at which deep-sea divers are trained.

This slightly unlikely activity is only one of scores of unusual products and services offered by Siebe, Gorman & Co. Ltd., newest member of The Fairey Group of Companies.

Although the youngest member, this Company is the oldest established and its history reflects the fine record which it has built up since its foundation in 1819 in London by Augustus Siebe, the inventor of the closed diving helmet and dress still basically in use today. The strong connection which the Company has with diving and all underwater operations has led many to believe that this is their sole activity. A visit to the Siebe, Gorman works will rapidly dispel this idea. Although still the leaders in this field, their products are so numerous and complex that it would be impossible to describe them and their uses in detail in a short article.

The products manufactured there are for the personal safety of workers in almost every industry. To achieve the high standard of workmanship required for equipment on whose efficiency a man's life depends it is understandable that the factory must provide every facility to this end. As the products cover so large a field—compressed air breathing apparatus and oxygen-breathing apparatus for use by fire services, coal mines, the chemical industry and food refrigeration plants; dust respirators, protective clothing, air compressors, de-compression chambers, aircraft seat-belts to name only a few—it will be realised that a highly elaborate system of manufacture is necessary.

The engineering requirements are met by a machine shop well equipped with all essential machinery, a metal-working shop, plating and paint shops, assembly sections, chemical laboratories, inspection and test departments, large stores, packing and despatch bays from which goods are sent to all parts of the world. This may sound rather like any other medium-sized engineering works, but a visitor is surprised to see coppersmiths in one shop making diving helmets and 'corselets', heavy diving boots with lead soles three quarters of an inch thick and each weighing 20 lb., while in the bay immediately next to it are girls operating sewing machines making clothing which will provide protection against most hazards encountered in industry, from aircraft seat belts and car safety harnesses to fire-fighting equipment and asbestos suits.

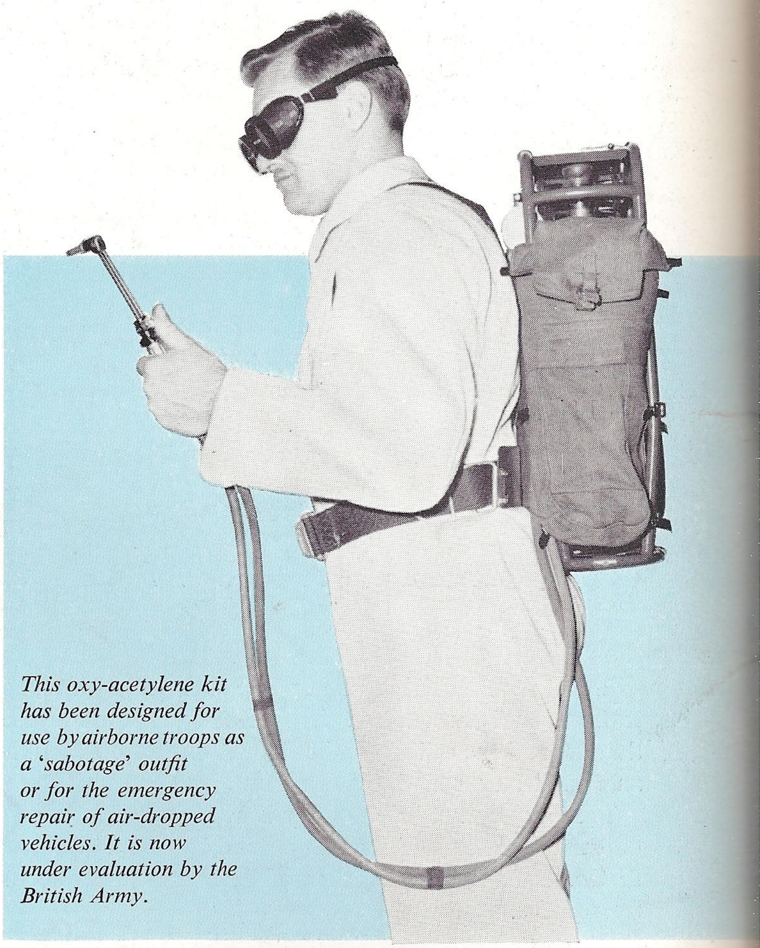
Where apparatus is provided for workers employed in dangerous jobs or where the nature of the work could affect their health it is obvious that the apparatus must be efficient and completely reliable. Design and development, therefore, play a major part in the initial stages of producing equipment to keep pace with the demands of new techniques in industrial manufacture and the introduction of new materials and processes. The increasing use in industry of radio-active isotopes has necessitated constant research into protection of the worker handling such dangerous materials. There is a constant demand to improve, modify or re-design existing apparatus, to combat new hazards or make its efficiency and safety even greater. All these are taken care of by a well-equipped development department. The Chief Development Engineer works closely with Government departments, mines rescue stations, fire services and industry to keep abreast of their existing and projected requirements.

(*Continued overleaf*)

Throughout the production of an article, be it a safety helmet, a gas or dust respirator or a more complicated piece of apparatus, its component parts are constantly being inspected and tested up to final assembly and adjustment, when the completed apparatus is given rigorous functional tests. This calls for an inspection department which, although complex, is flexible, adaptable and capable of assisting production and ensuring that the apparatus produced fulfils its intended function. In this respect the inspection department's work is unique compared with the comparatively straightforward methods necessary in most factories where only a few products of similar type are manufactured.

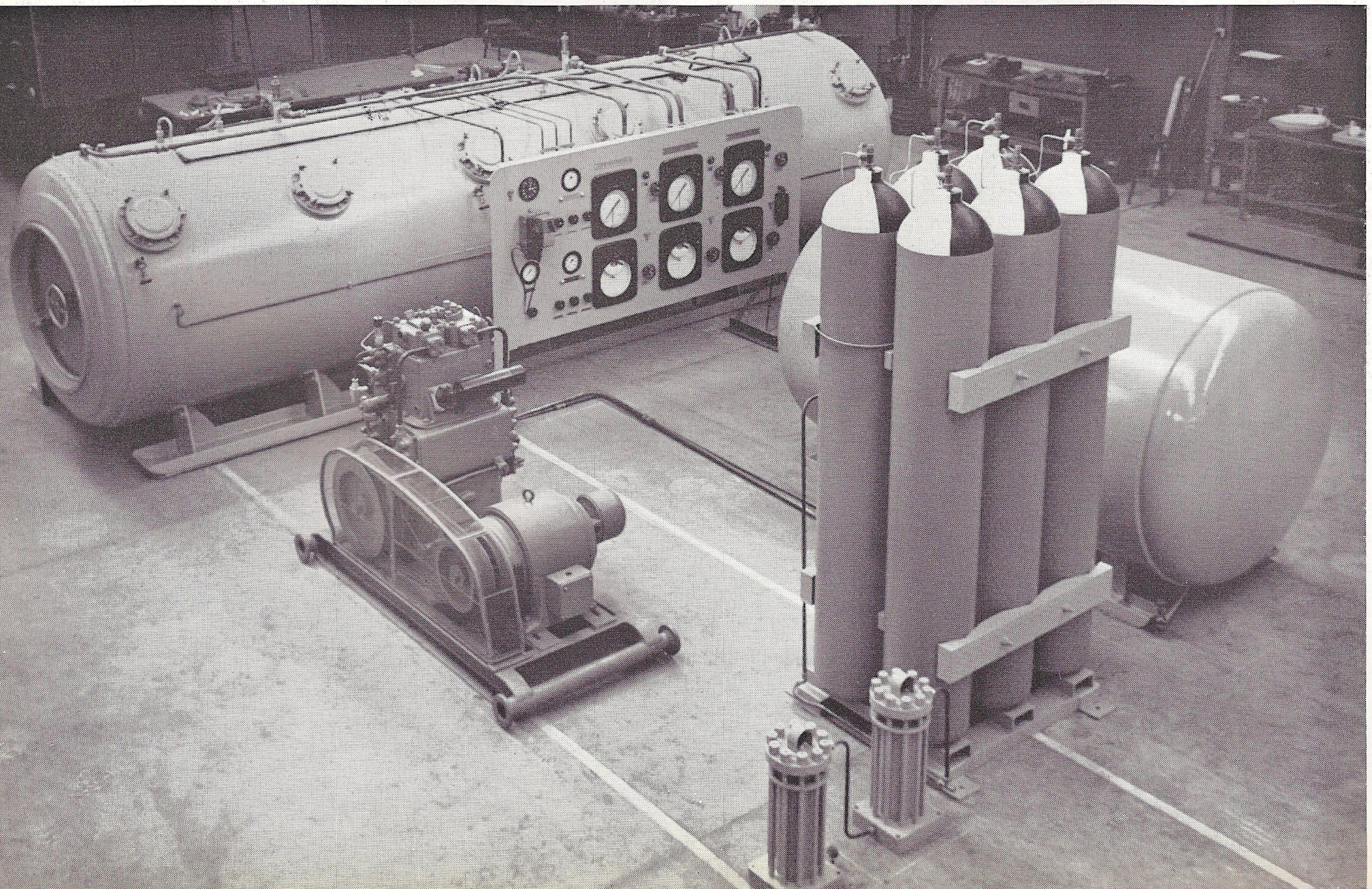
Let us now have a look at some of the products and the uses to which they are put. Most industries have obvious hazards and one which springs readily to the mind is the building industry where accidents occur daily through men being injured by falling objects. Many of the more up-to-date building contractors now provide safety helmets, safety boots, belts, etc., for the men on the site and in some countries, notably the U.S.A. and Germany, the wearing of helmets is compulsory. Another industry which, regrettably, has a high accident rate is coal mining and owing to the complexity of its processes many forms of safety equipment are needed. Some safety apparatus is needed for protection of the miner, such as dust respirators, miners' helmets and lamps and safety

(Continued on p. 76)



This oxy-acetylene kit has been designed for use by airborne troops as a 'sabotage' outfit or for the emergency repair of air-dropped vehicles. It is now under evaluation by the British Army.

A three-compartment re-compression chamber built (with all its associated equipment) by Siebe, Gorman for Shell International. It will be used at Lake Maracaibo in Venezuela where divers are assisting in oil drilling. If they have to be brought to the surface rapidly they will be placed in one of the three compartments and slowly acclimatised to the change in pressure so that they do not suffer 'bends'.



Left: Siebe, Gorman manufacture every part of this diver's suit (more properly called a 'dress'). The head-piece is the only item which is partly pre-fabricated by a sub-contractor.

Right: This suit was designed specifically for fighting aircraft fires. It is made of asbestos, coated in aluminium foil to reflect the heat. The pack holds twin compressed air cylinders which supply the power for a hand-saw.

Left: This 'dry' underwater swimming suit is made of rubber-coated stockinette and is completely waterproof unlike the 'wet' type of suit which permits a small amount of water to enter the suit. The water is kept warm by the heat of the swimmer's body and allows him to swim in remarkably low temperatures.

Right: This plastic suit is designed for industrial use in tanks and installations which give off poisonous and corrosive fumes. It is chemical and acid resistant.

boots, some for rescue or other emergency uses. Miners entering a working are required to test for the presence of gas or for lack of oxygen and to do this special gas detection apparatus is made by the Company. A reliable and quick method of testing for the presence of carbon monoxide gas is the carrying of a canary in a metal cage having a small cylinder of compressed oxygen connected to it. The test is made by introducing the caged canary into the suspected atmosphere. Should there be gas present the canary becomes unconscious. For the benefit of bird-lovers it can be said that as soon as the bird becomes unconscious the cage is sealed, the oxygen turned on and the bird revived. These birds are nearly always adopted as pets by the miners looking after them and most of them live to a ripe old age. Siebe, Gorman supply the cage – but not the canary.

We all read with sorrow reports in the newspapers of pit disasters and of the desperate attempts by rescuers to reach trapped men. In most cases of this sort the added hazard of pockets of poisonous gas is present and we read that breathing apparatus had to be worn by the rescuers and in many cases taken to the men to be rescued before they could be conducted through the gas to safety. Siebe, Gorman have supplied this type of apparatus to mines rescue stations throughout the country for many years.

A type of apparatus similar to that used in coal mines is supplied to most of the fire services in Great Britain. The apparatus permits the wearer to re-breathe his exhaled air after it has been cleaned of carbon dioxide and the oxygen content returned to normal by oxygen automatically regulated from a cylinder. Without this apparatus firemen would be unable to enter smoke-filled buildings either to rescue trapped people or to reach and deal with the seat of the fire. The result would be many more lives lost while financial losses due to fires would be colossal.

At the other end of the scale, cold storage is necessary to keep fresh the thousands of tons of frozen foods and ice creams consumed each year. The men who work in these conditions and maintain the plant need protection not only against cold but against the refrigerant gas which could escape in the event of an accident. Much experimental work has been done on clothing which is comfortable to wear and enables the worker to stay in low temperatures for a considerable time. Compressed air breathing apparatus is supplied for emergency use in case of compressor or piping failures with gas respirators which are an improved version of the old Service gas mask so well-known to many of us. Large numbers of these respirators are supplied to many industries and they can be designed to give protection against practically any known gas.

From cold to heat again. Many millions of bricks are lost each year by accumulated soot in the flues of the kilns. This affects the temperature control and results in the bricks becoming burnt. An air-fed suit has been developed to permit men to enter these flues, whilst they are still hot and in use, to remove the soot.

Heat-reflective suits made from newly developed materials such as aluminium-coated asbestos, have been supplied for aircraft crash-tender crews. These suits enable rescuers to pass through burning petrol fires to reach trapped crews of crashed aircraft. They have been supplied to the British Government, the South African Air Force and the Fleet Air Arm, and suits made of the same type of material have been supplied to the Atomic Energy Authority.

Siebe, Gorman pioneered the introduction of compressed air breathing apparatus for use in ships and tankers. Their efforts have been recognised by the approval of this apparatus by the Ministry of Transport and today most British shipping lines stipulate the carrying of a number of these sets on each ship for use in fire-fighting. All ships are required to carry two or more smoke masks and Siebe, Gorman supply these to 95 per cent of British shipping.

To turn to the lighter side of their activities the sports of water ski-ing and underwater swimming are becoming increasingly popular, especially as more people are taking their holidays on the Mediterranean coast and other Continental resorts where this form of sport does not have to be reserved for hardier souls. The 'Mistral' Aqualung is well known to the more dedicated underwater enthusiast but its use need not be confined to those of great experience since it is extremely simple to use and maintain. However, like many other sports where there is a risk of danger, suitable instruction in the use of the gear and safety precautions when in use are necessary.

A new type Neoprene 'wet' suit has been produced which is suitable for either underwater swimming in temperate climates or for use by the water ski-ing enthusiast. This 'wet' suit permits a layer of warm water to come between the body and the suit, as distinct from the 'dry' suit which is completely waterproofed to allow the wearer to be clad in warm woollen underclothes.

These suits have proved to be yet another outlet for Siebe, Gorman's specialised skills and knowledge. There will undoubtedly be many more as science advances in the new technology of nuclear engineering, with its limitless potential on and under the sea, in the air and on land.

Fireman wearing the regulation compressed-air breathing apparatus made by Siebe, Gorman for fire services throughout the world.

Research Reactors

Part IV of our series 'A Plain Man's Guide to Atomic Energy' by P. J. Duncton, B.Sc., A.R.C.S., D.I.C., F.R.Ae.S., F.Inst.P., Director and General Manager (Heston) Fairey Engineering Ltd., moves from the general principles of nuclear energy to the particular field of research reactor equipment. It includes a description of the HECTOR zero-energy nuclear reactor which Fairey Engineering is building for the Atomic Energy Authority.

THE FIRST three articles in this series have attempted to describe in simple terms the principles underlying the controlled release of nuclear energy. This and subsequent articles will deal with specific aspects of nuclear engineering, with particular reference to work which is currently being undertaken in this field by Fairey Engineering Limited.

Why, may be asked, is nuclear engineering any different from conventional branches of engineering? It is different only in degree.

All engineering is concerned with the everyday exploitation on an industrial scale of scientific processes investigated initially under laboratory conditions. In doing so it develops new techniques and utilises materials appropriate to those techniques and to the environments in which they are employed. Nuclear technology is newer than most technologies and is, therefore, closer than most to the laboratory. It utilises materials which have never before been prepared in bulk and certainly have never been used on other than a laboratory scale. It demands standards of purity and of cleanliness which have never before been required in engineering. It subjects materials, equipment and instruments to environments which have never previously been encountered outside the laboratory. Above all, it gives rise to installations which could endanger life and property on a catastrophic scale if they failed. The safety requirements of nuclear plant are, therefore, several orders more stringent than for other engineering installations.

It can thus be understood why it is that the annual expenditure in this country on nuclear research and development, for other than military purposes, is measured in tens of millions of pounds. Much of this research and development is carried out or sponsored by U.K.A.E.A. Much is also being done in parallel by industrial companies in support of their own nuclear projects. The work is brought together when industry supplies under contract to the Authority, much of the equipment required by the Authority for its research. Fairey Engineering Limited is concerned both with the development and supply of power reactor equipment to the C.E.G.B. by its association with Atomic Power Constructions Limited and with the supply of experimental reactor equipment to U.K.A.E.A. for use at its various establishments.

Experimental Reactor Equipment

Experimental reactors may serve many purposes, but all are the tool of the laboratory. One of the first objects of research in reactor physics is, of course, to determine the nuclear properties of the materials and assemblies to be used. We wish to know the probability of fissions occur-

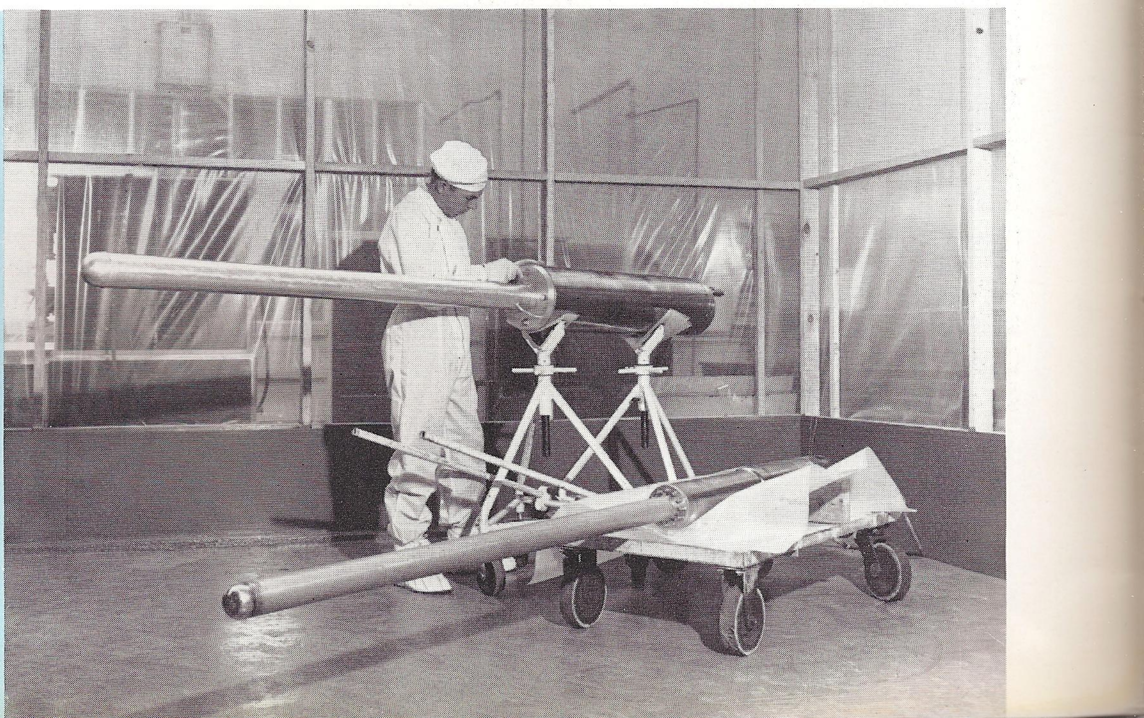
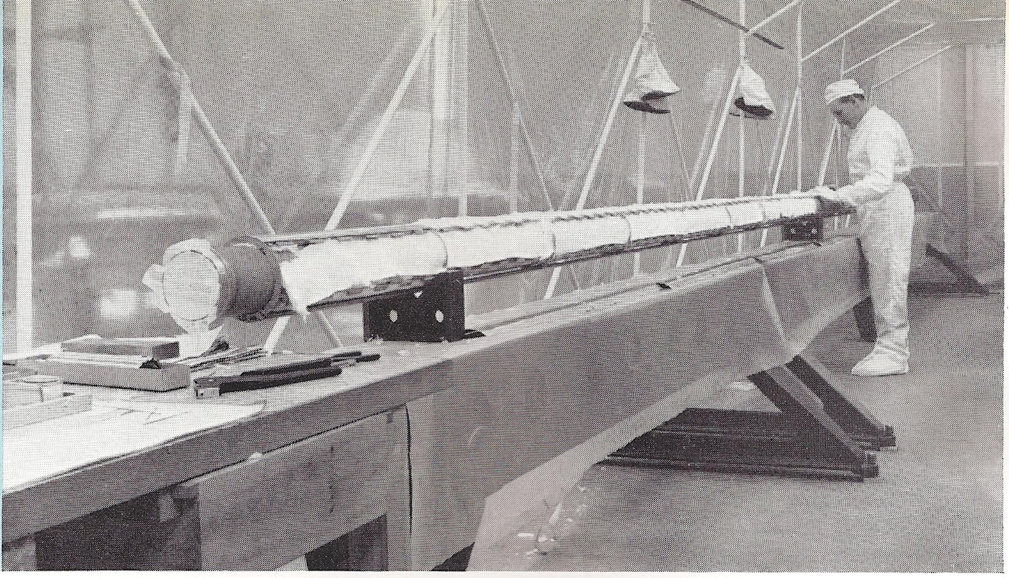
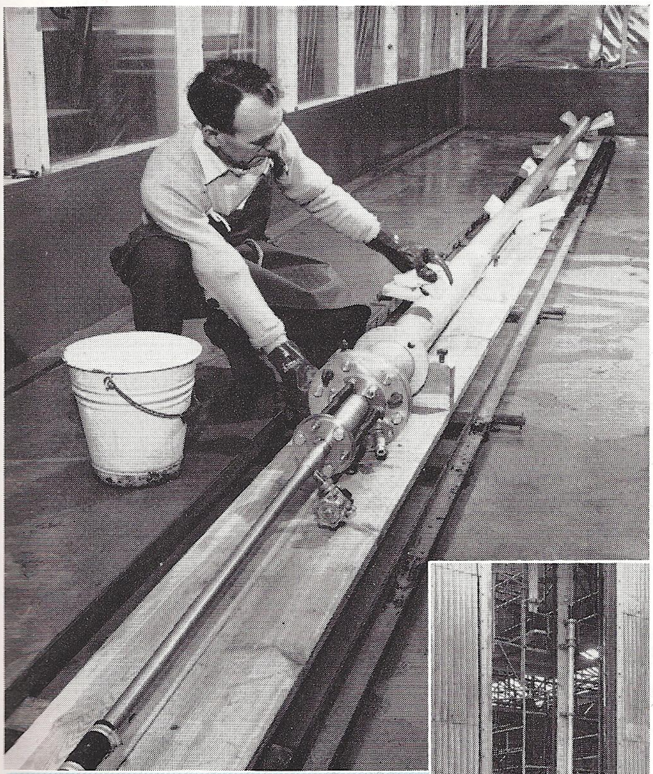


Fig. 1
The inner and outer sections of a horizontal rig for insertion in DIDO to be used to irradiate fissile uranium oxide samples at temperatures up to 1,000 deg. C. and to study the formation of fission products.

Fig. 2
The in-pile section of a BEPO loop experiment associated with the Advanced Gas-cooled Reactor programme during the final stages of assembly in a clean-conditions tent at Heston.



ring in the nuclei of all possible fuels when struck by neutrons of all energies. We wish to know the energies of the neutrons produced by such fissions. We wish to know the probability of the neutrons being captured, absorbed or scattered by nuclei of other materials which may intentionally or unintentionally be present. These are all of the category of 'cross-section' measurements, and, together, define the fundamental nuclear properties of the materials employed. The next type of closely related measurement is to examine neutron production and absorption in different arrangements of fuel and moderator and to find the best compromise. This can be done initially by small so-called sub-critical experiments, so small that no re-arrangement of the materials employed could possibly give rise to a condition of criticality. These are, by their nature, completely safe and do not, in general, constitute a serious radiation hazard. Used in conjunction with an artificial neutron source they can yield useful preliminary core design information. Larger experiments, by approaching or slightly exceeding criticality (so-called low power or 'zero-energy' reactors) can yield more representative nuclear data relating to the spectrum of neutron energies and to the distribution of the neutron population in the reactor. Higher powered experimental reactors are required to examine the effects of neutron bombardment on materials and equipment. By use of such a high-flux reactor it is possible to examine, for example, in a comparatively short time the effect of irradiation by a particular 'dose' of neutrons, as might be encountered during the working life of a power reactor. The build-up of fission products in fuel can have a significant effect on the reactivity of a particular assembly during the course of its life, and these effects, too, can be studied in a device of this type.



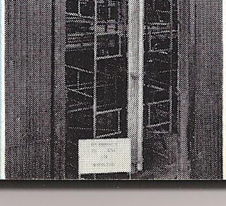


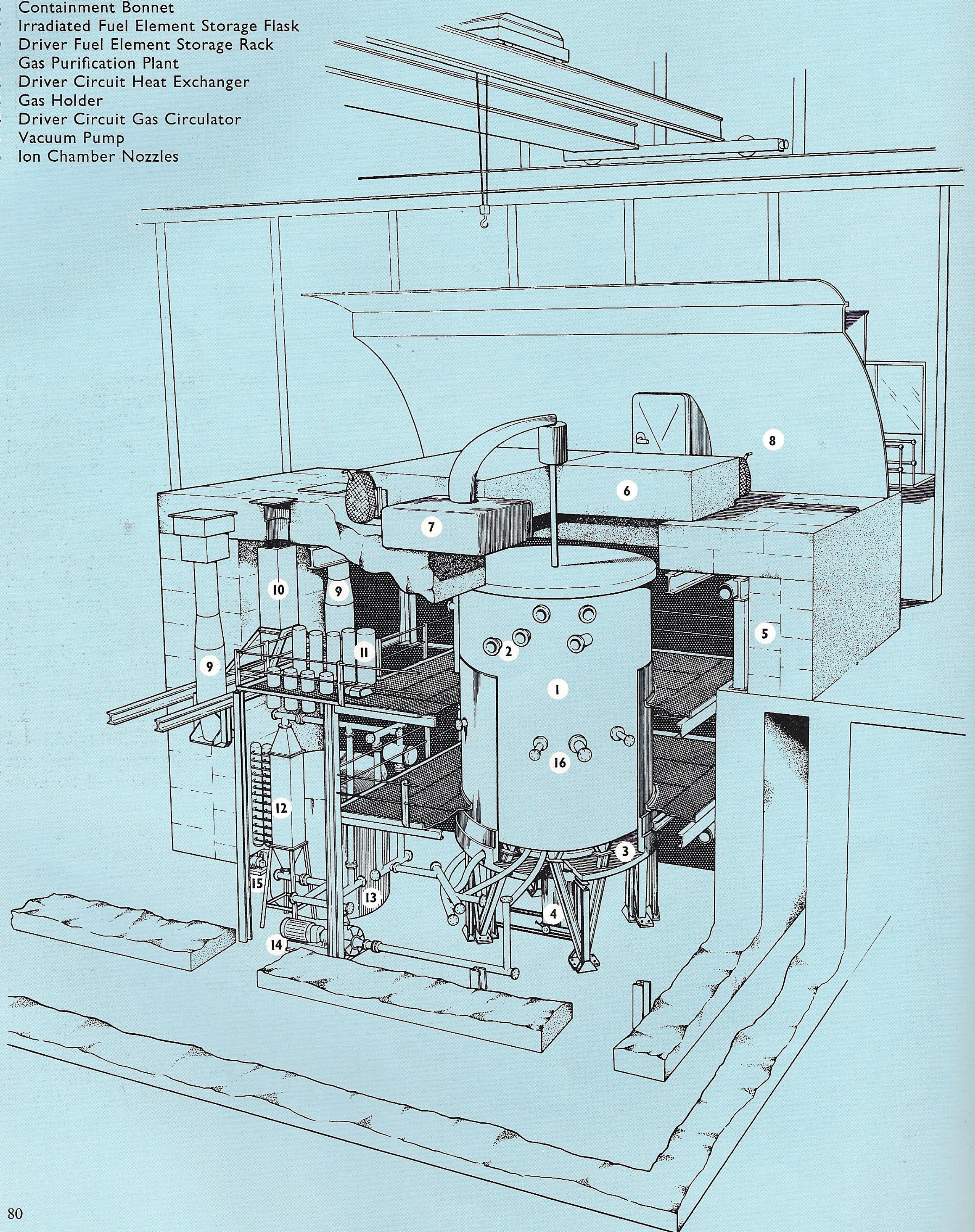
Fig. 3
Another in-pile rig for BEPO in which it will be possible to irradiate metallurgical specimens with neutrons at the temperature of liquid hydrogen (—253°C.). The rig is here shown undergoing functional testing and final cleaning.

Experiments carried out with research reactors thus can be sub-divided into two main types – experiments in which neutron production is being studied, and experiments in which the effects of neutron irradiation are being analysed. The latter are conducted by using 'in-pile rigs' or 'loops'. These are experimental assemblies specifically designed to carry out the experiment in hand. Thus it may be desirable to investigate the effect of heavy neutron bombardment of, for example, a ceramic material at a high temperature. This would be conducted in a high-flux reactor, such as DIDO at Harwell, by inserting the specimen surrounded by a suitable electrical furnace into an available experimental 'hole' giving access to the high neutron flux region. In addition to the heat produced by the furnace some heat is generated by the neutron bombardment of the specimen and its container and this makes temperature control necessary. Further, it is necessary to prevent overheating of the moderator so that the thimble surrounding the experiment must be provided with a cooling coil. In all, what

KEY *Fig. 4*

1 Pressure Vessel
2 Control Rod Gearbox Mountings
3 Lower Gamma Shield
4 Sample Catcher Flask
5 Biological Shielding
6 Trolley Doors
7 Oscillator Mechanism
8 Containment Bonnet
9 Irradiated Fuel Element Storage Flask
10 Driver Fuel Element Storage Rack
11 Gas Purification Plant
12 Driver Circuit Heat Exchanger
13 Gas Holder
14 Driver Circuit Gas Circulator
15 Vacuum Pump
16 Ion Chamber Nozzles

Hector



would appear to be a quite simple experiment demands a surprisingly complex apparatus. Fig. 1 shows part of a rig of this type, manufactured for the U.K.A.E.A. by Fairey Engineering Limited, for a study of the emission of rare gas fission products by a ceramic fuel.

Even more complex equipment can result if it is required to conduct tests of, say, a nucleonic instrument operating under reactor conditions, or to carry out engineering experiments within a reactor. These latter are conducted in so-called in-pile loops. Thus, for example, a comprehensive heat transfer or mass transfer experiment could be conducted with the working section of the experiment contained within the reactor. The PLUTO reactor at Harwell is well adapted to experiments of this type. Figs 2 and 3 show the in-pile sections of two different in-pile rigs for BEPO during the course of manufacture.

The experimental reactor work undertaken by Fairey Engineering ranges from in-pile rigs and loops through large-scale modifications to existing reactors to the design and construction of new research reactors.

One of the most recent of these reactors to be announced is HECTOR (Heated Experiment Carbon Thermal Oscillator Reactor) Fig. 4.

The U.K.A.E.A. has appointed Fairey Engineering as the major contractor for the design and construction of this new zero-energy experimental reactor. It will be erected at the Winfrith Heath Establishment in Dorset and will be used to reproduce and study the properties of different designs of power reactor. It is expected to go critical during 1962.

It comprises, in effect, a small reactor core which can represent the core of any type of graphite moderated power reactor, within a larger graphite moderated reactor containing enriched fuel, which 'drives' that under test. There is a central cylindrical hole within the test reactor in which it is possible to oscillate samples under test. The effect of the oscillating sample on the power of the reactor can be measured. This is a technique which has been established by U.K.A.E.A. at lower temperatures. In this reactor it will be possible to maintain the reactor under test at temperatures up to 450 deg. C. with temperature drift rates no greater than 0.003 deg. C. per minute. It will be the first reactor in the world in which oscillator measurements can be made and in which different core designs can be studied over such a wide range of conditions. It will be used to study in particular uranium fuels with different degrees of uranium 235 or uranium 233 enrichment, plutonium, thorium, and irradiated fuel elements discharged after long burn-up periods from power station reactors.

The degree of temperature control required is very close, and experimental work to develop and prove the system to be employed is in hand at Fairey Engineering's Heston factory. Figs. 5 and 6 show the rig and instrumentation employed during its erection.

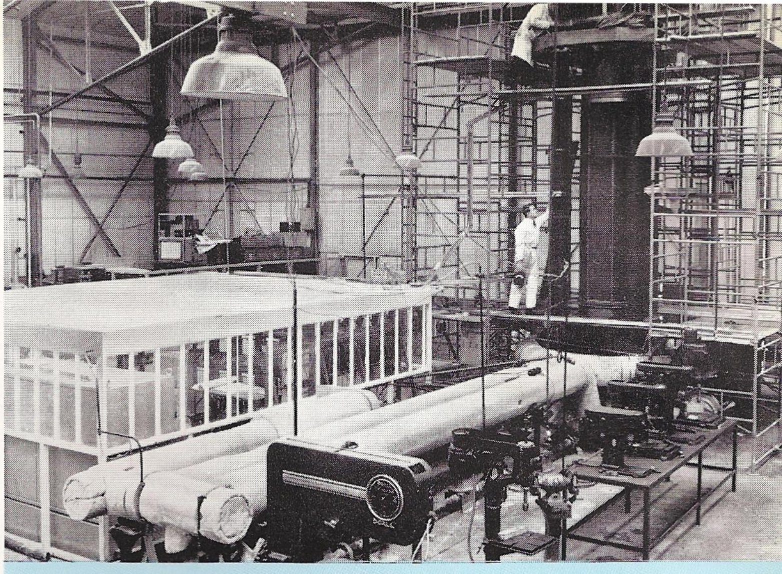


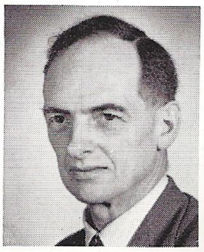
Fig. 5 (above) Temperature stability test rig during erection at Fairey Engineering's works at Heston. A graphite stack contained within the vessel surrounded by scaffolding is being used to simulate the core of HECTOR to develop methods of achieving the very accurate control of temperature required.

Fig. 6 (below) Part of the control and instrumentation room associated with the temperature stability test rig.

THE HECTOR TEAM

Leading the Fairey Engineering HECTOR team at Heston is Mr. L. W. Reeve, Chief Engineer, Nuclear Division (Heston). Chief Designer, Experimental Nuclear Equipment, is Mr. R. C. Floud. Mr. R. V. Read is Project Engineer and Assistant Chief Designer and Mr. G. E. Thomas, Chief Designer, Nuclear Control Equipment.

MR. L. W. REEVE



MR. R. C. FLOUD

MR. R. V. READ

MR. G. E. THO[M]

Towed Targets

Fairey Engineering to Market U.S. Systems in Europe, Commonwealth, Africa, and Middle East

FAIREY ENGINEERING LTD. is to market complete subsonic and supersonic towed-target systems for air-to-air and surface-to-air guided weapon training under an agreement announced in November with Del Mar Engineering Laboratories of Los Angeles, California, U.S.A. The agreement covers the exclusive distribution by Fairey Engineering of these systems in Great Britain and most of Europe, Africa, the Middle East and the Commonwealth.

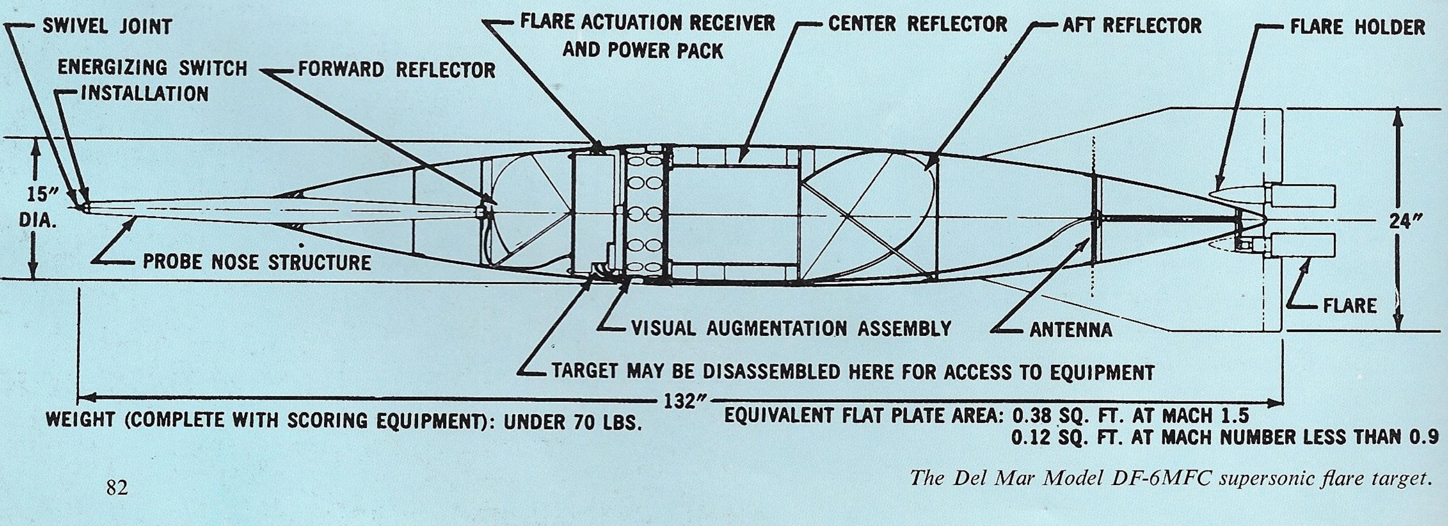
Great interest is being shown by the Royal Navy and the Royal Air Force in the Del Mar towed-target systems and Ministry of Aviation trials are to start soon. They are already in service with the Royal Canadian Air Force. Royal Belgian Air Force, the U.S. Navy and the U.S.A.F.

Fairey Engineering will provide complete installation and training facilities with repair and maintenance support. The systems themselves will be built in the U.S.A.

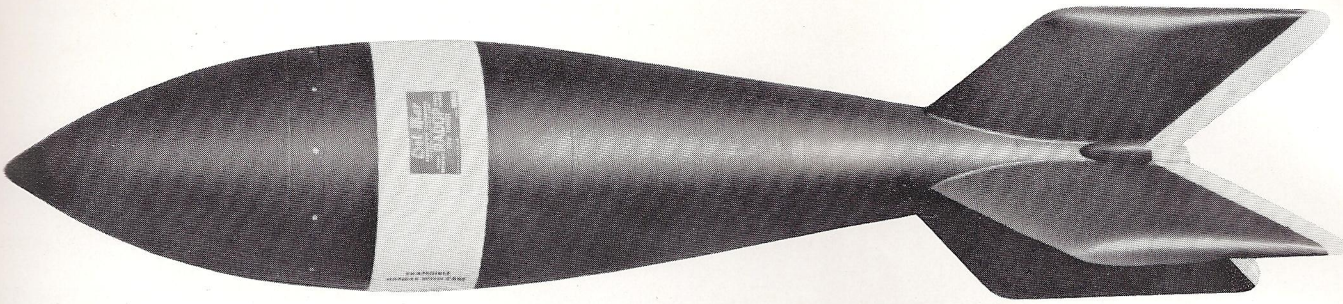
Key component of the Del Mar RADOP (radar/optical) system is an extremely light streamlined wingless target containing a unique radar reflector. This reflects energy from the A.I. radar of an attacking fighter or ground defence unit to present a radar 'blip' comparable to that of a large multi-engine jet bomber. The radar in the attacking aircraft can lock on to this 'blip' at 20 miles range, while Ground Control Interception Radar will acquire it at 150 miles. Unlike banners and other towed targets the Del Mar can be flown at a speed, manoeuvrability and altitude comparable in every way with that of a potential enemy aircraft. Loss of performance to the towing aircraft is only 2 per cent.

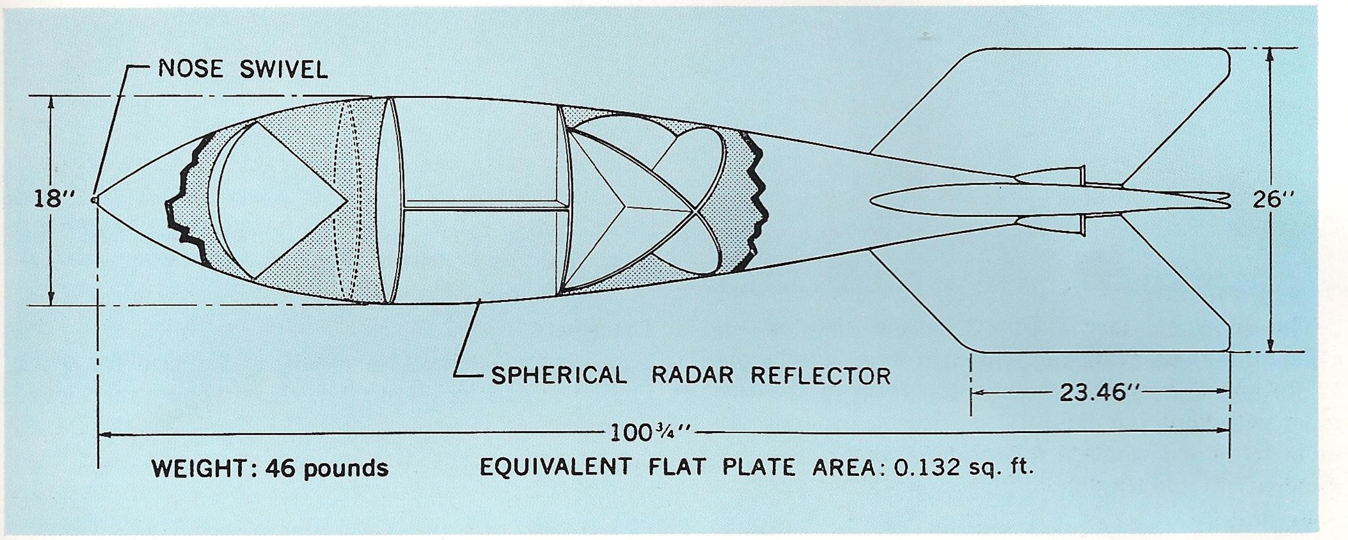
The complete Del Mar equipment including the towing and recovery reel with $6\frac{1}{2}$ miles of fine steel wire, the launcher, and the target itself can be fitted to any aircraft in about 30 minutes after simple initial modification.

This means that an operational fighter squadron can be responsible for its own weapons training programme in all weathers, at any time, anywhere in the world, and at operational heights and speeds. The merits of such a system must be compared with the conventional weapons training programme, which frequently involves moving the squadron's aircraft to a specified range at a specified date so that it can fit into a complex ground control organisation which will launch an expensive radio-controlled aeroplane.



The Del Mar Model DF-6MFC supersonic flare target.





Above: Model DF-4MFC lightweight flare-carrying tow target.

There are two basic versions of the Del Mar RADOP system, one for subsonic and the other for supersonic (Mach 1.5) training. Both can be used not only for air-to-air and surface-to-air guided weapon trials but also for cannon, shell and ballistic rocket training. Both are made of moulded pressed fibre bonded with plastic and can be fitted with special heat-sources so that infra-red guided weapons can home on them, as well as with a coloured smoke-puff device to enable the attacking fighter pilot to find the target visually at long range.

For ballistic-rocket firing, a combined radar-ranging set/cine-camera device known as a Scorer can be installed on the attacking aircraft. This provides a permanent motion-picture assessment of the accuracy of a salvo of rockets.

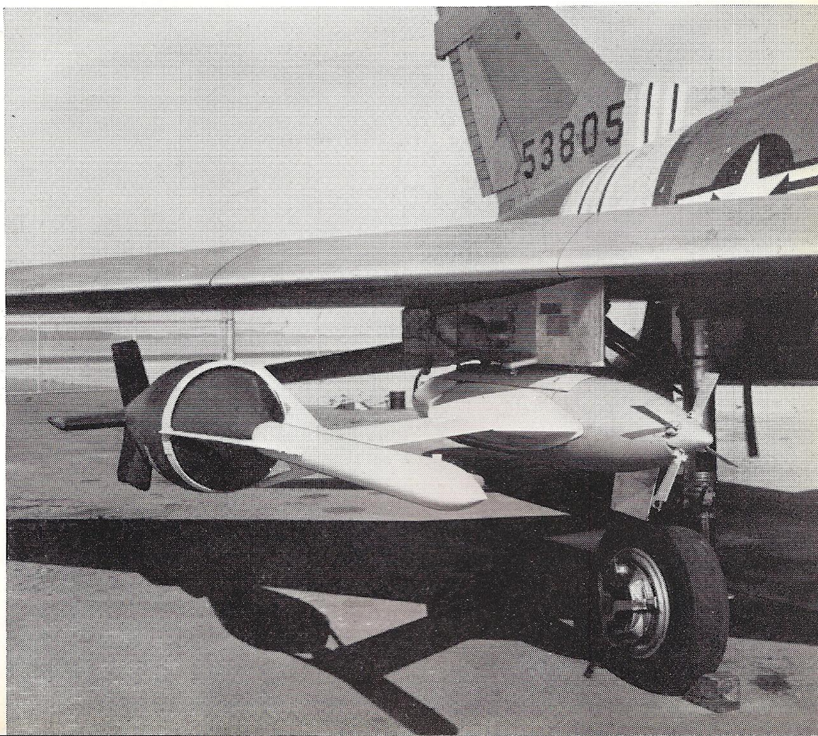
Technical Details

The RADOP (Radar/Optical) target system consists essentially of a target, launcher and tow reel, produced in a number of forms to meet different varying aerodynamic and weapon requirements.

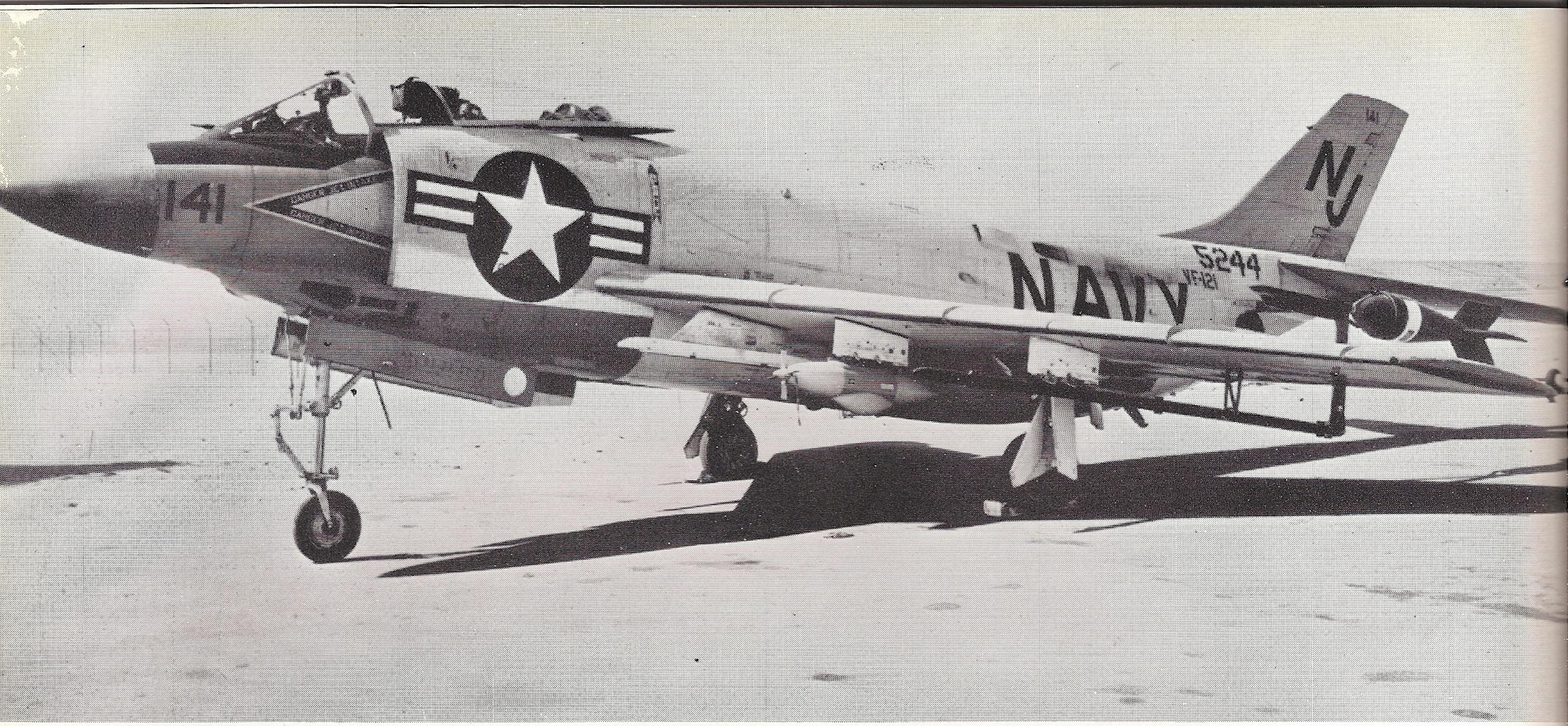
Targets

There are two basic forms of target, the sub-sonic DF-4 series and the supersonic DF-6. Both contain as standard equipment, a radar reflector assembly designed to give 360 degree coverage. This 'spherical' radar reflector consists of aluminium-coated foamed plastic planes joined to form 90 deg. corner reflectors. It is situated within the target at the point of maximum diameter and is so designed that attenuation of radar energy, as it passes through the pressed-fibre shell, is negligible. The radar energy reflected by the target presents an image comparable to that of a large multi-engine aircraft, and it provides a virtual 'sphere' of uniform reflectivity from any attack angle.

(continued overleaf)



Model DXL-4A reel-launcher combination, with a DF-4RC target, on an F-100 Super Sabre aircraft.



U.S. Navy McDonnell F3H Demon carrier-based fighter equipped with a Del Mar towed target installation.

The sub-sonic target DF-4R is the simplest and cheapest version available. It is 8 ft. long, weighs only 17 lb. and carries only the simplest form of the basic radar reflector. The DF-4RC version incorporates the radar reflector giving full spherical coverage and has the same weight and length.

The most sophisticated version of the sub-sonic target is the DF-4MFC which, in addition to the radar reflector, is designed to carry four infra-red flares at the roots of the stabilising fins. These flares are ignited through the U.H.F. or V.H.F. receiver also fitted within the target.

The receiver can take its commands either from the normal transmitting set in the attacking aircraft, or from the towing aircraft, or from a ground station.

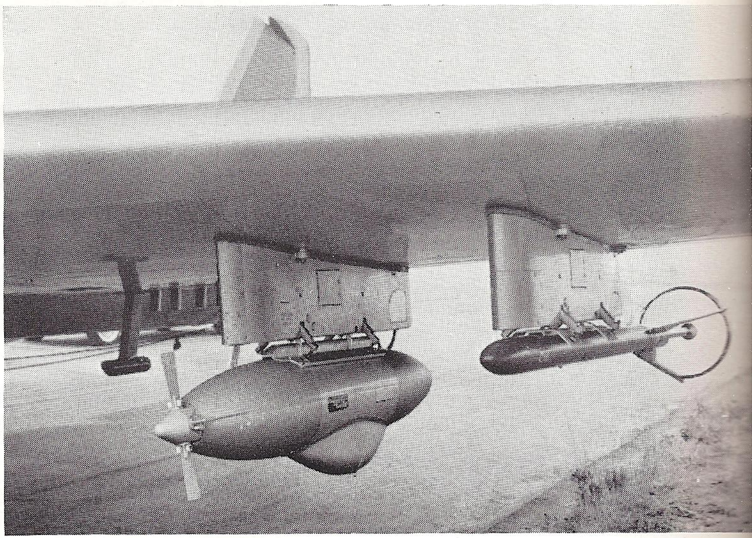
The flare ignition system can be pre-set before flight to fire one, two or four flares from one command signal. With all four flares burning the infra-red output is representative of a large multi-engined jet bomber.

The DF-6MFC supersonic (up to Mach 1.5) target incorporates all the facilities of the DF-4MFC, and in addition is equipped with a visual augmentation unit. This unit takes the form of two discs of twelve cartridges containing fluorescent powder, which are set off by a similar system to that used for the infra-red flares.

On receiving the command signal, one disc of twelve cartridges is discharged over a period of one minute. A further signal will fire the second disc. The puffs of fluorescent powder enable an attacking pilot to pick up the position of a target which would otherwise be impossible to detect at the extremes of visual range. The command system can be pre-set to ignite infra-red flares and 'puffer' cartridges simultaneously.

Launchers

The sub-sonic target launchers are designed for quick under-wing attachment to the standard bomb shackles or pylons of the towing aircraft. The simplest is the DL-45 for use with the DF-4 series. A more sophisticated form is used for the probe-nosed DF-6 supersonic target. In this case the launcher is suspended at the end of a swinging pylon attached to the rotating centre section of the tow-reel. Known as the Model DXL-6C, it too is designed for under-wing attachment in a similar fashion to the sub-sonic launcher. During taxi-ing the swinging pylon of the launcher, complete with the target, is rotated into the horizontal position under the wing to allow adequate ground clearance. In flight, the pylon is lowered to its vertical position for target launch, tow and recovery. This arrangement avoids turbulence near the wing during launch and recovery at high speeds.

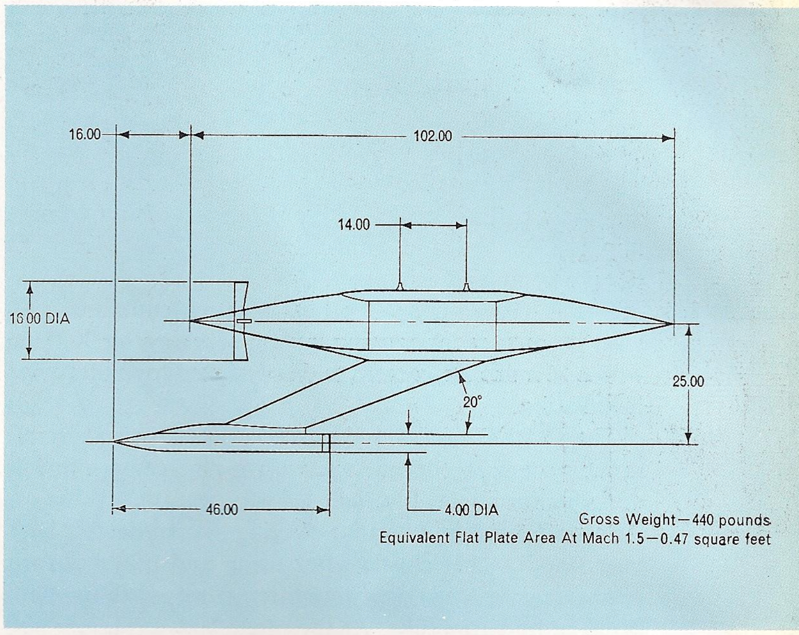


DX-4A Tow Reel and DL-45AB Launcher installation on port wing of B-57E aircraft (Martin-built Canberra).

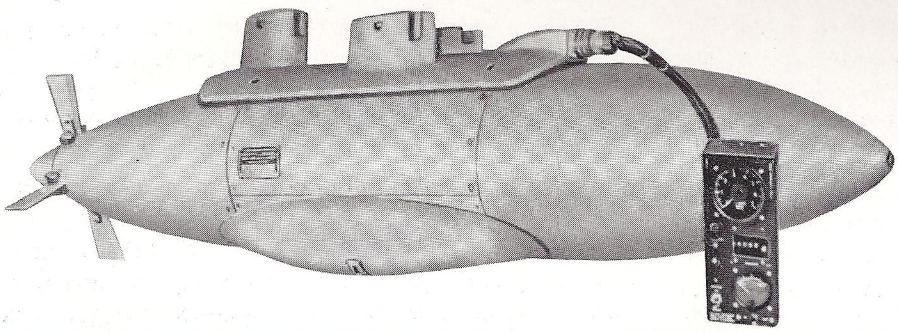
Tow Reels

The DXL-4A tow reel is an externally stored turbine-powered reel designed for towing the DF-4 targets with wire line. Energy to operate the reel is derived from the airstream passing over four turbine blades. This turbine is coupled to a reel drum which travels fore and aft as tow line winds on or off.

The tow reel can be attached to standard bomb pylons or to the fuselage or to JATO racks and has a nominal horsepower delivered to, or absorbed from, the reel drum that exceeds 10 h.p. at 5,000 turbine r.p.m. At 5,000 turbine r.p.m., five miles of .040 inch diameter tow line reels in or out in less than 20 minutes. An over-speed switch and relay automatically actuate the reel drum electric brake at 6,500 turbine r.p.m. All controls are operated by 24-28 volt d.c. power. A reel operator's control box has a turbine blade pitch indicator, turbine r.p.m. indicator, cable footage counter, cable cutter switch, master switch, brake switch and blade pitch control.

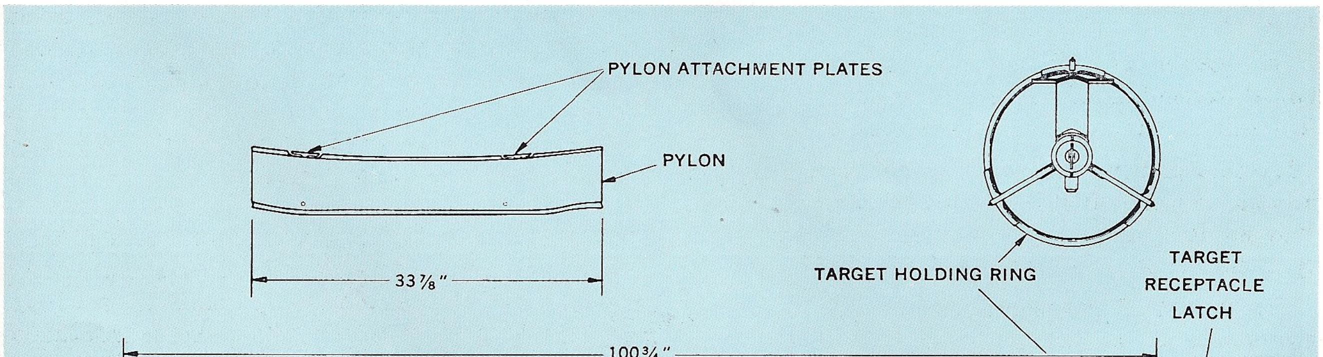


Model DXL-6C Reel Launcher.



Left: Model DX4A Tow Reel for towing the DF-4 targets.

Launcher Series DL-45 for front-shackle and pylon installations.



Standard musical wire is used in these tow reels in diameters of .033 in., .040 in., .045 in., and .050 in. These reels have a capacity of up to $6\frac{1}{2}$ miles of wire depending upon diameter.

Scorer

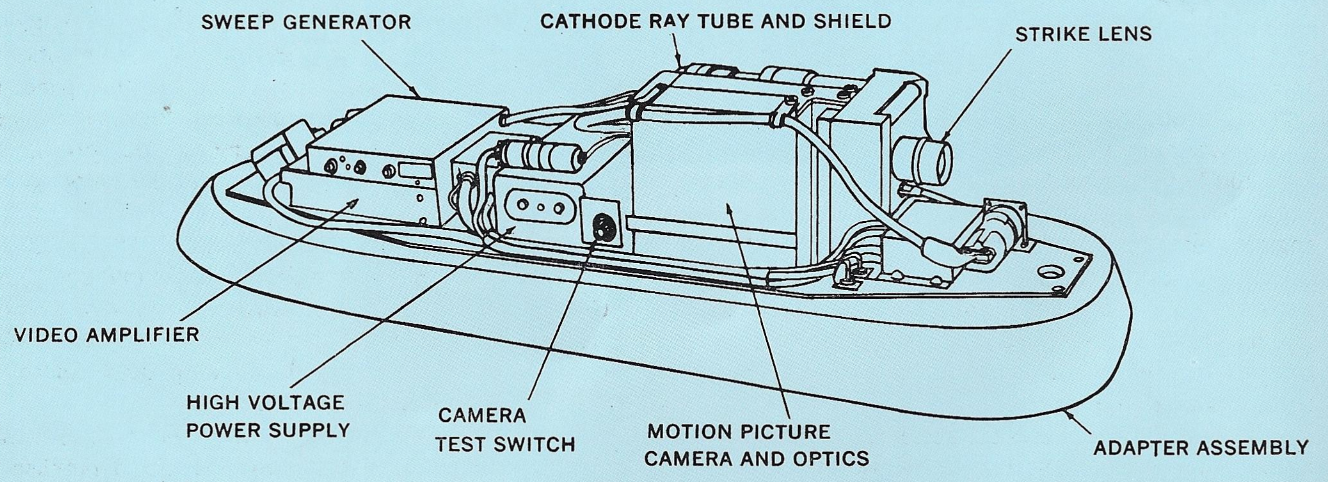
The Scorer is installed on the attacking aircraft for use in air-to-air ballistic rocket training. It records on 16 mm. film the vertical and horizontal miss-distance between the projectile and the target.

The D-100A model is an entirely self-contained unit with its own radar-ranging system working on X-Band with a 16 mm. cine-camera and is designed for under-wing installation.

The D-100B model makes use of the existing aircraft radar system in conjunction with a cine-camera and is designed for internal fitting.

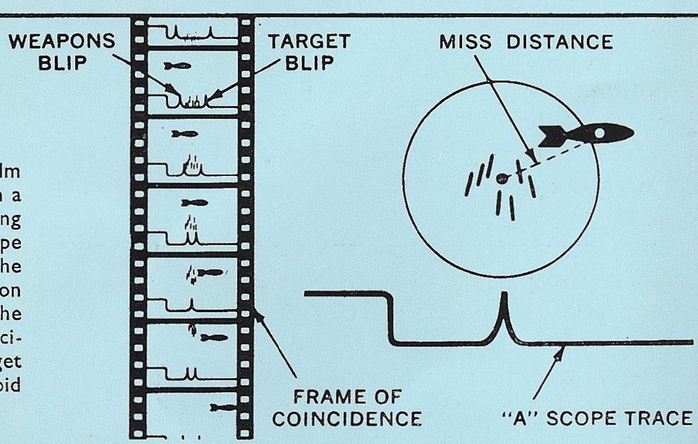
In both models the radar-ranging system detects both target and rocket cluster after firing and presents their relative range from the firing aircraft as two blips on a small cathode ray tube. As the range between target and rocket cluster decreases, so the two blips move towards each other. This presentation is passed through a series of lens and prisms to one half of the divided optical system of the cine camera. Thus each frame of the film will show a progressive convergence of the two blips. Coincident with this, the forward-facing lens of the cine-camera transfers a visual picture of target and rockets on to the other half of each film frame. At the point where rockets and target are equidistant from the firing aircraft, the two range blips on the film will be coincident. When assessment is being made after a firing sortie, the assessor will be able to select the film frame at which the blips coincide. This represents the instant at which the rockets were at their nearest point to the target.

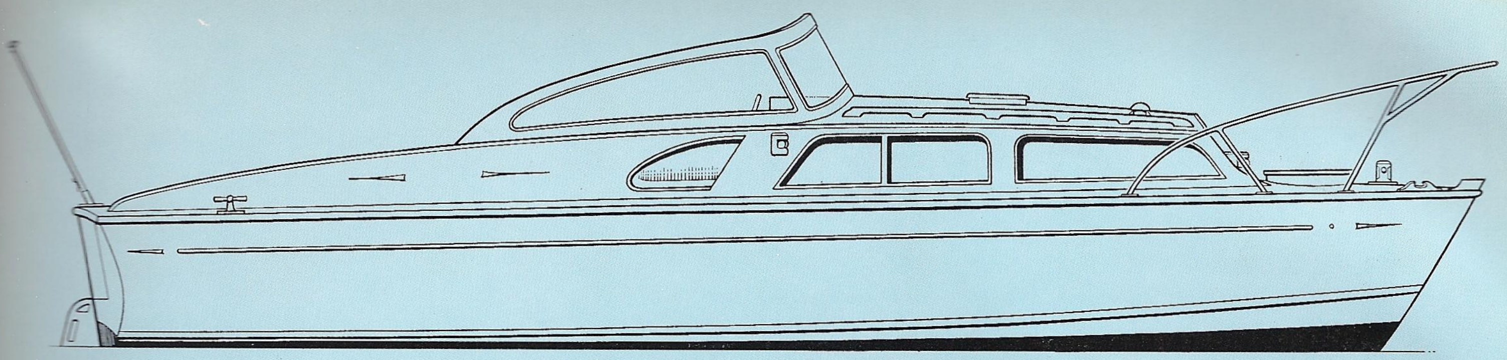
In the case of a dead abeam attack the actual miss-distance can easily be measured by setting a pair of callipers against the overall length of the target. Using this measurement as a scale, the callipers are walked from the centre of the target to the centre of the rocket cluster. Where attacks are made off the beam, allowance is made for the fore-shortening of the target image on the film.



ASSESSING SCORER FILM

Miss-distance information is presented by the Scorer. Each frame of film combines a motion picture record of the attack, with radar range data, in a three-dimensional photographic record. Scoring is accomplished by selecting the 'frame of coincidence'. Target blip appears on the right side of the 'A' scope trace and moves to the left (decreasing range). Weapons blip appears on the left side of the trace and moves to the right (increasing range). The frame on which these returns are superimposed, indicating that the target and the weapons are at the same range from the firing aircraft, is the frame of coincidence. With the frame of coincidence selected, divide the length of the target image into the length of a line drawn from the target to the weapons centroid and multiply the result by actual target length (eight feet).





HUNTSMAN 28

Fairey Marine's New Power Cruiser

A 28 FEET LONG, sea-going, sleek twin-engined cruiser with a hull basically shaped by international designer Ray Hunt of Boston, Mass., and designed and built by Europe's leading boatbuilder, Fairey Marine Ltd. That is the winning formula for the Huntsman 28 – the newest boat in the Fairey range.

The three major requirements which most serious motor yachtsmen ask of a boat are:— twin engines for safety; good sea-keeping qualities combined with a high cruising speed; diesel-engined safety and economy.

All these factors have been built into the Huntsman. Two 100 h.p. Parsons Barracuda diesels satisfy the twin engine requirement. They are the reliable Fordson tractor engines marinised by Parsons Engineering. At the continuous rating of 2,200 r.p.m. the cruising speed is 23 m.p.h. At maximum r.p.m. (2,450) the speed is 26 m.p.h. The fuel consumption of four gallons an hour by each engine gives a maximum range of more than ten hours at 25 m.p.h.

The Huntsman 28 shares the same basic hull design as the already popular Huntress 23 whose sea-going performance has drawn enthusiasm from the most experienced helmsmen. Trials with the first Huntsman 28 in rough seas have shown her behaviour to be even better. Her remarkably 'soft' ride, good lateral stability and absence of pounding promote immediate confidence. She cruises happily at more than 23 m.p.h. despite heavy sea conditions.

More and more people specify that their boats should be diesel-powered. This is partly because diesel fuel has a higher flash point than that of petrol and is therefore safer.

The other consideration strongly favouring the diesel-powered boat is the comparatively low cost of diesel fuel and the engines' low rate of consumption. As an alternative, Fairey Marine supplies a petrol-engined Huntsman 28 for even faster performance.

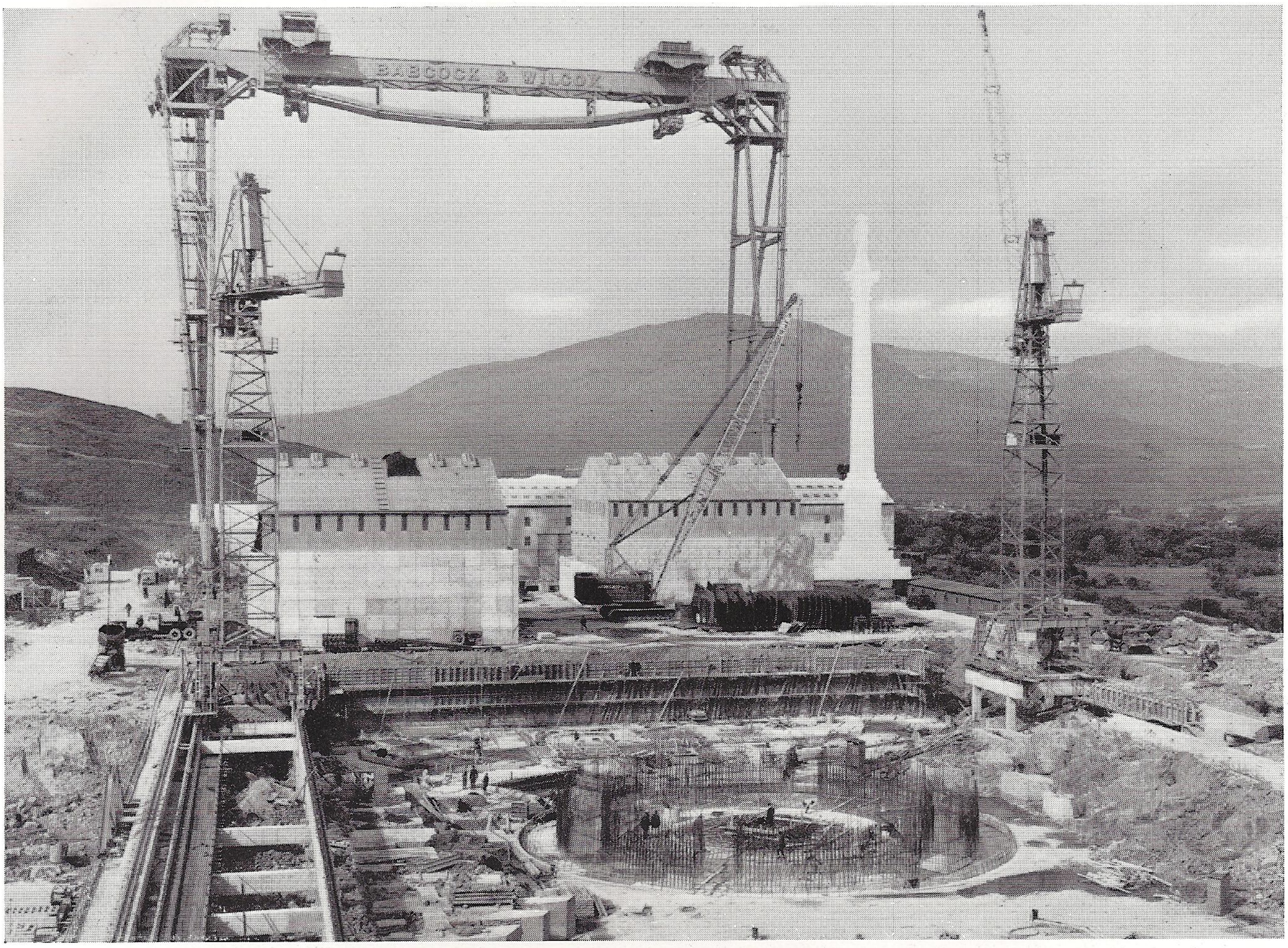
The new Huntsman abounds with sensible features that make power-boating more pleasurable. The flush teak-deck aft cockpit is large enough for sunbathing and is designed to accommodate a 7 ft. 6 in. Fairey Dinky tender.

The fuel tank, with a capacity of 90 gallons of diesel fuel, is situated beneath the aft cockpit deck. The engines are carefully soundproofed. Controls and instruments are simple; single-lever throttle-gear control and independent 12 volt electrical system are provided for each engine. The bridge has comfortable seating for four people. A large wrap-around windscreen gives the pilot good visibility and protection.

Step down from the spacious cockpit and you are in the 'all mod. con.' section of the cabin. On one side is the galley, housing a sink unit with water pump, a two-burner Calor gas cooker, racks for plates, cups and saucers and a locker for the cooking pots. Space is available for an electric refrigerator.

On the other side is a neatly-fitted lavatory, a wash basin, and space for hanging oilskins. Fixed bulkheads have been kept to a minimum in the cabin and the galley/toilet space can be closed off from the main cabin by a Marley Vynide folding door, which folds back to within five inches of the cabin sides. The main cabin has a 6 ft. 3 in. foam-rubber-covered bench seat on each side. A large table fitted in the centre can be folded and stowed out of the way. When fitted at bench level this table forms the base of the centre section of a double bed.

At the forward end of the cabin are two cupboards for hanging clothes and four drawers for clothing or charts. Under the cupboards is a 20-gallon fresh water tank. Headroom throughout the cabin is 6 ft. 2 in. A centrally-placed clear Perspex hatch provides daylight and could act as an escape hatch in an emergency. On deck, there is is a chromed bow pulpit enclosing a wide teak deck working area.



The Reactor 2 area seen from the South West Monotower and dominated by the 250 ft. Goliath crane. The drawing alongside of Nelson's Column (185 ft.) gives some idea of the size of this gigantic 400-ton crane. The buildings include some of the workshops for International Combustion Ltd.

Progress at Trawsfynydd

A report on current work at Trawsfynydd, Britain's newest nuclear power station. It is being built in North Wales by Atomic Power Constructions Ltd. for the Central Electricity Generating Board.

To date most of the major excavations and foundation works on the site have been completed and some 150,000 cubic yards of material removed. Work on the 93 ft. high by 10 ft. 6 in. thick reinforced concrete shield is well advanced and by the time the station is completed some 20,000 cubic yards of concrete will have been poured, all of which, both cement and ballast must be brought in by road. The route from Portmadoc Quay to site has been almost completely rebuilt, the narrow winding rock-walled lanes being replaced by wide constant gradient roads, over which vehicles can carry the heavier or bulkier reactor components, such as boiler strakes and pressure vessel shell plates.

On site the dominating feature is the 250 ft. high 400-ton-lift Goliath crane. The illustration showing Nelson's Column (185 ft.) to the same scale provides a good indication of the actual size.

Fairey Engineering activities on site have so far been of a preparatory nature and concerned mostly with the establishment of workshops, offices and the solution of storage and working area problems.

The first permanent F.E.L. representatives will be on site by the end of this year.

The main Fairey Engineering contributions to the station are programmed to appear on site from the end of 1961 onwards. While perhaps not as large or spectacular as some of the items now being erected, they are, nevertheless, the 'heart' of the reactor and as such are highly important and must be manufactured and erected to extremely high standards of workmanship.

Graphite Machining

At the Fairey Engineering Stockport factory, a graphite machining facility is nearing completion and when finished will be among the finest in the country. It will be producing the *graphite core*, consisting in each reactor of 83,000 individual pieces of graphite which, when assembled, approach a finished weight of 1,800 tons. The machining operations must be carried out under rigidly-controlled clean conditions and as the machining of the graphite for one reactor produces some 1,200 tons of graphite 'swarf', the magnitude of the operation is obvious. The whole graphite operation, programmed to a very tight schedule, requires extremely detailed planning as each graphite part must be machined, inspected, packed, transported to site and arranged in the graphite store in correct sequence, transferred as required into the reactor building, unpacked, re-inspected, cleaned, placed in position in the core and finally inspected for positional accuracy.

Associated with the graphite are many thousands of metal components which must also be accurately controlled.

The **Fuelling Machines** service certain components within the core, in addition to their major role of charging and discharging uranium fuel from the reactor. Each machine, weighing about 400 tons, consists of a 50 ft. high pressure vessel surrounded by heavy shielding. Within the vessel are mechanisms which enable the machine to be connected to the main reactor pressure vessel and to carry out refuelling or other operations with the reactor at full pressure and temperature (240 p.s.i., 400 deg. C.). As no other nuclear power station of the Trawsfynydd type is yet in operation, no actual experience of mechanisms working under these conditions is available. Every station has a different system or design of fuel handling equipment.

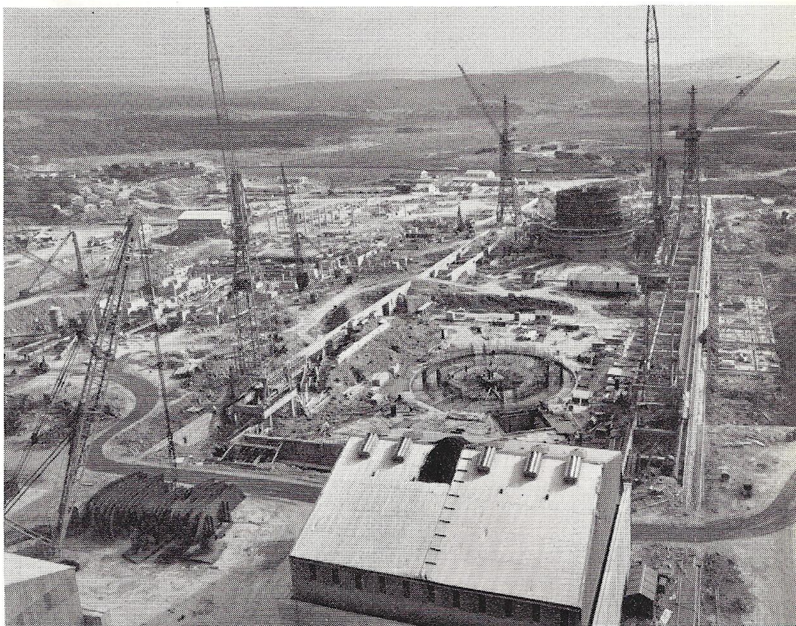
It has been necessary, therefore, to provide for an extensive test and development programme in order to guarantee the reliability of the equipment. The necessary facilities are being built at the Heston factory. The largest and most important item of test equipment is the 'Environmental Chamber', a pressure vessel, with internal heating, designed to work at 240 p.s.i. and 400 deg. C. and large enough, with standpipe extension, to test the reactor fuelling machine mechanisms. The chamber is located in a pit some 25 ft. square and 25 ft. deep and will be surmounted by a 50 ft. tower. Other specialised equipment includes special seal test rigs and a tower from which control rod drop tests are being carried out.

The **Irradiated Fuel Disposal Equipment** which receives burnt up, but still highly active fuel elements, from the fuelling machine. It selectively despatches these elements down chutes to the underwater acceptance bay where more Fairey Engineering equipment carries out further operations before the fuel is finally despatched to the cooling pond. Both the Fuelling Machines and Irradiated Fuel Machines are controlled from a central control room and Fairey Engineering is also designing and manufacturing the control equipment associated with them.

The **Control Rods and Mechanisms** are the means by which the reactor is controlled. The mechanisms which lower and raise the control rods into and out of the reactor core are highly specialised pieces of equipment and will require the most rigorous testing and development.

In addition to the above, F.E.L. will be supplying many more items for the Trawsfynydd reactor including new fuel equipment, Wigner measuring equipment, ion chamber mechanisms, crane control gear and 450-ton capacity maintenance bay trolleys.

Wide-angle view of site from Goliath Crane.



Fairey Air Surveys News

Europe to India Highway

F. A. S. WINS AERIAL SURVEY CONTRACT FOR PART OF ROAD LINKING ISTANBUL AND KARACHI

Fairey Air Surveys Ltd. has been awarded a contract to map 270 miles of road in Iran as part of a major road reconstruction project to link Turkey with Teheran. When the road is built it will be the final stage in a highway linking the capitals of Europe with India and the Far East.

The survey has been ordered by an Iranian firm of consulting engineers, E.T.C.O., and comprises the mapping at 1/2000 scale of approximately 430 kilometres (269 miles) of road between Zendjan and Marand, in North East Iran.

The aerial photography will be executed with the collaboration of the National Cartographic Centre of Iran, with whom Fairey Air Surveys was previously closely associated under a consulting and training agreement. Photographic flights will be made to achieve cover at scale of 1:10,000 and 1:7,000, and whilst the former will be used for mapping, the larger scale photographs will be employed for the plotting of road cross-sections by Zeiss Stereoplanigraph C.8.

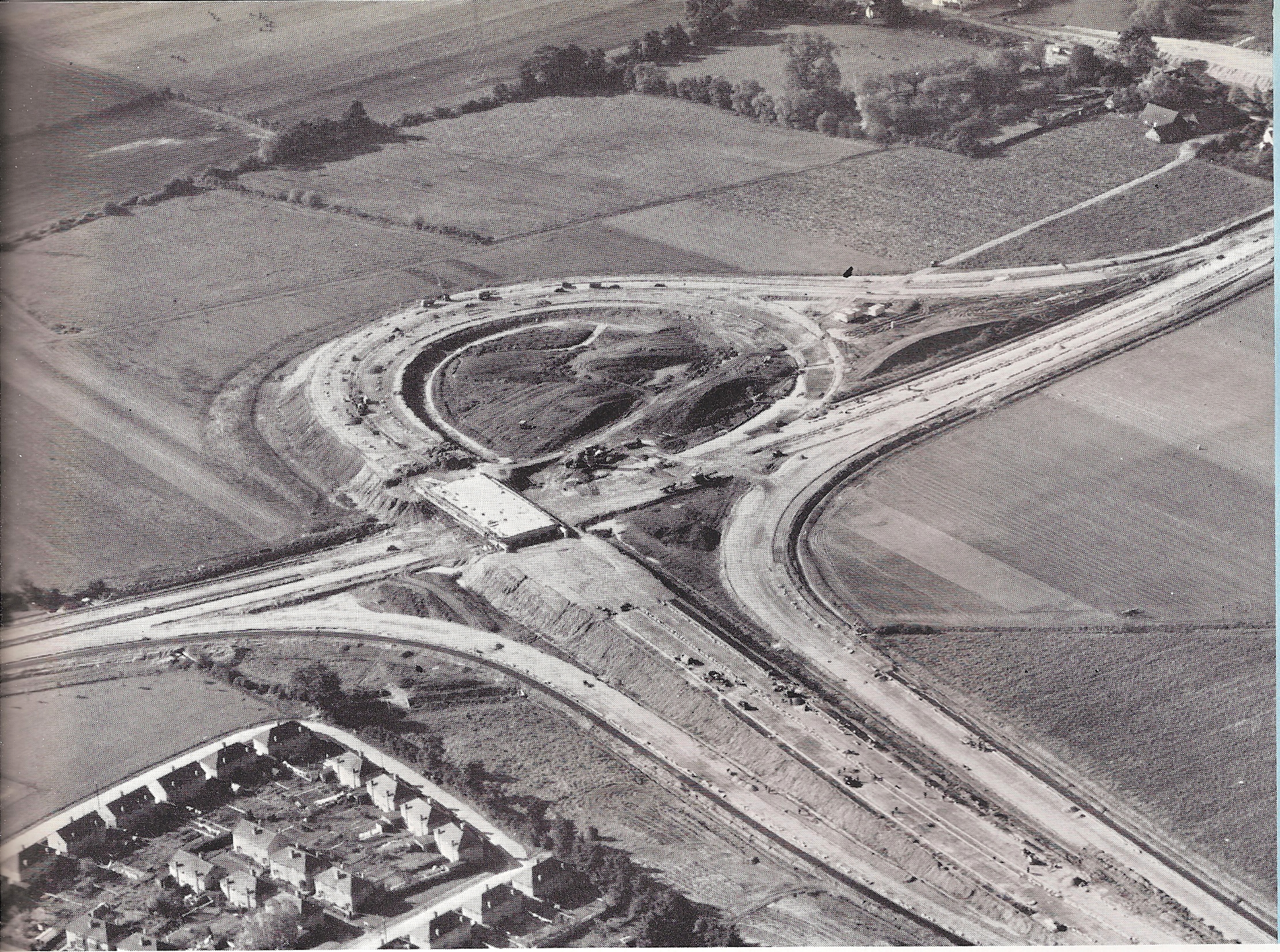
A Fairey survey team arrived in the field in November, operating from the small town of Mianeh. It is equipped with Tellurometer distance measuring equipment and Zeiss automatically compensating levels. Mr. M. G. Burry, who is in charge, has been with the Company since 1955 and has recently undertaken field surveys in Nigeria and Sierra Leone. In 1959 he completed the diploma course in photogrammetry under Professor E. H. Thompson at London University.

In addition to contoured mapping, permanent 'bench marks' of concrete blocks which act as reference points are being emplaced at 1,000 metre (1,100 yard) intervals along the whole of the route. These have been placed in position at known heights prior to photography and will be given co-ordinates in the first order plotting machine. This data will be of particular value in sections where a new alignment is being developed through currently undeveloped terrain (as between Mianeh and Siah Tchaman) since it will provide permanent well-surveyed points from which engineers may 'set out' the final centre line by simple survey methods.

It is expected that field surveys will have been completed before winter weather conditions begin to retard progress, and the subsequent mapping and plotting of cross sections should be in full swing during the first half of 1961. The latter, in particular, constitute a major project, no less than 2,700 plottings being required for the whole alignment.

Some of the difficult terrain in North East Iran through which the present Ankara-Teheran Highway passes. The picture was taken by Mr. W. P. Smith, Technical Director of Fairey Air Surveys, when he visited Iran in July for the reconnaissance stage of the project.

MR. M. G. BURRY



End of Maidenhead By-pass at Huntercombe Spur

U.K. Work Expanding

ALTHOUGH the major part of Fairey Air Surveys' work is in less highly-developed countries overseas, the number of contracts it has received from authorities in the United Kingdom has grown steadily in the last year.

Since April, contracts have been awarded to the Company by British Railways, the Central Electricity Generating Board, County and Borough Councils, development companies, the sand and gravel industry and estate owners.

The following list does not attempt to show every survey undertaken in the last four months but it does indicate the increasing awareness in this country of the saving in time and money that can result from calling in Fairey Air Surveys.

British Railways

LONDON MIDLAND REGION: Main line, marshalling yards and maintenance buildings between Kensal Green Tunnel and Wembley Central Station, Middlesex. Photography and mapping.

SOUTHERN REGION: Main line between Salisbury, Wiltshire, and Woking, Surrey. Photography, large-scale plans and folding-book strips of photographs. Busy London line between New Cross Gate and Deptford. Photography, large-scale plans and folding-book photographs.

Central Electricity Generating Board

Survey for proposed power line in Yorkshire. Photography and large-scale contoured maps.

County Councils

LANCASHIRE: Photography and 1/500 contoured maps of area at Skelmersdale.

COUNTY DOWN: Photography and mapping of stretch of coastal road between Mill Isle and Donaghadee.

SURREY: Photography at scale of six inches to one mile of small areas at Ham, Egham, Walton and elsewhere.

BERKSHIRE: Photography at 1/2500 and contoured plans at 1/500 – required for road improvement work at Long Lane, Purley; Pangbourne to Streatley; Maidenhead to Windsor.

ESSEX: Photography and 1/500 contoured maps of Springfield – Boreham By-pass. (London – Gt. Yarmouth Trunk Road.)

HERTFORDSHIRE: Photography and 1/500 plans of Hertford Relief Road, and King's Langley to Tring. (A.41 London – Aylesbury Trunk Road.)

Borough Councils

SWINDON, WILTS.: Photography and 1/500 maps, with contours at one foot intervals, for proposed housing development.

NEWCASTLE-UNDER-LYME, STAFFS.: Photography and large-scale mapping for proposed housing development.

Private Estates

Photographic mosaics of estates near Reading, Berkshire and Little Hampden, Buckinghamshire.

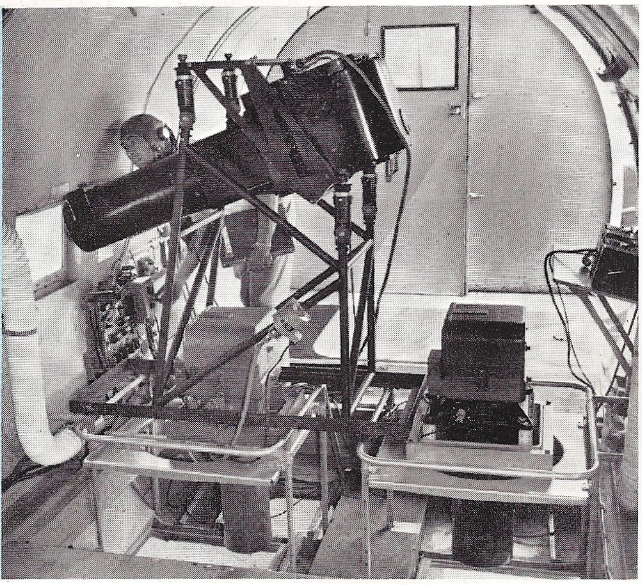
Sand and Gravel Industry

An increasing number of members of this industry are now aware that accurate air photography is an ideal method of obtaining a clear picture of current progress, as well as providing an excellent medium for planning purposes. During the last few months over 60 pit sites have been covered and 1/2500 rectifications supplied to private owners and various districts of the Sand and Gravel Association of Great Britain.

Water Boards

Mosaics and large scale contoured plans of Diddington Reservoir site for Mid-Northamptonshire Water Board.

Test Contract from Ministry of Aviation



One of the Fairey Air Surveys Dakotas used for testing Ministry of Aviation airborne photographic equipment.

FAIREY AIR SURVEYS is under contract to test airborne photographic equipment for the Ministry of Aviation. A DC-3 aircraft from the Fairey Air Surveys fleet is set aside for the work; this photograph shows its camera bay.

A large 48 in. Williamson F96 camera is directed through an aperture for oblique photography. Its anti-vibration mounting and isolators were designed by Fairey Air Surveys for the Royal Air Force.

Beneath the oblique camera is a standard 36 in. F52 mounted vertically. Beside it is another vertically mounted F52 24 in. camera which is being tested for auto-iris control. Above it, on the shelf on the right, are two small F95 cameras mounted for oblique work. These cameras are in standard use by the Royal Air Force for low-level tactical reconnaissance.

At the controls of the large oblique camera is Mr. F. J. Worton, Fairey Air Surveys' Flight Trials Officer. He is responsible for the Ministry of Aviation equipment-testing programme.

Airborne Tellurometer

THE Tellurometer Company of South Africa has commissioned Fairey Air Surveys to undertake a series of trials, under operational conditions, of the new equipment known as 'Aerodist' – an airborne Tellurometer.

Initial tests have been satisfactory and it is hoped that an accuracy of ± 2 metres at a range of 100 miles may result, measured against known ground control.

Fairey Air Surveys expects to make use of this remarkable distance-measuring equipment in those parts of the world where ground control is difficult and expensive.

Airborne Tellurometer equipment, known as Aerodist, mounted in F.A.S. Dakota G-ALWC. This equipment was inspected with particular interest by the party from the Photogrammetric Congress.

Ninth Congress of the International Society of Photogrammetry

This was the first occasion on which the Congress had been held in London. We were delighted to welcome many friends from almost every country in the world, not only (as one of the representatives of the host country) to the Congress itself but also to our stand in the Exhibition at Senate House and to our airfield and laboratories at White Waltham.

The Fairey Air Surveys Exhibition Stand seemed to attract much interest. It comprised a display of photographic and photogrammetric work undertaken by the Company, and equipment which we had originally developed for our own use, but which we are now marketing commercially. This included a lightweight contact printer, a 35/70 mm. continuous printer, a phototypesetting machine, and a selection of anti-vibration mountings and isolators.

A new F.A.S. film, made by the Fairey Film Unit, was shown for the first time during the regular Congress film sessions. Titled 'Behind the Camera', it illustrates the varied work of the F.A.S. Research Division.

Delegates to the Photogrammetric Congress in one of Fairey Air Surveys' processing laboratories at White Waltham.

FAIREY CANADA

Setting an example

(An extract from the Halifax 'Chronicle-Herald', Nova Scotia, 16th August, 1960.)

The pages of history are filled with examples of how diversification of production has been the salvation of an industry, as the march of science brought new patterns of need and demand, and how slow death came to those whose eggs were all in one basket.

The Fairey Aviation Company of Canada Limited is trying to make sure its big Eastern Passage plant is on the side of the former rather than the latter in the event anything should happen to the aircraft as an instrument of defence. And, in so doing, it has been benefiting not just itself but the Nova Scotia economy as a whole.

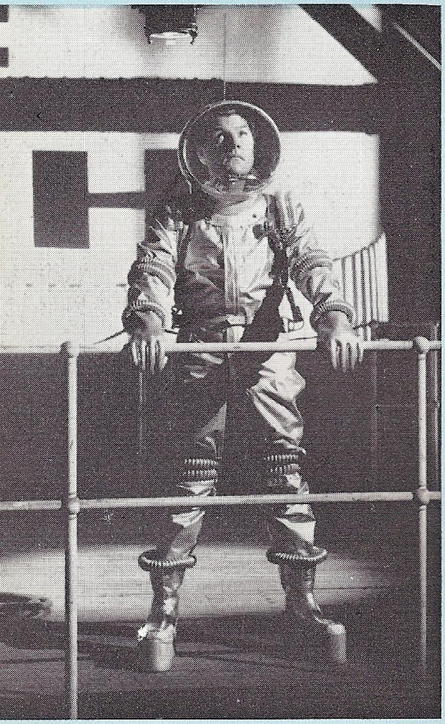
For the past two years it has been slowly developing a special commercial products division as a supplement to the servicing and repairing of military and civilian planes, and it now has built this phase of its operations to a 60,000 dollars-a-year business.

This change grew out of the observation by management that many small metal and wood products used in this area were being imported from distant fields. Two of its men, Russell Lattimer and A. P. Slyfield, were sent out over the Atlantic Provinces to determine just how extensive this was and what were the possibilities for having these produced at home. Their discovery, which was even greater than had been anticipated, resulted in the establishment of the new department which today is turning out, among other quality goods, a highly attractive Nova Scotia flag-and-pole ensemble, the new street sign plates now being erected on Halifax streets, metal truck bodies for a number of firms, and the revolving card display racks used in provincial tourist bureaux. It also engages in custom work entailing the use of metal, wood and plastics for many firms.

Because of this extra business, the company has been able to avoid lay-offs even when aircraft repair orders slackened off and has been able to keep its technicians busy on a day-to-day schedule. Much of the new division's work is done by regular aircraft workers in surplus time.

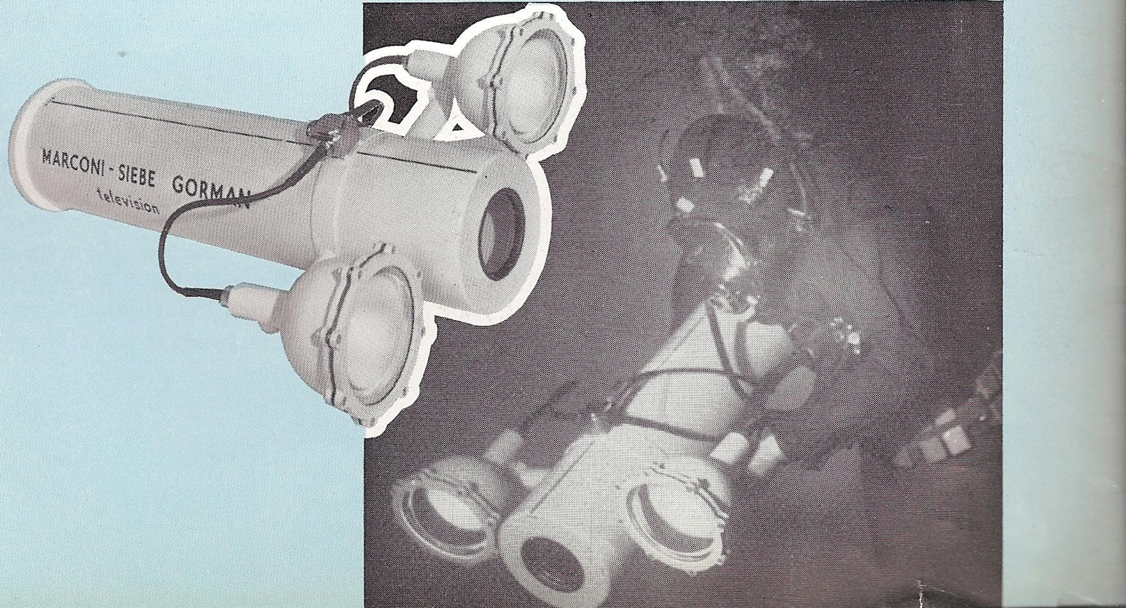
With more enterprise of this kind perhaps there would be fewer industrial closings in Nova Scotia and less complaining that this is a land without opportunity.

HALIFAX INTERNATIONAL AIRPORT, Nova Scotia, was opened on 10th September. One of the attendant ceremonies was the formal opening of Fairey Canada's large new hangar (see *Fairey Review*, September, 1960). The Hon. George Nowlan, Canadian Minister of Finance, is seen here unveiling the plaque. On his left are the Hon. E. C. Plow, Lieutenant-Governor of Nova Scotia and Mr. C. E. Hibbert, President of The Fairey Aviation Company of Canada Ltd. On Mr. Nowlan's right is the Hon. G. Hees, Canadian Minister of Transport. Mr. Hees is wearing Nova Scotian tartan. *Top* is a photograph of the completed 52,800 sq. ft. hangar. The scene below shows a reception among the aircraft after the official opening of the hangar. The four-engined aircraft in the background is a Canadair Argus long-range maritime reconnaissance version of the Britannia, which is in service with the Royal Canadian Air Force. Behind it a mezzanine floor is under construction. It will accommodate engineering offices and stores. An adjoining hangar designed for light aircraft should be in use early in 1961.

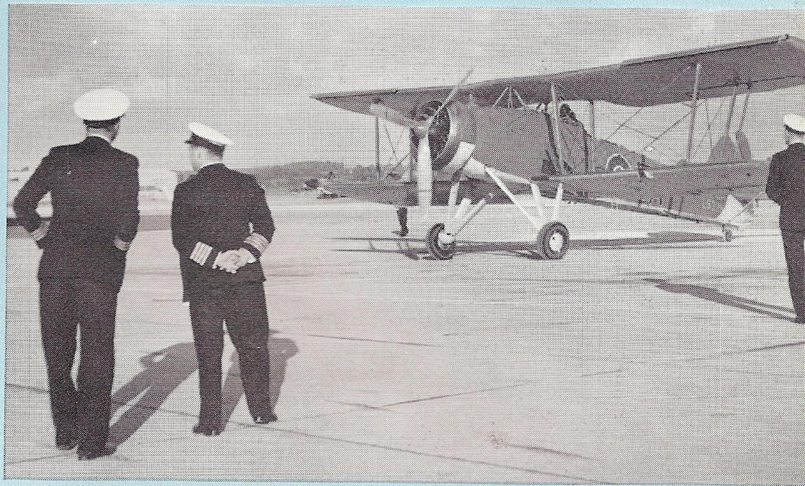


THE IMPRESSIVE 'space-suit' worn by Mr. Kenneth More in the new film 'Man in the Moon' was designed and made for the Rank Organisation Ltd. by Siebe, Gorman Ltd. at their Chessington factory. It has many unique features including rubber wellington boots with 4-in. thick balsa wood 'soles.'

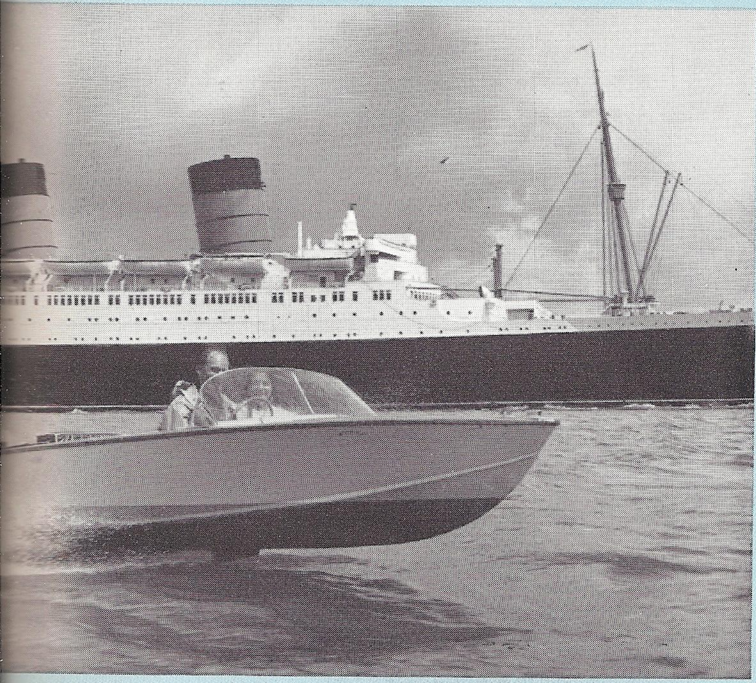
AN UNDERWATER television camera designed by Siebe, Gorman Ltd. (a Fairey subsidiary company) in conjunction with Marconi Ltd. was shown in London for the first time in November. Here it is being demonstrated by a diver in the tank at the Siebe, Gorman works. Weighing about 73 lb. it can be buoyancy-adjusted to give virtual weightlessness under water. It is 3 ft. long and 2 ft. 3 in. wide. Apart from its value as a hand-held instrument, the camera can also be lowered from the surface for the periodic examination of underwater installations such as the protective grilles on hydro-electric turbine intakes.



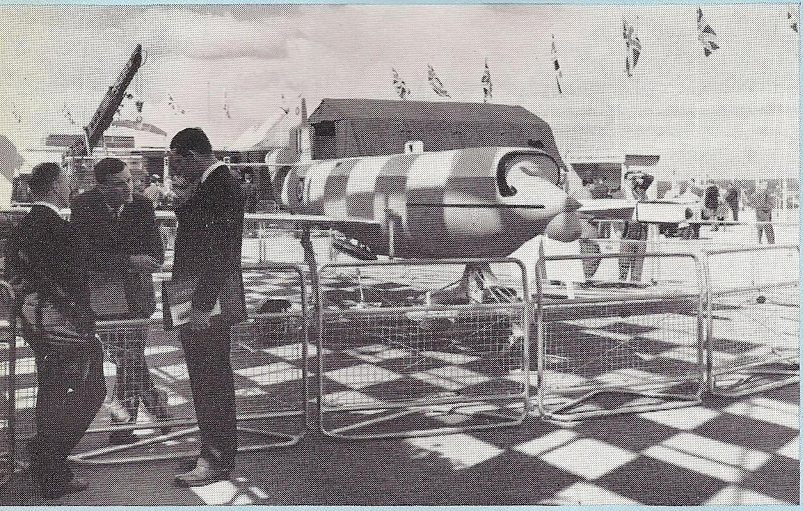
NEWS
in pictures

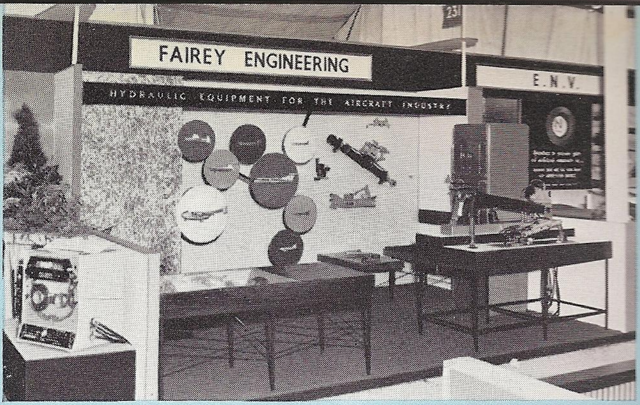


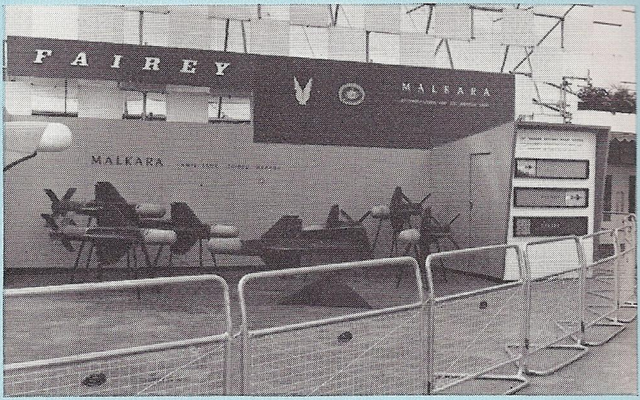
THE CLOSING MONTHS of 1960 saw the departure from White Waltham of two historic Fairey aeroplanes. The original prototype Fairey Fulmar (serial N.1854) was formally presented to Royal Naval Air Station Lossiemouth (H.M.S. Fulmar) by The Fairey Company in September. It had been maintained by Fairey's in a full airworthy condition at White Waltham and had appeared in Naval flying displays up and down the country. On 15th August it was flown by Mr. Roy Morris, Fairey Aviation test pilot, to R.N.A.S. Lossiemouth (commanded by Captain M. F. Fell, D.S.O., D.S.C. and Bar, R.N.) where it will be preserved by the Fleet Air Arm. On 11th, October, Mr. Morris performed a similar (and again slightly melancholy) duty with one of the two remaining airworthy Swordfish, LS.326 (the other is maintained by the Royal Navy at Lee-on-Solent). This much-loved machine will now be cared for by R.N.A.S. Yeovilton (H.M.S. Heron). It too will be kept fully airworthy until such time as spares run out. In the top picture Mr. Morris is seen handing the Swordfish's log books to Captain W. C. Simpson, O.B.E., D.S.C., R.N., (Commanding Officer of Yeovilton). With them is the Commander (Air), Commander N. Perrett, M.B.E., R.N. The picture right shows the Fulmar landing at Lossiemouth.



PLANING past the Mauretania passenger liner at about 20m.p.h. in Southampton Water is the Fairey Marine Cinderella 15 speedboat. Highly manoeuvrable, seaworthy and fast (30m.p.h. with a 40 h.p. outboard) she seats four comfortably. At the wheel is Mr. Peter Twiss, Fairey Marine Sales Manager (Motor Boats). Like most Fairey Marine craft, Cinderella 15 is available in kit form for the home constructor. The bare hull, rough-scraped with the chines faired in, costs only £99.







MR. G. C. ROBERTS has been appointed Commercial Director of Fairey Engineering Ltd. He is 44 and was until recently Managing Director of Britvic Ltd. and its subsidiary companies and a Director of Vine Products Ltd. He retains his Chairmanship of E. & H. P. Smith Ltd., General Engineers, of Birmingham.

FAIREY ENGINEERING'S STAND at the 1960 S.B.A.C. Display was concentrated primarily on the Malkara anti-tank guided weapon, the Jindivik target aircraft and aircraft hydraulics. These pictures show the display of seven Malkaras, a Jindivik with infra-red flare sources fitted, and the Hydraulics Division's Stand with illustrations of a few of the many aircraft using Fairey Power Controls.

THE NATIONAL Firefly Championship Races were sailed at Herne Bay from September 3rd to 9th. There was a fleet of 178 entries and a 'gate start' system was used for the first time on a large scale, instead of a conventional starting line. The week was a triumphant one for Mr. George Jones and his wife Violet, from Hoylake Sailing Club. The best four out of five races counted towards the Sir Richard Fairey Points Trophy and they won it easily in their boat 'Daddy Long Legs' with two firsts, one second and one sixth. The Sir Ralph Gore Cup was won by Mr. Brian Heron in 'Goblin' – the winner of the 1958 and 1959 Sir Richard Fairey Points Trophy. The Marlow Trophy Race was won by Mr. N. Duguid in 'Fairey Nuff'. A few days later (September 14th to 16th) the Public Schools Invitation Firefly Championship races were sailed at Itchenor. Thirty-eight schools took part and the winner was in doubt until the last race. Final placings were: 1st Pangbourne, 111½ points; 2nd Cranleigh, 106¼; 3rd St. Edwards, 97; 4th Bryanston, 94¼; 5th Canford, 88¼; and 6th Greshams with 87½. There are now some 2,700 Fairey Marine Fireflies sailing throughout the world.

MR. W. J. MAY, Chief Inspector of Fairey Aviation of Canada retired in August after 31 years with Fairey's. He joined Fairey Aviation at Hayes in 1929 as an inspector in charge of the Experimental Department. In 1948 he went to Canada as Chief Inspector for the Eastern Passage plant. In a speech wishing him well in his retirement, Mr. C. E. Hibbert, President of Fairey Canada, emphasised the courage of Mr. May and his wife in selling up their home twelve years ago and coming to a country which they had never seen before. Mr. May (seen here, left, with Mrs. May and Mr. and Mrs. Hibbert, right) received a cheque for 1,000 dollars from his co-workers as a retirement gift.

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