BY YON BONNIE BANKS

OR

THE FASLANE SUBMARINE BASE

BY

LIEUTENANT W. H. FOSTER, R.N.

As a result of the Nassau Agreement of December, 1962, which was concluded by the late President J. F. Kennedy and Prime Minister Harold Macmillan, the submarine-launched Polaris I.C.B.M. was made available to the United Kingdom. These missiles can be launched in a matter of minutes from some unmarked depth of the anonymous grey wastes of the ocean to arrive with remarkable accuracy at their assigned targets some thousands of miles away. The Polaris missiles are to eventually be our independent nuclear deterrent upon the passing of the V bombers.

The U.S.N. use nuclear propelled submarines as the vehicle for their Polaris missiles and so it is natural that the British Polaris missile system should be designed into a hull with nuclear propulsion of British design similar to that installed in the SSNO2 Class (*Warspite*).

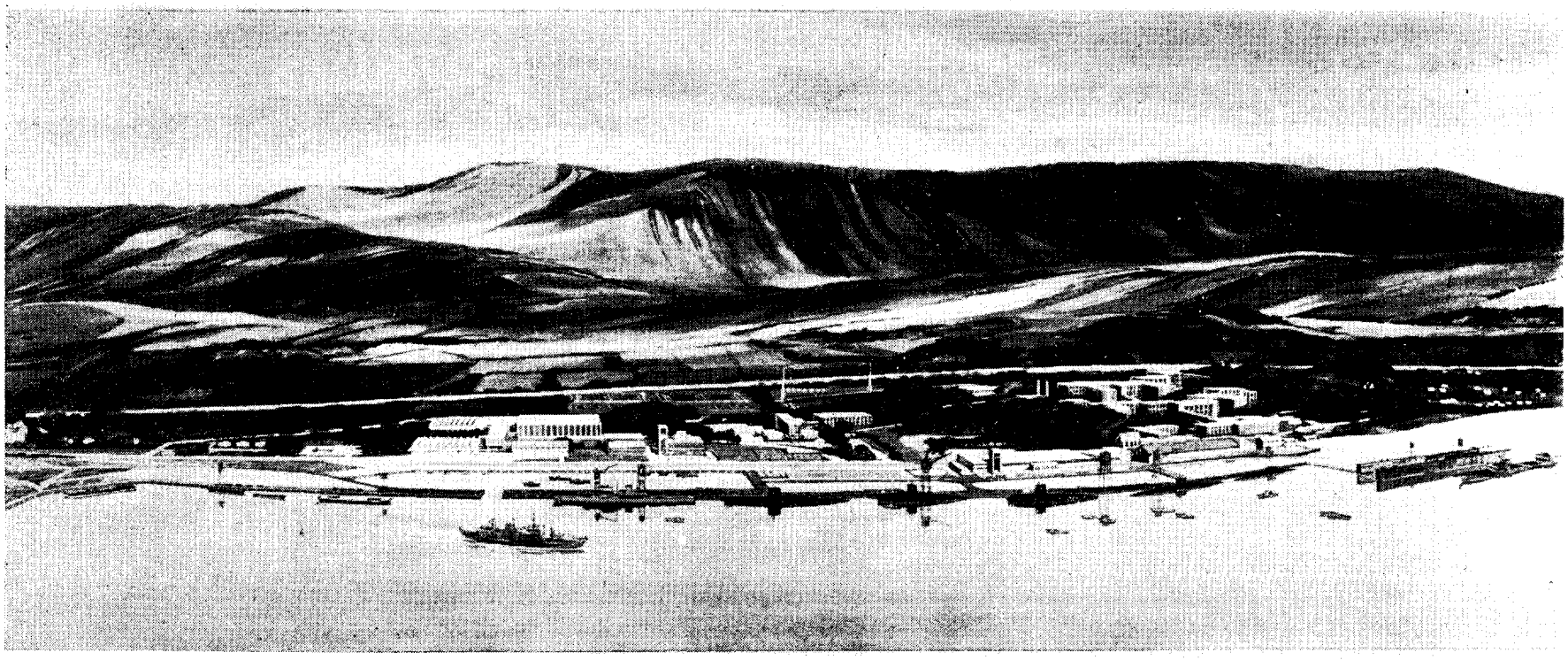

FIG. 1—AN ARTIST'S IMPRESSION OF THE FASLANE SUBMARINE BASE

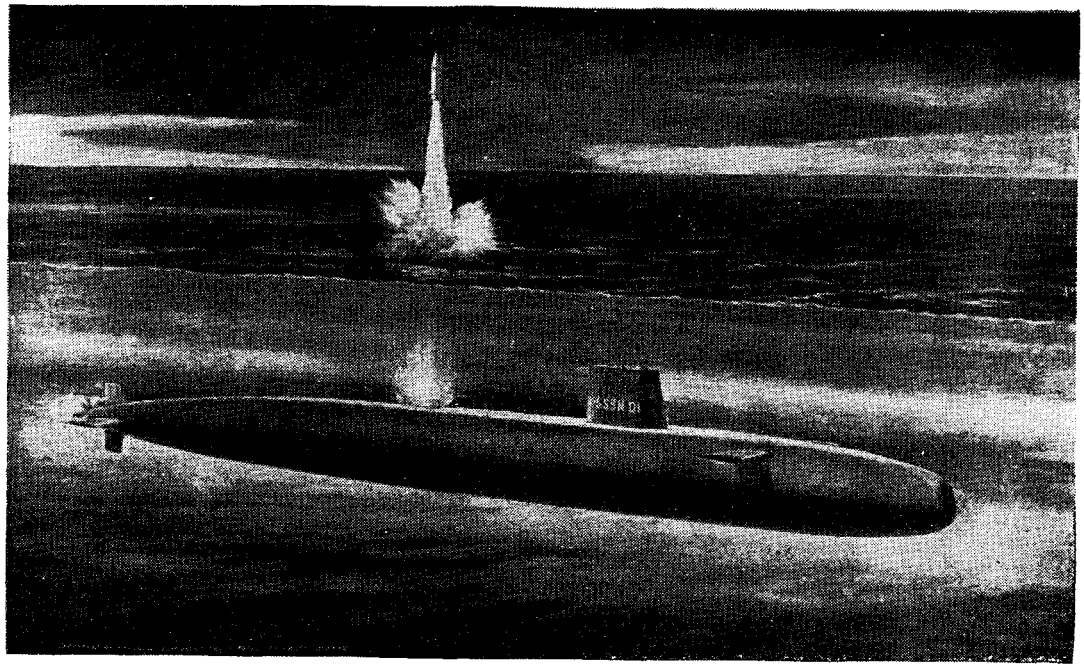

FIG. 2—AN ARTIST'S IMPRESSION OF SSBN FIRING A MISSILE

Though the Americans normally support their SSBN (Polaris carrying nuclear submarines) Fleet from tenders (depot ships), it has been decided to support our own SSBN.s from considerably expanded shore facilities at Faslane on the Gareloch. These facilities will form part of what will, in a few years, be the Faslane Submarine Base.

The decision having been taken to base Polaris submarines at a shore station in the Gareloch it became apparent that conventional SSK.s and SSN.s at present based on the depot ship at Faslane could, with little increase in the total cost, share the facilities to be provided for the SSBN.s, thus releasing the depot ship for urgently needed deployment elsewhere. Submarines working up after refit and submarines taking part in trials in the deep water lochs of the Clyde Estuary have been provided for in the planning of the new base. The Base is being built round the site at present occupied by H.M.S. *Maidstone* and the Third Submarine Squadron.

The diversion of the main road from the lochside inland has been approved and when completed the existing road will be closed to the public thereby forming an area approximately $1\frac{1}{2}$ miles long by a quarter of a mile broad. This area will largely be occupied by the Base and its associated auxiliaries.

The primary task of the Base will be to support five SSBN.s and a mixed squadron of SSN.s (nuclear powered hunter/killer submarines) and conventional SSK.s of the 'P'. and 'O'. Classes. In addition to the more usual maintenance and logistic support, the Faslane Submarine Base is planned to cover a far more comprehensive field including accommodation, recreation and amenities for submarine crews and Base staff, system training for Weapon personnel, married quarters and welfare facilities for wives and dependants. Some idea of the size of this project may be gained not only from the electrical capacity of the Base, which will be approximately equivalent to that of Gibraltar Dockyard, but also from the anticipated number of personnel administered and accommodated, both uniformed and civilian, of almost five thousand.

The area immediately surrounding Faslane, or geographically more correctly, Shandon, is hilly and sparsely populated with Helensburgh, the only town of any consequence, some $5\frac{1}{2}$ miles to the south. Helensburgh has, at present, a population of some 10,000. In four years' time this number is expected to rise to 15,000

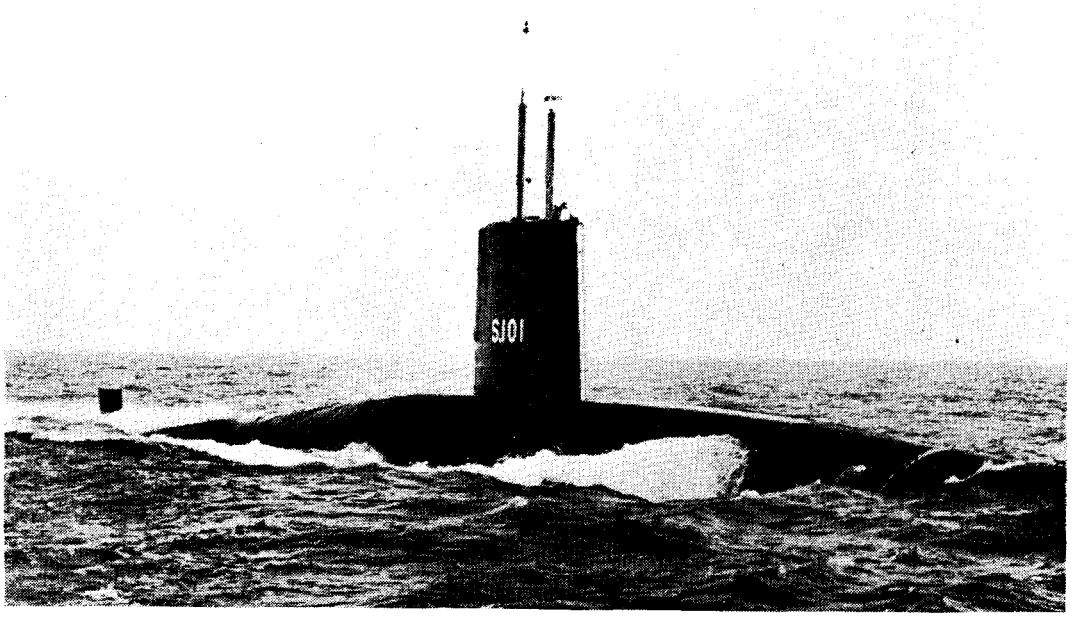

FIG. 3—H.M.S. 'DREADNOUGHT' THE FIRST OF THE SSNs WHICH WILL OPERATE FROM FASLANE

directly and indirectly attributable to the advent of the Faslane Submarine Base.

The absence or inadequacy of many common services like transport and housing in this area make the building and the eventual operation of the Base more difficult. The contours of the land in the vicinity to be used are well known to sheep and hill walkers, but do not lend themselves readily to the planning, building and running of a compact and efficient establishment, slopes of 1 in 7 being not at all uncommon. Similarly while the contours of the loch bed may appear to aid the provision of deep water jetties for submarines, their geological composition makes piling more than a little difficult.

As this Loch is part of the complex of hills and lochs famed for their beauty the Royal Fine Arts Commission is adamant that no building or other work should be erected to spoil the natural, if rugged, beauty of the surrounding land without their having approved the design. Such considerations were secondary when Faslane was established as a war-time emergency port and Metal Industries, Ltd., a shipbreaking organization contiguous with the northern end of the base was not and has not been obliged to observe any such conditions. The problems which have arisen of toning in the various buildings and structures with the surroundings have proved to be great but not insuperable.

While departments exist within the Ministry of Defence (Navy), formerly and more succinctly the Admiralty, which are responsible for the building of ships, their propulsion machinery, their weapons and all their associated details, no H.Q. department or organization is responsible to act as the design authority for submarine bases. The Chief Polaris Executive accordingly expanded his organization to include a Polaris Logistics Officer who was charged with the following task:—to design, establish and bring to operational readiness logistic support facilities for Polaris submarines.

The substantial portion of this task is to design, construct and bring to operational readiness the Faslane Submarine Base.

This Base, whose function will be to fulfil the support task placed upon it, is planned to be a most modern and, in some ways, imaginative undertaking. The operating cycle and staff requirements for Polaris submarines make the

level of maintenance and logistic support so much higher than anything which has ever before been attempted, not only in the Submarine Service but also in the Royal Navy. The order of the Staff Requirement is that the chance of failure of any item of equipment, which cannot be repaired within a very short time on board the submarine and which may cause a patrol to be abandoned shall be less than one per cent. Accordingly, the specifications and designs for the workshops, store buildings, and other support facilities have a forward looking and distinctly progressive slant.

The Base workshops will be housed in one large single-storey building with offices and small shops arranged on two floors along its northern and eastern sides. The areas included cover the normal electrical and mechanical shops, an electronics maintenance area, a periscope and mast shop, a nuclear repair area and the concomitant offices, heads, etc. Naval personnel will man all the areas in this workshop.

Interesting features of this design are the environmental control of the electronics maintenance area to stringent levels of temperature and humidity control and of dust filtration, the inter-division of this area by demountable industrial screening, thus giving the maximum degree of flexibility for reorganization as material or methods improve or alter, and the under-floor routeing of power supplies and cooling services.

The nuclear shop will be the first shore workshop specifically designed and built for the repair of activated or contaminated machinery and system parts outside H.M. dockyards. The health physics staff and laboratory will be sited in this area and will control all classified radio-active workers in the Base.

The engineering approach to the Polaris weapon system in general has been to design, on a modular basis, that is to build up from a selection of small and easily removable parts or modules, with the system repair accent being on replacement. The repair of these units themselves calls for special techniques and for these to be performed under controlled atmospheric conditions with stringent quality control checks. Thus the Module Repair Facility (M.R.F.) is being established at Faslane as the exclusive module repair agency in the United Kingdom, specifically to repair and test after repair the majority of defective arisings from the Polaris systems. All repairs will be tested to procurement standards in performance. The staff of this building will include dockyard technical grades who have had specialized training in the diagnosis and repair techniques involved.

The environment in all the major repair and test areas of the M.R.F. will conform to 'dust restricted' workshop standards. In the calibration and optical areas, situated at one end of the main M.R.F. building, yet finer limits approaching dust-free standards are specified. While the optical area is designed for modular repairs it shares with the calibration area the strenuous requirements of high grade environmental control and the maximum attenuation of vibration possible. The Calibration Centre is designed to check calibrate to normal working level all mechanical, electrical, hydraulic, optical and electronic measuring or test instruments used in the Base itself, in submarines attached and at the R.N.A.D. Coulport. Reference standards provided will support the check calibration instruments used.

Between-patrol, emergency and intermediate dockings of all classes of submarines have been provided for by the construction of a new floating dock (A.F.D.60) for the Base. This dock differs from the general run of Admiralty floating docks, in that it is to be secured to the jetty and will not be self-supporting but will be a 'bare bones' dock, that is it will require shore power supplies and will have only a nuclear safety inbuilt source of power. A.F.D.60 will be capable of lifting any of the submarines or craft which may be attached to Faslane. To those who have suffered the vagaries of the weather while in floating docks,

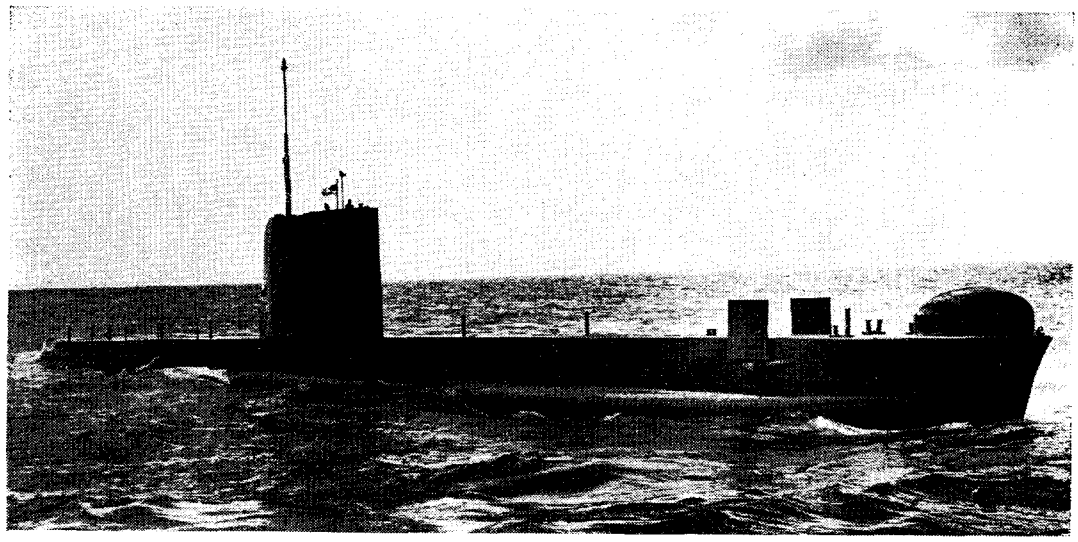

FIG. 4—AN 'OBERON' CLASS SUBMARINE WHICH WILL OPERATE FROM FASLANE

the provision of windbreak doors at either end of the dock and cloche type covers over the submarine in dock will be well appreciated innovations.

The berthing of submarines during between-patrol maintenance and when visiting Faslane has caused some 2,400 ft of deep-water jetties to be provided, giving berths for five submarines and a frigate. Each submarine berth with the exception of No. 1, which will be for one SSBN only, will be able to berth two or more boats in a trot. Cranes to plumb up to the third boat out will be liberally provided and will all travel the complete extent of the submarine berth. Shore supplies of various voltage and frequency electricity, fresh and demineralized water, H.P. and L.P. air, Diesel fuel, lubricating oil, H.P. nitrogen, telephones, etc., will be provided in readily accessible pits and connection boxes at all submarine berths.

With the maintenance accent on repair by replacement, the provision and storage of adequate supplies of spare items is the function of the civilian manned Base Naval Stores organization. This completely new formation under the control of the N.S.O. will provide at short notice items of equipment required to effect repairs. To achieve this immediacy, automatic data processing (A.D.P.) machines will be used and these will be linked with A.D.P. facilities at Copenacre and Eaglescliffe. The Naval Store will thus act as a 'forward counter' for the main store depots with almost immediate response to the demands from Faslane.

The victualling support for submarines and the Base will be provided in a building which will share an inter-connecting office block with the Naval Stores. Also connected to this building will be the M.R.F. and M.T. garage and workshop. As there will be almost five hundred civilians employed in the Base, both industrials and non-industrials, a Finance Office will be provided in this building to look after their pockets, while on the top floor a canteen will provide for their physical well being. The Transport Pool which will operate from the M/T garage and will be under the control of the N.S.O. is planned to be sufficiently large and diverse to give the Base the necessary flexibility in this relatively remote area.

The wardroom of the Base is being built to fulfil three tasks, the main one of which is to provide sleeping and messing accommodation for 120 single, or unaccompanied, officers. The second task is to provide luncheon facilities for all the naval officers employed in the Base, submarines and ships attached. The third and more unusual task, although becoming increasingly common, is the provision of recreational facilities for naval officers and their guests, both

male and female; a task which assumes more importance in this area which has in the past been generally apathetic to the presence of naval personnel and is sparsely provided with amenities. The building will be of five storeys, diminishing to three on the up-hill side and will be of modern design with a large expanse of windows overlooking the Loch.

As with the officers some fifteen hundred ratings are expected to be single or unaccompanied, and of these accommodation for approximately eleven hundred will be required at any one time. Sleeping accommodation will be provided in the six star-shaped blocks of three storeys high, all similar in external construction, but divided internally to form single cabins for chief petty officers, three-berth cabins for petty officers and four, five, six and seven-berth dormitories for junior ratings. Accommodation for the one hundred W.R.N.S.s ratings and N.N.A. is planned in one isolated block with separate recreational spaces and access for senior and junior W.R.N.S. ratings. All accommodation will be furnished to the latest standards and decorated in pastel shades.

The provision of galleys and messing arrangements for all ratings including W.R.N.S. will be centralized in one building. As this becomes the focal point of the naval accommodation area, it is logical to provide bars and a canteen in this building. It is planned to include those additional amenities such as N.A.A.F.I. family shop, barbers and tailors shops, and a sub-post office. The size of the building will be further expanded by the inclusion of all normal recreational facilities for junior and senior ratings. The amenities occupying the smallest proportion of this building have probably had undue effect on the naming of this, the 'amenities building'.

The duration of submarine patrols, coupled with the relative inactivity and lack of space on board submarines, make the provision of adequate arrangements for physical recreation a high priority item. A cinema and gymnasium combined with an indoor heated swimming pool will form the main centre of indoor sport. In view of the inclement weather which prohibits the use of sports fields during much of the year consideration is being given to the provision of a covered sports arena. Adequate football fields, hockey pitches, tennis courts etc., will be provided mainly in or adjacent to the Base to cater for these outdoor requirements.

To enable the Base to function correctly and smoothly in supporting submarines, many other miscellaneous activities are provided for. These include naval administrative offices, a medical and dental centre, fuel storage tanks, church building, etc. The normal minor activities and systems such as a comprehensive road and footpath network and adequate street lighting associated with such a major project, fill out the bare bones mentioned in the preceding paragraphs.

Throughout all the planning of this Base the thought in mind has been to build for the '70s. This has been achieved with the help of design departments and information from the U.S.A. and will produce a Base which will be, not only adequate, but worthy of Great Britain's submarine fleet of the future.