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THE NAVY ACQUIRES THE THIRD DIMENSION

Birth of the Submarine Arm

The story of the evolution of the Indian Navy's submarine arm from its embryonic stage to its coming of age astheswordarm of the Silent Service, is the story of the determined efforts made by the naval planners against all odds, spreading over several decades, to make the authorities realise that a submarine arm was and is one of the most essential components of any modem navy and finally succeeding, despite several canards and red herrings from different directions, in the early 1960s.

One of the later planners was Commodore B.K. Dang, who was the first senior officer from the Indian Navy to formally familiarise himself with all operational and training aspects of submarines. He was also directly involved inplanningthevariousphasesof the development of the newarm - assessment of requirements in the context of India's needs, training of personnel, performance levels, weapons and equipment outfit, spares, establishment of logistic facilities, bases for maintenance support and operational training and the deployment of submarines in war and peace.

Antisubmarine Training during World War II

During the early 1940s, though the Royal Indian Navy hadno submarines, ithad to perforce conduct courses in torpedo warfare and antisubmarine operations for the growing number of ships that were being fitted with ASDIC sets, but their training was conducted without any target submarines to practise on. There was thus no expertise in the RIN in the operational or maintenance aspects of submarines and RIN personnel, whenever planning antisubmarine operations, had to rely on information made available by the Royal Navy.

As recorded by Commander A. Brian Goord, a Royal Naval Reserve officer (later RIN) who had done his long antisubmarine course at *Osprey,* the first RIN officer to qualify in Anti-Submarine Warfare (A/S) during World War II was Lieutenant Commander Joe Jefford, then serving as the Commander of the Yard at the Naval Dockyard at Bombay and supervising the embryo A/S school in a small building in the same Dockyard. Jefford later rose to the rank of Vice Admiral and became Pakistan's first Naval Chief in August 1947.

Commander Goord had himself been recognised for having developed a target, which came to be known as the Goord Target, which was used to simulate a submerged submarine for training in antisubmarine operations.

Training in antisubmarine operations (A/S) continued during the remaining years of the War but the main problem confronted by the training staff, Goord recalls, was that:There was no practice target, other than passing merchant ships, which were often detected miles away owing to the freak temperature layers in

the Arabian Sea and were hence of not much use for carrying out dummy attacks. It was, therefore, decided to use a submarine target simulator bearing the name of Johnson, after its inventor. This was a small electric torpedo which ejected a stream of bubbles which gave off an echo. The snag was that it had a habit of getting lost - permanently. It occurred to me that we had a perfectly good method of blowing bubbles, using the diving pump and hoses. All that was needed was to devise an 'otter' which would run at a suitable depth and spread a curtain of fine bubbles on which to 'ping*. Thus was born the 'Goldfish', which, towed behind the motor cutter, with the crew toiling at the pump, provided an excellent target which lacked only doppler effect in realism.

The 'Goldfish'was used extensively by the Royal and Dominion Navies, as well as our own, and brought forth a complimentary letter from Their Lordships and a small financial reward. It was later improved and simplified by Martin Nott (Commodore M.H. St. L.Nott,the first Chief of Staff of the RIN after Independence), who used a small power compressor (or air bottle) instead of the diving pump.

We moved to the new A/S Scliool in November (1940). This was in Castle Barracks (Bombay). An Attack Teacher (training equipment for antisubmarine warfare) arrived from Britain, was installed and demonstrated to V.I.P.s, including H.R.H. the Duke of Gloucester and, more importantly, was brought into constant use. Courses for officers and ratings were stepped up and a Reserve Officers'Long Course passed out, to provide instructors and Port A/ S officers for the future. One of the officers on this course was Lieutenant (later Admiral, Chief of the Naval Staff) Ramdas Katari, then an RINVR officer.

Excellent though the Attack Teacher was, it could not take the place of practical exercises at sea. These we carried out in various small vessels, using even smaller ones as targets. In some ways this was more realistic than using the 'Goldfish', but every attack had to be aborted before running down the target vessel. The conflict of purpose in carrying out an effective attack and avoidance of actually hitting the target was hair-raising but, somehow, a major accident never occurred.

'. .. In early 1942,1 managed to shed the Bombay responsibility and, with Commander Kendall, RN drew up plans for a combined RN and RIN Anti-Submarine School *(Machhlimar)* at Versova (a Bombay suburb)/ *Machhlimar* started functioning in March 1943 and continued training officers and ratings during the remaining period of the War.

Submarine Requirements After Independence

While the importance of acquiring a submarine for the Royal Indian Navy -both for offensive operational training and for conducting exercises in antisubmarine warfare -had been fully appreciated, the question of acquiring submarines or developing a submarine arm was never taken up, for the threat perceptions of the Navy's erstwhile foreign masters did not warrant the inclusion of such a potent weapon platform.

With the advent of Independence in August 1947, however, free India's fledgling Navy started looking afresh %t its national maritime needs, distinct from the basically secondary supportive role assigned to ituntilthenby the BritishRoyalNavy.Thatrolehad undoubtedly enlarged the size of the Indian Navy

considerably during World War II, but chiefly in such roles as escorts of merchant shipping, pa trolling of coastal areas **and** the addition of amphibious craft for the recapture of South-East Asian territories from the Japanese.

By this timeithadbeen established that submarines had the initiative against the very much larger resources of ships and aircraft required for antisubmarine defence of shipping and through the two World Wars it had been clearly proved that the cost-benefit went decisively to the submarine. In fact, under Karl Doenitz, the German submarine Admiral, the impact of the devastation caused by the German submarines in World War II was brought to a point of such effectiveness that it was virtually determining the course of the war in the Atlantic till the end of 1942. As Doenitz said:

> While ships and aircraft exercised control of the surface, of sea areas, it was the submarines operating below the surface that neutralised this control.

This saying continued to be uppermost in the minds of the Indian naval planners during the years of the Navy's post-war development for the establishment of the submarine arm.

As mentioned earlier, during World War II the ships and craft of the Royal Indian Navy -frigates, corvettes, sloops, minesweepers and patrol boats -had all been fitted with SONAR equipment, antisubmarine mortars and depth charges but there was no submarine with which to train. Hence, live training in antisubmarine warfare could only be imparted in fits and starts whenever a British or Australian submarine visited India or when the Indian Naval Squadron or Flotilla took part in the annual Joint Exercises (JET).

Between 1939 and 1945 a large number of Indian officers and sailors in the RIN had served on board the RIN convoy escorts and ships to which antisubmarine roles had been assigned in theatres of operations around the globe. These RIN personnel had not only been impressed by the efficacy of the new two-element weapon platform-the submarine -as the most effective weapon delivery device but some of them had also specialised in the discipline of Torpedo (T) and Antisubmarine Warfare (A/S). A few of these T or A/S specia lists held senior positions in the Service and were adequately qualified in terms of expertise and experience to advise their senior officers on the acquisition of submarines for independent India's navy. They all felt that the Navy would be far more effective and it would be in its best interests if a submarine arm were to be added to the smallest wing, though seniormost at that time, of the country's Defence forces. Some of the operational staff officers at Naval Headquarters had put up proposals to the then Commander-in-Chief of the RIN, who was later redesignated as the Chief of the Naval Staff, and his Chief of Staff, to initiate the development of a submarine wing of the Indian Navy and as early as 1948, the assessed requirement of the Indian Navy was no less than 16 submarines.

The First Proposal

Within a fortnight of the historic transfer of power and the resultant partition of the Royal IndianNavy into twonavies for India and Pakistan on August 15, 1947, Naval Headquarters put up a proposal to the Government for the acquisition of four submarines for the Indian Navy. The proposal, which was prepared by Commodore M.H. St. LJvfott, a former regular British RIN officer who was the Chief of Staff at Naval Headquarters at that time as an officer of a new cadre designated as the RN (Special List), stated:

> So long as India remains within the British Commonwealth of Nations, her task will be very much lightened by the assistance she will receive from the Royal and other Dominion Navies. But even in these circumstances, she will be expected and indeed she will wish to contribute to the general Naval Defence of the Commonwealth in accordance with her status as the principal sovereign state in the Indian Ocean.
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> The immediate task before us, therefore, is to build up, in the shortest time, a *balanced* naval task force, officered and manned by Indians, which is capable of exerting, when the need arises, a definite influence in Eastern waters. The minimum force which would be likely to achieve this object would be two light fleet carriers, three cruisers, eight destroyers, *four submarines* and such smaller ships as are necessary as tenders to training establishments and for auxiliary purposes.' At that time the estimated cost of a submarine was £500,000 (Rs 6,666,000).
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> A year later the requirements of the navy were reassessed and the number of submarines required was raised to 16, to be acquired from 1952 onwards at the rate of two per year. In justification of the enhanced requirement proposed, Naval Headquarters stated, The submarine is a powerful naval weapon which can be used both offensively and defensively. As a weapon of offence, submarines can attack enemy warships but they a re more frequently employed for attack on enemy merchant shipping and military convoys thus straining the enemy's seaborne trade and supplies. Defensively they would form a serious threat to any enemy attempting to operate in our seas. Furthermore, submarines are necessary for antisubmarine training of personnel in destroyers and other light craft. They are economical compared with the result they may achieve.

Later, thenumberofsubmarines required was reduced to four which was the requirement projected earlier. These submarines were now to be acquired in a phased programme, two in 1957 and two in 1958, as 'manning of submarines will require highly skilled and trained personnel which, particularly with the development of naval aviation, will not be available in the earlier years.'

The proposal also included the setting up of a submarine training facility as, 'with theintroduction of submarines in the Royal IndianNavy, it will benecessary to build a school specially for the instructionof officers and ratings (sailors) in the art of submarine warfare. No site for this school has as yet been decided but itwillhaveto be sited on the coast at oneof the major naval bases'.

At this time, the two seniormost appointments in the Navy and some other senior appointments were held by officers of theRN who were on deputation to the Indian Navy (in fact it was nearly eleven years after Independence, i.e., in April 1958 that the navy was headed by an Indian officer for the first time). The senior British naval officers who were on deputation toourNavy and who were at thehehnof affairs during the late 1940s and early 1950s were, however, of the view thatsubmarines were far too sophisticated vessels with equally sophisticated weapon systems for Indian naval personnel to operate, and that it was a little too early for independent India's navy to venture into the field of submarines, torpedoes and mines. They also felt that submarines were yet to be rendered failsafe and were likely to cause accidents leading to loss of life if handled by persons without adequate experience which, they felt, Indian naval personnel lacked; and if this happened, it would not only demoralise naval personnel but would also impair the Navy's image and standing in the estimation of the Government of India and the general public.

At that time the Royal Australian Navy and the Royal Canadian Navy were of about the same size as the pre-Independence Royal Indian Navy and were yet to acquire a submarine arm. They, however, had obtained a few submarines from the Royal Navy on loan which, while carrying a few officer and sailor trainees of the host country's navy, were basically manned and operated by Royal Naval personnel. The British Naval Chief of the Indian Navy felt that India could at best follow the example of Australia and Canada before aregularsubmarinearmwasset up.

Since, however, India had by now become independent, the proposal to acquire submarines operated by foreigners didn't find favour with the Indian authorities and so had to be shelved. It was felt that the British wanted the Indian Navy to continue to be confined to the coastal defence role while the Royal Navy could continue to be assigned the bluewater responsibilities in the Indian Ocean, the defence of India's 6,000-km coastline, and the task of assisting the Royal Navy in perpetuating its big-brother role in the region.

Other Navies Go Ahead

While the proposal to develop the submarine arm remained in cold storage in this country, rapid strides were made in the rest of the world in propulsion technology, weapon systems, sensors, the submarine's operatingradius, torpedo range and homing capabilities, other anti-ship weapons, detection range, navigational equipment, diving capabilities and certain other aspects of submarine operations, but most markedly in underwater speed and endurance. The era of the'true submarine', operating only below the surface, was dawning.

The proposal was revived when the first Indian Naval Chief, AdmiralR.D.Kataritookoverin April 1958. By nowithadonce again been appreciated that the Indian navy needed submarines not only for the offensive role of attacking enemy vessels at sea, defending the vast coastal waters washing the shores of our peninsula and operating as escorts to our fleets and capital ships, but also to provide adequate practice to our shipboard personnel in conducting antisubmarine operations. Nearly all ships of the Fleet had by now been fitted with

SONARs and these ships and maritime aircraft needed to take part in antisubmarine exercises frequently in order to hone their skills. For this purpose it was most essential that ships of the Fleet haveadequa te and frequent opportunities in the South East Asian tropical opera ting conditions to exercise with our own live underwater targets, i.e., submarines. These exercises would be independent of the annual joint exercises (JET), held with ships of the Commonwealth nations after the South-West monsoon which only provided limited opportunities with limited scope for creating real-life conditions that prevail during the circadian, seasonal or annual cycle; besides these exercises, the only other opportunity to pa rticipateinantisub-marine exercises that came the Navy's way was when submarines of Commonwealth navies called at Indian ports during goodwill visits or while transiting the waters contiguous to our shores. Obviously, this was quite unsatisfactory and the level of the Naval personnel's training in antisubmarine operations continued to be low though it was felt that it could not be allowed to continue to be so.

Budget Constraints

Besides this limitation, it was generally felt that the budgetary allocation made annually to the Navy, compared to the allocations made to the other two Services, wasmostinadequate,however,despite the lack of adequate appreciation of the importance of sea power, especially in the Indian peninsular context, a paper proposing the acquisition of three submarines for the Navy which would not only be deployed for operations in the seas around the subcontinent but would also be available as live targets for antisubmarine training of naval personnel, was put up to the Government byNavalHeadquarters in 1959. This failed toelicitapositiveresponseand despite protracted discussions wherein the advantages 0/ acquiring the new weapon platform were repeatedly stressed, the Navy could not make any headway for several years.

It was also stressed that every modern navy operated submarines, that it would take several years to train submarine personnel and hence, pending the availability of funds and the official approval for acquiring submarines, Indian naval personnel opting for the submarine arm could be trained abroad and could man submarines when they were acquired so as to minimise the lead time required to make them operational.

Meanwhile frigates, sloops and corvettes of the Fleet continued to carry out antisubmarine exercises but the need for a submarine for use as a livetargetwasbeingincreasinglyfelt during the 1950s and the inefficacy of occasional submarine training whileexercisingonceor twice a year with foreign submarines continued to be highlighted in the reports submitted to the Government. Further,whiletheacquisitionof thefrigates *Talwarand Trishul* of Type 12, *Brahamaputm, Beas an&Betwaoi* Type 41 and *KHukri, Kirpan* and *Kuthar* of Type 14 during the 1950s had actually been planned around their antisubmarine capability, the requirement of submarines for their sea training was still to be accepted by the Government. The ships of Type 12 were remarkablyversatile with surface armament, air defence as well as antisubmarine capability, combined in a hull of very successful design with long endurance and efficient fuel consumption. The ships ofType 41 had mainly been designed for antiaircraft and surface operations and hence had a lower level of underwater capability though they had good

endurance; in the event these ships did not perform very well mainly because of problems posed by their machinery which were of a design the navy was yet to become familiar with. The ships ofType 14 were slightly smaller frigates with only antisubmarine capability. These were in their own right fairly effective antisubmarine ships but could only serve as adjuncts to a bigger force with the other important capabilities and, in the absence of a submarine to practise with, their value for the Indian Fleet was greatly lowered.

Need for Submarines Stressed

The proposal to establish a submarine arm continued to be in a state of limbo, ostensibly owing to lack of finances, but it suddenly acquired urgency with thearrival of the new frigates with antisubmarine capability, mainly because it har[1] *oeen* reported in 1958 that a neighbouring country was considering the acquisition of submarines for its navy. In a proposal on the subject submitted during that year, Naval Headquarters stated that therewasanurgentneedforaugmentingthefacilitiesavailablein the Navy for the antisubmarine training of surface ships with live submarine targets and unless this could be achieved, the efficiency of the Navy in antisubmarine warfare would, of necessity, remain low. It added that the acquisitionofmodemships fitted with the latest antisubmarine equipment did notby itself constitute anefficient antisubmarine force for,among other things, it required a high degree of sustained and continuous trainingwith live submarines under realistic conditions.

Stressing the importance of the operational role of submarines, the proposal stated:

> A submarine is an integral part of a balanced maritime force. . . In a local or global war in which India may be forced to take part, submarines can be employed to great advantage in achieving control over the waters which affect the defence of the country. They can be employed in patrols off enemy-controlled waters, and in strike against hostile surface ships on the high seas and in harbours. A submarine arm is one of the most effective means of blockading the enemy's seaborne trade. It can also operate its submarines in co-operation with the surface fleet as radar pickets and aircraft control ships for providing valuable early information. The technique of employing submarines for hunting enemy submarines is being developed and from recent knowledge gained from other countries, is likely toassume an indispensable role in any futurewar. Inaddition to all these, the very fact that we possess submarines, will impose a considerable submarine effort on the enemy and thus indirectly curtail his offensive power.
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> The major maritime powers of the world are expending a considerable effort on the build-up of their submarine arm and upon research in submarine design and performance and also the weapons she can carry. Thelatest improvements in submarines have been in the sphere of aquabatics, i.e., the shape and form ofasubmarine, and the means of propulsion including nuclear propulsion. These improvements have given a new capacity to submarines to remain, to all intents, permanently submerged and to proceed at very high speeds when submerged. These, taken together with improvemen with their weapons, will have

the effect of making submarines a most potent weapon. Recent trends in naval warfare clearly indicate that the operational importance of submarines will continue to increase.

> . . . in order to develop a fully integrated maritime force, the Indian Navy should make an early start in establishing a submarine arm of its own. The important thing is to acquire the technique of operating submarines as early as possible and for that purpose a start with conventional or old submarines will provideanadequateanswer.

The Projected Requirements

It was proposed to start with a flotilla of at least four submarines, each of approximately 1,000 tons displacement and a crew of 50. Technical logistic support in terms of docking facilities, battery and periscope repairs and maintenance and submarine refitting would be provided by the Naval Dockyard at Bombay. The other facilities required would be a shore base or a depot ship with machine shops, torpedo preparation shops, electrical workshop amd spare gear storage, a fully-equipped training establishment for both operational and technical training, facilities for 'degaussing'and 'wiping' (removing induced and permanent magnetism) and a salvage organisation complete with salvage tugs, diving gear, divers and resuscitation equipment.

It was also proposed to requisition the services of foreign submarine experts in an advisory capacity for the planning and establishment of the submarinearm, as the Indian Navy at that time did not have officers with adequate submarine experience. These experts would gradually be replaced by Indian officers as and when they acquired sufficient experience. The capital outlay in the establishment of the submarine branch with four new submarines at that time was estimated at Rs 16 crore with a recurring cost of maintenance of Rs 2 crore.

By November I960, the Indian Navy had acquired two cruisers and an aircraft carrier was on the way. Besides these, there were eight new frigates fitted with sophisticated submarine detecting devices and antisubmarine weapons lethal enough to achieve a kill. The six destroyers of the Fleet had also been fitted with antisubmarine equipment and one of their principal roles was the detection and destruction of submarines. Since submarines used diverse tactics to get into a favourable position to fire torpedoes and to avoid detection by antisubmarine ships and these tactics involved change of depth, speed and courage or the use of decoy devices or a combination of two or more of these, it was realised that only officers with submarine experience, born of service in submarines, would know What tactics a submarine was likely to adopt under a given set of . Since the traini imparted at the Navy's Torpedo and l d T i l S h l C h i b Antisubmarine School and Tactical School at Cochin was based on theoreti-«*t knowledge, practical knowledge acquired through service in subma-^UPWH considered of utmost importance.

mis purpose, the Navy now proposed the establishment of a ne-trained cadre of 38 officers and 65 sailors to be trained over i of four years. The first batch of four officers and 12 sailors being to be trained at the Royal Navy's submarine school in 1961 for isperiodofoneyear.

Submarine Still A Vessel 'Non Grata'

Sinc«, however, the impression that a submarine was only an'offensive' V^pOn platform and, the feeling persisted at the highest level that its a|tpH5ltion would run counter to our national policy of non-violence and non-interference in the affairs of other countries, Government approval even for training submarine personnel abroad continued to elude the Navy. It is believed that even Pandit Jawaharlal Nehru, the men Prime Minister of India, and some other national leaders were of the view mat a submarine only had an offensive role and hence should not be acquired for India which was wedded to peace and had no ambition outside her national territorial limits and the sea area of her responsibility. This attitude was perhaps analogous to Britain's dismissalof submarine warfare aj^/i|aderhand, unfair and un-English' and the French branding it as 'a dishonest form of warfare' around the turn of the century. ¦ .#§ sit -is interesting to note that even KM. Panikkar, the distinguished historian-diplomat, had appreciated the importance of the submarine, especially its impact on naval strategy and its edge over larger surface vessels. Writing as early as in 1945 on the significance of India's position in the Indian Ocean, he said that the 19th century concept of the untenabtfity of effectively holding a regional sea against a superior fleet did not hold good any more. He felt that an inferior navy with lighter craft, supported by submarines and aircraft suitably deployed, could now ensure the safety of considerable stretches of sea and there was thus no reason why an efficient and well-balanced Indian Navy should not be able to secure control of the Bay of Bengal and the vital stretches of the Arabian Sea, whenever required.

Training of Submarine Personnel Approved

Eventually, in 1962, i.e., 15 years after Independence, approval was obtained for the training of one Captain and eight junior officers in submarine operations, technology, maintenance and tactics at the Royal Navy's submarine training school. *Dolphin,* at Gosport off Portsmouth, England. The senior officer of the group, the Captain, was to undergo a condensed course but was in addition to acquire the necessary expertise in the organisation of a submarine arm, setting up the necessary infrastructure and logistic support, development of the maintenance facilities in the base and the dockyard, the operational set-up, die tactical doctrines adopted by submarine arms and fleets operating with or against submarines, development of training facilities, including simulators and escape towers, and submarine rescue operations. The other officers were to be trained in submarine operations and maintenance for manning the submarines that would be acquired in later years.

Strangely enough, the Government continued to impress on Naval Headquarters that it had only agreed to allow naval personnel to undergo submarine training in order to enable them to improve the Indian Navy's **antisubmarine** capabilities and it did not in any way commit the Government to acquire submarines for the Navy at any time.

Training with the Royal Navy

The first batch of five officers comprised Captain (later Commodore) B.K. Dang, who was to later establish the nucleus of the Submarine Arm, lieutenant Commander KS. Subramanian and Lieutenants M.N. Vasudeva, R.J. Millan and A. Auditto, all of the Executive Branch, who had been carefully selected from a large number of

intrepidvolunteers who had decided to venture into the new element below the surface of the sea. These officers sailed for the UK in February 1962 for training at *Dolphin;* Captain Dang for a special, condensed, acquaintance course of six months' duration, and the others for one year's training in submarines. They were to study theinfrastructureorganisation, operational know-how and maintenance and back-up facilities required for setting up the Subma-xine Arm of the Navy.

Having faced certain problems during the establishment of the Fleet Air Arm for the Indian Navy, Naval Headquarters was also wary of similar problems cropping up while acquiring submarines from Britain. But since the Royal Navy had offered to impart submarine training to Indian naval personnel, it was decided to depute a suitable senior naval officer to the UK to acquire the necessary organisational expertise. Hence the choice of Captain B.K. Dang for the task as it was felt at Naval Headqurters that with the up-to-date experience gained by him as the first Commanding Officer of the British-built *Talioar* during intensive antisubmarine exercises held with British ships and submarines after her commissioning in the UK, hehad been equipped with the necessary expertise to sift and imbibe the ¦ Mniinnm possible quantum of information during his attachment and OMh course in submarine operation and technology. It had by that time fettot decided mat the overall planning, initial training of personnel in Jmiiftiii rniintrir- acquisition of ships and maintenance expertise and AMrftoent, assessment of qualitative and quantitative requirements in Malpdtt» the establishment of the submarine arm, operational and |0#iHg«tablishments and exercises, installation of an escape training i«w«r>Hc$_v$was to be entrusted to and programmed by IndianNavalperson-ntl and no foreign expertise would be sought for the purpose. ••?!> Captain Dang had joined the Navy in March 1943 as a Lieutenant fcfcrlfae Royal Indian Navy Volunteer Reserve (RINVR). An ex-Dufferin officer, he specialised in the Torpedo Anti-Submarine (TAS) discipline at *NbtdMUnar* in Versova, Bombay in the same year. Completion of the course fetlM4had exposed him to the major antisubmarine commitments of the Royal Indian Navy in our waters - the defence of our fleet and merchant ~~aMppi~~ng against underwater predators - though the Service was consid-esed to be only an adjunct to the Royal Navy at that time. - ' The criteria for the selection of the first batch of officers for submarine teaming were extremely rigid. Besides being in medical category S, A„ (Le$_v$ in top physical condition for service ashore and at sea) the officers were tefMimf to possess the other faculties most essential in a submariner - afaBHy to firstly, live within extremely confined spaces with, occasionally, ftfianvkonment with a high carbon dioxide content. Secondly, withstand Winded periods of submersion and absence of daylight and natural BrtSRtation; Thirdly, withstand long spells of loneliness and, fourthly, WMnafelltty to hot-bunking, i.e$_v$ time-sharing of bunks peculiar to submarines because of constraints of living spaces. All these officers sailed through these tests with flying colours.

Submarine training at the *Dolphin* for inductees mainly comprised three months' theoretical and formal training followed by a long spell of nine months at sea on board submarines based at Gosport. Along with the officers from India, there were trainees from the Royal Navy, Canadian Navy, Australian Navy, Norwegian Navy and Pakistan Navy. It goes to the credit of the British Admiralty that there was no discrimination so far as the foreign trainees were concerned, and they were allowed access to all sensitive areas and classified documents and by the time they passed

out, they had acquired as much expertise as their Royal Naval course-mates.

The Indian Naval sailors who were deputed to the *Dolphin* for submarine training performed equally well. Rear Admiral M.N. Vasudeva, who was in me first batch of trainees from India and who was the first officer of the Indian Navy's Submarine Arm to rise to flag rank, reminisces,

> Besides officer trainees, we had several senior sailors from different navies in our group. I remember one of them, M. Singh, who was an Engine-Room Artificer in our Navy. Though he was undergoing training and had seen submarines for the first time in his life when he came to *Dolphin,* he was in great demand in very submarine even before he had completed his training. Whenever the submarines or submarine equipment ashore had problems, they sought his assistance and he went and solved them. Our capabilities were thus soon known to the British and so we were respected and trusted and assigned tasks that were more complex and called for higher expertise than those assigned by the Royal Navy to even their own submarine personnel in their own submarines....

The second batch of four officers, Lieutenant Commander (later Captain) M.N.R. Samant and Lieutenants *VS.* Shekhawat (later Vice Admiral), S.K. Singh (later Commander) and P.K. Ramanathan (later Commander), out of whom the first two were from the Executive Branch and the other two from the Engineering Branch, proceeded to the UK in July 1963. The third batch of officers consisted of Lieutenant S. Nagrani (later Commander) andJ.MS. Sodhi (later Rear Admiral) of the Executive Branch and Lieutenant (later Commodore) Inderjit Singh of the Electrical Branch and the fourth batch had Lieutenants L. Talwar(laterCommander) and K.R. Menon (later Rear Admiral) of the Executive Branch and Lieutenant (later Commodore) D.N. Thukral and Sub-Lieutenant (later Lieutenant Commander) of the special Duties List S.L. Ba tla of the Electrical Branch. By 1965, 15 officers and 20 sailors had completed submarine training in the UK and returned to India.

In April 1962 Captain Dang joined the *Dolphin,* the submarine training school and base of the First Submarine Squadron and the headquarters of the Hag Officer, Submarines of theRoyalNavy.lt was an unusual experience for him, rubbing shoulders with young Lieutenants as well as senior submarine officersof the British and NATO navies and starting his training from the grass-roots level. He underwent a curtailed Lieutenant's course including escape from a 100-foot escape tower - an experience considered most essential, physically and psychologically, for a submariner to get over any initial hesitations v/hich he has because of the claustrophobic effect of being shut down in a small vessel under the sea with no access to sunlight or fresh air. It also provided the necessary confidence to motivate others into joining the submarine arm.

A month of basic submarine acquaintance was followed by a month of squadron staff duty, study of the squadron system, with occasional seagoing spells, and base maintenance facilities for the weapons and equipment. He underwent training onboard the old submarines of the A **and** T classes which were in British fleet service during World War D and **fead** been GUPPYED (equipped with Greater Underwater Propulsive

itower) since. The A class had good endurance but were rather played out **fdtheir** machinery status. He also took part in tactical training in the ftopoise class submarines and their improved version, the Oberon class; he ***Vtnt** to sea on board both these modern types, participating in a week-**long** tactical exercise off Northern Ireland, and witnessed an exercise in tactical evolution of detection between aircraft and snorting submarines which did not surface at all.

He then visited some of the British shipyards, such as Samuel White **and** Camel Lairds, to familiarise himself with the various problems faced *$f* them in the construction of, submarine hulls, their maintenance and docking, maintenance of their main machinery, auxiliaries, batteries, torpedoes, detection equipment, sonars, radars, fire control systems and other equipment.

This was followed by a month of tactical exercises with a squadron of the Oberon and Porpoise classes of submarines in an operational role in the Northern waters off Faslane. Thereafter he returned to *the Dolphin* and studied the organisation of the Flag Officer, Submarines including the interaction with the material division of ship construction and other Admiralty departments at Bath concerned with the major problems of construction, refit and maintenance.

Criteria for Submarines for th e IN

This exposure helped incrystallising the more important aspects of setting upasubmarinearminhis mind andcollectingmaterialfor the first detailed assessment of requirements. In the paper he prepared on his return to India, he proposed that the Submarine Arm of the Indian Navy should be started with a minimum of three submarines, though four had been a customary division of a squadron of naval ships, because one of anything is nothing, two may be meaningful and three is a basic organisational unit' which, in the case of submarines, was particularly apt. One submarine could then be in major maintenance at any one time, one in transit and one in the assumed patrol area at one week's passage time or 1,500 miles from base, two weeks on patrol and one week's return accounting for the submarines' six weeks normal operating cycle, sufficient to reach any area across the Bay of Bengal or the Arabian Sea.

The second requirement was that the submarines for our navy ha o have a sufficiently wide radius of operation and what the Indian Navy needed were patrol submarines capable of long reach and considerable endurance. It is the basic geographical position of the Indian peninsula at the top of the Indian Ocean with its two arms, the Bay of Bengal and the Arabian Sea each ending with extremely narrow waterways in the Malacca straits to the East and the Bab-el-Mandeb and the Straits of Hormuz to the West, which were the deciding factors as regards the minimum endurance of our submarines.

The third very important and vital requirement was that the design of the submarine must be rugged and hould incorporate high safety factors, adequate safety margin in its buoyancy characteristic, a fail-safe quality in its machinery, duplication of critical equipment such as gyros, valves, etc., mainly because the Indian Navy swas setting up an arm with an inherent hazardous quality of service and any disaster or tragedy in the earlier stages of such a

venture would probably mean the avoidable abandonment of such an important enterprise.

And, finally, the fourth requirement, an obvious one, was that the submarines that were going to be acquired, whether new or old, must be within the economic repair life of the hull. Warships generally have an economic repair hull life of about 20 years for smaller vessels such as destroyers and submarines and 30 years for the capital ships, i.e., aircraft carriers and cruisers. And so if a submarine was over 20 years old or was approaching this age, it would be very uneconomical even if the price tag attached to it was low enough. The two disadvantages of a new submarine would be the time taken to build it and the higher price tag but the advantages would outweigh the disadvantages. One was, of course, prepared to accept a submarine already built, but it had to be one that had a reasonably long economic repair life left.

Besides these important factors, another aspect of considerable importance was the methodology to be adopted for training the crew, both immediately and in continuity for the submarine arm to be formed. It was realised at this stage that the establishment of hull training facilities in India would mean considerable investment in equipment and would lengthen the lead time for acquisition further. What was visualised, therefore, was the use of the submarines themselves as floating classrooms for which they should have sufficient space to carry not only their crews but also a training class of about 50 per cent to 100 per cent of the crew strength. This was an important requirement as submarines have extremely cramped accommodation and the hot-bunking system which entails provision of bunks for only two-thirds of the strength of the crew. Some larger submarines, such as the old American Fleet class boats, the British A, Porpoise and Oberon classes and the Soviet F class had, however, the necessary space for carrying additional personnel for on-the-job training.

Types of Submarines Considered

Though the American Fleet class boats had two to three years less remaining hull life than the British boats, they were known to be in better condition and had very rugged hulls and machinery which would have possibly added five years to the economic life after a refit. The 450-ton German-built Baltic class submarines were far too small for our purpose. The French Daphne class had a new design but was rather small and its endurance was limited to about 1,000 nautical miles which did not fulfil our purpose. There were also Italian boats and some Dutch boats as well, but their basic characteristics were not compatible.

Meanwhile, if it was not the papers, proposals, monographs, presentations and pleadings of the Naval Headquarters, it was the Chinese incursion into the Indian territory in 1962 during which some Chinese submarines were reported to have been operating in the Bay of Bengal challenging the 'might' of the Indian Navy that tilted the balance in favour of the submarine's acquisition. The Navy lost no time to once again put up a proposal in November 1962 highlighting the areas of our weaknesses at sea, and the possible loss of face if the Chinese submarines had chosen to display their prowess either by attacking our naval and merchant ships, or by blocking the approaches to our harbours with mines. This paper proposed the acquisition of three submarines with an Operational radius of 1,500 nautical miles - one on patrol, one undergoing maintenance and resting the crew and one on transit to or from

the patrol area.

^ ***In*** May 1963, another detailed proposal justifying the formation of a submarine arnin the IndianNavy was put up to the Government. It was once again reiterated that the advent of the modern submarine had already revolutionised the trends of maritime warfare, that submarines werenow capable of operating deep inside an opponent's area of maritime control without the support ofairor surface forces, and that the technological advances made had enabled modern submarines to operate without being detected and with vastly increased endurance, giving it a striking capability matched by no other naval craft. It further pointed out that despite the great strides made in improving the capabilities and sophistication of antisubmarine detection equipment as also in the lethality of weapons used to seek and destroy submarines while still submerged, the fact had been established that the submarine had an edge over the antisubmarine forces and that a dangerous situation could be created at sea by submarines of even a weaker hostile maritime power. The appearance of a true submarine had already shaken the major naval powers of the world out of their static orbit of conventional weapons, conventional propulsion and conventional weapon platforms, and it was now an accepted fact that submarines had become prime weapons of offence as well as defence.

In addition, another important aspect highlighted was that an environmental factor that had not received adequate recognition in the past was that the relatively shallow depths and other conditions prevailing in the waters contiguous to our shores enhanced a submarine's covert qualities and subverted any efforts made even by a modern and well-equipped fleet to neutralise it. The hydrographic structure of the Indian Ocean -thermal conditions, temperature and density gradients and relatively shallow depths ofwater-attenuated the low-frequency sonar emissions of even advanced antisubmarine ships and aircraft thus defeating submarine hunting and killing operations far more effectively than in any other sea area and would increase the survival potential and effectiveness of the IndianNavy's submarines well beyond the usual estimates made by naval planners and strategists.

Another argument put forward was that India had already established some control of the surface and theairwithherrelatively austere fleet and the recent acquisition of the aircraft carrier, *Vikrant,* but complete command of the surface would only be possible if it could operate below the surface as well. For local air and sub-surface superiority, however modest, coupled with India's peninsular position at the focal point of the Indian Ocean and her easy access to the Ocean's choke points would enable our Navy to deny the surface in the contiguous sea areas to an extra-regional flotilla, even if it is moderately superior in weapon capabilities and endurance.

It was also stressed that at that point of time, newly established maritime states, even around the Indian Ocean such as Indonesia, had accorded adequate importance to the establishment of a submarine arm and hence, if the Indian Navy was to grow into a balanced naval force, the establishment of a submarine arm would be an inescapable necessity. It was stated that as early as 1948, the Defence Committee of the Cabinet had accepted the proposal in principle but, due to various factors the subsurface wing was yet to come into being.

It was also pointed out that 'killer' submarines were acknowledged as the best weapons in antisubmarine warfare. These submarines were employed as barriers in the submarine transit areas and since they could now communicate with patrol aircraft, they were in the best position to destroy enemy submarines. Since the Indian Navy had large ocean tracts to guard and these weredominatedbynarrow and restricted focal areas of entrance such as the Malacca-Straits, Gulf of Aden, etc., the killer submarine would be most effective in such areas.

Submarines could also be used for offensive mine-laying. While the offensive capability of the surface forces against naval forces of the enemy would be dependent on chance encounters at sea, submarines would have the capability of mining enemy harbours and thus deterring the enemy from aggressive intentions. Besides, the possession of submarines would act as a deterrent to any hostile action around our island territories in the Bay of Bengal and the Arabian sea.

The proposal also highlighted the need for setting up suitable repair and refit facilities and an operational base for submarines in a fully protected haTbour. For this purpose, Marmagao was considered most suitable because it met all the requirements and was close enough to the Torpedo and Antisubmarine School a t Cochin.

The types of submarines which might be available at that time for acquisition for the Indian Navy were the British A, T and Porpoise/ Oberon classes, the American Fleet class, the Russian W and Z classes and the French Narval class, all of which were conventional submarines. Some of the more important aspects of their vital statistics and capabilities and limitations are given in Table 6.1.

Table 6.1. Capabilitiesand Limitations of the Conventional Submarines available to the Indian Navy

	Britain			USA	USS		France
Class	*M*	*T*	*Porpois Oberon*	*"Tleet*	*'W*	*Z*[1]	'Mu
Displacement **(Tons)**							
Surface	1385	1321	2030	1816	1030	1000	1640
Submerged	1620	1570	2410	2425	1180	2200	1910
Dimensions							
Length	282	273	295	312	240	290	256
Beam	22	26	26	27	22	26	24
Droug	17	15	18	17	15	19	18
ht	20	16	24	24	14	20	14
Torpedo	6 to 8 x21"	6x21"	8x21"	10x21	6x 21"	8x 21"	8x21"
Sneed *Otts)*	19	11	15	20	17	20	18
Fuel **(Tons)/** ***Endurance***	159 T	132 T	14 000	300T	16 000	26 000	15 00
Complement **(Officers** sailors)	5+55	6+59	6+65	85	60	70	7+51
Year Built	1943-1946	1942-1945	1957-1962		1945-1962	1951 - 1960	1955-1960
Silent Speed	2	3 to 6	6 to 12	2 to 8	Very poor	Not know	Not know

SuitaUUtyfor Tropical Conditions	Moderate	Poor	Moderate	Very good	Poor	Not known	Mode-rate
Remarks	Designed fbrthe Padfkin World War H	Designed fbrthe Atlantic	Post-World Warn Design for the Atlantic		Design for Pacific Indonesia	Acquired by China, UARfc German xxi class	- Impro-ved version of

The total expenditure on a squadron of four new submarines, a submarine base, and a submarine service of about 30 officers and 400 sailors was estimated atRs30crore; and if the submarines, were second-hand with four to six years' remaining life, the total outlay would be in the region of Rs 8 to 9 crore and in this case, from out of the existing old boats, the American Fleet class boats were considered most suitable for Indian conditions.

Submarine Acquisition Approved

The Government finally acquiesced, and the recommendations of Naval Headquarters were accepted - a nautical milestone in the history of the Navy. But the type of submarines to be acquired had notyet been decided upon and what was available was a mixed bag with varying operational range, diving, speed and manoeuvrability characteristics, weapon systems, sensors and balance of operational life. There were the British A and T classes which were already 20 years old, had developed metallic rheumatism and arthritis and were on the verge of being consigned to the breaker's yard; there was the modern British Porpoise class which displaced about 2,400 tons and which was later modified and built as the Oberon class from 1965, the latter passing muster; there was the American Fleet class of 2,400 tons which had several sub-classes and had already been in service for 16 to 18 years but, because of its rugged construction and modernisation, had about five years' operational life left, and could fill the gap while negotiations **were** initiated for the acquisition of more modem newly built submarines; and there was the German Baltic class of about 350 tons, which had originally been built for the Norwegian Navy **but** was **considered** too **small in size and** its limitations precluded its consideration for acquisitio

Negotiations with British Authorities Fail After a careful scrutiny of all parameters, including the financial commitments and foreign exchange availability, the British Porpoise class submarine was considered to be ideally suited for acquisition for the Navy, and negotiations began. The British, however, were not prepared to

part with a Porpoiseclass submarine but offered to build anOberon class submarine fbrourNavy and, since the Oberon would take some time to be available, they also offered an A class submarine for use until the former was ready. **But** this class was far too close to superannuation for our purposes and hence was not accepted.

Meanwhile the Government agreed to buy a new Oberon class submarine from the UK if it was specially built for the Indian Navy to **suit** Indian conditions, and if deferred credit terms for Rs 5 crores were made available by the UK (Rs 3 crore for the submarine and Rs 2 crore for the spares), but the British Government were not willing to offer any such credit. Our Government was also not prepared to spare the funds for the purpose and thus the proposal was virtually aborted. Lord Louis Mountbatten wrote in 1965,

> IhaveaspeciaIlysoftspotinmyheartfortheIndianNavy,havingdone so very much for it from the time I was the Supreme Allied Commander and had most of the (Royal Indian) Navy serving under me from 1943 to 1946 until I was Viceroy and the Governor General, ' when I took a great personal part in the division and reconstitution of the Navy.
>
> Ever since then I have been instrumental in getting almost all the requirements of the Indian Navy by the British Government, including « **the** two cruisers, the aircraft carrier, the destroyers, the organisation - ., **for building the** frigates at Bombay, etc.
>
> I had even managed to get more favourable terms for the **construction** of **a** British submarine but alas it all took so long mat this **particular** transaction fell through.

Lord Mountbatten later said that the British denial of deferred credit amounting to only Rs 5crore virtually brought to an end the flow ofBritish **ships** and equipment to India, and acquisition of naval **hardware from other** sources snowballed soon.

The British had also offered the use of an old A class submarine from the Royal Australian Navy on temporary loan, to be used only for antisubmarine training; but for obvious reasons this offer was promptly rejected.

The 'watershed' decision to acquire the F class submarines from **the** Soviet Union was preceded by interesting exchanges between the Chief of the Naval Staff, Admiral BS. Soman, and the British First Sea Lord, Admiral Sir David Luce.

With the developments following the 1962 Chinese incursion into India and the consequent reassessment of our requirement of ships, aircraft and submarines, and the need for the defence of the Andaman and Nicobar islands on which we had no presence of any military significance, it was decided to acquire a sizeable package from Britain to refurbish and strengthen the existing Fleet and to primarily establish a naval presence in our Eastern waters. After the preliminary exchange of letters, both official between the Government of India to the Admiralty, and demi-official between Admiral Soman and Sir David Luce, all that Britain offered to the Indian Navy consisted of two or three Battle class destroyers which were with the Royal Australian Navy and already 30 years

old, one or two T class submarines which were also with the Australian Navy and 20 years old, and some Seacat missiles, whose capabilities and lethality was limited, and associated low-level equipment. Such an offer was made presumably because of thehang-over of having been the mightiest maritime country in the world for centuries, and the instinctive desire to supply lower-level ships and equipment to 'dominion' navies.

Another possible reason was that Britain did not look upon the Chinese attack the way India did. As the then British Naval Attache at New Delhi, Captain F.W. Watson, said to the Director of Naval Plans at Naval Headquarters, Captain Dang, the Chinese had never thought of demolishing India and had not even attacked India - what had actually happened was that the continued provocative statements made by our leaders and some erratic action at the frontier positions on the disputed McMahon Line as well as in Ladakh had made them react with a view to, as he put it, keep Indians on their toes! The Indian Naval authorities were, therefore, advised not to take the Chinese attack too seriously and to radically curtail their shopping list for the Navy!

Thus the demi-official letter from Admiral Soman to Sir David Luce, which once and for all detached the Indian Navy from the Royal Navy's apron strings, read

'Thank you for your letter and the offer of assistance which you have made. I must, however, state clearly that this level of response does not meet the urgency or size of the requirements as we see it in the situation after the Chinese attack of 1962. We see our requirements clearly as more urgent and much more for modern ships and equipment in sufficient quantity. I must, therefore, point out that should you not beabletodoany more than this, something must give way somewhere soon.

That 'something' obviously was the traditional bond between the British Admiralty and India's Navy for the supply of British ships, equipment and technology, and the latter's virtually total dependence on the British sources of supply.

The later proposal of 1963 which was a long-term naval development plan based primarily on the rapidly changing scenario after the 1962 Chinese incursion, envisaged the major change resulting from British insularity - that of looking elsewhere for naval hardware.

Delegations to the USSR

In May 1964, an Inter-Service Defence Delegation headed by the then Defence Minister, Shri Y.B.Chavan, and with the Deputy Chief of the NavalStaff, Commodore (later Admiral and Chief of the Naval Staff) S.M. Nanda, as the senior Service representative, visited the USA for the main purpose of acquiring two or three Fleet class submarines and a few destroyers - the requirements having been based on the threat from the Chinese Navy in the Bay of Bengal, as perceived at that time. The US Government's assessment of the Chinese naval threat was also different from India's and they did not consider it necessary for India's Navy to acquire any naval hardware from them, though they had supplied some weapons and equipment to our Army and Air Force. On the contrary, they advised the delegation to go back to its traditional suppliers of ships and equipment, the British Government.

It was ina scenario like this that it was decided to approach the Soviet Union for the supply of submarines. The Soviet Union had earlier supplied some W class submarines to the United Arab Republic and Indonesia. It **was,** however, reported that these boats were not operating effectively, **and** the submarine bases had been over-staffed by Soviet personnel at the senior levels in Alexandria. In Indonesia the situation was even worse arid **only** one out of every five submarines was operational. But the F class **submarine** of 2,300 tons being offered by the Russians to India now was **found** to **be** similar in specifications to the more modern British Propoise/ **Oberon** class and the older American Fleet class and hence it was decided **to** make a bid for three submarines of the F class.

The acquisition of naval vessels and weapon systems from a source other man the UK for the first time in the history of the Indian Navy was **a** watershed in its development from a fledgling marine wing to a major naval force. It was, however, also going to pose some new prob^ms tome Navy. Until this time all ships and craft had been acquired from the UK, **all** spares ashore or afloat were of British origin and there was adequate flexibility of commonality in the use of these spares in different types of ships. The maintenance facilities and dockyard personnel had, over the years, been attuned to only British ships and equipment, the personnel were, familiar with the Royal Navy's philosophy and routine for operation and maintenance, and the language in which all operational and technical publications were printed and training conducted -English -was a language Indian naval personnel were well-versed in.

These problems were certainly daunting but since the Soviet offer was the best, the Navy decided to go in for the F class submarine, notwithstanding the problems it would have to face in order to resctucture its operational and maintenance doctrines, the logistic support philosophy and the language barrier. Accordingly, another inter-Service defence delegation, headed by Shri Y.B. Chavan, and, among others, with Rear Admiral S.M. Nanda, who was still the Deputy Chief, Captain 6.K. Dang, Director of Weapon, Policy & Tactics and Captain (later Rear Admiral) C.L. Bhandari, the technical member, visited the Soviet Union in August-September 1964. GeneratJ.N. Chaudhuri, the then Chief of the Army Staff, and Lieutenant Colonel G.S. Sandhuwerealso in this delegationfor the first time.

The Inter-Service Defence Delegation, headed by Shri Y.B. Chavan, received a very warm welcome at Moscow. This was the first time that a naval team was included in the delegation - only the Indian Air Force having had earlier dealings with the Russians for procuring MIG aircraft.

The naval team's primary concern was the acquisition of naval equipment centring around the requirement for submarines. At the first meeting with the State Committee for Foreign Economic Relations inMoscow, the naval members were shown the drawings and specifications of the equipment offered to the Indian Navy by the Soviet Government. The General Engineering Division of the Committee was handling the deal, and arranged visits to Leningrad and Sevastopol where the ships were shown with demonstrations, and detailed discussions took place. The naval team was then taken by hydroplane off Leningrad harbour where they boarded an F class submarine. A quick 'walk-round' of the submarine covering its entire length from stem to stem followed while the team observed the lay-out of torpedo tubes, reload arrangements, accommodation standards and the provision for increasing the bunk

strength, the machinery design, fire control system, battery compartments and other equipment fitted on board. A new feature of the submarine was that it had three shafts, the outer two being used either for propulsion at high speed or charging the batteries and the inner one, which was bigger, was used for slow, silent long-distance cruising.

The 'walk-round' was followed by the submarine diving to a depth of 50 feet for a few minutes, and a verbal briefing on various other aspects of the submarine's capabilities. Though the operational standards of the submarine had yet to be assessed, three-screw-propulsion seemed rather cumbersome, arrangements for spare parts support had not been examined, sophisticated electronic equipment was minimal, and the quality *of* electrical-cum-mechanical torpedoes had not been established, The naval team nevertheless felt that the submarine was generally suitable for operation in Indian waters. Besides, it had a rugged structure, and material of high quality had been used for its construction. It would fill thebilL

When the naval team later visited Sevastopol, they were shown several types of ships that the Soviet Government was prepared to supply to India. These ships included a submarine 'mother' ship of the Don class, which was described as such because she had been designed to provide accommodation for stand-by submarine crews, logistic and other support, andrepairandmaintenancefacilitiesatsea. The acquisition ofa ship of this type was considered worthwhile because the Russian philosophy of submarine operations was dependent upon mobile floating logistic support since they perforce operated at that distances on the high seas for long periods without touching shore bases. Some minor limitations were later revealed, but by and large it was felt that a ship of this type was an essential requirement for the submarine arm.

Some of the other long-term requirements related to the submarine arm, such as a submarine rescue vessel and support ships of other types, were not gone into at this stage, but the shore support requirements were studied in great detail for the development ofa submarine base on the East Coast.

The Russians offered to build three F class submarines for the Indian Navy, with the delivery to commence two to three years hence at intervals of one year.

When the delegation returned from the USSR it saw two develop-iftents. The First Sea Lord of the British Royal Navy, Admiral Sir David Luce, had written to Admiral Soman saying that he was sending a special tearhofofficerscomprising an Admiral, a Captain and a civilian technician from the Admiralty, to point out the changes that British co-operation with the Indian Navy would undergo if India went ahead with the acquisition of naval hardware from the Soviet Union. Most of these changes were related to the question of security, and the First Sea Lord stated that if India went to the Soviet Union for naval equipment, the security of British equipment in the Indian Navy would be jeopardised and the British Government would thereafter have to curtail release of classified information and equipment to the Indian Navy.

The reply was a polite acknowledgement pointing out that India was protecting her security interests, but she hoped to continue to maintain good relations with Britain in keeping with the tradition of friendshipand co-operation between the Royal Navy and the Indian Navy.

In the event, the Government refused to spare any finances for the Navy because the budgetary allocation for acquisitions from abroad had been utilised by the Army and the Air force. Thus the Navy 'got nothing more than a bit of window-shopping' out of the Inter-Service Defence Delegation's 1964 visit to the USSR. However, in the exercise of assessing our requirements, it did help in formulating the basis, subsequently further matured by detailed study at Naval Headquarters, for the acquisition programme that was adopted in 1965.

Shri Y.B. Chavan led another Inter-Service Defence Delegation - this time to the UK -towards the end of 1964. The Delegation made another attempt to seek deferred credit for building an Oberon class submarine in the UK but was once again unsuccessful in its bid. Theproject virtually reached an impasse as the Government of India too continued to be unwilling to make budgetary provision for the submarine.

Soviet Offer of F Class submarines Accepted

From the Soviet point of view, India's navy needed to be strengthened, particularly because of the Chinese incursion into our territory in 1962 and later, and also because Chinese criticism of the Soviet policy in Soviet East Asia and the Indian Ocean was changing the politico-military scenario and altering the geopolitical compulsions in the region. Hence another Inter-Service Defence Delegation headed by Shri G.L. Sheth, Additional Secretary, with a Naval team comprising the Deputy Chief of the Naval Staff, Rear Admiral (later Admiral and Chief of the Naval Staff) S.N.Kohli, and Captain (later Commodore) B.K. Dang, Director of Weapon Policy and Tactics at Naval Headquarters, Captain (later Rear Admiral) C.L. Bhandari, Captain (later Rear Admiral) K.R. Ramnath and Shri Paramanandan, Director of Naval Design, visited Moscow in August 1965. The Soviet Union readily agreed to not only supply three (later to be increased to four) F class submarines with the first to be delivered by the end of 1967, five Petya class patrol vessels, two small landing ships and four patrol craft, but also offered deferred creditsforRupeepaymentspreadover aperiodof lOyears at a low interest rate of 2 per cent per annum. The price of each submarine was at that time estimated at Rs 2.5 crore. The Soviets also offered to train two submarine crews at their naval base in Vladivostock.

An interesting featureof the negotiations with the USSR was that they didnot have any fixed prices for wha t they offered - they could readily bring them down to suit their overall strategic needs and purposes. For example, while the British asked for Rs 5 crore for the Oberon class submarine including the outfit of spares, the Russians offered the F class for only Rs *25* crore each. The surface vessels of fered by them were cheaper than any other source in the world.

As Commodore Dang reminisces, the price of the Petya class, which die Navy was planning to acquire, had been considerably reduced after some hard bargaining by Shri Sheth, leader of the Delegation, during a meeting with the State Committee for Foreign Economic Relations at Moscow which was headed by General Sedorovich. When Shri Sheth asked for some further reduction, the General threw his head backjn anguish and exclaimed, 'Oh God! You want it cheaper than that?' To which Mr Sheth replied, 'General,

I thought there was no God in the Soviet Union'. The General had a sense of humour and since he was fully empowered to adopt a price to suit Soviet national requirements, he promptly reduced the price further.

The New Environment

Until this time, as already stated, the IndianNavyhadbeeninclosecontact with the Royal Navy and everything in the Indian Navy was of British origin. The acquisition of submarines from the Soviet Union posed several challenges to the pioneers of the Submarine Arm, not the least of which was the fact that sophisticated and exacting training was conducted in a new language using a new script. These pioneers who had been carefully selected, however, faced the challenges creditably and imbibed all the finer aspects of the art of submarining despite the hostile weather conditions prevailing in their training environment both in the North Pacific and Baltic regions, in raging blizzards, ice-bound waters and sub-zero temperatures which sometimes went down to 35 degree C below the freezing point.

Added to the inimical environment were the arduous and uncomfortable living conditions on board a submarine which was totally different from what average human beings, especially those from tropical regions, are accustomeoto - claustrophobic living spaces, hot-bunking, strict rationing ofwater, absenceofcookedmeals,inhalationof air containing hazardous pollutants and a high level of carbon dioxide, total ban on smoking especially while submerged, lack of recreational and other amenities, confinement in an enclosed space for hours, days or weeks togetheratsea with no communication with the outside world one is familiar with. The high risks associated with submarining demands a high level of dedication and motivation which our submarine pioneers displayed inample measure and, with inspired leadership and a cheerful approach to adversity, overcame many a seemingly insurmountable problem.

First Submarine Squadron Commissioned

Twenty years after the proposal for acquiring submarines had been submitted, the Indian Navy finally entered the submarine era when the submarinearmformally came into being with the commissioning of*Kalvari* (the name of a species of greyshark), commanded by Commander KS. Subramanian, atRiga in the Soviet Union on December 8,1967 which, after a brief period of training with the Soviet Navy, arrived in India on July 16, 1968. The three other submarines, *Khanderi* (the name of a wide snouted sawfish) commanded by Commander M.N. Vasudeva, *Karanj* (the name of a species of whale-shark) commanded byCommanderM.N.R.Samant>and Kttrsimi (the name of a log-snouted shark) commanded by Commander A. Auditto, were commissioned respectively on December 6, 1968, September 4,1969 and December 8,1969. The submarine depot ship, appropriately named *INS Amba* and commanded by Captain (later Vice Admiral and Vice-Chief of the Naval Staff) M.R. Schunker, was commissioned on December 28,1968. The Directorateof Submarine Armat Naval Headquarters came into being on January 6, 1966 with Captain Dang as its first Director.

These four submarines formed the first submarine squadron of the Indian navy - designated the 8th Submarine

Squadron - and transformed the Service in to a three-dimensional wing of our Defence forces. At this time Pakistan, Indonesia and Japan were the only other Asian countries that possessed submarines.

Some of our senior submariners feel that the British Oberon class submarine was in some respects superior to the Russian F class, the more important aspects of its superiority being, firstly, that while the former was an improved and updated design, the latter was basically a design produced by a German submarine designer immediately after World War Hand secondly, the la tter's basic role was carrying out attacks onmercan-tite, shipping rather than attacking submarines. The F class, however, had more positive buoyancy than the Oberon class which, for a fledgling submarine arm, was an important safety factor to be taken into account. They also feel that if the British had decided to give us deferred credit for the Oberon class submarines, which they think did not happen because the Labour Party had lost the elections in Britain and the Conservatives were in power, our Submarine Arm would have come into being in 1963, which it actually did five years later - a period within which the Navy could have inducted a second squadron of submarines.

An excellent example of the cama raderie and fellow-feeling amongst submariners and their unflinching loyalty to the Arm is evident from the example of Johnson, an Engine Room Mechanic who had volunteered for joining the Submarine Arm and was very keen on becoming a submariner despite his 'track record' which disqualified him outright. He had twice been to detention quarters, he had spent some time in naval cells and was up to no good'. To quote Rear Admiral Vasudeva,

> He came and saw me when I was going through the service documents of sailors who had volunteered to join the Submarine Arm and were to serve with me after induction and training in *the Khanderi.* I told him that he had been almost congenitally breaking the rules,had no respect for the law and had had several spells in the Navy's detention quarters for fairly serious offences. He said, 'Sir, if you select me, I promise you I will never let you down. Please disregard my service documents and my past. If you select me, one day you will be proud of me'. So I decided to give him a chance and selected him as one of the reserves for my submarine.
>
> Johnson sailed through his submarine training courses at Vladivostok in the USSR and soon became an important cog in the administrative and maintenance machinery in the *Khanderi's* engine room. While we were in Russia, I noticed that young Johnson had a roving eye but as soon as he came on board he meant business and was efficiency personified. When we sailed out of Riga on our way home and were crossing the Bay of Biscay, our submarine started rolling alarmingly. We could not dive in the channel and there was great risk of fire as the ship continued to roll as much as 55 degrees from the vertical on either side. Nearly all members of the ship's company (crew) were sick and werebringingup everything that they had eaten, but throughout our passage through the storm, the only person available in the engine room, ever on his toes and taking full charge, was Johnson, Engine Room Mechanic First Class.

When we were rounding the South Cape (of Africa), we went through a terrible storm when we couldn't

even see *Amba,* which was only a nautical mile away, because of the mountainous waves. The upper lidhad to beclosed and theofficerof the watch had to be chained to a fixed structure because every time the crest of an oncoming wave broke over the conning tower, even the head of the officer was wider water for a few moments, and the waves nearly tore the exposed fixtures off the hull. Almost everyone was sick again. This went on for three and a half days which seemed like ages but Johnson never gave ' , up. Whenever I spoke to the engine room and asked whowasonduiy,/' the reply was always the same, Tour loyal Johnny, Sir'. Such is tie stuff the Indian Navy's submariners are made of -persons who/ran rise to great heights when the chips are down.

By the middle of the 1960s it had become abundantly clear to the Indian authorities that in the scenario of continuing super power build-up in the Indian Ocean, rising tensions in the Gulf, the growing strategic importance of this Ocean, and the immense po tential of the living and mineral resources off the tropical belt and continental shelf in this ocean, future wars, even if limited, were most likely to be fought in this region, and the success of our Navy, if it was embroiled in war with another nation, would largely be decided by the superiority, both in numbers and sophistication, of its underwater weapon platforms. The nation had bynow become aware of the viability of a strong submarine force as a vital element of our maritime force and the most effective deterrent to any intrusion into our waters. This was in keeping with the assertion of Prime Minister Jawaharlal Nehru that 'to be secure on land, we must be supreme at sea'and Shivaji's naval doctrine, 7alaimjasya, ValaimTasya'(hewho rules the sea is all-powerful).