JANE'S FIGHTING SHIPS

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EDITED BY
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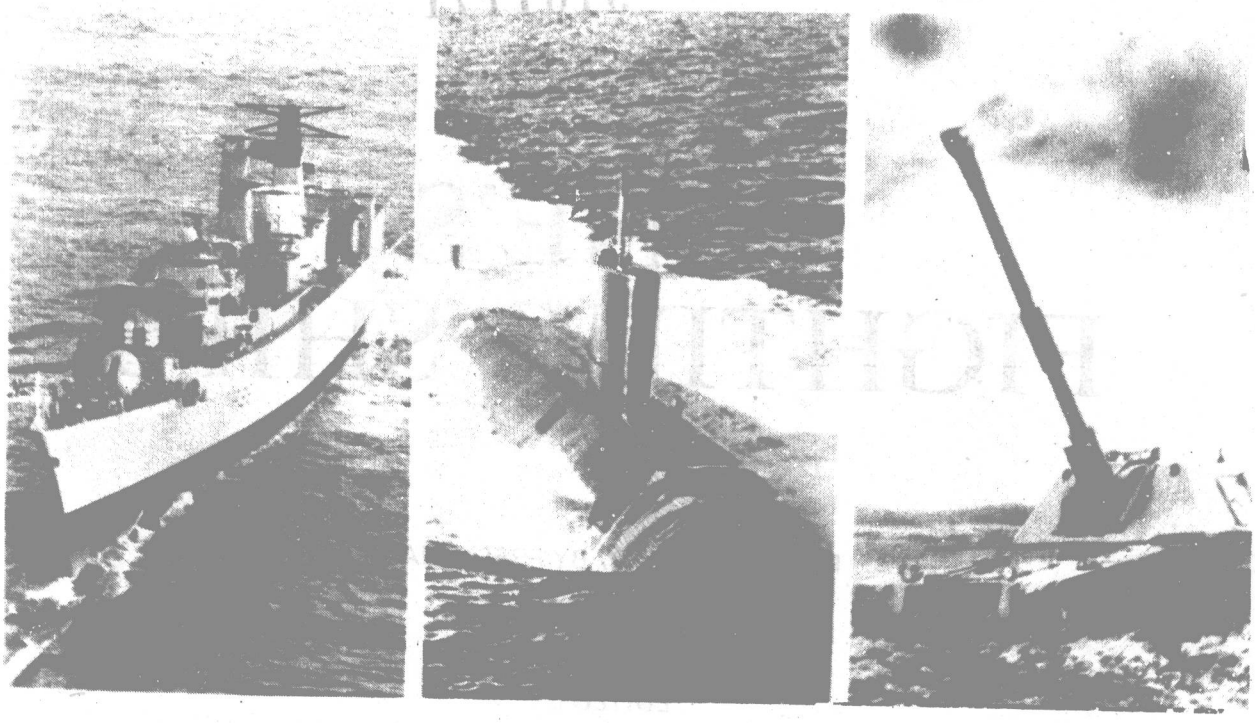

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Foreword

"We overestimated our Intelligence". At the start of any campaign it is a military cliché that an honest commander will have to admit that he was inadequately informed about the enemy. The latest to join this distinguished company is Admiral Crowe, Chairman of the US Joint Chiefs of Staff, who made his confession last September when talking about the damage to merchant shipping caused by Iranian mines laid from an assortment of transport vessels, and by small arms carried in the fast patrol launches of the Revolutionary Guard. It isn't easy for those educated in the atmosphere of superpower confrontation between ships and submarines of unimaginable firepower to take seriously either horned mines that look as though they have escaped from an exhibition of World War II memorabilia or men in open boats with hand-held rocket launchers. We can be sure that the Admiral's advisers knew about the mines and the small craft, but in the deluge of information available they failed to isolate what proved to be the most important elements at the start of the US Navy's involvement, and my guess is that the mining expert was unable to make himself heard above the roar of Silkworms, Exocets and midget submarines.

The same problem of too much information, too many choices, confronts almost every aspect of naval affairs, starting with equipment procurement and selection of weapon systems and moving on through command and control and tactical data handling. To find a path through this jungle you need experts, which means people with previous experience of all aspects of the particular problem which you are trying to resolve. And yet so much second hand information is available that men of intelligence and goodwill who have no knowledge of the sea still feel competent to make judgements and choices, buoyed up by the sheer volume of indiscriminate or "selective" evidence with which they can be presented by the products of modern information technology. The trouble is of course that many of the experts are also people with a vested interest in the preservation of the status quo plus a little bit better and a little bit more, so providing a readily available rationale for those who wish to undermine or supplant their judgements in the competitive struggle for defence budget priorities. But whereas there may be justification for turning to independent advice to balance special pleading, in the end it is essential to trust the judgement of those who have first hand knowledge of the environment, regardless of suspicions about their motives. This seems to me particularly important in maritime affairs where the scale of events is so easily distorted by focusing on small scale maps. To a generation brought up with the daily images of satellite weather photography allied to the certainty of being able to fly anywhere in the world in a few hours, the whole maritime scene is as though viewed through the wrong end of a telescope. The sea is still as vast as it was in the days of Raleigh and Columbus because ships still move at a speed which both of those two global explorers would have no difficulty in recognising. If you leave Portsmouth harbour (the English one that is) and take the second turning on the right as depicted on the TV weather map you finish up in the Norwegian Sea; in reality you would be up the creek in Southampton Water less than twenty miles from your point of departure. Perhaps to the professional sailor one of the few satisfying aspects of the Gulf war has been the education of at least a section of the Western media into the difficulties of identifying radar contacts in what is by oceanic standards a tiny area of sea. Naval spokesmen don't always help themselves in explaining their time and space problems by talking about barriers and choke points. Bottling up the Irish Sea to prevent submarine egress seems a comparatively simple business as an abstract idea. At the northern end there are just less than fifteen miles between Scotland's Mull of Kintyre and Northern Ireland's Rathlin Island, and yet such are the sonar conditions in that stretch of water that detecting a submarine by the most modern of active or passive acoustic devices generates difficulties which by comparison make even the identification of the Pasdaran launch in the Gulf a relatively easy task. Much of the ill-informed comment on the vulnerability of ships to shore-based air attack could be countered by releasing a statistical analysis of the efforts needed by planners to ensure that contact of any kind is made between ships and aircraft during exercises even quite close to the airbase concerned; and a warship's ability to launch "for exercise" surface to surface missiles against lighthouses or other non-offending bits of a coastline, to say nothing of friendly and neutral shipping, is remarkable even when not subjected to the stress and fog of war.

There is both above and on the surface of the sea today a hopeless imbalance between the range to which weapons will go and the firing platform's ability to be certain of its target, hence the pressures for better third party targetting, improved IFF identification equipment (well almost anything would be an improvement), more computer based automation (as though this will somehow alleviate the situation) and greater communications compatibility between ships of different countries who may find themselves being a greater danger to each other than to the enemy. In an extreme case, an exchange between two detached task group units might go like this: "Request send your helicopter to identify the radar contact bearing due north range 30 miles from me". "On my plot the contact 30 miles to the north of you is me and my helicopter is at this moment refuelling on your flight deck". The possibility exists that in war this exchange might have been preceded by a missile fired in panic. Such difficulties ought to be containable by improved data link capability which, with the need to control active electronic emissions, becomes more and more important, but air and surface plot compilation is subject to a range of human frailties even in an environment free of electronic countermeasures. If the theorists are correct, in the future the task unit commander described earlier could ask the all-seeing satellite to identify his unresolved contact, which is an application of what is described as "real time targetting by satellite". Such a thing is possible now under trials conditions in carefully chosen scenarios and within a benign electronic environment; but applied to the sandstorms of the Gulf, the darkness of northern Norway, the gale lashed Atlantic or major shipping routes anywhere in the world, satellite targetting on demand is an armchair fantasy believed in only

by those who do not know the sea or who have been so long away from it that they have forgotten the reality. Straying into unknown territory myself, I would venture that leakproof ballistic missile defences come into much the same category of self-interested science fiction. But, if by virtue of the size of the ocean and the target identification problem, and not least because of its own passive and active defences, the modern well-run task force or air defence ship is not as vulnerable to hostile long range air attack as its detractors would like to believe, there is lurking in the depths a far greater problem and that of course is the nuclear powered attack submarine (SSN). There is probably more nonsense talked and written at every level of classification from Top Secret to the *Washington Post* about anti-submarine warfare than any other military subject. The major navies are under few illusions about the power of the nuclear submarine but a profitable anti-submarine industry has developed which is dedicated to understating their decisive potential as ship killers and trying to convince itself that as a threat the SSN is containable. In spite of the millions of dollars spent on acoustic equipment improvements in the last 20 years it is no secret that passive sonar detection ranges which were always unreliable are now decreasing as well and the laws of physics combined with the structure and contents of the oceans have got active sonar developments in a vice like and short range grip. Very low frequency transmitters have some potential but mobility and fire control complexities are always going to limit practical application. Non-acoustic devices are equally flush with development funds and even less productive in achieving anything like a guaranteed area search capability. Meanwhile the weapon delivery potential of these underwater cruisers continues on a steadily rising curve of improved performance in payload, range and lethality. As they dive deeper and go faster and the hulls get stronger, the difficulties of a successful counter attack are further compounded. So far only one SSN has fired a shot in anger and the sinking of the *General Belgrano* effectively excluded a navy with relatively unsophisticated anti-submarine capabilities from the remainder of the Falklands War. But supposing the Argentines had had three or four SSNs, would Britain with all its anti-submarine expertise have sent the task force in the first place? And supposing Iran had a couple of modern SSNs out there in the Indian Ocean, would the US battleships have been so readily deployed? And if you can convince yourself that the answer to those two questions is still "yes", how about taking a carrier attack group into the Norwegian Sea in the face of 90 or so Soviet nuclear attack submarines?

NATO navies subscribe to the principle of layered defence against air attack. The first layer is to attack the air base which like everything else that is static is genuinely vulnerable; there are no certainties in weapon systems' effectiveness but now that the earth's surface has been mapped from space with such accuracy, and firing platforms know precisely where they are themselves, the one really easy target is the one whose geographical co-ordinates can be punched into the computer and no allowance needs to be made for movement during weapon time of flight. That is real vulnerability because all the difficult fire control solution problems — search, detection, classification, localisation, target motion analysis — don't exist. The fixed target survives only if its defences are better than the attacker's weapons or it can quickly be repaired after the attack. So having had a go at the air base, the second line of defence against air attack is to use shore-based interceptor aircraft on those rare occasions when geography is in your favour and the aircraft can be spared from other tasks. Much more cost effective in this role are carrier-based fixed wing aircraft because the mobile airfield can be positioned to allow maximum effective use of precious flight time, control is exercised at the scene of action and response is immediate and not dependent upon uncertain long lines of communication. The third line of defence is the area surface to air missile fired by the specialised air defence ship and further augmented by the close in hard kill weapons such as Seasparrow and Vulcan Phalanx which are now fitted in most warships of corvette size and above. Finally there is the whole armoury of so-called soft kill systems including deception devices, decoys and jammers which force the attacking aircraft and its "intelligent" weapon to make instant judgements if the weapon is to find the intended target, always supposing the aircraft has first arrived in the right area. In summary, the maritime air defence business requires co-ordination, alertness in short bursts and fast reactions.

By contrast the anti-submarine battle is conducted at a slower and more deliberate tempo. Unlike the aircraft, the submarine is independent of its base for weeks at a time and the use of depot and support ships adds further mobility. So although the shore base is still an attractive and easy target a pre-emptive surprise attack would be necessary to catch the submarines alongside. In transit the nuclear submarine is more at risk than at any other time because much of the detectable radiated noise is augmented by speed, and at the same time the submarine's own sensors are dulled by flow noise. Nonetheless the ocean is vast, there is no underwater sensor remotely equivalent to radar and the submarine wishing to avoid detection can make the complex environmental water structure work to its advantage. Then once on patrol the nuclear submarine can use its mobility and endurance to search, detect, shadow and attack at a time and a place largely of its choosing against a defence less alerted than will normally be the case with air attack. And what about the effectiveness of ASW in depth? Can the same attrition factors be expected as in layered air defence? The trouble is that all anti-submarine search systems depend on the vagaries of sound propagation in a noisy and unreliable medium. In the early days both passive and active sonars relied upon noise or echo returns being above ambient or background sea levels. The first breakthrough was the application of correlation techniques which enabled selected broad band frequency noise to be recognised even though it was below ambient levels. The principle was the same as that of the human ear being able to detect someone speaking its owner's name below the noise level of a crowded room. Then came narrow band frequency analysis which allowed specially tuned receivers to pick out, focus and magnify individual or discrete sounds which at the bottom end of the frequency spectrum travel greater distances through water the lower you descend the frequency ladder. By good fortune such noises were common to the propulsion and auxiliary machinery of the early classes of nuclear submarines, as they are to surface ships, but because the submarine operated alone and often in deep water channels, conditions were better for the propagation of noise than in the surface layer or duct. That was the good news, the bad news was that reception was unreliable being affected by such things as depth of water, temperature, salinity, surface weather, the target submarine's aspect and depth, the amount of machinery it was running and in addition there had to be an open or clear acoustic path between target and sonar receiver; a path which could be interrupted by circumstance, for instance shallow water or a noisy ship in the vicinity, or by countermeasure devices. Whether the passive sonar receiver is installed in another submarine or towed behind a surface ship or monitored from an aircraft or from shore all these difficulties apply and even when a detection is achieved it provides only a single line of bearing and the lower the frequency, broadly speaking the less accurate that bearing will be, hence the need for long hydrophone arrays. The really bad news is that all the detectable noises can be virtually eliminated by better design and operating techniques, so closing the so-called passive sonar window, and at the same time jamming and deception devices are being developed to disrupt further this already fragile acoustic environment. There is still some potential gain to be made in improving sensitivity circuits and computerised target recognition equipment and it seems probable that this may buy a bit more time. Also because the technology has been operating in conditions which need human skills of a high order, it takes years to build up operator expertise and adequate training facilities. To expect to be able to buy a towed sonar array and go out and detect so-called "noisy" nuclear submarines is to misunderstand the nature of the problem. The state of the art amongst those navies with experience of low frequency passive sonar equipment is that spectacular ranges can be demonstrated as having been achieved on carefully selected occasions but even then detection when it happens is often not continuous and may not always lead to attack criteria being accomplished; as the primary method of anti-nuclear submarine warfare the passive sonar has never been reliable, its capabilities are frequently and wilfully exaggerated and for all the efforts of modern technology the situation is now steadily deteriorating.

So of the two primary threats to surface shipping, multiple air attacks can be contained if the defence is adequately equipped and well organised, and in the worst case of multiple raids has carrier-borne fighter aircraft and an action data automation system approaching the capacity of the Aegis system. It also helps the defence if the airbase can be disrupted, an option not exercised in the last major campaign at sea in the South Atlantic in 1982. There can be no such confidence in the outcome of the underwater battle where the nuclear submarine's mobility and stealth gives it such a decisive

advantage over surface forces. Of the other elements of the maritime battle none has the same obvious potential for major impact as air defence and anti-nuclear submarine warfare but all of them could be decisive in some circumstances. Mines have had much publicity recently both in the Gulf and in the Red Sea and can cause great inconvenience and much loss of shipping. But as with the diesel-powered submarine, which is a formidable type of advanced mobile intelligent floating mine, there is a requirement for co-operation by the target in that it must first go where the minefield has been placed so making the mine a weapon primarily of defence and attrition rather than one of offence and initiative. Land attack cruise missiles and dedicated amphibious ships are key elements of the "ships against the land" strategy which forms part of the armoury of any well balanced modern fleet as is the whole range of logistic support vessels. It is reach, the ability to operate other than in coastal sea denial, that separates the major navies from the others. In spite of the complications generated by maritime strategists, and the proliferation of scenario based operational concepts which provide harmless employment for naval staffs all over the world, sea power in the late 1980s remains fundamentally about the protection or disruption of economic and supply shipping whether as an end in itself or as an adjunct to the land battle. This makes it peculiarly idiosyncratic to individual nations since not all will suffer evenly if shipping is disrupted. It also means that those dependent upon the sea cannot give up the unequal struggle just because defence of shipping has become more difficult and expensive.

United Kingdom

In attempting to review the progress made in the past year by the world's 150 plus different navies it has become traditional in most publications, this one included, to tackle the problem region by region. Like any other division this leads to the creation of artificial boundaries but at least allows a busy reader to skip the bits which are of no personal interest. A different approach might be to make a distinction between superpowers (you know one when you see one and in maritime affairs there are currently two), medium maritime powers which as a generalisation are those that can reach out beyond their own back yard and whose ships may be encountered worldwide, and the vast majority of the rest which at various levels of equipment sophistication have no ambitions other than to protect their sovereign territory and maritime economic zones. Navies are curiously national institutions perhaps because as I have indicated already a nation's dependence upon the sea can vary so much even between adjoining countries. That the United Kingdom, as dependent upon the sea as it ever was, has in the last 15 years talked itself into giving priority to a continental defence strategy at the expense of its navy may be seen by historians as one of the more peculiar distortions created by a defence policy which puts the political significance of uncertain alliance ahead of the national military requirement. Medium and smaller nations confronted by superpowers must either declare themselves as neutrals or form alliances and this was the genesis of the North Atlantic Treaty Organisation which has served Europe so well for nearly 40 years. But successful deterrence based on the political cohesion of self-interested individual nations is not a sound foundation on which to build a long term defence equipment programme however attractive this may seem to an internationalist lobby in the UK who have lost an empire and are determined to exercise their skills beyond the limits of what they denigrate as narrow minded nationalism. There is no historical precedent for immutable alliance and Western Europe is one of the least likely places on earth to try and form one. The West European reality is the level of debate on the economic community's agricultural policy, not some supranational combined defence force. It hasn't yet proved possible to establish a consistent European anti-terrorist policy nor even a unified naval command structure in the Gulf even though the objectives are simple and shared and in the latter case, the forces involved are singularly modest. In part because of NATO's origins and in part because SACEUR is in Europe and SACLANT is an ocean away the land air side of the Alliance has always been politically more coherent and better organised than its maritime sister. The soldiers also have the advantage of being able to define their task with the greater precision needed to impress transient ministers and civil servants who find the concept of sea power a more difficult discipline to comprehend. In the UK all this last came to head in 1981 when a defence review unambiguously indicated that the surface fleet was bottom of the pile for defence spending and proposed that one of the aircraft carriers should be sold, the major amphibious ships paid off and destroyer and frigate numbers further reduced. On top of that the Trident strategic deterrent was to be paid for out of the naval share of the long term budget. Events in the South Atlantic in 1982 made implementation of part of that review politically impossible and the Minister responsible later left politics but not before there had been public and mutual recriminations with the then Chief of the Naval Staff. Unfortunately for the Navy, the bureaucrats and scientists who had been the Minister's principal advisers stayed on and although there has been no formal repeat review of defence policy the same priorities are now being implemented by stealth, using the twin mechanisms of lowering manpower ceilings and failing to order ships to replace those reaching the end of their useful lives. As has been frequently commented on by my predecessor, the UK is almost alone among the major democracies in not publishing even a medium term warship shipbuilding programme so the extent of the change in equipment priorities is deliberately obscured. Nonetheless the original rationale of the Type 23 "Duke" class frigates was to check equipment cost escalation by producing a cheaper hull than its predecessors the Type 42 and 22, but at the same time to maintain numbers by building at least three to four a year. That building commitment has now been formally abandoned in favour of extending some of the older ships' lives from 18 to 22 years. In January of this year the Royal Navy had 46 destroyers and frigates listed in the 1987/88 Statement on Defence Estimates and of those only 28 could be said to be fully operational; the remainder were undergoing trials, refits or weapon modernisation in Dockyard hands. Of those 28, six were either in transit to or operating in the Gulf and a further four were committed in the South Atlantic and Caribbean. With one in the Standing Naval Force Atlantic and one maintaining an operational patrol in the Iceland–UK gap there were just 12 left for all other national and NATO commitments. And this is for a nation which depends for its economic welfare on the 300 or so ocean going ships which dock weekly in its ports and harbours but has as a higher priority a few kilometres of a foreign field which in war could be lost in 24 hours, and in peace is the sovereign territory of a country which is showing increasing reluctance to sustain its role as the selected battlefield for World War III.

The more cheerful side of the UK naval scene is that the replacement Polaris programme is on track, and the fleet and patrol submarine building priorities will ensure that the UK remains in one sense a formidable maritime power into the next century. The requirement to maintain the present amphibious capability has been recognised with the funding of feasibility studies into how best to maintain existing Commando lift capabilities for the next two decades at least, and although there are not enough of them a mine warfare vessel building programme is continuing. Perhaps one of the most interesting developments with implications for other navies is the implementation of plans to man fleet replenishment and air support ships with mixed crews of naval and civilian personnel. It would be unkind to make comparisons with the experiments going on elsewhere with combined male and female ships' companies, a nettle the RN is reluctant to grasp, but professional though the Royal Fleet Auxiliary Service undoubtedly is, it nonetheless works to predominantly merchant attitudes, rates of pay and conditions of service. It is neither easy to see how the chain of command on board is going to work in practice nor how that command will cope with the obvious and unfavourable comparisons in conditions of service which could constantly undermine crew cohesion and morale. In summary then the Royal Navy still has some excellent equipment and training facilities and a professional and competent corps of middle ranking officers and senior ratings. But there comes a stage in the slow decline of any great institution where a reduction below a critical size in terms of numbers of people undermines corporate self confidence, reduces promotion opportunities and causes the balance of professional and domestic lives to become too lopsided; at that point good men can no longer be retained and efficiency falls away. In these circumstances senior officers walk a tightrope between shouting their problems loud enough to generate political action but not so loud that they demoralise further their own troops. Too much or too little noise from the top can be equally damaging. By allowing themselves in 1985 to be absorbed into an enervating joint staff structure the chiefs of each service have lost their authority to generate red blooded debate over defence priorities. At a lower level many naval officers in the Ministry of Defence dissipate their energies by absorbing briefs on tank warfare or the merits of mixed munitions and none may speak out boldly for their own service for

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fear of being dubbed too partisan to promote in a joint staff structure. In such an atmosphere decisions evolve by that curiously modern British device of nudge and wink which makes a virtue of the silent consensus. In my view only a vigorous and open debate about long term national defence priorities can stop this country continuing to sacrifice its surface fleet in order to advance in the short term the worthy but unreal cause of a federated Western European defence force.

Europe

Comparisons between Britain and France are always interesting and none more so than in the field of Defence Policy. Where maritime Britain puts as its main priority a contribution to the NATO alliance on the mainland of Europe, continental France opts for an unashamedly national policy and an expanding navy. Whereas the Admirals in London hardly dare mention that the time has come to start feasibility studies into the next generation of aircraft carriers, the French are pressing ahead with a nuclear powered ship as a measure of the national commitment to maintaining a strike capability both in home waters and in support of French interests worldwide. Whereas the British defence budget has declined in real terms in 1988/89 and the Navy's share of it by an amount now obscured in a joint service accounting system the French have increased theirs by 3% with the Navy enjoying a 4.6% rise. Under construction are four nuclear submarines, three attack and one strategic, the nuclear powered aircraft carrier already mentioned and several other smaller warships including the first French surface effect ship which was ordered in February this year. 1988 will see the commissioning of one SSN and six major war vessels and support ships. There are of course financial problems which may delay completion of some parts of the projected five year plan to 1991 but there is a sense of direction and an all party consensus on defence stemming from a long term review in 1986/87 of the threats likely to be faced by France during the next twenty years. The contrast with the short term expediency of British Defence policy could not be more stark.

Of the other western European navies the Federal Republic of Germany cancelled the Type 211 submarine project due to a shortage of DM20 billion in the navy budget and has decided to centre its future submarine construction programme on building twelve Type 212 submarines with a hybrid fuel cell/battery propulsion system based on the prototype air independent system which started trials in November 1987. Fuel cell development has been around a very long time and with the first submarine to be ordered in 1990 project definition is planned for this year and time is short. If it works, this form of propulsion will make the Kiel based submarine flotilla an even more formidable force in the Baltic than it is already. The West Germans also have money allocated for a programme of four replacement air defence ships to be built in advance of the NFR 90 NATO frigate project. Equipment collaboration between Alliance partners is a hybrid animal inspiring a love/hate relationship by defence ministries, industrialists and national treasuries. Progress has been made since the days when a collaborative project was considered by the military as a method of getting at greater expense what you didn't need years after you wanted it. There have been some successes and some failures but it is difficult to argue with the principle of the need for some commonality between weapon systems in the West with the aim of cutting back on the costs of research and development and easing the logistic resupply problems. Once again though the internationalist lobby would much prefer to minimise the very real difficulties of matching both the operational requirements and the timing of the replacement equipment cycle within individual nations. The hull and propulsion characteristics of a ship which will operate predominantly in for instance the Baltic or Mediterranean are not the same as those required for the Atlantic Ocean, and the chances of several nations all requiring a new air defence ship at much the same time are not high even if agreement can be reached on the trade off between cost and effectiveness of, for example, competing area defence surface to air missile systems which are still being developed. It is difficult enough to get sensible agreement within a single Ministry on a weapon system of that complexity; add to that a factor of eight and the NFR90 project could be said to be overambitious. Details of progress on the ship so far are included in the Ship Reference section under NATO. West Germany was one of six nations to agree the feasibility study results at the end of 1987, with the UK and France rejoining with some reluctance in February 1988. The gist of the UK objection was that the modern concept of integrated hull and weapon systems meant that you could not with confidence proceed to Project Definition for a ship of this size until you had decided which weapon systems you were going to fit. This seems to be so basic a prerequisite that those nations that can afford to revert to national projects are clearly proceeding with their own designs in parallel and West Germany is one of them. At the beginning of 1988 nearly three quarters of West German warships were more than 20 years old and the situation seems likely to be worse by 1995 unless remedial action is taken soon. The German hard kill solution to the close range anti-missile problem is the General Dynamics Pomona RAM which is at sea on trials and should be fitted by the early 1990s in the "Lutjens" and "Bremen" classes as well as the Type 143 fast attack craft. There are still problems with finding aircrew and maintainers for the final total of 110 Tornados, and Sea King helicopter operations are also hampered by a shortage of trained people. Reserves are being given more continuity training and a new establishment is to be opened in 1990 for this purpose. A successful trial in 1987 showed that part of the fast patrol boat flotilla could be manned by reservists which may help offset the planned reduction of some 3700 men by 1995. There can be no complaints if West Germany chooses to give its land forces priority over its navy. As the warships of Britain, France, Italy, Belgium and the Netherlands headed purposefully for the Gulf the West German Navy contributed by deploying ships to the Mediterranean in October 1987 to join the naval "on call" force (NAVOCFORMED) as replacements for those that had gone to the Middle East.

In Italy the aircraft carrier *Guiseppe Garibaldi* was commissioned in August 1987. The long rumbling dispute over which service is to fly the fixed wing aircraft has been decided and the Navy should now be able to acquire the aircraft it needs to bring this ship to full operational effectiveness. The present number of ten submarines is thought to be inadequate and two more follow-on "Sauros" are to be ordered in mid-1988. The long delayed pair of "Animoso" destroyers are at last being built with the first one due to be launched in mid-1989. An interesting and innovative idea is the fitting of three Super Rapid 76mm guns to these ships as a combined medium range anti-surface armament and close-in weapon system against missile attack. It is a pity that navies don't follow the example of the NATO alliance air forces and armies in having occasional fire power competitions; it might be a useful way of assessing the relative merits of the various close range anti-missile systems which are a growing feature of every major surface warship. Of the other NATO European navies Spain continues to move steadily towards an operational organisation based on two carrier groups in part at the expense of plans for new submarines which have been postponed. The new aircraft carrier commissions this year, two "Oliver Perry" type frigates are building and the plan to 1996 includes four frigates possibly of NFR 90 design, 16 mine warfare ships, six missile fast attack craft and five amphibious lift ships. Although joining NATO in 1982 Spain, like France, remains outside the integrated military command and notwithstanding increasing participation in combined exercises and the surprising offer in 1987 to provide warships to replace US Sixth Fleet units sent to the Gulf, the priority role of the navy remains the national task of defending the territorial integrity of the country and its Island dependencies. At the other end of the Mediterranean the dispute between Greece and Turkey over ownership of continental shelf hydrocarbons has lead to near confrontations at sea in both 1986 and 1987. Greece is going ahead with plans to build four new frigates for which funds have been allocated and three more submarines are also being considered. In November 1987 there were unconfirmed reports of proposals to raise defence spending by over 20% but whether this was to strengthen NATO's vulnerable southern flank or merely to be in a stronger position next time round against their neighbours was not clear. Of the two navies, Turkey has a clear advantage in numbers although many of the ships are getting a bit old and a building programme which includes submarines, frigates and fast attack craft is in hand. Priority is also being given to improvements in radars, electronic countermeasures and command and control systems.

On NATO's northern flank the maritime order of battle is altogether healthier, as for the time being is the commitment to collective defence. It could be argued that if the strength of the Soviet Northern and Baltic Fleets is unable to concentrate the minds of Europe's northern democracies, then nothing could. The Netherlands' well balanced and modern navy has a rolling replacement programme for the older submarines and frigates and

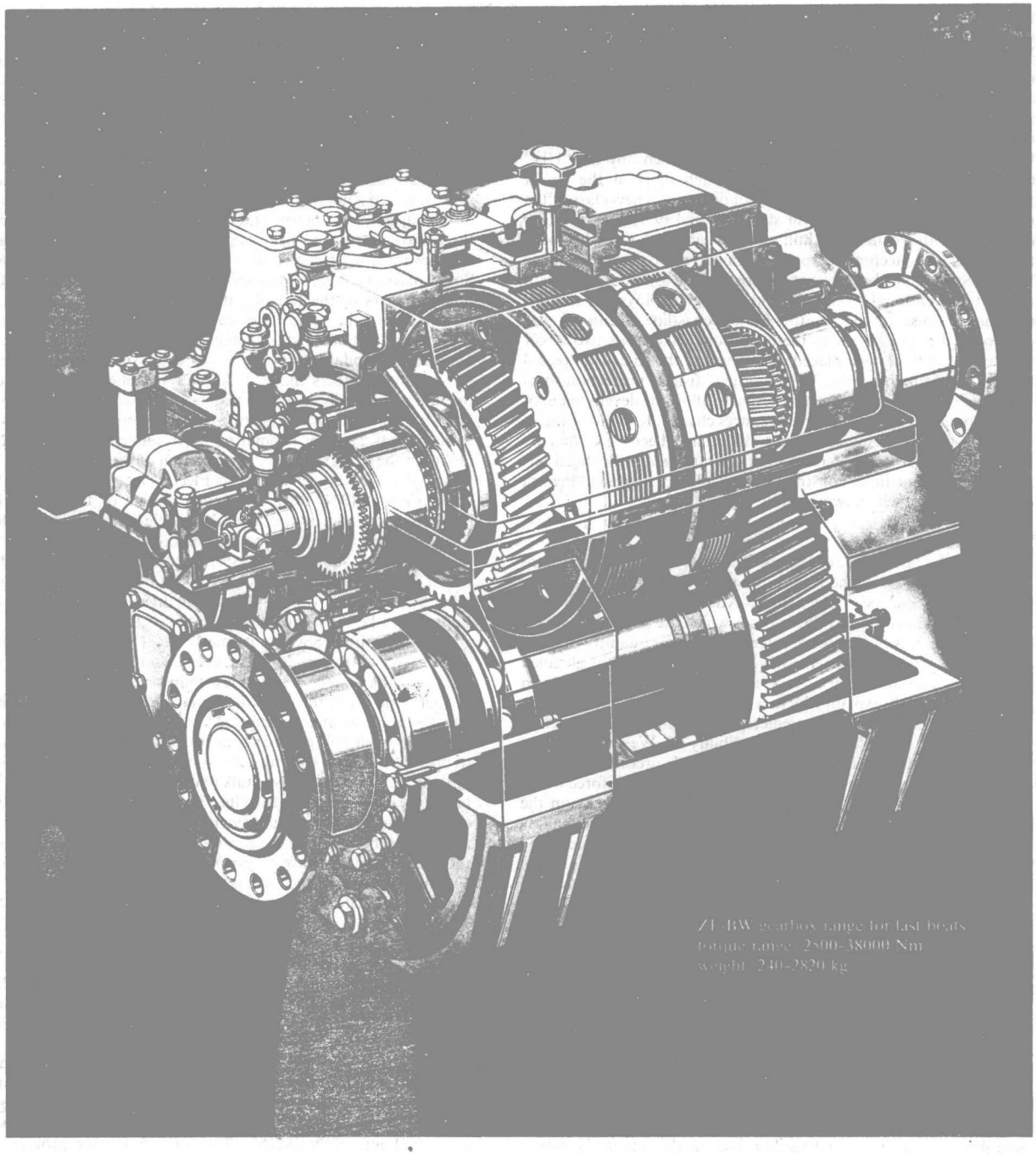
task group deployments indicate a continuing determination to have some influence on affairs away from the home base. If anti-submarine warfare is difficult enough in the open oceans, the inshore waters of the Norwegian coastline provide the perfect concealment of small well handled conventional submarines. Anyone wishing to use the fjords with hostile intent had better first make sure that the Norwegian submarine flotilla has run out of weapons. The replacement of the ageing "Kobben" by the "Ula" class is therefore the first priority although most of the recent publicity has been given to the choice of design of a new class of ten mine warfare vessels which will start building in 1989. A surface effect ship with a catamaran hull made of sandwich GRP has been rejected by some technical experts as having poor shock resistance but the Norwegians believe that the cost will be low compared with modern conventional monohulls and the high deployment speed is essential because of the length of their coastline. Denmark has decided that it cannot justify the operational cost of its two larger frigates which have been placed in reserve but the so-called "patrol frigate" class to replace the "Hvidbjornen" fishery protection ships has sufficient built-in flexibility of design to allow the development of a fully armed frigate should circumstances change. Last but not least Belgium's specialist minesweeping skills have been rewarded by taking a full part in the Persian Gulf operations and Portugal has three new frigates under construction to replace the ageing "Pereira da Silva" class of which two are now in reserve.

The Soviet Union

Moving to the eastern side of Europe immediately sheds a harsh light on the puny efforts of the traditional maritime powers of the free world on the European side of the Atlantic Ocean to take out adequate insurance against the colossus which the Soviet Union has constructed in less than three decades. If the sheer quantity of ships and submarines induces a sense of numbness at first sight, detailed study does little to reveal an operational or deployment pattern which could readily explain why they have built such a large fleet. In the 1960s it was confidently predicted that the attack submarines were designed to undermine the credibility of Western strategic submarines and, aided by shore-based naval aircraft, would be prepared to attack strike carriers and any other seaborne force which could be used to launch pre-emptive or retaliatory attacks on the Soviet homeland. A secondary priority was assumed to be what is called in the jargon "the interdiction of sea lines of communication" which almost means the same as sinking merchant ships. As an instrument of foreign policy the visibly impressive surface fleet would play a key role in support of the expansion of Soviet influence worldwide. The fourth arm, the merchant marine, would provide logistic support to the navy while at the same time undermining Western maritime self-reliance by undercutting trade tariffs and forcing unsubsidised economic shipping out of business. The trouble is that of all these blithely assumed roles only the last has made any dramatic impact and even that needed the co-operation of western shipowners who took too long to break free from the related problems of overmanning and uncompetitive wage rates. As an aid to foreign policy the Soviet fleet has acquired basing rights in Vietnam, South Yemen and Ethiopia and to a lesser extent in Syria, Libya, Cuba and Angola. Of these only Cam Ranh Bay could be described as a major naval facility and on the whole the Soviet surface forces seem to prefer remaining snugly alongside in their home fleet areas rather than roaming the oceans of the world confronting the US Navy. Deployment levels "out of area" as well as representing a surprisingly small proportion of the available ships declined by 6% in 1987 compared to 1986, continuing a slight downward trend since the peak of 1984. Tactical exercises which by Western standards have always been fairly timid affairs have recently been conducted closer to home waters, although the Soviets could change this policy overnight. 1987 was the first year this decade in which no Soviet task force deployed to the Caribbean but a continuous five to seven ship Soviet presence is still maintained off West Africa. Submarine excursions have also reduced with the withdrawal of the "Yankee" class SSBNs from Atlantic patrols in late 1987 at least in part because of the growth in numbers of "Typhoons" and "Deltas" and perhaps also to fill the missile gaps in Europe left by the agreed withdrawal of the ground launched intermediate nuclear forces.

In order to explain such apparent coyness a so-called "Bastion" theory of Soviet maritime policy has now gained official respectability. Although not a new idea it has evolved in a new form and the most recent expression of US Naval Maritime Strategy projects forward deployments into the Soviet homeland area in part at least because to engage the Soviet fleet that is where you have got to go. This analysis of the visibly wimpish Soviet policy at sea can be overstated and the significance of the influence gained over countries which have acquired Soviet hardware, particularly India, should not be ignored, but there is an enigma here which has not been convincingly explained. Reasons put forward range from operational concepts based on forming defensive rings around strategic submarines to a failure of understanding by the Generals in Moscow of the nature of sea power and the flexibility it provides. No doubt the growing strength of the US Navy has also been a key factor. Perhaps most worrying of all is that the current western analysis of Soviet maritime policy is the one that must give most pleasure to the policy makers in the Kremlin if their war plans envisage a swift breakout into the vulnerable sea lanes of the free world. Such a deployment option exists, whether planned or not, because of the numbers of submarines in the Soviet order of battle. Furthermore those same numbers make it difficult to believe that they could operate successfully in home waters alone without major mutual interference. It is worth repeating that many modern weapons fired from aircraft, ships or submarines have ranges far in excess of the ability of the firing platform to be certain of the identification of its target. If all the Soviet Northern Fleet's 38 strategic missile firing submarines (SSBN) deployed under the ice of the Arctic Basin (ignoring for a moment the "Delta's" visible limitations for under-ice operations) each would have a reasonably sized patrol area. If some of the 55 attack submarines (SSN) were to join them in a protective ring it might still just be possible to keep them from engaging each other by mistake. It is when you start to divide the ice free area of the Barents Sea between the rest of the SSNs, the 30 nuclear powered cruise missile firers (SSGN) and the 47 diesel boats that the absurdity of the exercise becomes apparent, even if you discount say 25% of the total as being unable to sail at less than several weeks' notice. As a further addition to the waterspace management problem, defensive minefields could also be expected to add to the congestion. The nuclear submarine's great tactical strength is not so much its ability to operate without exposing itself to radar or visual detection, but its mobility to intercept, chase, stalk and pursue its target or conversely to use the environment to full effect to evade detection. Limit its area of operation and its tactical strength is shorn like Samson's locks. It is not easy to believe that the Soviets have failed to discover this for themselves and the only playground big enough for the Northern Fleet nuclear submarine force is the Atlantic Ocean. Apply the same logic to the Pacific Fleet and you have to find sufficient water for 69 nuclear submarines and 41 diesel boats, only this time the ice is hardly a serious factor.

Developments in new construction programmes have as usual been impressive if not spectacular. It is believed that a new class of cruise missile firing nuclear submarine is being built to carry the long range SS-NX-24 currently undergoing trials in a converted "Yankee" class. A nuclear submarine is launched about every seven weeks and a conventional submarine every ten weeks although most of the latter are for export. If this year's Strategic Arms Limitation talks affect the SSBN order of battle, previous patterns suggest that those submarines which have their ballistic missiles removed will be converted into SSN/SSGNs. The aircraft carrier programme is proceeding slowly and the fourth "Kiev" became operational in 1987. The first large deck carrier the CVN *Brezhnev*, or whatever she is now going to be called, is expected to start sea trials next year; the development of the Flanker B variant two fixed wing aircraft should succeed in time for full production by 1992. Premature rumours that the CVN was to be downgraded to a STOVL-only capability appear to be part of what can with confidence be predicted as a legitimate search for indications that the Politburo's concept of "reasonable sufficiency" in military strength is in practice leading to a slowing down in all Soviet military equipment programmes; no such adjustment is yet reported although given the momentum of ship construction it is unlikely that a change in policy would be apparent for at least two or three years. It is to be hoped that Western analysis will remain wholly objective. The fourth units of the "Kirov" and "Slava" cruisers are being built, as well as more of the "Udaloy" frigates and "Sovremenny" class destroyers; a new type of major warship is also being constructed at Kaliningrad possibly as a follow-up to the "Krivak" class; sea trials could begin by mid 1989. The strength of the Navy is its awesome numbers, the fire power of its weapon systems, the simplicity and reliability of its propulsion



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The navies know why.

111/113

machinery, the sturdiness of design, the emphasis on reliable command and control and the worldwide logistic support it can summons from the state owned merchant and fishing fleets. Its weaknesses are the lack of experience of its officers in taking tactical initiatives, the quality of the conscripts, its preference for spending time in harbour, the sensor technology gap with the West and the lack of any consistent attempt to train at sea other than in set piece exercises. Last year my predecessor wrote at length on the different approach the Soviets have adopted to submarine construction and concluded that it would be "wilful self deception to ignore the probability" that they have advanced beyond the West in the business of submarine hull and propulsion technology. Complacency by the West in that or any other field would be misplaced.

The Baltic

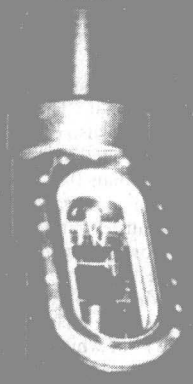
Of the Warsaw Pact fleets Poland has at last acquired a new Flagship with the transfer of a modified "Kashin" class DDG but still only has one "Kilo" class submarine. A borrowed "Foxtrot" has made up for the unexpected non-arrival of two more "Kilos", which are probably unnecessarily big for sensible use in the southern Baltic. In the summer of 1987 a Polish "Tarantul" managed inadvertently to damage a West German ship which was observing a live firing exercise. The "Parchim II" class corvettes built by East Germany have been transferred to the USSR in a reversal of the normal flow and a recent acquisition for the GDR Navy is a second fighter bomber squadron of Fitter K aircraft based at Laage. At sea the East Germans continue to be aggressive and ill-mannered whenever an opportunity arises. Of the other Baltic navies Finland has ordered four "Helsinki II" class fast attack craft for delivery between 1990 and 1992 and Sweden commissions the first of four "Vastergotland" class submarines this year. Apart from submarines the Swedish Navy is concerned that there are no other new construction ships in the present five year plan other than one trials vessel which is probably to be used for transporting mobile ASW systems. The preoccupation with Soviet mini sub incursions into Swedish territorial waters continues in spite of reported scepticism at the political level. It is not easy to see what the Soviets hope to gain from these violations other than a particularly narrow type of operational experience and they stand to lose a very great deal if a submarine is captured or sunk. The most solid piece of evidence so far was the 1981 "Whiskey on the rocks" incident at Karlskrona which could have been explained by navigational incompetence of a type which most honest naval officers, (at least those who were at sea before modern electronic aids) would have no difficulty in recognising.

America

From Sweden to Canada across the Arctic is not a great distance and the concern of one country with violations of its offshore integrity finds something of a mirror image in the Canadian's intention to exercise sovereignty over their northern archipelago. Having said that the comparison ends. Whereas Sweden's maritime boundary is one small inland sea, Canada faces three oceans and has for years subscribed to a defence policy which takes serious account of only one. If the plans to build a flotilla of ten to twelve nuclear powered submarines are realised Canada takes a giant stride from the anonymity (and security?) of being a junior partner in NATO and NORAD alliances to having a national maritime capability which will have to be taken seriously by the two superpowers between which she is geographically sandwiched. If her intention is to adopt a high profile this is no place for the faint hearted. In the more narrow sense under-ice operations are also not for the faint hearted and are very demanding on both men and equipment. Submarine emergencies caused by serious propulsion and control failures, floods or fires are dealt with by a Pavlovian swiftness of response which invariably means surfacing and you can't do that with twenty feet of solid ice above you. The open oceans are fairly well surveyed by now which they need to be if you are thumping along blind at twenty plus knots with a keel depth of over a thousand feet, but survey ships can't go where there is permanent ice cover. Gyrocompasses work on the principle of seeking a point which for practical purposes is an infinite distance away at the North Pole, but they become unreliable when that point is relatively adjacent. All of these problems can be coped with as can the noisy acoustic environment and the limitations on the use of weapons under ice but it is not going to be cheap, nor are the support and maintenance facilities and the training and engineering safety standards needed to appease the irrational public fear of nuclear power generation. As to which type of submarine to choose, an outsider pontificates at his peril. Having got into the game earlier and at the beginning enjoyed close collaboration with the US Navy, the British ought to be a decade ahead of the French in every aspect of SSN operational effectiveness and they also have expertise in under-ice patrols dating back to the Halifax-based diesel submarine squadron of the early 1960s. In addition there are continuing and very close operational ties between the US and British submarine services in part based on pragmatic self interest in waterspace management. But submarine operations are very secretive affairs demanding a measure of equal commitment if experience is to be shared, and it may be that it is just such a commitment that Canada would like to avoid, in which case the French option becomes more attractive politically as well as cheaper. Although generating rather less debate Canada has also started modernisation of the "Tribal" class and is now committed to six additional "Halifax" class destroyers. Mine countermeasures capability is also to be resurrected after sixteen years of neglect.

If the United States's attitude to a nuclear submarine flotilla under the Canadian flag is at best ambivalent, its own holy grail is the "Seawolf" programme and with good reason. Of the world's two largest nuclear attack submarine flotillas the Americans have in the last 20 or so years built just two production designs, the "Sturgeon" and the "Los Angeles", and two prototypes, the "Lipscomb" and the "Narwhal". In the same period the USSR has put to sea the "Victor", the "Charlie", the "Alfa", the "Oscar", the "Sierra" and "Akula" of which four of these six classes are still building, and as single prototypes the "Papa", "Uniform", "X-Ray" and "Mike". It would be difficult to find an example of a more divergent approach even accepting some obvious dissimilarities in the operational requirements of the two nations. But if you are going to put all your eggs in one basket it had better be a good one particularly if the design is to run for a decade. And once having done the design work, construction must start on time because there is no substitute warming up on the touchline, nothing to fall back on except the outdated model which is already effectively two decades behind the technology. The important design details of the "Seawolf" are not yet common knowledge but an informed guess is that since it was conceived in an era of almost effortless passive sonar superiority nothing radical will have been attempted. In other words a technologically much improved "Los Angeles" class capable of multiple roles with eight torpedo tubes and a magazine of twice the capacity but with overriding emphasis on winning by stealth the one to one ASW battle. Happily there are also indications that once the programme is up and running a bolder and more innovative approach to submarine design is waiting in the wings in recognition that the current and projected use of the nuclear submarine platform is conceptually too narrow. Whereas it is possible to devote most of a commentary on the Soviet Navy to its submarine element without causing too much irritation the same cannot be said of the United States where the carrier battle group forms the central core around which the rest of the fleet revolves. And whereas the nuclear submarine is the key player in the anti-submarine and anti-surface battles the aircraft carrier is predominant where air defence and tactical land attack are the priorities. Even more important than that is the visual element of commitment which is one of the virtues of sea power without the much more complicated involvement which goes with land and air forces based in foreign countries. When it comes to exercising naval presence the aircraft carrier is at the top of the pile, the best gunboat of all. At the same time it must be prepared to go in harm's way. There is a tendency for advocates of the theory that Third World instability is collectively at least as dangerous to political and economic stability as superpower confrontation in Europe, to back off from actual involvement in case somebody gets hurt. Furthermore when they are hurt the world's press can be guaranteed to muster all its well honed clichés on surface ship vulnerability and the dangers of aggravating the situation. The US carrier battle groups are the free world's maritime policemen and they are effective in this role. They ought to be better supported by elements of other free world blue water navies and the doctrines of the Atlantic alliance would be more plausible if serious attempts were made to achieve merged operational control as a matter of course. It would be inconvenient to the Admirals concerned but would immeasurably stengthen the political impact of the whole force. Apart from obvious political sensitivities, the major practical difficulty is communication and data link equipment and of course the protection of national operational security. It is part of the unreality of NATO's command and control structure that it is

SEARCH/ATTACK



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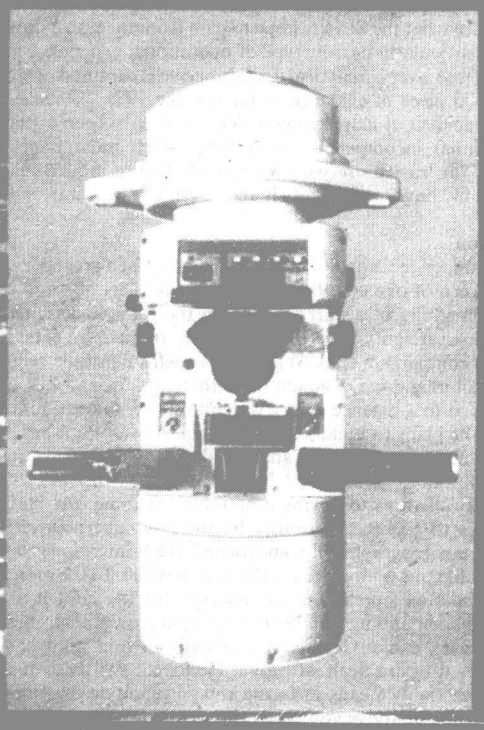

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believed by many on the European side of the Atlantic that such difficulties would somehow mysteriously disappear in a time of rising tension in Europe. By concentrating on the issues which unite individual nations, multi-national alliances prosper as political instruments of effective deterrence but not as serious methods of conducting war at sea. The United States Navy has a National Maritime Strategy better defined and more up to date than NATO's, a permanent and efficient shore-based operational control organisation, a set of procedures in daily use at sea, tactics and communications (in the widest sense) which are by virture of its equipment often incompatible with its allies, and a balanced fleet in which every aspect of maritime warfare is covered. It has always seemed nonsense to me to suppose that such a navy in times of international tension is going to subordinate itself to a polyglot talking shop of the Brussels variety which has a reputation for finding it difficult to make timely politico/military decisions even in paper exercises. Add to that a NATO operational control set up which is activated only for major exercises and complicated books of procedures with which the USN is largely unfamiliar, and well-intentioned scepticism increases even further.

Following two decades of comparative neglect, and after seven years of much needed rebuilding and re-equipping, the United States Navy is now again a rejuvenated and formidable force. Although the artificial goal of a six hundred ship fleet is receding in the colder winds of a down turn in the economy, this looks less of a problem from afar than may seem to be the case in the hothouse of Washington. The state of each shipbuilding programme is described in detail in the USA section of this book and will not be repeated here. There has been a good deal of slippage in the projected construction programme; the worst being the *Arleigh Burke* which is thirty-nine weeks behind at the time of writing. Two more "Nimitz" class carriers and the "Ticonderoga" class are now fully funded and apart from the need to hasten progress on the destroyer programme much of the interest in the coming year centres on the first "Seawolf" contract and in the small ship field on increasing the minesweeper order of battle. Strategic Arms Limitation talks may have an impact on the SSBN order of battle. In the technical field the US has impressive programmes in data processing, countermeasures and stealth technology. Taken in context the premature retirement of 16 elderly frigates does not seem too severe a problem unless it heralds the start of a new ice age in political support for the Navy. This seems unlikely but the resignation of the Secretary for the Navy in February this year reflects the understandable nervousness of a naval hierarchy who still bear the scars of the 1970s. It would be very bad news for the free world if that era of political neglect of the Navy were to be repeated. On the key question of manpower there is some understandable naval irritation at the application of rigid manpower ceilings and it is depressing to see more emphasis being given to joint staff duties which, in spite of their obvious merits, in the end leads to a dilution of professional expertise in middle ranking officers who are hard pushed to stay adequately in touch with developments across the whole range of their own service without the distraction of becoming involved in the problems of others. In particular a joint service approach to manpower problems ends up taking insufficient note of the major differences in conditions of service between those who live at sea and those who do not.

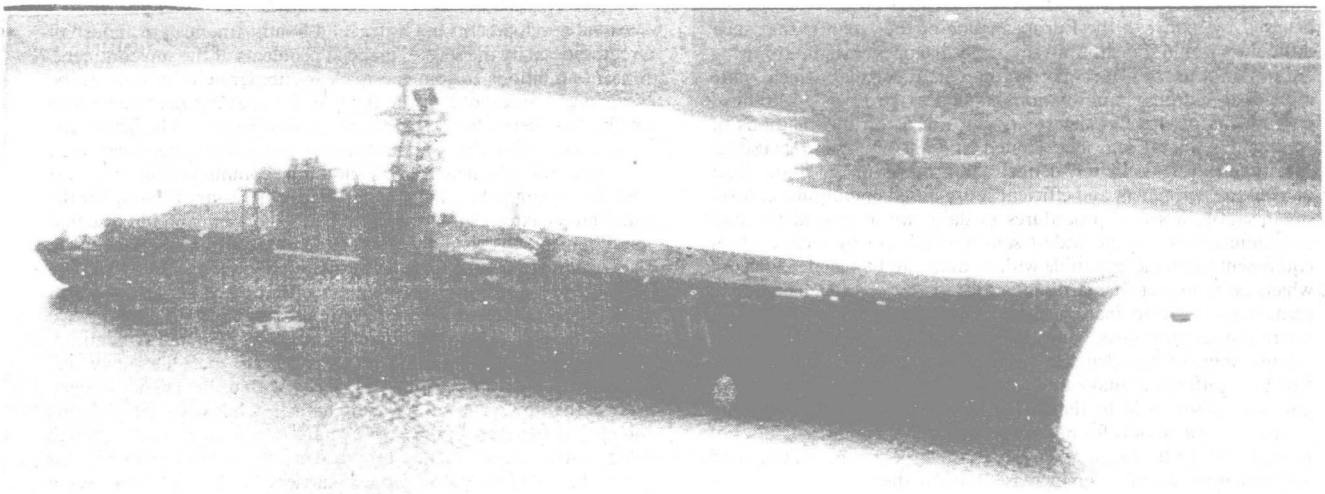
How good is the American Navy? Even to ask the question is to sense hackles rising all along the Potomac. No civilian should underestimate the difficulties of being an effective junior officer in a naturally anti-authoritarian democracy. To lead by the carrot is an admirable policy as long as the stick is also applied at regular intervals. I once served in a ship where command was exercised by giving indiscriminate praise to everyone. The good men resented it as there was no reward for extra effort and the less than good saw no reason to get better since they were being praised anyway. If there is an Achilles heel in the world's most powerful fleet it lies in a "zero defect" philosophy towards the people in it. The technology is mostly excellent; the commonality of systems, one of the definitive tests of a sound equipment procurement policy, is impressive considering the size of the fleet; and there is the strong sense of purpose which comes with the knowledge of the importance of the Navy's role in defence of the United States and as a major instrument of US foreign policy. At the top of the pole the nuclear attack submarines and the carrier air groups in particular operate at the highest level of military competence and effectiveness. Further down the scale, and without the spur of knowing that your life depends upon being competent all the time, some human failings are inevitable in any organisation which employs well over half a million people.

Naval developments in Central and South America are almost all circumscribed by the severe financial problems of the sub continent. Brazil's ambitions to join the nuclear submarine club seem to be particularly unrealistic in the light of the pressing need to update much of the fleet which is facing block obsolescence. The first of the "Tupi" class conventional submarines has recently been delivered and the first of the new frigates should be commissioned early next year. It is going to be a long haul to get the necessary funding for the full total of sixteen ships approved by the government and essential improvements to existing weapon systems are also being postponed. In Argentina the submarine and frigate building programmes have slowed right down and there are still rumours that various ships, both old and new, are for sale. Although laid up for a time the two "Type 42" destroyers were reported at sea in 1987 and Argentina's vital stake in the Antarctic region suggests that the Navy will continue to be given reasonable priority within the defence budget. Across the now peaceful Beagle Channel, Chile also has a strong interest in the development of Antarctic resources and although there is no new construction programme, two out of the four DLGs are to be converted to helicopter carriers for Exocet fitted Super Pumas. Chile is also a strong candidate for the purchase of more of the "Leander" class frigates as they are sold off by the UK. Peru has been strengthened by the return this year of a much rejuvenated cruiser, the *Almirante Grau*, which has been refitted with modern missile systems and new radars and fire control equipment. Uruguay has plans for three new or second hand frigates and Mexico is building more patrol craft to try and improve control of its offshore economic zone. The only other significant navy in the region is that of Venezuela which has long term plans for two more submarines as well as patrol craft and mine warfare vessels to join the three fast attack craft which were ordered in 1987.

Australasia and East Asia

Still in the southern hemisphere the Australian Navy seems to be making some progress after years of benign neglect. Like the UK here is another "island" nation which has chosen in the last decade to place its navy in the third rank of defence priorities. Again the siren song of shore-based air power has presumably been deployed to convince those whose offices are lined with small scale maps that sea control can be exercised on the cheap by the instant application of a few minutes of fast jet air power. How do you explain to people with no experience and therefore no feel for the size and complications of the problem that maritime defence demands an intimate knowledge of the environment which comes only with being on the spot seven days a week, 24 hours a day? Eight new frigates of either the "Meko 200" or "Schelde M" class types are soon to be ordered with six for Australia and two for New Zealand, and also in hand is the construction of six locally built Kockums submarines. The base in Western Australia is being expanded as Australia begins to commit itself to a two ocean navy. Delivery of Pacific Forum patrol boats continues although it still isn't clear whether a newly independent Fiji will still benefit from this programme. Australia's determination to remain involved further afield has recently been demonstrated by a decision announced in December 1987 to prepare a clearance diving team for support operations in the Persian Gulf; ships are also to deploy to the Malaysian peninsular on an occasional basis. Meanwhile those Far Eastern navies which might be inimicable to Australian interests continue to expand including the Pacific Fleet of the Soviet Union which in the last twelve months has consolidated its foothold in the Indian Ocean.

Some distance from Australia's northern seaboard is the Indonesian archipelago which contains the world's fifth largest population. The rationalisation of the command and control of the navy into an Eastern and a Western Fleet was completed in 1986 but however it is organised the problems of policing the thousand islands remain severe and understandably the emphasis is put on light and amphibious forces. With nine shipbuilding yards Indonesia is now able to build its own warships up to frigate size and a design will be chosen in 1989 for an eventual class of twenty-three ships of which the first two are to be built by the successful contractor and the remainder by P T Pal at Surabaya. More patrol craft, mine warfare vessels and hydrofoils are also on order as is the fourth Dutch "Leander" which is to be delivered in November. Small European submarines have not proved too successful in the tropics and the expansion of the modest submarine force may have been given a lower priority. If wars in the Middle East have about them an air of practised inevitability the China Seas are areas of potential instability on a far greater scale. In the South China Sea there are resurgent



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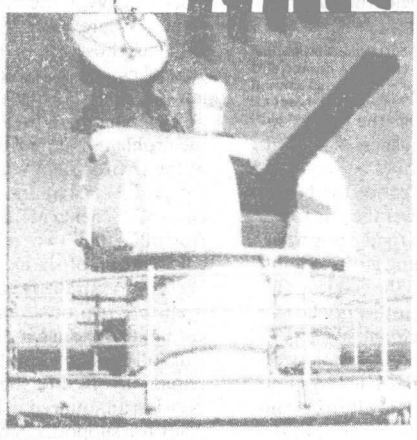

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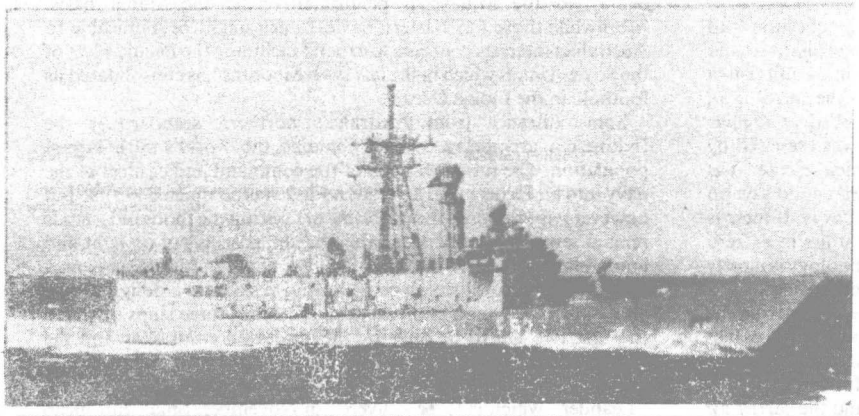

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tensions over the sovereignty of the Spratly Islands and their likely undersea oilfields; China, Taiwan, Vietnam, Malaysia and the Philippines all have some sort of claim. Long standing local disputes between North and South Korea, the Soviet Union and Japan, China and Taiwan show no signs of making significant progress. The Philippine Navy is the only one in the region in obvious decline while those of South Korea, Thailand, Singapore and Malaysia seem well balanced within limited budgets and are being maintained for their local roles. Vietnam's increasing subordination to the Soviet Union may in due course help rejuvenate an ageing fleet but her primary role appears to be the provision of the one major Soviet out-of-area naval base at Cam Ranh Bay. Taiwan has a lot of elderly ships which are kept in excellent operational condition and is doing her best in the face of considerable difficulties to update the fleet. Having taken delivery of two "Zwaardvis" type submarines at the end of 1987 and been denied a repeat order by the Netherlands government there has been a clear statement of intention to build more in Taiwan. Twelve modified "Oliver Perry" class frigates are to be constructed over a period of ten years and missile armed fast attack craft are building at the rate of three a year. Replacement minesweepers are probably the greatest priority for the future. The traditional fear of invasion from the mainland of China still sets the agenda for defence spending but the threat to economic shipping is now being given the attention it deserves in the light of China's nuclear submarine programme. In the China Seas and western Pacific the two superpower navies confront each other in much closer proximity than in the Atlantic and the USA remains in a maritime sense at least as preoccupied here as anywhere else. The region's slumbering maritime giant is of course Japan, still exercising what has become with time a self-imposed restraint over both the size and the deployment of its navy. Although restricted in both usage and rules of engagement by its constitution, Japanese military spending now ranks about sixth in the world and there is a lively internal debate as to whether Japan should expand the perimeter of its naval operations and play a more active role in defence of its own economic interests. Rumours that consideration is being given to the acquisition of small anti-submarine aircraft carriers may have been officially inspired in order to test likely responses both internally and in the international arena. Certainly the Americans would welcome such an initiative as probably would Australia and New Zealand. Malaysia, Thailand and the Philippines have expressed some reservations and apart from the Soviet Union, the most opposition is likely to come from China. On firmer ground the 1988 naval estimates make provision for the first of a possible total of eight "Aegis" type destroyers, another improved "Yuushio" class submarine and two mine warfare vessels. Currently building are three submarines, seven destroyers, four frigates, two minesweepers and two fleet support ships. Japan has some of the highest paid sailors in the world, a long maritime tradition and access to the technology industries of an economic superpower. It is a formidable platform from which to expand.

Of all the world's navies the most difficult to assess is the Chinese. Decades of isolationism combined with a preoccupation with coastal defence have restricted blue water development and although there has been a painstaking and courageous attempt to build nuclear submarine technology the time it has taken suggests that this has been an overambitious project. On the other hand any navy which employs three hundred thousand people justifies a place at the top of the maritime league and it is a shame that it is so difficult to acquire reliable information. The submarine picture is marginally clearer than it was a year ago. The first SSBN is just about operational after a succession of problems with the missile system and up to two attack nuclear submarines are also at sea. Both classes have production programmes and it is probable that increasing French involvement has led to a redesign which may now produce better results more quickly. In addition there are about eighty hulls based on variations of the original Soviet "Romeo" class of which up to half are no longer fully operational and of the others the weapon systems are a couple of decades behind modern western technology. A Soviet "Golf" class and an unsuccessful "Ming" design are also in the order of battle. Major surface warships are predominantly of two hull types, the "Luda" and the "Jianghu". While earlier versions of the "Luda" are being extensively modernised the frigate building programme has now produced the fifth variation of the "Jianghu" hull. Repeated reports of new designs have been generated and it does seem as if at least one new class and possibly two are being built for home consumption. Of the literally hundreds of coastal craft of various types an accurate order of battle is impossible to obtain even though the different characteristics are reasonably well documented. As China is now willing to embrace more western technology it is to be hoped that she will assist in giving a more accurate account of an expanding navy of which she can be justifiably proud but which has a lot of catching up to do to achieve western standards of operational effectiveness.

Africa

Perhaps not surprisingly the great continent of Africa has no navy with serious aspirations or capabilities which extend beyond its own territorial and economic zones. Egypt is beset by financial problems but manages to maintain a professional and proud navy even though some of the hulls and weapon systems could do with modernisation. Libya has the naval order of battle to pose a real threat in the Mediterranean but in spite of Soviet assistance is operationally a paper tiger. The "Kilo" class submarines delivered in the last six months to Algeria show the strength of Soviet commitment but a close look at the other Soviet supported tropical and sub tropical navies does not inspire confidence in their operational availability. South Africa with the most cogent need for a strong navy inevitably sees it as a lower priority than the land/air forces and recent deletions of some of the fleet are said to represent a shift of emphasis to port approach and harbour defences. This doesn't quite tie in with paying off minesweepers and commissioning a large fleet support ship and there is no doubt that the indigenous shipbuilding industry is now capable of building its own frigates and submarines. Nothing is going to change the strategic importance to the West of the Cape route nor the reliance of South Africa on the freedom of its ports. It is to be hoped that once again the pedlars of shore-based air power are not, as in other countries with similar problems, being allowed to oversell the potential of their maritime contribution.

South West Asia

It seems logical to leave until last the Persian Gulf and south west Asia which in the last 12 months is the only area of the world where ships have been consistently fired at and either damaged or sunk. There were 178 such attacks in 1987 compared with 107 in 1986. The damage statistics change every month and although it is tempting providence to say so there are indications at the time of writing that international attempts to reduce the flow of ammunition to the two major protagonists have slightly dampened down the frequency of attacks on undefended shipping. Also the concentration of warships from nations of some of the major navies with vested interests to protect has up to now been effective on a national basis. As an example of the need to be able to deploy the appropriate level of naval forces in order to defend your economic interests from the attentions of unreasonable men, the Persian Gulf has been a timely reminder of the utility and importance of sea power and in particular of the sometimes derided destroyers and frigates. Nuclear submarines and aircraft carriers are the primary maritime instruments of offensive operations but for the defence of merchant shipping against surface or air launched weapons it is essential to have multi-purpose surface warships operating continuously in the close vicinity of the ships at risk. The two principal Gulf protagonists still have some 25 large attack and patrol craft each, which are increasingly difficult to maintain and re-arm and most of the publicity has been given to the Pasdaran's flotilla of over one hundred small boats. Iran has demonstrated that almost anything which floats or flies slowly enough can lay mines and with 2000 large weapons still in stock gets the credit for reminding the rest of the world that minesweeping capabilities have been neglected for too long. Midget submarines have also caught the headlines although by today's standards of weapon destructiveness this seems to be an unnecessarily complicated way of delivering a comparatively small amount of explosive to a stationary target. Iraq's newly completed frigates and corvettes have remained in the Mediterranean and may now be sold to pay for higher priority arms in the land/air battle. Saudi Arabia has put the acquisition of a submarine flotilla as second priority to increasing her mine countermeasures forces by eight vessels and her considerable flotilla of Coast Guard craft continues to be strengthened.

On the Indian sub-continent Pakistan's search for suitable frigates must have been given a sense of urgency by the onward march of her powerful eastern neighbour but financial problems and war weariness in the north remain major obstacles to improving the navy. The same cannot be said for India. I have already suggested that major navies are set apart from the others by the acquisition of fixed-wing carrier-borne aircraft and nuclear submarines. India now