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NAVAL POLICY AND CRUISER DESIGN, 1865-1890

by

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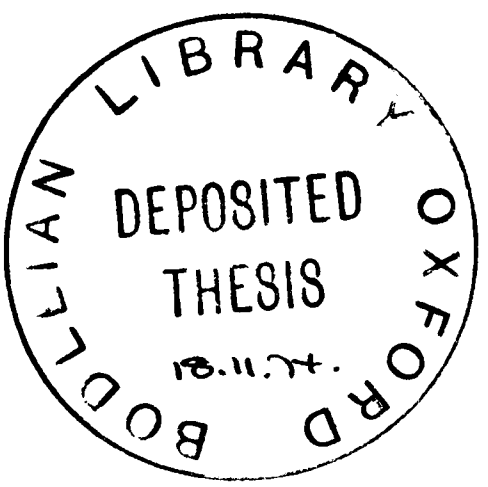

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ABSTRACT

Naval history,like military history,has until recently concerned itself largely with battles,or at least with wars. The implicit assumption was presumably that the key to history was to be found in these turning-points,rather than in the piping times of peace. A fighting service was only really of interest when fighting. In recent years this approach has been largely abandoned,and it is now recognized that warfare is an extension, not only of politics,but of most other activities of man; that it is in itself one of his most characteristic activities,and may be studied to reveal most of his characteristics. The present study falls into this pattern. In that it traces the progress of warship design,it may be taken as a traditional technical study. In that it covers the formation of grand strategy and naval policy it may be thought of as an essay in the moulding of government decisions. As a survey of the administrative development of the Admiralty,it falls into another possible category. Finally,in charting the rise of professional studies and the intellectual growth of the Victorian naval officer it touches directly on social history. It is the writer's belief that a fighting service,especially one with so distinct and independent a character as the Navy,may be studied as a society in itself, or as a microcosm of society in general.

It was with these considerations in mind that the years 1865 to 1890 were chosen. Paradoxically enough from the viewpoint of the old approach to naval history,they were years of general peace; it is contended that they were not the less interesting for that,but rather the more. One may almost say that the absence of major naval battles or campaigns allowed naval development to proceed along a steady course,undisturbed by adventitious factors. The influences at work upon the Navy and its policy

are the more easily discerned without the distractions of actual operational experience. It is this which lends peculiar interest to the period; in no other age of British history were naval officers more remote from the experience of naval war. Of the thirty or so officers who sat at the Board of Admiralty between 1866 and 1890,none had ever fought in a naval battle of any importance. They had been present at numerous bombardments,they had led landing parties and boat actions,stormed cities and stockades,fought in river,swamp and jungle,against pirates, savages,and slavers; but they had no experience of naval warfare on the high seas. This gives a unique quality to the age; to borrow a metaphor from medicine,it was sterile,uncontaminated with reality.

In any circumstances this must have sternly tested the Navy's grasp of its proper functions,but this was a confusing time in other respects. These twenty-five years cover the crucial change in the design of cruisers from sail to steam,and wood to iron and steel. In 1865 they were still vessels differing in no fundamental respect from those of Nelson; in 1890 they differed in no fundamental respect from ships still in service to-day. The men of the time had to cope with changes more rapid and radical than any the Navy had known since Tudor times. Their efforts to meet this unexpected challenge present an illuminating story.

This development of cruiser design was not a subsidiary matter. Contemporary battleships have received a lot of attention, and rightly so,but to dismiss cruisers as unimportant is to perpetuate one of the most characteristic errors of the period. Cruisers were the warships which protected the trade and possessions of the Empire,which exercised the command of the sea preserved by the battlefleets in European waters. The cruiser represented

the practical expression and practical exponent of grand strategy. The cruiser was,or should have been,designed to fulfil a specific strategy. The gradual realization of this; or rather, the gradual realization that the proper strategy,and consequently the proper designs,should be aimed at war rather than peace,forms one of the themes of the study.

The tale of this quarter-century is on the whole one of remarkable success. By 1865 the Navy had drifted very far from a proper appreciation of its real functions,and it was peculiarly ill-placed to weather the reefs of change. Nevertheless it did so, and in the process rediscovered much of the understanding of naval warfare which generations of naval warfare had formerly taught it. It seems to have done so through the efforts of naval men unassisted by efficient administration or far-sighted political leadership. It was individuals,collectively and severally,who brought the Navy back to itself,and this study devotes proportional attention to them. The machinery of the Admiralty was ill-designed to help them,and few of the Navy's political masters understood the real nature of the changes that were taking place. So often it takes an external stimulus such as a disastrous war to generate reform in a fighting service - as the Crimean and Boer Wars brought about changes in the Army. The Navy achieved reform without any such disaster,and the most important motor of that change was a growing confidence and professional knowledge among ordinary naval officers. There were men of vision at the Admiralty who attempted to transform the system from within,but it was not their efforts which were finally successful,but something very like a popular movement among naval officers in the middle and junior ranks.

This account of an aspect of naval development is in many ways approached as social history. Its theme is less the development

of a particular type of warship,a particular system of administration,or a particular body of opinion,than the evolution of a society of which they were constituent parts. It is through these parts,however,that the subject is approached. The study traces the progress of cruiser design and the simultaneous,though seldom parallel,growth of a school of professional studies and the grand strategy it nurtured. It draws a distinction between the official thinking of the Admiralty,which varied with the members of the Board; the developing thinking of the Colonial Office and the Army,which was founded on a sounder appreciation of the bases of sea power than the Admiralty's; and lastly,and most importantly,the burgeoning school of professional studies among naval officers outside the Admiralty which came to centre round the Royal United Service Institution. The rise of this school of thought to be the accepted orthodoxy of the new era constitutes one of the Navy's best claims to have reformed itself from within.

Running beside these bodies of opinion,in a relationship with them which the thesis attempts to analyse,were the designs of cruisers. They should have reflected the contemporary understanding of strategy; for many years they only reflected the contemporary lack of understanding of it. Instead it was the personal interaction of the men at the Admiralty which dictated their designs. The history of administration tends to show bodies of increasing complexity trying to compensate for individual human weakness by evolving a machinery able to run equally well under good or bad leadership; to compound the virtues of the one,and compensate for the faults of the other. The Admiralty had a long way to go on this road. Even by 1890,it was only beginning to evolve an administration able to redress to some extent the weaknesses and strengths of its officers.

Much attention has therefore been devoted to the personalities who had so large an influence.

The study traces a number of important themes running through the twenty-five years it covers,but it was felt that the period was too long and too diverse for a purely thematic treatment, and moreover it falls naturally into a series of shorter periods, distinguished from one another by easily discernible characteristics. The thesis has therefore been divided into broad chronological chapters,and subdivided thematically. It is hoped that this scheme adequately reflects the nature of the subject.

The first resource of the historian dealing with such a subject must always be the official records. Those of the Admiralty,like those of other government departments of the period,have been heavily and indiscriminately 'weeded',and they no longer furnish sufficient materials in themselves. The most valuable papers are in the series Adm.1 in the Public Record Office,covering the internal and external correspondence of the Board and its immediate servants. No less important for the technical side,though equally fragmentary,are the Constructors' Branch records of individual ships; formerly kept at the P.R.O., but now at the National Maritime Museum. Many of these 'Ships' Covers' have not survived,and those that do remain contain a very variable quantity and quality of material,loosely arranged. Nonetheless this is an essential source,not only for the designs themselves,but for the study of policy formation. In this as in many cases the historian has cause to be grateful that the inefficiency of Admiralty record-keeping has so often preserved documents for posterity by secreting them where they were never meant to be.

These official records may be supplemented by the papers of various senior officers of the period,especially those of Sir Alexander Milne and Sir Geoffrey Phipps Hornby,both at the

Maritime Museum. Happily for the historian, Admiralty officers of the time retained a thoroughly eighteenth-century attitude towards the distinction between official and private papers. These and other men who held high office took with them on retirement copies or originals of many important documents which have thus been preserved. Their private correspondence with naval friends is equally informative on the background to decisions, and especially on the personal relations which were so important in the Admiralty of this period.

A further source of great importance is to be found among the Parliamentary Papers in the reports of various commissions and committees of enquiry. There is a special value in reading the replies of the decision-makers of those days to the sort of awkward questions which they so seldom asked themselves. Many of these reports also printed correspondence and other documents of great importance. Special mention must also be made of two unpublished sources of this class; the Reports of the Carnarvon Commission, and the written evidence submitted to the Committee on Designs; both of great importance, but not easy to find.

By contrast to all these, the papers of politicians of the time are a great disappointment. Without exception the Prime Ministers of the day, like almost all men in public life, paid very little regard to the Navy. In the published and unpublished papers of Russell, Derby, Gladstone and Disraeli there is very little reference to the Navy except insofar as it touched on matters of politics, patronage, or relations at Court. Even Lord Salisbury, who knew and cared more about the Navy than his predecessors, has left very little evidence of the fact. Such papers as have come down to us from the First Lords of that quarter-century present a similar picture. Only Somerset seems to have sustained a detailed interest in naval affairs, and that mostly in subjects

outside the scope of this study. W.H.Smith's papers have survived best,and that competent and hard-working man seldom thought naval affairs of sufficient interest to be mentioned to his correspondents. To find a politician at the Board who has left concrete evidence of a real interest in and knowledge of naval affairs one must turn to that relatively obscure figure,A.B.Forwood,whose papers in the Hampshire Record Office form a small but significant archive.

In general,there are no easy approaches to such a subject as this,in this period. The historian must correlate fragmentary evidence from a variety of sources,and he cannot expect to close all the gaps. In spite of the warnings to the contrary which the present writer received on beginning this study,however,there is a more than sufficient quantity of material available to piece together a coherent and fairly comprehensive picture of twenty-five years of naval development. The methods used in preparing this study,and the materials consulted,have largely been conventional ones. It is hoped,however,that the results are less conventional. It is the writer's belief that it approaches a little-known facet of Victorian society from an unusual angle,and that in doing so it affords some valuable insights.

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Table of Abbreviations

(those of universal currency excepted)

A.L.	Admiralty Library (otherwise Ministry of Defence, Naval Library).
A.P.	Armour-Piercing
B.O.M.	Builders' Old Measurement*
C.O.	Commanding Officer
D.G.N.O.	Director-General of Naval Ordnance (later D.N.O., qv.)
D.J.A.G.	Deputy Judge-Advocate General
D.N.C.	Director of Naval Construction
D.N.I.	Director of Naval Intelligence
D.N.O.	Director of Naval Ordnance (formerly D.G.N.O., qv.)
F.I.C.	Foreign Intelligence Committee
F.O.	Flag Officer
I.H.P.	Indicated Horse Power
I.N.A.	Institute of Naval Architects
J.R.U.S.I.	Journal of the Royal United Service Institution
N.I.D.	Naval Intelligence Division
N.M.M.	National Maritime Museum (Greenwich)
N.R.A.	National Register of Archives
pdr.	pounder*
P.P.	Parliamentary Papers
P.R.O.	Public Record Office
Q.F.	Quick-Firing
R.B.L.	Rifled Breech-Loader
R.C.N.C.	Royal Corps of Naval Constructors
R.M.A.	Royal Marine Artillery
R.M.L.	Rifled Muzzle-Loader
R.N.C.	Royal Naval College (Greenwich or Portsmouth)
R.S.N.A.	Royal School of Naval Architecture (South Kensington)
R.U.S.I.	Royal United Service Institution
R.Y.	Royal Yacht
T.I.N.A.	Transactions of the Institute of Naval Architects
V.B.	Vavasseur Broadside (mounting)
V.C.P.	Vavasseur Central Pivot (mounting)

*Vide Glossary.

CHAPTER ONE: THE STATE OF THE ART IN 1865

A: Historical Development

This study commences in 1865 because that year marks the beginning of a revolution in cruiser design as complete as that introduced in battleship design five years earlier by the Gloire and Warrior.[1] In less than a quarter of a century the cruisers of the Navy changed from being wooden sailing vessels armed with smooth-bore muzzle-loaders,to steel steamships mounting breech-loading quick-firers.It must not,however,be supposed that the cruisers of 1860 were identical to those of 1800,still less to those of earlier periods.Historians sometimes write as though no real changes in warship design took place between Queen Elizabeth's time and Queen Victoria's,but the truth is that almost every aspect of the naval world changed in all but fundamentals during that period,and the process was moving most swiftly during the first part of the nineteenth century.In particular,it is not often realized how little the frigates, corvettes and sloops of 1860 corresponded to those of half a century earlier.[2]

Many people are familiar with the types of man-of-war of the Napoleonic Wars.Almost all of any size were ship-rigged, and these ships were officially classified into six Rates, according to the number of guns they carried.The First and Second Rates were 'three-deckers',that is to say that they mounted their batteries on three of their five complete decks. Third Rates were 'two-deckers',and these three Rates were 'ships

[1] James Baxter,The Introduction of the Ironclad Warship (Harvard,1933), pp.92-180.

[2] For developments during the first half of the century see C.J.Bartlett,Great Britain and Sea Power,1815-1853 (Oxford,1953), & Michael Lewis,The Navy in Transition,1814-1864 (London,1965).

of the line',capable of standing in the line of battle.Beneath these the Fourth Rates were smaller line-of-battle ships,of a type outclassed by 1800,and no longer built.The Fifth and Sixth Rates were frigates,which constituted the principal cruiser type of the fleet.They had three complete decks,and carried their main battery on only one of them.Similar to the frigates, but smaller,were sloops,and some of the smallest sloops,which fell outside the rating system,were brig-rigged.These armed brigs were the smallest cruisers of the fleet.By 1800 the French term 'corvette',for the larger sloops,was in general use,though not yet adopted in official terminology.Corvettes differed from frigates in having one less deck,so that their main battery was mounted on the open upper deck.Ship-sloops and brigs were also 'corvette built'.

Frigates,corvettes,and sloops fulfilled what would to-day be called cruiser functions.They exercised the command of the sea obtained by the battlefleets.For British cruisers this meant, above all,the protection of trade,but they had other important duties,including scouting and harrying the enemy's commerce. These tasks were very well understood at the time,but no words existed to distinguish warship types by function in the modern fashion.It was impossible to speak generically of 'cruisers' while the species was divided up into frigates,corvettes,sloops, and brigs,on a system based solely on rig and construction.The word 'frigate',referring to the most numerous and important cruiser type,was commonly used as a generic term,as in Nelson's celebrated complaint of 'want of frigates' - indeed,the ships whose untimely absence he was lamenting included a sloop as well as frigates.The word 'cruiser',then spelled 'cruizer',referred vaguely to any vessel,of whatever size or type,sent on detached or independent service.A single ship of the line,convoying troopships

home from Canada; a lone Revenue lugger patrolling the Sussex coast for smugglers; or a Concarneau privateer scouring the Western Approaches for convoy stragglers,were all 'cruizers' as the word was then used,and ceased to be such when they combined with other vessels.This lack of any word to delineate by function the cruiser species was to be a grave disadvantage when the course of warship design divorced the constructional features of frigate,corvette,sloop,and brig from the functions with which they had been associated.Only the use of the word 'cruiser' in its modern sense,first common in the 1880's,relieved the problem.

By the time the era of iron and ironclads was opened by the Gloire and Warrior in 1860,the old cruiser types had already changed greatly.The most marked development in all classes was a great increase in size.Frigates had grown so large that they had become a sort of light battleship.Instead of being a numerous cruiser type,they were scattered in ones and twos as colonial flagships,and in their distant commands assumed the local functions of capital ships.Within its sphere,the frigate was now the arbiter, not the exerciser,of command of the sea.

As the frigate grew in size,the corvette grew likewise. By 1860 the corvette had attained the size and status of the old frigate.As the final absurdity,some corvettes were 'decked', that is,frigate built,but still called corvettes.Beneath the corvettes the sloops also grew in size,but the armed brigs, never a numerous class,were little built in peacetime.

The frigate's new status as a 'capital ship' in distant waters was further enhanced by the introduction of machinery. The voracious coal consumption of early marine engines condemned them to the status of auxiliaries,but such as they were,these engines could obtain greater efficiency only at the cost of greater size,so that larger ships were usually faster than smaller

under steam.Thus the frigate recaptured the advantage of speed which it had left behind with its new size and rank;that is to say that the advantage of speed passed from the cruiser (or old frigate) to the capital ship (or new frigate).Thus the high speed which has always been regarded as the cruiser's chief requirement was lost,and the corvettes and sloops of the mid-Victorian Navy degenerated into a subordinate species unable to perform useful functions,or escape a superior enemy.

The increased size of the old cruiser types,and their decreased ability to perform cruiser functions,coincided with the development during the Crimean War of a new type of warship. The naval operations of that war consisted chiefly of inshore bombardment of coastal fortifications,and for this work there was constructed a large fleet of tiny vessels of shallow draught, mounting one or two heavy guns.These gunboats and gunvessels were admirably adapted for their work,but they were extremely slow under sail or steam,very short-winded,poor seaboats,and only safely to be trusted in action against serious enemies which,like forts,could neither outmanoeuvre nor pursue them.Nevertheless, at the end of the war the Navy had an enormous fleet of them, and it was decided to employ them.The rapid growth of the Empire, and of British trade overseas,were held to have created an urgent need for small warships for foreign service.The sloops and corvettes were too large and too few to do what was wanted.Gunboats and gunvessels were numerous and cheap,their heavy guns could deal with savages and slavers,their shallow draught allowed them to chase these and other such elusive enemies,and their deficiencies were quite acceptable in time of peace.There was an immediate call for such vessels to assist in suppressing the slave trade, to preserve British interests,and to spread civilized values in every corner of the world.The gunboat was the perfect exponent,

and has justly been remembered as the perfect epitome,of the mid-Victorian attitude to the world beyond British shores.

Gunboats and gunvessels were incapable of undertaking a cruiser's duties,and they were vulnerable to any enemy more formidable than a dhow,junk or war canoe.Whatever their usefulness in peacetime,it is inconceivable that a fighting service would have allowed so large a proportion of its money and manpower to be absorbed by these vessels,almost useless as they were for warlike purposes,had they not already forgotten the true cruiser type.By a gradual and almost imperceptible process,the Navy had lost the real cruisers of a former age,and retained only the names by which they had formerly been known.The ships which a careless historian might assume to have been cruisers, either from their disposition or their designation,were in fact nothing of the kind.In a real sense,the years from 1865 to 1890 saw not merely a development,or even a transformation,but an actual rediscovery of the cruiser.

B. Strategy

It is impossible to treat naval policy and warship design without detailed reference to the strategy which alone could give purpose to them, and this study involves frequent reference to grand strategy. Certain assumptions about British strategy are implicit throughout, and it is as well that they should be clearly stated at the outset.[1]

From the seventeenth century, when an organized Royal Navy first found itself defending substantial overseas interests, to the world wars of modern times, Britain has been faced by essentially unchanging strategic problems. It is a fundamental assumption of this study that the Victorians faced the same problems, and that, however little thay realized it, the solutions which experience taught their ancestors and their posterity were valid for them also. To argue in favour of the traditional understanding of sea power and its uses, as exploited and expressed for so many centuries, is not a radical or dangerous historical principal, but it is one that should be made explicit.

The core of the problem for the Victorians, as for so long before and after, was one of distance. Britain's major potential enemies lay close at hand, within a few days' sailing of her shores. For the most part they were military powers much stronger than Britain, and presumably capable of defeating her armies on land, so that the safety of the realm depended chiefly on the Navy's ability to repel sea-borne invasion. Inevitably, therefore, the most powerful warships were concentrated in home waters. Long before the separation of warship types and functions was properly understood in theory, it already existed in practice.

[1] Adequate treatment of naval strategy is still far to seek; the most systemmatic treatment of the matters treated in this section remains Julian S. Corbett, Some Principles of Maritime Strategy (London, 1911), pp. 87-156.

From the early seventeenth century Britain had growing overseas interests demanding protection.Floating trade,upon which a large part of the nation's wealth and prosperity already depended, had to be guarded in war and peace.More and more territorial possessions had to be defended both against local enemies,and against expeditions which might be sent out by European powers. Since the greatest concentration of force had always to be maintained in home waters,all these overseas interests had to be protected by subordinate forces.

By the eighteenth century a basic answer to this problem had been evolved which was never forgotten,even in the mid-Victorian period.It was accepted that the superiority in home waters which was necessary to ward off invasion ought also to confer a general superiority in European waters by which any major overseas expedition by an enemy could be frustrated at its inception.In modern terms,the command of the sea in European waters carried with it the command of the sea throughout the world,provided that there were no substantial naval powers outside Europe.This assumption could be safely made at almost all times before this century.

By the late eighteenth century a strategic pattern had been evolved which,with minor variations,lasted into our own times. In European waters Britain maintained a battlefleet - in practice more than one - and throughout the rest of the world a series of lesser squadrons,each responsible for part of the oceans.It was axiomatic that command of European waters ought to protect colonial squadrons against major irruptions by European enemies, so that each had only to be able to deal with local enemies,and the colonial squadrons of European powers,with whatever reinforcements of single ships or small detachments might be got out to them.

This basic strategy was never forgotten by the Victorian Navy,

even in its darkest age.What were forgotten were the practical mechanisms of working the strategy.Mid-Victorians knew the over-riding importance of the battlefleet,but forgot that it needed cruisers as scouts to be effective.They remembered that British colonial squadrons had to be able to match their opponents,but ceased to wonder how,or why.

Colonial squadrons were for practical purposes strategically autonomous.The 'umbrella' of general command exercised from home waters kept them in a sort of artificial isolation in which they repeated in miniature the elements of global strategy.Each squadron had a 'capital ship' element,which strove with its opponents for the local command of the sea,and each had its cruisers and smaller fry which scouted,raided,protected trade,and generally exercised command.In the eighteenth century the 'capital ship' element was generally a ship of the line,sometimes several of them; by the mid-nineteenth century it was usually one or two heavy frigates.As a rule Britain's potential enemies,that is to say in most cases,France,had smaller squadrons of similar composition and disposition.

Because this colonial warfare represented the principal sphere of operations for British cruisers,it is worthwhile to examine in some detail the potential strategies open to a British colonial commander and his opponent.In one case,both parties might desire to fight a squadronal action.Each would presumably form up his forces,his 'capital ships' supported by whatever other he cared to commit,and fight an action on the issue of which would depend local command.The defeated squadron would probably have its base blockaded,and perhaps captured; its remaining ships would be eliminated one by one,and local command would be complete. This is a simple,and quite plausible scenario, and it is one very commonly assumed in mid-Victorian times,but it is far from

being the only possible one.

In most cases British colonial squadrons were stronger than any others.Every French,or other enemy commander,would know this, and it was unlikely that he would commit his ships to a decisive action on unfavourable terms.It was far more probable that he would refuse battle altogether.This possibility had occurred to British officers,and they had an answer to it.In the event of war each British squadron would proceed to blockade,and if possible capture,its opponent's base.Without it the enemy would be helpless, and his surviving ships must soon be taken.He could protect his base only by accepting battle on his enemy's terms.This was the general strategic understanding in the Navy in the 1860's,and much later.It was cited to support colonial squadrons composed of slow ships of short range.Since action could be forced on the enemy,guns and armour were of decisive importance,and no amount of speed and range would allow an emeny to escape for long the inexorable British advance.

This strategy had serious flaws.It was in effect a repetition on a small scale of the tested strategy of blockade by which command of the sea in European waters had so long been maintained, and it was open to Britain's enemies abroad ,as well as at home, to undertake a guerre de course. To this the Victorians would have replied,firstly,that such a campaign had never proved decisive, and further,that with only a single base for each squadron, the entire raiding force could be blockaded with an ease impossible in home waters.There was truth in these points,but even in European waters,under the direct command of the battlefleets, trade had in the past been protected only by a large force of cruisers.By the 1850's the amount and importance of the trade to be protected had grown out of all recognition,but there were

virtually no true cruisers left to protect it.[1]

Furthermore,the strategy ignored factors of time and distance.British ships were habitually scattered over enormous areas,in only occasional contact with one another.It was bound to take a long time to assemble them,especially as most were very slow,and carried insufficient coal to steam great distances. Once concentrated,each squadron had to collect the necessary colliers and supply ships,and proceed to an enemy's base which might be far away.It was true that a nucleus of strength was sometimes kept concentrated around the flagship,and true also that some warning of war might be received; but the Victorians themselves discounted this last,having a firm belief in surprise attacks,and few British squadrons were incontestably superior to their potential opponents unless fully concentrated.Even in favourable circumstances this was bound to take weeks or months. The French,or other enemies,perhaps forewarned of war,certainly with smaller squadrons of swifter ships,could concentrate faster. It was open to them to overwhelm isolated ships or divisions of a British squadron not yet closed up,to attack the British bases (few of which were well defended),or to undertake a guerre de course, secure in the knowledge that,at the worst,a long time must elapse before British sea power made itself felt.The Australian squadron, for example,was unusually favoured in that its base at Sydney was only a thousand miles from the French base at Nouméa in New Caledonia,but even this squadron must have taken months to concentrate for a blockade.The Pacific Squadron's base at Esquimault was over four thousand miles from Papeete,and six

[1]The tonnage of shipping registered in Great Britain rose from 1,669,000 tons in 1800 to 4,659,000 tons in 1860,and 7,979,000 tons in 1890.The value of overseas trade (imports,exports,and re-exports) rose from £114,700,000 in 1800.to £375,000,000 in 1860,and £744,500,000 in 1890.B.R.Mitchell & Phyllis Deane,Abstract of British Historical Statistics (London,1962),pp.217 & 282.

thousand miles from the South American waters in which much of the squadron was permanently stationed.Most colonial squadrons faced similar difficulties.Yet by the 1850's Britain already depended on her shipping for the imports and exports on which all national prosperity was based,and for a growing proportion of her foodstuffs.It was extremely questionable whether any colonial commander could leave floating commerce undefended for months while he slowly concentrated and moved on the enemy base. If he were forced to disperse his ships for the defence of trade, with the enemy still undefeated,his ships were too slow to catch the enemy if he attacked merchantmen,or to escape him if he concentrated to destroy portions of the scattered squadron in detail.For lack of the cruiser qualities of speed and range, British ships could not effectively employ their great strength, and ran a grave risk of defeat in detail.The essential weakness of the whole British strategic scheme was that it depended on taking the initiative against an enemy who possessed all the advantages which confer strategic flexibility.Only if he chose to resign these decisive advantages did the British plan stand a good chance of success,and plans which depended on the incompetence or stupidity of the enemy were scarcely the best security for an empire.

During the quarter-century covered by this study,the realization grew that the vulnerability and importance of Britain's overseas interests demanded better protection. The primacy of the battlefleet, which so dominated naval thinking in the early ironclad era, was modified by the admission of the vital significance of overseas trade.With this new understanding came a new emphasis on the cruiser qualities of speed and range,and the strategic flexibility they conferred.This affected the 'capital ship' element of colonial squadrons as much as the smaller ships,and throughout this period

a trend is apparent towards the merger of the cruiser and the colonial 'capital ship' into a type combining the qualities of both.This type I have called the 'cruiser capital ship'; a ship, that is to say,intended to match any enemy warship on her station,and thus to secure that local command on which the smaller cruisers depended; yet also possessing the speed and range, and consequently the strategic flexibility,required of the true cruiser.This trend reached its culmination about 1890,when the 'cruiser capital ship' was of basically identical design to all smaller cruiser classes.

The Victorians faced a problem which troubled their ancestors, and has not yet been solved by their posterity; the general difficulty of reconciling size and numbers.When it presented itself,as it did during much of this period,in the form of numerous small gunboats versus a few swift cruisers,the problem was relatively simple.The former could not,and the latter could, perform the cruiser functions which were vital to Britain,and once this fact was appreciated the choice was straightforward. It was otherwise with large cruisers. There was no easy answer to the question of whether the 'cruiser capital ship' element was best represented by one large or several smaller ships. To put the same problem from a different standpoint; the dividing line could not easily be drawn between small battleships and large cruisers.During the years to 1890 technical change tended to produce two distinct types,cruiser and battleship,and thus artificially to clarify the question,but the development in later years of hybrid types,occupying debatable ground between cruiser and battleship,shows that the late Victorians,though they grew to appreciate more clearly the distinction between the two,never found a complete answer to the problem of establishing the proper type of 'cruiser capital ship'.In a sense,the apparently

clear understanding of the nature of the true cruiser in 1890 was almost as much the product of technical factors as was the apparent ignorance of 1865.

The strategic conceptions outlined in this section underlie the whole of this study. It is assumed throughout that Britain was potentially threatened by European enemies; it is suggested that some of the threats could have been met only by an effective cruiser force directed by a coherent strategy; and it is maintained that in 1865 neither existed. The subject of the study is the reinvention of the cruiser, and the partial rediscovery of the traditional strategy of its operation.

CHAPTER II: NEW SHIPS AND NEW MEN, 1865 - 1870

A. Alabama and Wampanoag

The American Civil War offered a testing ground for many sorts of new weapons and new methods of waging war. In naval warfare alone it produced the first practical ironclads, submarines, and mines. None of its developments, however, had more influence on the succeeding half-century than one which was quite unoriginal; the use of cruisers to attack merchant shipping.

The Confederate States possessed an extensive coastline and many harbours, but as the greater part of America's shipping, and all her warships, were held by their enemies, they were rapidly enclosed by an extended blockade, which absorbed most of the energies of the Union Navy. The naval fighting of the war was chiefly coastal and riverine. Under shelter of the Federal Navy's command of the sea, the seaports of the north-eastern states pursued the trade on which depended most of their prosperity, and some part of the northern war-effort. There was an obvious opportunity to strike at this target, and the Confederate Navy determined to exploit it by commissioning raiding cruisers, and issuing letters of marque. Circumstances were very much against them. The blockade prevented privateers from bringing in the few prizes they were able to take, and the Confederates possessed no ships suitable to be made into raiding cruisers. Nevertheless, a few ships were obtained abroad or improvized at home, and one achieved extraordinary success.

The Alabama was a small barque-rigged wooden screw steamer of 1,575 tons, capable of eleven knots under steam. Her armament was inadequate to engage any but the smallest regular warships, and her coal supply was poor.[1] Apart from the skill and daring

[1] Capt. Samuel Long, 'Tactical Aspects of the Utilization of Ocean Steamers for War Purposes', Journal of the Royal United Service Institution (cited as JRUSI) (London, 1856 et seq.) Vol. XXIV, p. 415.

of Captain Semmes,she had few natural advantages.Yet this ship, almost unaided,brought about the decline of the seaborne commerce of the United States,which before the war stood second among the maritime nations of the world,and after it was reduced to an insignificance from which it has never fully recovered.The Alabama took or destroyed fifty-seven merchant ships,all of them small, and only one of them a steamer. These vessels and their cargoes represented a direct loss of twenty-five million dollars,which was a serious,but hardly a disastrous injury. The indirect effects of the Alabama's operations,however,were out of all proportion to the direct losses.War risks on American vessels rose to uneconomic levels; shippers refused to load,and seamen to sail under the Federal flag.The vessels were laid up or sold abroad, and the trade passed into neutral bottoms, mostly British.
In 1861 the United States' merchant marine had 2,500,000 tons of shipping; by 1865 this had fallen to 1,100,000 tons.In the same five years the proportion of U.S.overseas trade carried in American bottoms declined from 65% to 27%. 775,000 tons of American shipping were transferred to foreign flags during the Civil War,348,000 tons of that during 1863 alone.[1] The effect on the Federal war-effort was slight,since war materials continued to be imported in neutral bottoms, but the Alabama's depredations were ruinous to the northern seaports.By the 1880's 77% of Atlantic trade was in British bottoms,and only 7% remained to American.[2]

During her short but dramatic career the Alabama established herself as the universal type and model of the raiding cruiser

[1]Harold & Margaret Sprout,The Rise of American Naval Power,1776-1918 (Princeton,N.J.,1939)p.162.J.Tramond & A.Reussner,Elements d'Histoire Maritime et Coloniale Contemporaine (Paris,1924)p.138.

[2]Extracts from the Reports of the Royal Commission on the Defence of British Possessions Abroad (Carnarvon Commission),Parliamentary Papers (cited as PP,with twofold pagination,the first element being the page of the printed papers or report, the second the MS page of the bound volume),1887 LVI p.307/911.

for the next fifty years.She was the terminus a quo of every discussion of the attack and defence of trade.Her operations were continually cited,and her example everywhere invoked.It is therefore worth examining her career. In the first place,the general impression that she alone destroyed the United States' merchant marine is probably incorrect,though she was by far the most effective of the Confederate cruisers.The commercial strength of the U.S. lay in the building and operating of wooden sailing vessels,and they were rapidly being superseded by iron steamers. In 1865 there was no yard in the United States accustomed to build ocean-going iron steam ships.In all probability the Alabama only hastened a decline which commercial forces had already made inevitable.[1] It is important to remember,however,that she was generally credited with the complete destruction of U.S. commerce.

The Alabama operated under a fairly free interpretation of the laws of war as then understood.She was unable to send her prizes to be condemned by Confederate prize courts,in the regular fashion,so Semmes held prize courts on board,though his proceedings were not more arbitrary than those of a friendly prize court, and perhaps less so than those of some of the neutral courts which released his prizes under Federal pressure.He allowed the neutral flag to cover all goods but contraband of war,and this was quite narrowly interpreted.[2] Semmes was hampered by the unsuitability of his vessel.The Alabama was neither fast nor of long range.She was,however,a good sailer,and she was able to make many of her captures without using steam.Here it was not

[1] A.W.Kirkaldy,British Shipping,Its History,Organisation and Importance (London,1914)pp.25-6.

[2] For the Alabama's operations see Raphael Semmes,The Cruise of the Alabama and the Sumter (London & New York,1864),My Adventures Afloat (London,1869),and Service Afloat (Baltimore,Md.,1887).The last two are substantially the same book; the first is in fact an account by George Carleton,with extensive quotation from Semmes' diaries.

always remembered,when lessons were drawn from her cruise,that the Alabama,though rightly described as the first steam commerce-raider,operated mostly under sail,and almost exclusively against sailing vessels.

It was sometimes claimed that the Alabama had practically no opposition.It is true that Gideon Welles,Secretary of the Federal Navy,refused to allow the bulk of his forces to be diverted from the decisive work of blockade,but it is hardly true that Semmes was unopposed.In the Caribbean alone,Commodore Wilkes,commanding the Flying Squadron,had at various times sixteen vessels under his orders,yet in nine months cruising,during much of which both the Alabama and another Confederate cruiser, the Florida,were successfully operating in the area,he entirely failed to frustrate them.[1] Ships sent to catch Semmes could not find him; ships sent to patrol particular spots were easily eluded. Much of this can be attributed to Semmes's skill,but it serves to emphasise the difficulty of making contact with a single ship.

The Alabama's dramatic career came at a time when Britain's relations with the U.S.Government,and also with Russia,were particularly strained.It required no great intelligence to appreciate the threat posed by extempore raiding cruisers to the trade of Britain,which controlled the bulk of all sea commerce in the world,and alone of all nations depended upon it for her livelihood.The danger to Britain's trade suddenly became a commonplace of all strategic thinking.For this reason the Alabama's cruise has been taken as the beginning of this thesis, because she revived interest in what was,from the British point of view,the principal function of a cruiser; the attack and

[1] James Russell Soley,The Navy in the Civil War: The Blockade and the Cruisers (London,1898)pp.201-204.

defence of trade.We have seen how true cruiser functions had tended to be forgotten; the Alabama gave everybody a sharp reminder.

The lesson was not lost on the Russian Admiralty,which in 1863 feared war with Britain,and despatched all available seagoing ships in two squadrons,one to the Atlantic and one to the Pacific, in order to avoid being blockaded.These squadrons had orders to undertake commerce-raiding on the outbreak of war.[1]

The lesson was also learned by some in the British Admiralty. The Controller was alive to the threat presented by small,fast cruisers,and proposed a special class of swift corvettes to protect commerce from 'privateers and enemy's fast sailing wooden cruisers'.These ships,the Amazon Class as they became,were to be fast enough and sufficiently well-armed to fight all but the larger regular warships,and cheap enough to be built in quantity. The Controller considered that 'The whole class of our sloops of all kinds would be of no use either against an enemy's man-of-war or against a privateer',and the entire fleet of thirty-five should be replaced by the new design.[2]

Naturally enough,however,the lessons of the Alabama were absorbed most completely by her victims. Relations between the United States and Britain were extremely strained,not least because of the Alabama herself,and war was considered quite possible. In his annual report for 1863,Secretary Welles announced that 'We need and should have steamers of high speed, constructed of wood,with which to sweep the ocean,and hunt down

[1] N.Monasterev & Sergei Tereshchenko,Histoire de la Marine Russe (Paris,2nd.ed.1932,trans.Jean Perceau)p.204.Морской Сборник (Morskoi Sbornik)(St.Petersburg,1848 et seq.);Capt.Zelenyi, June 1878; extracts trans.in Revue Maritime et Coloniale (Paris, 1859-1972)Vol.LXI (1879),p.33.

[2] National Maritime Museum (cited as NMM),Phipps Hornby Papers (cited as PHI): PHI/110/4(A);Milne Papers (cited as MLN): MLN/P/B/3(D); 'General Remarks on the Classification,Distribution and Construction of Armour-Plated Ships',by Robinson,13th December 1864.

the ships of the enemy'.[1] In the same year contracts for four ships were let. The designers were allowed considerable latitude in the means they chose to adopt to obtain the fifteen knots required.This was the famous,or perhaps notorious,Wampanoag Class,designed to scour the commerce of Britain from the seas. They were long and fine-lined vessels,built of wood.and carrying very large and heavy engines.In the best circumstances,it would have been surprising if they had proved either good seaboats or sturdy hulls. In fact only two,the Wampanoag (later renamed Florida),and the Madawaska (later renamed Tennessee),were built of seasoned timber.The Madawaska had engines of John Ericson's design,and failed to make her contract speed by two knots. E.N.Dickerson's ship,the Chattanooga,barely made any speed at all.Only the two ships designed by Benjamin Isherwood,Chief Engineer of the U.S.Navy,were even initially successful. Isherwood's career was beset by such extreme controversy during his lifetime that it is even now difficult to get an impartial view of his achievements. The best treatment of the subject[2] favours Isherwood,and generally with justice,but it does not answer all the charges brought against him. The Admiralty,on the other hand,relied on their naval attaché Captain Ward,who was probably too much influenced by Isherwood's opponents.[3] All discussion of the Wampanoag must therefore be undertaken with some caution. She was,for her day,extremely fast. In the open sea she is said to have maintained 16.6 knots for thirty-eight hours,17.25 knots for six hours,and 17.75 knots for one hour. These figures,however,were not obtained by accurate measurement,

[1] William Hovgaard,Modern History of Warships (London,1920)p.165.

[2] Edward William Sloan,Benjamin Franklin Isherwood,Naval Engineer; The Years as Engineer in Chief,1861-1869 (Annapolis,Md.,1965).

[3] 'Summary of Official Reports on the U.S.Navy',pp.10-12.(Public Record Office (cited as PRO): Adm.1/6272 Pt.2).

and the Admiralty considered them 20% too high for the power developed in such a hull. Moreover Isherwood had gone to extraordinary lengths to obtain this speed.He had designed an entirely new engine system,and forced on B.F.Delano,the nominal designer of the hull,extensive changes to accomodate the machinery.Isherwood's enemies contended that the ship carried coal for only three days steaming,had virtually no berthing space,and could not be stored for any long period at sea. Her rig,they alleged,was too unbalanced to be used,because the masts had been stepped only where the machinery permitted. The first of these charges is certainly false,and the others are suspect,but Isherwood's most scholarly partisan[1] does not entirely refute them. The much-vaunted engines seem to have been inferior to contemporary British work. 1,260 tons of machinery produced less than 5,000 Indicated Horse Power,or about five cwt.per I.H.P.,compared with three cwt.per I.H.P. in the Raleigh. There is something in Isherwood's claim that the extra weight allowed high speed to be maintained for long periods,but not all parts of the engines were especially durable,if it be true that the wooden gear-wheels of the Wampanoag wore down five-eighths of an inch on her trials between New York and Charleston.[2] In general it seems that in spite of their high speed,these ships lacked many of the essential qualities of efficient sea-going warships.Only two units of the class survived for more than a few years,with most of their boilers removed,and re-rigged as slow,but moderately efficient steam corvettes.It is extraordinary that such designs should ever have been built.

[1] Sloan,op.cit.pp.170-188.

[2] Other references for this section are: Sprout & Sprout,Rise of American Naval Power,p.169.Elting Elmore Morison,Men,Machines and Modern Times (Cambridge,Mass.,1966),pp.99-117.Theodore Ropp, The Development of a Modern Navy; French Naval Policy,1871-1904 (Harvard MS Ph.D.thesis,1937),p.70.

They represented the last attempt by the United States' Navy to build modern warships until the late 1880's.Nevertheless their influence on British naval thinking was very great. The intentions and theoretical performance of the design were known at the Admiralty by 1865.The Wampanoag ran trials in February 1868,and reports of her speed were soon current in England.By the early 1870's the failure of the class was generally admitted.During those five years,from 1865 to 1870, these ships dominated Admiralty thinking on unarmoured cruisers. If the Alabama with her speed of eleven knots had wrought such havoc, what might not four[1] heavily armed ships of fifteen knots or more do to British commerce ? There was no warship in the world capable of catching them. At this period it is hardly an exaggeration to trace nearly all naval thought in Britain and elsewhere on the nature and problems of the cruiser,to one of these two ships,and especially to the Alabama. We have seen that the Amazon Class,called forth in direct reply to her,were essentially traditional steam sloops with a higher speed than had previously been obtained.But the Alabama begot the Wampanoag, and she presented a threat which demanded radical thinking. Their influence on the Admiralty brought about a decisive break with the design tradition which extended in an unbroken line of ancestry from the pinnaces and shallops of the Tudor Navy.

[1]Eventually seven ships were ordered,but only four ever entered service for even a brief period.

B. The Admiralty Reacts

The Admiralty's reply to the Wampanoag Class was the frigate Inconstant. This ship marked a sharp break with all preceding cruisers,and she was the ancestor of all large unarmoured cruisers after her. With the possible exception of the Amazon Class,she was the first British cruiser of the Victorian era whose functions and design were the subject of serious consideration. Sufficient of the original documents have survived to give us a clear understanding of how this epoch-making ship came to be built.

It is not however certain by whom she was originally conceived. On 24th April 1866 the completed design was submitted by Edward Reed,Chief Constructor of the Navy,to his superior Admiral Robinson,the Controller.These two men were the chief protagonists of the design,and it is probable that one of them,most likely Robinson,originally conceived the idea. In any case,these two remarkable men dominated the Admiralty during a formative period, and no study would be complete without a description of them.

Robinson,[1] as Surveyor,and later Controller,of the Navy, was a subordinate officer of the Admiralty under the orders of the Board,and the direct supervision of the First Sea Lord,to whom he was responsible for all the matériel of the Navy. It was a position whose influence depended greatly on the man who held it. An officer of strong character and determined ideas could dominate much of the Admiralty,and perhaps even the Board itself. Robinson was all that. Probably no-one who had reached an influential position in the Royal Navy in Queen Victoria's time

[1]Robert Spencer Robinson,1809-1889: 1821 entered Navy,1828 Mate, 1830 Lieutenant,1838 Commander,1840 Captain,1860 Rear-Admiral of the Blue (1861-71 Controller of the Navy,& 1868-71 3rd.Sea Lord), 1862 Rear-Admiral of the White,1866 Vice-Admiral (1868 KCB),1871 Admiral.

had a more powerful or incisive brain than he. He believed that the needs of a future war should govern the design of warships, yet 'All the time I was at the Admiralty, I never heard [planning for war] referred to or examined in a large or comprehensive spirit - it always appeared to be too vast and too difficult to be seriously grappled with'.[1] We shall see how comprehensive Robinson's ideas were, and how difficult he found it to convince his colleagues. A man of the greatest discretion might have found it hard to do so, and Robinson possessed in the fullest measure the abrasive personality so characteristic of the determined reformer. Though a powerful writer and speaker, he had no idea of tact; he had but to put a case to make every hearer his enemy. His colleagues and superiors found him impossible to work with;[2] his subordinates were terrified of him.[3] 'I am aware', he wrote, 'that my opinions may be found far in advance of those of flag officers of much experience'[1]: it was a view he seldom bothered to conceal. He was a man of violent and intractable prejudice, he made enemies frequently, and did not scruple to pursue them with every weapon at his command. As Controller, he so harried Sir Cooper Key, Admiral Superintendent of Portsmouth Dockyard, that that ambitious officer was almost glad to escape to the backwater of Malta Dockyard.[4] His vanity led him to wage war irreconcilable against those members of the Board (as such his superiors) who were also his juniors in rank.

[1](bis) 'Letter from Rear-Admiral Sir G.T.P.Hornby, commanding the Channel Squadron, to the Right Hon. George Ward Hunt, M.P., with remarks by Admiral Sir Alexander Milne, G.C.B., Vice-Admiral Sir J.W.Tarleton, K.C.B., Captain the Rt.Hon.Lord Gilford, Admiral Sir S.C.Dacres, G.C.B., and Admiral Sir R.S.Robinson, K.C.B.' (printed papers), pp.18 & 23, (NMM: MLN/P/B/1(C)).

[2]Dacres to Milne, '21st' [ca.1869], 11th April [?1870], & 5th August 1870 (NMM: MLN/P/A/1(A), sv. Dacres).

[3]Vaughan Miller to Milne, 14th November 1872 (Idem, sv. Miller).

[4]F.B.P.Seymour to Northbrook, 5th May 1870 (Idem, sv. Seymour). Robinson to Milne, 10th, 11th & 14th January 1868 (Idem, sv. Robinson).

Robinson had some reluctant admirers in the Admiralty,but no friends,except perhaps one. One man shared his combination of brilliant mind and savage temper; Edward Reed,[1] Chief Constructor of the Navy,responsible to Robinson for the design and construction of all the Queen's ships.Reed's character and career fulfil many of the requirements of Greek tragedy.He was a brilliant man, author of fundamental advances in the science of naval architecture which remain basic practice to-day. In seven years as Chief Constructor he carried out a complete revolution in warship design. Such a man deserved and achieved greatness through his talents,but even more than Robinson,his character was fatally flawed. Like his superior,he was a man of incisive mind and persuasive tongue.In debate he was fluent,powerful,and utterly unscrupulous. Reed was a man to whom enmity and argument were the breath of life. Like Robinson,he could not present a case without making an enemy; unlike the Controller,who was always pained to find himself disliked,Reed revelled in this situation,and would have been lost without it. His mind worked naturally in opposition. Once engaged in controversy,all other considerations were abandoned in the pursuit of conquest and the humiliation of his adversary. Honesty,expediency,and consistency were forgotten,and his enormous professional talents prostituted to provide polemical ammunition. Reed never consciously advanced untruths,indeed his greatest strength in argument lay in the sincerity with which he advocated his positions,but he was a man with a limitless capacity for self-deception. His innuendo might be irrelevant to his case, discreditable to his opponents,and dishonourable to himself;

[1]Edward James Reed,1830-1906: 1853-61 Editor of the Mechanic's Magazine,1860 co-founder & first Secretary of the I.N.A.,1863-70 Chief Constructor of the Navy,1871 Chairman of Earle's Shipbuilding Co.& partner of Whitworth's,1874-80 Liberal MP for Pembroke (1880 KCB),1880-95 & 1900-06 MP for Cardiff.He married Sir N. Barnaby's sister.

his evidence fictional,and his arguments inconsistent; but he remained passionately convinced of them. So long as he was at the Admiralty,with his energies channelled into professional concerns,he was at his best. Once released to devote his life to unlicensed argument,he rapidly destroyed the great reputation which his abilities had won. This was the tragedy of the man who, in 1870,was hailed with justice as the greatest naval architect England had produced since Phineas Pett,and who,by 1890,was a bore to the general public and a by-word among his professional peers.

Reed was at his best at the Admiralty,but he was never anything but a difficult colleague.His technical education had been irregular,and he had won his post by submitting unsolicited designs to the Admiralty. He thus passed over the heads of the dockyard shipwrights who traditionally controlled all the senior posts. He was an unconventional upstart,and unlikely to be popular. He did nothing to remedy this handicap. If any man could be vainer and less likable than Spencer Robinson,Reed was he. He agitated for Whitworth guns,in which he had an interest,for successive increases in his salary,for impossibly early promotion for his brother,for various extraordinary payments to himself. He constantly threatened resignation.[1]

Reed's strengths as a naval architect lay in his scientific methods,and his unconventional engineering approach to difficult problems.He sponsored the work of W.E.Froude,first head of the Admiralty Experimental Works,inventor of ship-testing tanks,and virtual founder of the science of hydrodynamics,whose work ensured

[1]F.B.P.Seymour to Northbrook,5th May 1870 (NMM: MLN/P/A/1(A),sv.Seymour).

for the Admiralty an enormous scientific advantage over all other navies throughout the later Victorian era. Reed's technical weaknesses were the same as those of most naval architects of his time; a lack of understanding of the problems of sea-keeping. He had virtually no sea experience, and never thought it necessary to obtain any. His ideas on warship function were exclusively theoretical, and not always sound. He was at his best when tightly supervised by a superior like Robinson, who knew exactly what he wanted, and at his worst when free to build ships of his own conception, as with the Favorite, Pallas, Penelope and Research.[1]

These two strong men were the servants, at the time the Inconstant's design was prepared, of the Duke of Somerset's Board. Somerset himself[2] was a competent and successful First Lord, but his naval colleagues were not remembered for their abilities. The First Sea Lord, Sir Frederick Grey,[3] seems to have been a stupid and idle man, and his naval colleagues not much better. The papers of the time give the impression that Robinson was accustomed to persuade Somerset directly, and more or less ignore his nominal superior.

Reed submitted his design of the Inconstant on 24th April 1866. She was to be 'a ship of war to carry a few heavy guns at high speed without armour plating'. An armament of ten 12½ ton guns was suggested, and a speed of fifteen knots was hoped for.[4] The following day Robinson presented the design to the Board.[5]

[1] Admiral G.A.Ballard, 'The Three British Armoured Corvettes', Mariner's Mirror (London, 1911 et seq.) Vol.XXI (1935) p.12. Oscar Parkes, British Battleships (London, 2nd.ed.1966) pp.85-117.

[2] Edward Adolphus Seymour, 12th Duke of Somerset, 1804-1885: 1859-66 1st.Lord.

[3] Rear-Admiral the Hon.Sir Frederick Grey, 1st.Sea Lord 1862-6.

[4] Report of the Committee to examine the Designs upon which Ships of War have recently been constructed, with Analysis of Evidence (un-numbered Command paper, cited as Committee on Designs), Appendix A, Sect.IV (PP: 1872 XIV p.291/889).

[5] Idem, p.290/888. PRO: Adm.1/5980, 25th April 1866. NMM: MLN/P/B/3(D) (draft copy).

The new vessel was 'to meet the large and swift ships that may be built by other powers,on equal terms as to speed and armament'. In Robinson's draft copy the 'large and swift American ships of the Pampanoosuc [Wampanoag] Class' are specifically referred to. The final version is slightly more diplomatic on this point, but makes no real secret of the Inconstant's projected opponents. A detailed comparison of her armament with the American ships' concludes in her favour,especially in that her rifled guns could outrange the smooth-bore American weapons.

The design was approved by the Board the following day.[1] The unusual speed with which the design passed through these stages,and the relative brevity of the arguments presented, suggest that the question had already been thoroughly discussed.

The problems faced by Reed in designing the Inconstant were considerable.He had to combine a higher speed than any British warship had ever attained,with good sailing qualities (seldom achieved in warships of large size),heavy armament,and comfortable berthing for a large crew. The strains imposed by large and powerful engines,and the long,fine hull required to maintain speed in a seaway,suggested,if they did not require,iron construction, but this involved further problems. From the constructional point of view,iron was ideal,but from the military point of view it had serious disadvantages.[2] The Simoom Trials at Portsmouth in 1846 and 1850 had shown that iron offered a poor resistance to shot. Wooden scantlings,struck by shot,either resisted the blow,or sustained a clean hole,which could fairly easily be plugged,and if below the waterline,would partly close itself. Iron shattered when struck,leaving a jagged hole which could not

[1] Committee on Designs,loc.cit.p.292/890.

[2] Chief Constructor's report to the Controller,17th November 1866, (PRO: Adm.1/5982).

be stopped,and sending clouds of langridge across the battery decks. Furthermore,a shot which penetrated the engaged side might pass across the ship and drive out the plating on the disengaged side. Iron offered greater security against fire when struck by shells,but shell guns formed only a part of the armament of most warships. It was therefore held that only armoured warships could safely be built of iron,and then only if the armour were impenetrable,since armour shattered by shot produced much worse effects even than simple shell plating. It was out of the question for the Inconstant to carry armour, yet it was virtually essential that she have an iron hull,which alone could absorb the stresses involved. Reed's solution was to sheathe the entire hull with a double skin of oak planking nine inches thick. This,it was hoped,would allow the iron hull to be penetrated cleanly,if at all. At the cost of increased weight,and hence size and expense,it secured a measure of protection to the hull,and,more important,the crew. It must always be remembered that throughout the era of wooden warships,ships were very seldom sunk in action,unless by fire. Almost all actions were decided by casualties among the crew,and armour was introduced into warships primarily to protect the crews from shell-fire. The sheathing of the Inconstant,being watertight, had the additional advantage of permitting her to be coppered. She was thus the first iron warship able to operate for long periods without docking,which was a significant gain,as a ship of her size could dock in very few places outside Britain,and iron hulls foul very rapidly.

Reed did not consider the sheathing more than a useful expedient to improve protection.

> 'When the utmost has been done in this way,it cannot be doubted that they will still remain unsuited

> for close action,& should chiefly fight at long range.... they are not by any means well adapted for closing with slow and stoutly built ships,and withstanding the blows of shot and shell,but will best fulfil their legitimate functions and find their greatest security in fighting from a distance with their long range guns'.[1]

These long-range guns were crucial to the whole design of the Inconstant,and they were to prove one of the principal points of controversy in it. Very few cruisers,indeed,very few warships, were armed with long-range guns as such. Most guns were of short range and large calibre,and the accepted tactic was to close one's enemy and pound him at close range. Superior speed enabled one to force action,rather than choose one's range. Guns of the period were generally divided into shell guns and armour-piercing guns. Shell guns fired large common shell at short range. Armour-piercing guns fired solid or hollow shot,and the larger sizes had a longer range. There were no armour-piercing shell in general use,although the large armour-piercing guns could fire common shell. Naval men thought in terms of shell guns or armour-piercing,not of long or short range. The Inconstant had to have guns of long range,which meant large armour-piercing guns. These were normally mounted only in ironclads,yet the Inconstant could never engage a regular ironclad. Many critics of the design asked why,if she could not fight ironclads,she were not given a normal cruiser armament of a large number of shell guns,with a high rate of fire,which would be much more effective against the unarmoured wooden cruisers she was expected to oppose ?[2]

Somerset's Board,however,approved Robinson's conception, and Sir John Pakington,who succeeded him in June,endorsed the

[1] PRO: Adm.1/5982,loc.cit..

[2] For a typical specimen of this view,see written evidence of Capt. Henry Boys of HMS Excellent to the Committee on Designs,dated 13th June 1871,unpublished printed paper No.104 (NMM: PHI/110).

decision. The Inconstant mounted ten 9-inch,12½ ton,armour-piercing guns,and four 7-inch,6½ ton. Only two ironclads in the Navy were better armed. As completed in October 1869 she fulfilled the best hopes of her designer. She proved to be able to steam at the unexampled speed of sixteen knots,and was furthermore very fast under sail. No warship in Europe could equal her speed under steam,and only the steam frigate Immortalité,of all the ships in the Navy,could match her on any point of sailing. She once made thirteen and a half knots under plain sail,and was extremely weatherly,though her great length made her slack in stays.[1] Reed achieved the very difficult feat of combining sufficient stiffness to carry canvas (especially difficult since the Inconstant was taunt-rigged in the old fashion) with sufficient tenderness to make a steady gun-platform. Her sailing qualities were important because her range,though good for her day,was still very small. At her full speed of 16.2 knots she could cover 1,170 miles,at ten knots 2,700 miles,and at her most economical speed of 6.4 knots,3,020 miles.[2] She was thus unable to make a steam crossing of the Atlantic without coaling.

For her day the Inconstant was a superb specimen of cruiser design. There is little doubt that she would have been able to catch and sink her projected opponents of the Wampanoag Class, and a fortiori,any other cruiser afloat. Robinson considered that a threat to trade would come from two sorts of vessel,the 'national war-ship',whose speed and armament would allow her to drive off all opposition,and the 'armed privateer',which,'when the road had been cleared for them by the national war-ship would

[1] For a general description see Admiral G.A.Ballard,'British Frigates of 1875: The Inconstant and Raleigh'(Mariner's Mirror Vol.XXII (1936)p.42.

[2] Admiralty Library (cited as AL),Foreign Intelligence Committee Report No.73 (May 1885)'The Protection of Commerce by Patrolling the Ocean Highways and by Convoy',Appendix E,p.17.

pick up everything that came in its way [sic]'.[1] The function of the Inconstant was to encounter the former, to drive them off, and thus to permit the smaller classes of cruiser to deal with the 'privateers'. In other words, the Inconstant was to be the 'capital ship' of cruiser warfare, which should secure command of the sea, and permit lesser cruisers to exercise that command in the protection of trade. In order to combine the qualities required of her, she was bound to be large and costly.

This was Robinson's conception of the design, and it was a sound one, as far as it went. So long as the word of colonial cruiser warfare was one of unarmoured warships, the Inconstant could dominate it. When once armoured warships began to be found in colonial squadrons, her absolute supremacy was gone, because she could not safely engage them. Her high speed and heavy armament would always have been of the greatest utility, but she would have become a second-rank ship, when it became a question whether her great size and cost could be justified. Robinson specifically intended the Inconstant to counter American ships, and the U.S. Navy had no sea-going ironclads, so one must approve the original conception. By the time she was completed in October 1869, the seven French second-class ironclads of the Alma Class were in service, and the Russian armoured cruiser Kniaz Pozharskii was afloat. It was in these circumstances that the continuation of the type was discussed.

If one asks exactly how the Inconstant was to be operated, it does not appear that any serious thought was given to the question. She was to pursue and sink a certain type of American ship; but whether she was to seek her enemy by patrol or convoy, whether she might find him singly or in squadrons, were matters

[1] Memorandum by Robinson; Committee on Designs, Appendix A, Sect. IV, Paper B, April 1870 (PP: 1872 XIV p.918/934, & PRO: Adm.1/6177).

scarcely considered. Strategy was an almost forgotten subject in the 1860's,especially the strategy of cruiser operations. Throughout the decade,only one paper on the question was given at the Royal United Service Institution. Captain W.Horton presented a study[1] of unusual perception for its time,but even he,though briefly noticing the difficulty of finding raiding cruisers, offered no thoughts on how it was to be done. Robinson does not seem to have worked out the strategy to be employed - though, indeed,it was no part of his job to do so.

> 'The question is:',as he wrote,'How will this country wage war with one or more maritime Powers ? According as our ideas are clear and definite on this point,so will be our proceedings in time of peace; for the manner in which our naval force will be used in time of war,must govern our decision [on ships to be built] ,and how they should be used in time of peace'.[2]

There is no evidence that Robinson or anyone else ever interpreted this as a requirement for a developed strategy of cruiser employment. The evidence of witnesses before the Committee on Designs clearly reveals the standard of contemporary opinion. Staff-Commander Kiddle[3] of the Minotaur knew of no purpose the Inconstant could fulfil,as she was certainly too large for commerce-protection. Captain Sherard Osborn[4],(a well-known partisan of Captain Coles) considered commerce-protection so subsidiary and indecisive a form of warfare that such a large ship could only be justified by her usefulness in peacetime. Both witnesses appeared never to have thought of the problems before,were very confused,and frequently contradicted themselves.

[1] 'The Necessity for Building Unarmoured Ships of War',JRUSI X p.1

[2] 'Letter from Admiral Hornby...to the Rt.Hon.G.Ward Hunt,&c.',p.18 (NMM: MLN/P/B/1(C)).

[3] Committee on Designs,Minutes of Evidence,(PP: 1872 XIV p.128/692).

[4] Ibid.p.86/650.

Mr.Edward Reed defended the Inconstant's high speed,by which 'The moral power of the country would be best sustained'.[1] Reed often appeared to attach a high value to the psychological effect of a ship,and was apt to be carried away by his own rhetoric. He once claimed that the Inconstant could 'destroy two-thirds of the ironclads of the world',and 'sweep down on them with terrible and glorious effect'.[2]

The most revealing witness was Captain Charles Waddilove of the Inconstant herself.[3] Questioned on her function,he could only suggest that she was 'built for speed',and to test the idea of sheathing. The chairman having explained her purpose,Waddilove thought an ironclad would do the job better. The existence and nature of the Wampanoag Class having been explained to him,he agreed that his ship was a match for them,and that the smaller cruiser Volage was not,yet still preferred the latter. Waddilove's evidence is throughout a tissue of confusion and contradiction, which throws an unfavourable light on the mental training of the mid-Victorian naval officer. He had just been appointed to one of the best commands in the Navy,and subsequently rose to flag-rank,so he was presumably well thought-of. There is no evidence that he was stupid or incompetent,and yet to the modern observer he seems astonishingly innocent of professional knowledge or intellectual capacity. Perhaps the most startling revelation was that he had apparently never heard that his ship was intended to fight at long range,and proposed to engage at close range a slower American ship with a much heavier armament of short-range guns, even though he correctly judged that the American ship would then have a great advantage.

[1] Ibid.p.152/716,Q.3061.
[2] Frederick Manning,The Life of Sir William White (London,1923),p.164.
[3] Committee on Designs,loc.cit.pp.121/685-125/689,especially QQ.2308,2313-6,2324-6,2338-54,2387-9,2417-8,2421 & 2425.

It is against the background of such a level of comprehension in the Service as a whole that Robinson's thinking must be judged. He was not in a position to supply what he saw as the principal want in naval policy-making.

> 'I am confident that there ought to be,in the Records of the Admiralty,a well-considered general outline of how a maritime war should be carried on. This would require a thorough study of the nature and number of the ships we ought to have,and the disposition of the fleet with reference to hostilities'.[1]

This was a want not to be supplied for many years. In the absence of any plan of strategy,Robinson conceived his ship largely in terms of matching potential opponents,and only partly in terms of a projected strategic function. Ideally the latter should be a primary,and the former a secondary influence on any design. Robinson could not place the Inconstant in her proper position in a strategic plan,because none such existed,but at least her conception in reply to foreign building ensured her a real,if limited rôle. In subsequent years even so relevant a criterion as this was often ignored in favour of considerations of cost,or similarity to former types.

The Inconstant's design marked a new epoch,not only in its striking departure from previous types,but also in the new way in which it was conceived. Just as the one can be traced to Reed's scientific rather than traditionalist approach to naval architecture, so the other sprang from Robinson's logical approach to the problems of design.Within his field,Reed was more successful in imposing his interpretation,because he was supreme in his department,whereas Robinson's influence on the central decisions of warship design and strategy was slight in theory,and circumscribed

[1] 'Letter from Admiral Hornby....to the Rt.Hon.G.Ward Hunt,&c.', p.18 (original italics)(NMM: MLN/P/B/1(C)).

even in practice.

The Inconstant's design was proposed by these two strong men in alliance,and approved by a Board content to follow their advice. The progress of the idea under Boards more accustomed to think for themselves was to be less easy.

C. The Progress of the Idea

On 13th July 1866 Sir John Pakington and his new Board of Admiralty officially took office. They were to bring to the problems of cruiser design more attention and greater intelligence, both individual and collective, than these had previously attracted. Perhaps in consequence, the new Board also found itself in disagreement more often than its predecessor.

Sir John Pakington[1] was an old and experienced politician; he had already been First Lord for two years, he knew the Admiralty and he knew naval affairs. In all these qualities he was uncommon among First Lords, and he was much less under the tutelage of his civil servants and naval advisers on one hand, and his Cabinet colleagues on the other, than some of his predecessors and successors.

Such a man might have dominated Somerset's Board to an unhealthy extent, but his own was of higher calibre. The new First Sea Lord was Sir Alexander Milne,[2] whose authority was unequalled in his generation. As an administrator, Milne had won deserved praise for his organization of the Transport Service during the Crimean War. As a diplomat, in his command of the North American Station during the American Civil War, he had greatly contributed to avoiding British involvement, which had at times seemed imminent, and had won the respect of both sides in America. As a naval thinker, Milne was a man whose influence, especially through his later membership of the Carnarvon Commission, was

[1] John Somerset Pakington (né Russell), 1799-1880: Eton & Oriel; 1837-74 Conservative MP for Droitwich (1852 Sec. for War & Colonies, 1858-9 & 1866-7 1st. Lord of the Admiralty, 1867-8 Sec. for War); Bart. 1846, GCB 1859, 1st. Baron Hampton 1874, President of the INA for 21 years.

[2] Alexander Milne, 1806-1896: 1817 entered Navy, 1827 Lieutenant, 1830 Commander, 1839 Captain (1847-59 4th, later 3rd Sea Lord, 1858 KCB), 1858 Rear-Admiral of the Blue (1860-4 C-in-C North America & West Indies), 1861 Rear-Admiral of the White & local Vice-Admiral, 1865 Vice-Admiral (1866-8 1st. Sea Lord, 1869-70 C-in-C Mediterranean), 1870 Admiral (1871 GCB, 1872-6 1st. Sea Lord), 1881 Admiral of the Fleet.

unobtrusive,but not unimportant.[1] As an officer,he was liked and respected for his integrity,ability,and strength of character. Milne was a man of shrewd common-sense rather than profundity or brilliance,whose mind ranged widely,but worked best in the synthesis of others' ideas,rather than in the creation of his own. He was the most prominent of a number of officers who considered that the ironclad revolution had concentrated overmuch attention on battleships,to the detriment of other types of warship.[2] His essentially conservative nature reinforced his conviction of the importance of cruisers,which were still 'real' warships,rather than mastless turret ships like the Devastation. He was among the first Victorian officers to devote serious attention to colonial problems and the defence of trade. As early as 1858 he had written that 'our present force is....not adequate to the wants of a great maritime nation with colonies to protect.'[3]

Milne and some of his colleagues brought to the Admiralty the first intelligent concept of cruiser warfare to oppose to Robinson's,which had hitherto held the field unchallenged. They assigned to armour a much higher value in cruiser warfare than he did. In the early years of Somerset's Board,when the ironclad era was in its infancy,it had seemed to many that armour would be extended to all classes of fighting ships. In pursuance of this idea Somerset's Board,with Robinson as Surveyor,had built the ironclad corvettes Favorite,Pallas,and Penelope,and the ironclad sloops Enterprise and Research,[4] the design of which first brought

[1] B.McL.Ranft,The Naval Defence of British Sea-borne Trade,1860-1905 (Oxford MS D.Phil.thesis,1967)pp.145-150.

[2] D.M.Schurman,Imperial Defence,1868-87 (Cambridge MS Ph.D.thesis, 1955)pp.33-52. Schurman rather makes Milne the 'apostle' of coal, which both exaggerates his concentration on that fuel,and belittles the scope of his thinking.

[3] Printed Paper of 22nd May 1858,'Reply to Questions submitted by Her Majesty thro' the Prime Minister to each member of the Board of Admiralty',p.9 (NMM: MLN/141/2).

[4] Ballard,Mariner's Mirror XXI (1935)p.12.Parkes,British Battleships, pp.85-117.

Reed to the Admiralty. The intended function of these ships remains a matter of puzzlement.[1] The sloops could not steam more than ten knots,had derisory bunkerage,and the Research, especially,was not seaworthy.The Pallas was built more as a fleet ram than a cruising ironclad.[2] The Penelope had very shallow draught,presumably to fit her for the coastal operations of the Crimean War. None of these ships were suitable for colonial commissions,whether or not that had been the original intentions of the designs. Only the Favorite was capable of this service, though she was a poor sea-boat,and very slow under steam and sail. She was always regarded as a temporary expedient,and served only one sea-going commission.

The Navy's first essay in colonial ironclads,if any of these ships can be so regarded,had not been a great success,but by the time the Inconstant was launched in November 1868 a new generation of ironclads had reached colonial waters. These were all second-class battleships. As a group they were slow and short-winded, but superior in armament and protection to any other warship beyond European waters. H.M.S.Zealous and Royal Alfred were flagships respectively on the Pacific and North American stations, and the French had completed the Belliqueuse,Armide,Thétis,and Jeanne d'Arc,with four more sisters following. It was necessary and sensible for Robinson and the Admiralty to provide ironclad flagships on foreign stations to oppose,if necessary,these French ships. When the Belliqueuse arrived in the East Indies early in 1867,the Royal Navy was still represented in those waters by the Princess Royal,74,one of the last sea-going ships of the line to

[1] A reference in Colin Frank Baxter,Admiralty Problems during the Second Palmerston Administration,1859-1865 (Georgia MS Ph.D.thesis, 1965),p.27,implies they may have been built for Channel defence.

[2] Parkes,op.cit.p.100.

carry a flag. The French ship could have sunk her with impunity, and this was a state of affairs which could hardly have been allowed to last. In fact the French had no aggressive plans. They did not distinguish, as British officers generally did, between the battle-fleet in home waters, and colonial squadrons abroad. Their second-class ironclads were intended to work with the battlefleet in case of need, and their draught was calculated to permit them to operate in the Baltic against Prussia. Equally, the first-class ironclads could be, and were, concentrated in support of purely colonial objectives, as in Mexico in 1866, and Tunisia in 1880.

> 'Chez nous, la première flotte cuirassée de Dupuy de Lôme était véritablement conçue en vue de se suffice à elle-même et de répondre à tous les besoins; ses corvettes cuirassées.....plus lentes que les frégates cuirassées, furent des bâtiments de combat de second rang et non des croiseurs'.[1]

The French navy of the period aimed at a superiority obtained more by technical advance than strategical combination,[2] and they had no serious expectation of challenging Britain at sea. Thus Jurien de la Gravière wrote to an English friend in 1860:

> 'Vous voulez être les maîtres incontestés des mers et ne craindre personne ni aucune coalition maritime, jusqu'à un certain point nous nous inclinons devant cette prétention; mais nous ne voulons pas que votre sécurité soit telle que vous vous imaginiez pouvoir nous traiter comme bon vous semble'.[3]

When France deployed her second-class ironclads on foreign stations, which were by no means their only, or even primary destination,

[1] Louis-Émile Bertin, La Marine Moderne (Paris, 1910) p.98.

[2] Ropp, Development of a Modern Navy, p.15.

[3] Pierre Le Masson, 'La Politique Navale Française de 1850 à 1914', Revue Maritime (Paris, 1859-1972), 1968, p.186.

she intended them to fight local,rather than European enemies.[1] France was beginning to enter the phase of feverish colonial expansion which reached its climax in the 1880's and 1890's. The colonies were under naval control,not only at ministerial level,but throughout the service. Many naval officers spent their entire careers ashore as colonial administrators. A large part of the naval estimates,and a larger part of naval attention, were devoted to colonial affairs. By the late 1860's small powers outside Europe were already beginning to acquire coastal ironclads. Insofar as the French built their second-class ironclads with any distinctly colonial enemy in mind,it was their rivals and victims in the struggle for colonies,rather than Britain,whose overseas squadrons were almost everywhere greatly superior, and whom they did not seriously propose to fight.

Nevertheless,it was this French force of second-class ironclads which caused Milne and his colleagues to question the utility of large unarmoured cruisers. Essentially they were involved with a problem to which no complete answer has ever been found,even in easier circumstances; the proper elements of force to be employed in a subordinate theatre of war,and the true distinction,if any,between cruisers and battleships. As we have seen,it was technically difficult to endow any 'cruisers', and impossible to endow all,with the qualities of speed and range which should have been their generic characteristics. It was hard to assign the proper value to these qualities when the most powerful vessels,indeed,almost all the vessels,in a colonial squadron,were really too slow for cruiser duties. Likewise it was hard to distinguish between colonial second-class ironclads and their bigger sisters,when the former were

[1] Ropp,op.cit.p.67.

only smaller, slower and weaker versions of the latter, with no distinctive advantages.

Soon after taking office on 13th July 1866, Sir John Pakington requested from the Controller his opinion of the needs of the Navy, and the programme which should satisfy them. On 23rd August Robinson submitted his reply.[1] He envisaged threats from invasion, local attack on a colony or coaling station, and general attack on trade. This last was most seriously posed by the new American cruisers, against which the Inconstant was intended to fight. 'Both in speed and armament she will prove a fair match for any unarmoured ship afloat'. He proposed to build five more of the type by 1870, with the aim of eventually bringing the Navy's strength to twelve. In the same period, three of the Juno type,[2] and twelve first and twelve second-class sloops were to be built. Robinson's proposals involved a total expenditure on shipbuilding of £1,300,000 annually for three years, and he produced figures to show that, although this would be above the most recent votes, it was less than had formerly been considered necessary.[3]

Even before Robinson sent in his proposals, Pakington had already received, on 8th August, a memorandum from his department explaining the programme of the previous Board.[4] They had kept many old wooden cruisers in repair;

> 'The Board's object was to avoid coming to a decision on the difficult question, as to what kind of ships were

[1] NMM: MLN/P/B/1(C).

[2] The Juno (launched November 1867) was a large screw corvette, of a type intended to full the gap between old sloops and new frigates.

[3] The votes had fallen from £1,662,892 in 1861-2, to £316,000 in the previous year, 1866-7, although the former year was admittedly that of the greatest expenditure on new ironclads.

[4] 'State of Work in the Yards in August 1866' (PRO: Adm.1/5981).

> required for naval warfare,until a sufficient experience had been obtained as to armour-plated ships,and heavy-rifled artillery'.

The former Board had intended to decide this question,and had the choice of replacing the old and slow cruisers of a former age with ships of very similar type,or with a smaller number of faster and more efficient cruisers. The paper is imbued with Robinson's ideas,if not actually written by him,and leaves no doubt of its opinion that the latter was the only sensible course.

This decision was one of great importance for the Navy. The two alternatives represented the two main schools of thought on the employment of cruisers. Those who saw their function largely in terms of peace-time colonial work,of what was often called police work,naturally advocated large numbers of small, cheap ships,which should normally be of shallow draught,full rig,and heavy armament,but need not be fast or of long range. Those who thought of cruisers primarily as warships insisted that their military qualities should be paramount,and among these counted speed and range as highly important. They were prepared to accept that such ships must be larger,costlier,and less numerous than existing ones,and that,in consequence,the composition and duties of colonial squadrons would have to be modified. These two essentially divergent schools embraced most thinking naval officers during the 1860's and 1870's. Few would have accepted the opinions of either in this starkly simple form, but nearly all compounded their opinions from one side or the other.

Robinson was of course an ardent apostle of the 'military' school of thought,which strongly coloured his submission to Pakington. The new Board,however,though not exactly inimical to

it,held generally to a more moderate view. Evidently they did not accept Robinson's proposals,because on 13th September he again submitted a strong defence of them.[1] The thirty-three new cruisers,though expensive,would be infinitely more valuable than their predecessors. In the long run,they would prove an economy, since they would replace old wooden ships whose maintenance was extremely expensive. When the programme was complete in 1870 it would be possible to cease repairing the older vessels.

> 'The expenditure upon them does not even ensure the possession of a force on which we could satisfactorily rely in the event of War with a maritime power. Our small classes of ships must,sooner or later,be replaced by ships that can meet the smaller ships of France,America or Russia upon equal terms'.

On his own copy Sir Alexander Milne noted,'I don't think so'.

The objections of the new Board were partly on financial grounds.Pakington was being pressed to keep the Estimates down, and the way in which the burden of Robinson's argument shifted from naval grounds in August,to financial ones in September,is probably indicative of the nature of the objections he was trying to meet. The Board nonetheless took the view that,whatever the financial stringency,the number of smaller cruisers could not be reduced. When Robinson presented his report on the designs of the new ships on 20th November,[2] he had admitted defeat on most of his previous proposals. In a 'sacrifice of the highest speed obtainable in ships of unrestricted dimensions.....it appeared to me that I strictly fulfilled the wishes of their Lordships as expressed to me in several discussions on these subjects.'

[1]PRO: Adm.1/5981,& NMM: MLN/P/B/1(C) - the latter is Milne's copy.
[2]PRO: Adm.1/5982.

Only one Inconstant type had survived, but this 'I recommend for adoption to meet the large class American corvettes'.

Financial stringency played some part in the Board's refusal to accept Robinson's proposals, but there was clearly a fundamental difference of opinion on strategic policy. On 30th November Milne circulated to his colleagues a paper 'On Shipbuilding Policy'.[1] In it he expressed his view, which lay somewhat between the extremes of the two schools. Of the Inconstant he wrote:

> 'This ship is built especially for a 15 knot speed. I doubt the policy of so large and expensive a ship, I would prefer a limit of 14 knots and a smaller ship, but the Controller urges that others should be built, and I do not therefore object to another being laid down'.

It is interesting to observe how Milne, who certainly knew his own mind, and disliked Robinson, was forced by reluctant admiration for the Controller's abilities to defer to his judgement. The rest of the Board were more forthright. Sir Sydney Dacres,[2] the Second Sea Lord, was firmly in favour of Robinson's ideas:

> 'I do not hesitate to say that I should wish [that] the scheme, as introduced to the board by Admiral Robinson in August & September should be carried out in its integrity, as I consider the necessity for building the number of ships proposed is of paramount necessity [sic] to meet the needs of the country, not only for a time of war, but also as the best and cheapest means of preserving the blessings of peace'.

Unlike Milne, he was in favour of building more Inconstant's:

> 'We must not be neglectful of the future, or forget, with the Alabama's ravages before us, what would be the

[1] NMM: MLN/P/B/1(C).

[2] Sydney Colpoys Dacres, 1805-1884: 1817 entered Navy, 1824 Mate, 1827 Lieutenant, 1834 Commander, 1840 Captain, 1858 Rear-Admiral of the Blue, 1862 Rear-Admiral of the White, 1863 Rear-Admiral of the Red (1863-5 C-in-C Channel), 1865 Vice-Admiral (1865 KCB, 1866-8 2nd. Sea Lord, 1868-71 1st. Sea Lord), 1870 Admiral (1871 GCB, 1873-84 Governor of Greenwich Hospital).

effect on our own trade if war overtook us unprepared to meet the destruction that would follow on the cruizing of such powerful corvettes as are now completing in America and found England, with nothing to overtake them but one Inconstant Class.'[1]

Dacres, however, was alone in this opinion. At least two of his colleagues would have been happy to find England with no Inconstant's at all. Rear-Admiral Seymour,[2] the Third Sea Lord, disliked the class;

'...and would lay down no more ships of that description. They are more expensive than the 2nd. class Iron Clads of 3,082 tons[3] and much less efficient in action. Speed is their best point, but the greatest speed may fail when most required.'[4]

The Junior Naval Lord[5] was of the same mind:

'Speed and seagoing qualities are there,- but I cannot reconcile myself to a class of ship in which the Captain is to be cautioned to fight at long range. If it be true (and I do not doubt it) that a ship of this class cannot be built without this enormous disadvantage, I think there are moral as well as physical reasons for abstaining from commencing them.'[6]

Two more second-class ironclads would be preferable. Hay also

[1] NMM: MLN/P/B/1(C), 1st. December 1866 (original italics).

[2] George Henry Seymour, 1818-1869: 1831 entered Navy, 1837 Mate, 1838 Lieutenant, 1842 Commander, 1844 Captain, 1863 Rear-Admiral of the Blue (1866-8 3rd. Sea Lord).

[3] Possibly he was referring to the Zealous or Penelope, both of approximately this tonnage B.O.M..

[4] Loc. cit. supra, undated.

[5] John Charles Dalrymple Hay, 1821-1912: 1834 entered Navy, 1839 1st. Cl. Volunteer (served in Kaffir War), 1840 Midshipman, 1841 Mate (at bombardment of Acre), 1844 Lieutenant, 1846 Commander, 1850 Captain (1861 3rd. Bart., 1862-5 Conservative MP for Wakefield), 1866 Rear-Admiral (1866-8 4th Sea Lord, 1866-80 MP for Stamford), 1870 retired, 1873 Vice-Admiral, 1878 Admiral (1880-5 MP for Wigtown Burghs, 1885 KCB, 1902 GCB).

[6] Loc. cit., undated (original italics).

propounded a remarkable theory of cruiser warfare,which is at once percipient and fundamentally unsound. The fastest warships afloat,he argued,were the new first-class ironclads.[1] They were the best ships to run down any raiding cruisers,and money would be better spent on these powerful ships than on weak frigates. In arguing thus Hay ignored,or forgot,the one strategic doctrine which the Victorian Navy generally preserved amidst the abandonment of so many others; the distinction between the battleship,which obtained general command of the seas,and the cruiser,which exercised it. If the most powerful ironclads in the Navy were scattered in pursuit of raiding cruisers,there was no battlefleet to hold the general command of the sea upon which the country's overall security depended. On the other hand,Hay was not the last to notice the suitability of the early ironclads for service as armoured cruisers (which,indeed,some of them became in later life). The Warrior could steam fourteen knots; no British battleship attained fifteen until the Alexandra (launched 1875),nor any armoured cruiser before the Impérieuse (launched 1883). In the early ironclad era the most powerful ships were also the fastest. This posed a fundamental problem in the design of cruisers, whose function requires them to be both numerous and relatively fast. The only way of increasing the efficiency of simple-expansion engines was to increase their size,so that the only really fast cruisers were very large and costly. In fact,cruisers could be either fast,or numerous,but not both. Throughout the first ten years of this study,it was generally impossible for technical reasons to design a satisfactory cruiser,and it was especially difficult to evolve a satisfactory 'cruiser capital ship' that was not merely an inferior battleship,too weak to

[1]The Warrior and her early consorts were the fastest warships afloat before the completion of the Wampanoag and Inconstant.

stand in the line of battle,and too slow properly to dominate colonial waters. Sir John Hay's suggestion rested on ignorance of the most basic strategic principles,but it correctly pointed to the real difficulty of cruiser design in the period,that ships designed for different functions could still do cruisers' work better than they. Rather than being a specialized type of warship,unequalled in the performance of their own tasks,cruisers had declined to the status of a generally inferior species, whose only merit lay in cheapness and numbers. If the Inconstant had really cost as much as a first-class ironclad,which she did not,there would have been a dangerous logic in Hay's proposals.

It is worth examining the quality of thought among Milne's Board. We have seen how Sir John Hay was able to ignore a basic strategic doctrine. Hay was one of the last of the old school of political admiral,whose service in the House of Commons was as important to them,and counted as much towards their advancement, as their service afloat; perhaps he was not representative of the best naval thinkers. All the other members of the Board presented arguments that were justifiable. They appear to rest on a coherent strategic doctrine; one in which the ironclad flag of a slow colonial squadron was of more significance in any form of war than fast unarmoured cruisers. Presumably they adhered to the standard doctrine of squadronal engagements and blockades. We are left to presume this,however,because none of them justified their position by specific reference to this,or any other doctrine. Their memoranda consist solely of statements of opinion,unsupported by argument or evidence. In this they were entirely typical of their times. It is very difficult to find a naval officer or naval thinker of the period who was accustomed to advance any support for his opinions,other than what his own experience might be presumed to afford. The only

form of reinforcement which any case usually received was the support of other authorities,and their standing was normally derived from long service and great age,rather than proven ability.

In this case Pakington seems to have accepted Robinson's arguments for at least one more Inconstant type to be built, because on 31st January 1867 both Seymour and Hay,the chief opponents of the idea,entered renewed protests. They did so at a time of stringency in the Estimates,but,it seems,without result.[1]

The Estimates had been a subject of disagreement throughout Pakington's period of office. His general attittude to the question is well expressed in a letter to Milne of 25th October 1866:

> 'Some statement should be drawn up for early circulation to the Cabinet,stating,irrespective of money, our actual position with respect to ships (iron & wood) as compared;
>
> 1- With the navies of other powers,and
>
> 2- With our own requirements at home and abroad'.

Derby had apparently suggested that the Estimates be kept the same,but,

> 'My impression is that it will be impossible to keep down the Navy estimates to the amount of the current year,without a dereliction of duty which would give just offence to Parliament & the nation.'[2]

From Robinson's revised programme of 20th November,[3] it is evident that Pakington failed to get much of what had been requested,in spite of Dacres's support. Early in the new year Derby proposed a further reduction in the Estimates,to which

'Sir S.Dacres,the Controller,and myself [Milne] most strongly

[1] Hay's memorandum NMM: MLN/P/B/1(D); Seymour's NMM: MLN/P/B/1(C).
[2] NMM: MLN/P/A/1(A) sv.Pakington (original italics.)
[3] Ante p.43.

objected,I may say,remonstrated,and urged reconsideration of this vital question,but without avail.'[1] On 15th January Pakington held a conference in his room on the matter,and on the following day Milne,having consulted Robinson and Dacres,wrote to the First Lord giving their considered opinion that the safety of the country urgently required that the Estimates be reduced no further.[2] This view was supported by extensive evidence and argument (itself an eloquent testimony to the gravity of the subject).Pakington forwarded this letter to Lord Derby. The protest was without effect.

On 8th March 1867,however,Sir John Pakington was succeeded as First Lord by Henry Corry[3], who left the Board intact. Like his predecessor,Corry had experience at the Admiralty,but his political standing was slighter,and his letters suggest that he had less of the strength of character required to secure Cabinet approval against opposition. In view of Pakington's protests, one may suspect that this quality had its attractions for Lord Derby. Milne prepared for Corry a memorandum on his predecessor's policy.[4] In it he urged an increase in the ironclad fleet,which was inferior to that of France,and the maintenance of the overseas squadrons. He explained the difficulty the Board had already experienced over expenditure. Pakington's programme for 1867-8 included a further ship of the Inconstant type. In view of the financial situation,however, Corry discussed with his Board whether

[1] Unsigned & undated draft memorandum in Milne's hand,probably intended for Corry [March-April 1867] (NMM: MLN/P/B/1(C)).

[2] Milne to Pakington,16th January 1867 (holograph copy,noted below in Milne's hand,'This letter was sent to Lord Derby by Sir J.Pakington')(NMM: MLN/P/A/1(A),sv.Pakington).The protest is also referred to in Milne to Northbrook,9th October 1881 (holograph draft copy)(Ibid.,sv.Northbrook).

[3] Henry Thomas Lowry Corry,1803-1873: Christ Church;1825-73 Conservative MP for Tyrone (1841-5 Civil Lord,1845-6 & 1858-9 Parliamentary Secretary,1867-8 1st. Lord of the Admiralty).

[4] Cited n.1 supra.

to replace her with a smaller corvette,thus allowing another second-class ironclad to be built.[1] In this Robinson acquiesced, for the sake of an increase in ironclad strength. The corvette design,to which H.M.S.Active and Volage were built,was essentially a reduced copy of the Inconstant,to be capable of fourteen and a half knots. Robinson and Reed envisaged her as filling the place next below the Inconstant in the strategic plan. The type was generally approved of by all,but there was disagreement between those who considered it complementary to,and those who considered it a replacement for,that of the large frigate.

On 9th April 1867,when Reed sent Robinson an analysis of the advantages and disadvantages of building one Inconstant or two Volage's,[2] the question was evidently still undecided. By 22nd July,when Robinson submitted the Volage's design,[3] it must have been settled. There remained,however,the perennial argument over armament,and the range at which she should fight. The Controller recommended a broadside of six 6½ ton guns (the smallest armour-piercing size),but with the hostility of Seymour and Hay to fighting at long range,and Milne's doubtful neutrality,the issue was bound to be re-fought. Milne himself wrote of the Inconstant, 'There is some doubt whether she should carry twelve-ton guns, or a somewhat larger number of nine-ton - I incline to the latter'.[4] The Director-General of Naval Ordnance,Admiral Key,[5] was strongly against mounting armour-piercing guns in an unarmoured ship.

[1] Memorandum by Robinson,9th April 1870 (PRO: Adm.1/6177).

[2] NMM: 'Ships' Covers'. This class of material,originally in the PRO,still bear PRO numbers in the series Adm.138. They will be cited thus: NMM: Adm.138/16,Cover of Active & Volage,p.5.

[3] PRO: Adm.1/6018.

[4] Undated 'Memorandum for my successor' [late 1868] (NMM:MLN/P/C/2(A)).

[5] Astley Cooper Key,1821-1888: 1833 entered Navy,1840 Mate,1842 Lieutenant,1845 Commander,1850 Captain (1858-60 member of Royal Commission on National Defence),1866 Rear-Admiral (1867-9 DGNO), 1873 Vice-Admiral (1873 KCB,1875-7 C-in-C N.America & W.Indies), 1878 Admiral (1878 FO Particular Service Squadron,1879-85 1st. Sea Lord,1882 GCB),1888 retired.

In October Reed was writing energetically to refute him.[1] 'I have taken pains to point out that this class of ship has not been designed for fighting at close quarters; that they are essentially ships for distant fighting and for chasing.' His pains were wasted on Key,who still considered that against a ship of equal force,her captain,'will certainly engage her at close quarters partly,if not entirely'.[2] On this occasion Pakington's decision went against him,and the Active and Volage were completed with their designed armament.

In the prevailing financial stringency Robinson's programme of shipbuilding for 1868-9[3] concentrated on keeping up the Navy's numerical strength. Over £2,000,000 a year for three years would be required to build up to the Board's proposed establishment, and as frigates were the only type whose numbers were adequate, more Inconstant's naturally took a low priority. When the Board's establishment was rejected as too expensive,Robinson was too busy fighting for the Navy as a whole to propose another Inconstant with much vigour.[4]

Sir Spencer Robinson was naturally left at the Admiralty when Milne's Board left office with the departing government,and once more he found himself in the powerful position so often held by the permament administrator over his new and inexperienced superiors. Gladstone's Liberal government took office on 18th December 1868,and Mr.Childers was appointed First Lord.[5] On 14th

[1] Submission for the Controller,24th October 1867 (original italics) (NMM:MLN/P/B/3(D)).

[2] Idem,original italics.

[3] Submission in reply to Board Memorandum of 3rd December 1867 (PRO: Adm.1/6020).

[4] Submission on the Estimates 1868-9.6th January 1868 (PRO:Adm.1/6079). Submission of 9th February 1868 (holograph draft copy)(NMM:MLN/P/A/1(A), sv.Corry).

[5] Hugh Culling Eardley Childers,1827-96: educated at Cheam,Hadham & Trinity Camb.; 1852-5 Auditor-General of S.Australia,1860-85 Liberal MP for Pontefract (1864-5 Civil Lord of the Admiralty, 1865-6 1st.Sec.of the Treasury,1868-71 1st.Lord,1872-3 Sec.for War, 1882-5 Chancellor of the Exchequer),1886-9 MP for Edinburgh South (1886 Home Secretary).

January 1869 a new Patent for the Board was issued, giving the Controller a seat at the Board, and with it a practical power enjoyed by no other naval lord. From this position of strength Robinson fought his last battle against his professional opponents and the forces of government parsimony.

On 11th January 1870 Robinson noted on a report from the naval attaché in Washington[1] that Britain still needed six Inconstant's and twelve Volage's to be safe in any war against the United States. On 22nd he again emphasized the formidable nature of the American threat.[2] Evidently these arguments were intended to buttress his application for another Inconstant and Volage, rather than two of the intermediate Raleigh type. On 9th February he submitted a large dossier[3] in support of his protest against the decision to build only reduced copies of the Inconstant. She was incontestably superior to all other cruisers, but the proposed Raleigh type was not powerful enough to sink the Wampanoag, yet too large and costly to fulfil a corvette's duties. For a negligible saving in initial cost and manpower a ship was to be built without any strategic purpose, which usurped the name of frigate, but could not do a frigate's work.

In reply the new First Sea Lord, Sir Sydney Dacres,[4] disputed whether the Raleigh would be unable to engage the American ships. Her proposed armament of light but numerous guns with a high rate of fire would be just as formidable as her opponents', and an extra knot of speed did not justify the greater cost of the larger ship. The Navy's great want was numbers of ships, and more Inconstant's

[1] Report from Captain Ward, with various memoranda, 10th January 1870 (PRO: Adm.1/6168).

[2] 'Remarks by Mr Reed on the Report of the Secretary of the United States' Navy, with observations of Sir R. Spencer Robinson thereon' (PRO: Adm.1/6177).

[3] 'Submission of the Surveyor [sic] concerning Unarmoured frigates, with minutes thereon' (Idem).

[4] Ante, p.44, n.2.

could not be afforded if it was to be supplied. It is interesting to see how Dacres had forgotten all the arguments which had so impressed him three years earlier.[1] Even more interestingly, Reed himself seems to have become less convinced of the necessity of iron-hulled warships fighting at long range. His proposed armament for the Raleigh, submitted on 14th February, included only two 9-inch chasers, and sixteen 70 cwt. shell guns.[2] It looks as though he was led astray by his idea of actions fought entirely as chases, but the proposal still represents a considerable, and apparently inexplicable, volte face.

Childers decided on 11th to build one Inconstant and one Raleigh type.[3] The compromise was made without the Controller, Chief Constructor or Director of Naval Ordnance being informed,[4] and was communicated to them in writing as a fait accompli. On 9th April Robinson again protested at the completed design of the Raleigh, presenting the very long memorandum which has often been quoted above, and which may justly be regarded as his professional testament.[5] He was informed that the First Lord 'Did not consider it necessary that Sir Sydney Dacres and I should be in his presence together to discuss the subject'.[6] It was the last shot in the long campaign over the design of unarmoured cruisers. Within a few months Reed and Robinson had left the Admiralty, and the subject was dead.

[1] Ante, p.44.

[2] Hood to Milne, 25th October 1874 (NMM: MLN/P/A/1(B)).

[3] 'Submission of the Surveyor, &c.', 9th February 1870 (PRO: Adm.1/6177).

[4] Report from the Select Committee of the House of Lords on the Board of Admiralty, together with the Proceedings of the Committee, Minutes of Evidence, and Appendix, (Lords' Committee), Minutes of Evidence (PP: 1871 VII p.50/64, Q.455).

[5] Committee on Designs, Appendix A, Sect. IV. (PP: 1872 XIV p.291/889); (PRO: Adm.1/6177).

[6] Lords' Committee, loc.cit. supra n.4. Robinson is a suspect source of evidence, even so soon after the event, but the fact is very probable.

The story of the design of the Inconstant, and her derivatives the Shah,[1] Raleigh, Active, Volage and Rover,[2] distinctly reveals the methods and thinking of the Admiralty in the late 1860's. It makes clear how far the practical working of the Admiralty differed from its theoretical constitution. Robinson was supposed to be an administrator, executing the decisions of the Board. In fact, as we have seen, he initiated all the proposals for cruiser designs in this period. His position, though nominally subordinate, gave him great power; his forceful personality was not averse to exploiting it; and his potent mind was able to put it to good use. He produced a limited but coherent strategic plan which at least partly convinced the more intelligent of his superiors, Milne and Pakington, and had influence even on Childers. At times, it is clear, Robinson, Milne and Pakington were alone involved in important decisions, with the rest of the Board proferring advice, but having little real influence.

The progress of the Inconstant also reveals the strategic concepts of the Boards of the period. She was proposed by Robinson, and accepted, as a counter to the American ships of the Wampanoag Class. She was therefore conceived in the limited sense of an antidote to an anticipated threat. This at least ensured that she had a real function, and it was a great advance on the method obtaining with the smaller cruisers, which was indefinitely to repeat former designs with minor improvements. Nevertheless, the Inconstant was conceived in an essentially negative way, as a response to a particular threat. We shall see that for some years to come many, if not all cruisers, originated in similar thinking. It is vain to look for a positive approach, for the building of

[1] The second Inconstant type.

[2] An improved Volage, launched ~~March 1873~~ Aug. 1874.

ships to fill places in a general strategic scheme,or to do more than merely to frustrate the designs of the enemy. For most decision-makers at the Admiralty,the question was simply whether the Inconstant could sink the American cruisers,not whether she occupied a necessary position in a balanced cruiser fleet,and answered to needs which no other ship could meet. Robinson, however,did evolve some idea of such a balanced cruiser fleet. He thought of the Inconstant as filling the 'cruiser capital ship's' rôle against swift enemies.[1] At the same time each station required 'a second-class ironclad,which should take the place of the old wooden screw frigates',[2] so that,'there should be one ship on the spot,which would not be driven off,and could maintain the honour of the Flag'.[3] The one element would supply a centre of power,the other the high speed associated with a large armament required in cruiser work. This was a sophisticated answer to a problem posed by technical advance. We have seen how the large frigates of earlier days had successfully combined the greatest power and the highest speed in colonial waters. They were therefore able satisfactorily to associate the elements of power and speed required of the true 'cruiser capital ship', which should be the most powerful unit on a colonial station, yet still possess the speed and range required of a true cruiser. The technical advances of the 1860's made it impossible any longer to reconcile these qualities in a single ship. The most powerful ship on a colonial station had to be armoured,and the true cruiser had to be much faster than before. The qualities could no longer be combined,except at the size and cost of a first-class ironclad.

[1] Ante,p.31.

[2] Memorandum by Robinson to Committee on Designs,25th January 1871 (NMM: PHI/110).

[3] Robinson's 'General Remarks on the Classification,Distribution, and Construction of Armour Plated Ships',13th December 1864 (NMM: MLN/P/B/3(D),& PHI/110/4(A)).

It was therefore necessary to split the functions and produce two types; one fast,the other powerful,and both essentially unsatisfactory. The large,fast,unarmoured cruiser could no longer be the centre of power which frigates had formerly been,and which ships of her size and cost might be expected to be. The second-class ironclad was too slow and short-winded for a true cruiser,and fitted very ill into practical operations,imposing severe constraints on the strategic flexibility of a squadron. At the same time she was not the match of any first-class ironclad, and could not safely be used against them.

This dilemma lay at the heart of all strategic thinking on cruisers. Any solution was bound to be unsatisfactory. Probably Robinson's scheme of duplicating the major elements of a cruiser force to provide both speed and power was the best available solution. It had,however,the major disadvantage of being very costly,and at a time of great financial stringency. It is hardly surprising that it was never completed beyond a skeleton.

Between 1865 and 1870 the Admiralty was dominated by a small group of men. Milne,Pakington,and above Robinson,gave to cruiser design a direction which the confusion of the next decade failed to supply. Of all the men of his age,Sir Spencer Robinson came closest to an understanding of the fundamentals of cruiser work, and made the most successful attempts to translate it into practice. He did so at a difficult time,when vision and political courage in high degree would have been required of the Board of Admiralty and Cabinet which should accept his ideas,and when both were lacking. It is not surprising that his achievement was so limited, indeed it is remarkable that he achieved so much. Succeeding generations at the Admiralty found the intractable problems of his period much eased by the progress of engineering,yet the confusion and mistakes of Robinson's successors throw into even

clearer relief the fundamental soundness of his ideas,the wisdom of what he strove for,and the value of what he achieved.

CHAPTER III: CONFUSION WORSE CONFOUNDED, 1870-1877

A. Childers reforms the Admiralty

The decade from 1860 to 1870 was the first of a new era in the naval world,one in which iron and steam began to supersede wood and sail. We have seen how some men of ability and foresight had tried to meet the problems of the new order. However advanced their views,however,they were all content to work within the system they had inherited. Any organized society is inherently conservative,and the Navy was more so than most. Even the radical spirits of the Service (and there were few of them in the 1860's) did not think in terms of remaking the administrative machinery of the Navy.although they recognized some of its imperfections. Men like Sir Spencer Robinson were doomed to frustration,if not to failure,because they tried to apply novel ideas within a traditional system which was inherently hostile to them. They were swimming against a tide of conservatism,a tide which was unlikely to turn until the Admiralty was forcibly shaken out of its old ways. What was wanted was an iconoclast from outside the naval world,not only to make specific reforms,but even more to establish a general climate in which reform might flourish.

Such a man came to the Admiralty in December 1868,when Mr Gladstone appointed H.C.E.Childers as First Lord,giving him a mandate to remake the Admiralty,and reduce the Navy Estimates. On 7th January 1869 the new Board issued a circular letter to all its subordinates,outlining its policy:

> 'The First Lord and the Board of Admiralty,in accepting the charge of this Great Department,have undertaken that its expenditure shall be carefully examined and anxiously watched and controlled,with a view to a wise and well-ordered reduction'.[1]

[1] PRO: Adm.116/861.

It was,of course,axiomatic in the Gladstonian view that a reduction, if not wise and well-ordered eo ipso,was at any rate fully compatible with wisdom and good order.

Childers was entirely in sympathy with Gladstone's economical aims,but,unlike the Prime Minister,he did not see the Service simply as a source of potential saving. Childers was convinced of the need to reform the administration of the Admiralty and the Navy,to increase efficiency as well as to save money. He came determined to apply 'business principles' to an organization badly in need of them,but in doing so he was not uniformly successful.

His first action was to reduce the overseas squadrons.In the opinion of the Prime Minister,a system of cruisers spread all over the world tended 'to multiply causes of quarrel and dispute'.[1] It was thus undesirable in itself,as well as expensive. The ensuing reductions had much to recommend them on military grounds. Far too large a proportion of the Navy's money and manpower were devoted to vessels on colonial stations,many of them without potential value in wartime. Unfortunately,Childers's measures did not fall principally on the ineffective units of colonial squadrons; rather the reverse if anything.[2] They were not designed to improve fighting efficiency,and the five thousand men removed from colonial squadrons were not released to more useful duties; they represented an absolute saving on the Navy Estimates,definitely not to be expended elsewhere. What might have been a real increase in overall effectiveness turned out to be yet another reduction in the already inadequate numbers of ships and men.

[1]Buckinghamshire Record Office,Ramsden Collection: Gladstone to Somerset,13th December 1864 (A.R.41/62 (L) No.66).

[2]For examples of the actual reductions,see undated instructions by Dacres to the DNO,and to the C-in-C China (PRO: Adm.116/861); & Hansard,3rd.series,cxciv,885.

Of greater importance was Childers's reform of the systems of promotion and retirement. The flag-lists of the Navy were overloaded with officers few of whom could hope for more than very intermittent employment,but who so clogged the Navy List as to deny their juniors much chance of promotion. The natural consequence was far too many senior officers,and far too few junior ones. Lieutenants, in particular,were in chronically short supply,and were bound to be so while their prospects remained so poor.

Childers resolved this situation with energy and success. For every rank he instituted a retirement age,and all officers then above it were dismissed. The impact of this drastic measure was softened by a great increase in pensions.which for the first time bore some relation to the pay of a serving officer,and the cost of living. This was an essential reform.of far-reaching effect. It was an indispensable preliminary to any real change in the Service. Its value was most clearly seen in the 1890's,when a generation of able and intelligent officers whose early promotion had been made possible by Childers's reforms,rose to high rank. Nonetheless,it earned him the undying hatred of a large number of senior officers who had unavoidably suffered by the measure. Though its value was widely recognized,and the complaints against it were not always as sincere as they seemed (Lord John Hay,for example,while protesting bitterly in public,privately admitted that he preferred his political career[1]),Childers was henceforward disliked by a large proportion of the senior officers of the Navy,and it was this necessary and beneficial reform,as much as his disastrous essays in other directions,which made him unpopular.

Childers came to the Admiralty,like many another First Lord before and since,knowing little about naval affairs.In itself this

[1] Dacres to Milne,dated '21st' [ca.1869] (NMM: MLN/P/A/1(A),sv.Dacres).

need not have been a serious disadvantage; it could even have been helpful. Childers,however,neither recognized his own ignorance, nor attempted to remedy it. He regarded it as his prerogative personally to interfere in naval matters,rather than leave to his subordinates the jobs they had been appointed to do; but he never acquired the knowledge which would have enabled him to intervene successfully. In 1869 when the new Board went to sea with the Reserve Squadron,Childers took the unprecedented step of assuming personal command of the fleet,ignoring the Commander-in-Chief and issuing orders on his own authority; a proceeding of very doubtful legality,and obvious unwisdom.[1] He thought himself perfectly capable of designing warships,or,at any rate,of dictating the main features of their designs,and he did so upon avowedly political principles.[2]

This was the man who determined completely to reform the antiquated machinery of the Admiralty,and he was not without excuse,for the Admiralty in 1869 suffered from several chronic administrative weaknesses. To explain these it is necessary to go back to the beginning of the century.

During the Napoleonic Wars the Navy was controlled by an Admiralty whose organization was divided into two tiers. The Board of Admiralty was composed largely of naval officers,with a civilian politician at its head who was normally a member of the Cabinet,and was responsible to it. This Board was collectively charged with the overall policy of the Navy,including grand strategy and warship design. Its decisions were in part executed by a subordinate but independent body,the Navy Board,composed of the heads of the various administrative departments. In theory

[1] P.H.Colomb,Memoirs of Sir Astley Cooper Key (London,1898),p.385. Parkes,British Battleships,p.188. Hansard,3rd series,cxciv,969.

[2] Memorandum of Robinson to Committee on Designs,25th January 1871,p.2 (NMM: PHI/110).

this division of responsibility was a viable one, but in practice it was productive of endless friction. The Navy Board and its subordinates were generally inefficient and often corrupt. The efforts of the Admiralty Board to effect reforms were frustrated not only by the usual difficulty of transient superiors trying to reform a permanent civil service, but also by the independence of the Navy Board, and relations between the two were often very poor.

It was to improve this notoriously unsatisfactory state of affairs that Grey in 1832 appointed Sir James Graham First Lord. Graham was an intelligent and capable man, and he had for his Senior Naval Lord the finest sea officer of his day, and perhaps of the century, Sir Thomas Masterman Hardy.[1] By his reforms Graham improved the practical efficiency of the Admiralty, but in doing so he planted the seeds of future trouble. He abolished the Navy Board altogether, and placed the five Principal Officers of his revised scheme (Surveyor, Accountant-General, Storekeeper-General, Controller of Victualling, and Medical Director-General) under the direct supervision of members of the Board. Each Board member was thus responsible to the First Lord for the affairs of the department he represented.[2]

This arrangement greatly improved the practical working of the Admiralty, but it had serious latent disadvantages. Each Board member now had two potentially incompatible functions. As head of a department, he was directly responsible to the First Lord, and through him to the Cabinet and the country. On his own authority he administered his department, without the intervention of his

[1] Bartlett, Great Britain & Sea Power, p.8. A.M.Broadley & R.G. Bartelot, Nelson's Hardy, His Life, Letters and Friends (London, 1909).

[2] For Graham's reforms and their consequences, see Sir Oswyn Murray, 'The Admiralty; Pt.VII: Naval Administration from 1832 onwards', Mariner's Mirror XXIV (1938) p.458. Bartlett, op.cit. pp.9-11. Arvel B.Erickson, Sir James Graham (Oxford, 1952), pp.95-109. W.C.B.Tunstall, Imperial Defence, 1815-1870, pp.810-811, in Vol.II of Cambridge History of the British Empire (Cambridge, 1929-63).

colleagues. As a Board member,however,he met his colleagues every day to take collective decisions on matters of general policy. It was not necessary,either in theory or in practice,for all members of the Board to be present and to acquiesce in a Board decision. Two members constituted a quorum,whose decisions could receive the Board stamp,and be carried out in orders signed by the Secretary 'by Command of their Lordships'. Furthermore neither theory nor practice drew any clear boundary between the individual responsibility of the heads of departments,and the collective responsibility of the Board. The Second or Permament Secretary was the mouthpiece of the lords whether acting singly or together.

This had two equal and opposite dangers. In the first place it was almost impossible to assign responsibility for anything to any individual. Secondly,naval officers were involved in administrative work for which they had neither time nor training. There existed no naval staff in the Admiralty. Apart from the members of the Board the only naval officers in Whitehall[1] were such officials as the Surveyor,Director-General of Naval Ordnance, and Hydrographer,together with the First Lord's Private Secretary, who was generally a post-captain. The Surveyor,D.G.N.O.,and Hydrographer themselves had some naval assistance,the last-named being especially favoured,with nine officers under him in 1865. The D.G.N.O.was able to use the captain and officers of H.M.S. Excellent,gunnery training ship at Portsmouth,as an unofficial staff. The naval lords,however,had no professional assistance whatever,except such as might occasionally be obtained by employing officers of the Hydrographer's department on unofficial staff-work. The consequence was that each naval lord was the only naval officer in his department,and to him came all matters,

[1]Until 1869 the officers named actually worked in Somerset House, and were thus physically as well as administratively cut off from the naval lords.

however trivial,which were held to require professional knowledge beyond the competence of a civilian clerk. Naturally the naval lords were engulfed in questions of detail which left them little time to run their departments efficiently,let alone attend to the matters of policy for which,as a Board,they were supposed to be responsible. One naval lord claimed that his first nine months in office were almost entirely occupied with the question of whether boy-seamen in training ships should be issued with pewter spoons in consequence of their Lordships' decision to allow them a ration of treacle with their plum duff.

The result of this sort of thing was that by 1869,after thirty-seven years of substantial peace and gentle progress in the naval world,in which general policy rarely thrust itself forward as a topic of importance,the naval lords had become mere administrators, almost entirely divorced from large considerations. The Board mechanism now existed only as an engine for dissipating responsibility.[1] It did,however,still serve one useful purpose,in ensuring that on matters of general concern each member was aware of the facts, and of his colleagues' opinions on them. This was especially valuable to the First Lord,the only member of the Board with some leisure to consider general questions,and the one who most commonly took decisions on them. He alone represented the overall interests of the Navy. His naval colleagues had grown accustomed to the drudgery of detailed administration. By Childers's day it was a commonplace in the Navy that the naval lords were grossly overworked, and had ceased to be able to devote time or attention to questions of policy. Sir James Graham had unintentionally abolished the Navy's only mechanism for reviewing general policy,at a time when the accelerating pace of technical advance made it more

[1]Murray,loc.cit.p.461ff.

necessary than ever.

As the practical importance of the naval lords declined, so that of some of their subordinates rose accordingly. The Surveyor of the Navy,later Controller,had a staff. He controlled the whole constructors' department,and with it most of what professional assistance on questions of matériel was available. He,unlike his superiors,had leisure to ponder the general policy which it was theoretically their duty to consider. He,the administrative subordinate,was alone free of the administrative burdens which so completely crippled his superiors. We have seen how an intelligent and forceful officer like Robinson could use these advantages to evolve an understanding of policy which was beyond the abilities.or the opportunities,of his seniors.

Another officer whose position was greatly strengthened was the Private Secretary to the First Lord. He became the source of professional advice which the naval lords were not always at leisure to give. As a private and confidential voice,unseen and irresponsible,he operated outside the conventional chain of command,and was capable of becoming a powerful influence,particularly if the First Lord wished to circumvent some of the usual obstructions of the system. It was usual for the post to go to a young and promising post-captain,to whom any First Lord might naturally turn if he were dissatisfied with the advice given by the elderly admirals on the Board.[1]

The weaknesses of Graham's system of Admiralty administration were publicized by a series of unfortunate scandals,the most important of which was the loss of H.M.S.Megaera.[2] This aged

[1]See complaints on this subject by Dacres (infra,p.74) and Milne (Milne to Tarleton,4th September 1873 (Brown Library,Liverpool. Microfilm Department; Tarleton Papers,No.164,Reel 5/10)).

[2]Norman McCord,'A Naval Scandal of 1871: The Loss of H.M.S.Megaera' Mariner's Mirror LVII (1971) p.115.

troopship was on passage to Australia with relief crews when she was found to be literally falling apart. By great good fortune her captain was able to run her ashore on the Isle of St.Pauls, and no lives were lost,but public indignation was naturally aroused,not only because the ship had been sent to sea in an unseaworthy condition,but because the responsibility for this was lost in the byzantine intricacies of the Admiralty,where even a Royal Commission failed to locate it completely. The Megaera was lost in June 1871,and thus came in the public eye as a justification ex post facto for Childers's reforms,which were largly intended to fix just this question of responsibility.

Childers's scheme was embodied in the Order in Council of 14th January 1869,which altered the composition of the Board. As before,the civilian members,apart from the First Lord himself, were three; the Civil Lord and the First,or Parliamentary Secretary, both members of Parliament,and the Second or Permanent Secretary, the head of the Admiralty civil service. In place of the four sea lords there were now three; the First Naval Lord,the 'Third Lord and Controller',and the Junior Naval Lord. The whole running of the Navy rested on the first two. The First Sea Lord was responsible to the First Lord for personnel,and the Controller for matériel; the Junior Naval Lord being merely an assistant to the First Sea Lord. Childers had established a rigid chain of command. He gave his instructions to,and received his advice from, his two principal naval advisers,and they in turn to and from their subordinates. The Controller had under him the D.N.O.and the Chief Constructor,and the latter in turn the constructors' department and the Director of Dockyards. In such a system, Childers considered,there could no longer be any doubt about

who was responsible for any decision.[1]

Under the new régime, the Board as such almost ceased to exist, except as a collective name for the senior officers of the Admiralty. As a Board, it was reduced, almost literally, to a 'rubber stamp'. It met briefly once a week to give formal approval to those orders which were legally required to receive the Board stamp. No mechanism for collective discussion now existed, and no incentive remained for any attention to be paid to matters of general policy. The First Lord decided all important matters, upon what advice he chose, and he decided also what was to be decided. If he took opinions, he would invite the First Sea Lord, or the Controller, or whoever he chose, into his room, usually singly, and having heard his adviser, would dismiss him and execute the decision forthwith. He was neither obliged in theory nor accustomed in practice to encourage any private discussion among his subordinates, or to inform them of his actions and intentions. He took whatever counsel was congenial to him, and naval lords were often left in ignorance of his decisions until his orders were already executed, and the practical consequences began to affect their departments. Within their departments they worked *in vacuo*, each unaware of his colleagues' opinions and actions. All official discussion was by memoranda circulated in writing. In practice this proved highly unsatisfactory. The papers circulated slowly and erratically, they were often mislaid, and the overworked naval lords had little time to write or read them. Ill-educated naval men expressed themselves poorly, and frequently misunderstood

[1] *Reports of the Select Committee on the Navy Estimates, with Minutes of Evidence and Appendices* (PP: 1888 XII pp.491-707 & 1888 XIII pp.1-756). Evidence of Evan MacGregor, especially QQ.11-13, 19-21, 31-36, 319-322, 403-404, 410-413 & 444-466 (PP: 1888 XIII pp.2/502-32/532). *Lords' Committee* Report (PP: 1871 VII pp.vii/7-xi/11). Murray, *loc.cit.* pp.471-475.

one another. The system was designed to discourage them from looking beyond their departmental concerns,and it did so very well.[1]

Although Childers had abolished the Board in all but name, one significant vestige of its formerly collective character was allowed to remain. All important orders,from whomsoever they came,were still actually executed by the Permanent Secretary 'by Command of their Lordships'. A public fiction of collective responsibility was thus maintained,and it was not immediately obvious to the outsider that most such orders now issued directly from the First Lord or another individual Board member.

The consequence of Childers's adoption of 'business methods' and 'personal responsibility' were to be felt for the rest of the century,and even later. He finally eliminated any prospect that the existing Admiralty would take a large and general view of the rapidly changing naval world. His work ensured that all questions,however important,would be treated as administrative details,generally in haste,and on individual judgement. By separating the naval lords he created a possibility of mutual misunderstanding which was to be realized frequently in the following years,as harrassed naval men glanced rapidly through each other's turbid and illegible memoranda.

Nevertheless,Childers's character and methods,rather than his measures,are the key to many of the troubles of the Navy during his stewardship.[1] Although his reforms have hitherto been described,and were publicly presented,as administrative improvements, he himself saw them also in political terms. The quarrels of Reed and Robinson were understood by him not as personal or professional,but political differences; the Controller and Chief Constructor being Liberals serving a Board,and a Service,largely

[1]Norman McCord,loc.cit.,makes some useful observations on them.

Conservative in opinion. He saw these two, and especially Robinson, as potential allies in his economical schemes. Evan MacGregor,[1] a well-informed observer, and favourable to Childers, has explained how the latter disliked depending for advice on a senior naval lord who naturally favoured the interests of the Navy over those of the Treasury, and who, through the Controller, had a monopoly of the technical information required to form judgement, and could not easily be contradicted.[2] By raising the Controller to the Board, Childers neatly created a powerful rival to the First Sea Lord; one, indeed, who was practically much more powerful, because he controlled all the matériel of the Navy, and, unlike his nominal superior, had professional assistance. There were now two senior naval lords, whom the First Lord could play off against each other, and as they need never meet in his presence, this was very easy. It seems likely that Childers had previously been in contact with Robinson, whose long-standing ambition to get to the Board was well known. Certainly the First Lord seems to have anticipated finding a willing ally. In this he was grievously disappointed. After an initial period of relative harmony, during which Robinson succeeded in getting the Shah's design approved,[3] relations rapidly deteriorated, and Childers soon found that he could tolerate neither the opinions nor the character of his intended ally.

All the tensions and contradictions of Childers's Board came to a head over the loss of H.M.S. Captain. This battleship

[1] Evan MacGregor, 1842-1926: 1860 entered Admiralty as Temporary Clerk, 1861-9 Private Sec. to various naval lords, 1880-4 Head of 'M' Branch, 1884-1907 Permament Secretary (1892 KCB, 1902 GCB). He was a withdrawn man; an efficient administrator, but no innovator.

[2] Preliminary and Further Reports (with Appendices) of the Royal Commission appointed to enquire into the Civil and Professional Administration of the Naval and Military Departments and the Relations of these Departments to each other and to the Treasury. [C.5979] (Hartington Commission), Appendix IA, p.1 (PP: 1890 XIX p.1, & NMM: MLN/P/B/1(B)).

[3] Ante, p.53.

had been laid down by the previous Board in response to political pressure.[1] She was a rigged,sea-going turret ship,intended to prove finally the principle of the Coles Turret. Captain Cowper Coles,the inventor of the revolving gun turret,had campaigned long and hard for its adoption into the Navy. Like his friend and supporter Captain Sherard Osborn,he had won fame by his exploits in the Sea of Azov during the Crimean War,and he had many supporters in the Service. More useful,however,were his numerous partisans in political life,especially in the Liberal party,and at Court,where Prince Albert had been,and consequently the Queen was,an enthusiast. The turret had been successfully fitted in unmasted coast-defence ships,but Coles,like most officers of his day,would not accept mastless ships as truly sea-going, and did not regard his turret as fully vindicated until it had proved successful in a fully-rigged ship. Reed objected to this idea,not only because the masts and rigging would mask the turrets' arcs of fire,but because he thought it difficult,if not impossible,to give a turret ship enough stiffness to stand up to canvas. Accordingly he refused to be responsible for such a ship,and when the Admiralty bowed to political pressure and ordered the Captain,Coles was given carte blanche to design the ship himself in concert with whatever shipbuilder he chose. The Admiralty merely inspected the quality of the materials used, and paid the bills. This unique arrangement was intended to give Coles no chance to shuffle off responsibility onto the Admiralty if the ship were to prove a failure.

Coles was no naval architect,but he sketched his design, before falling ill and leaving Messrs.Laird to build the ship.

[1]For a general account see D.M.Schurman,"In Deference to Public Opinion",the Loss of H.M.S.Captain',Mariner's Mirror LIX (1973)p.57.

As completed she floated two feet deeper than her designed draught, but Childers had no hesitation in sending her straight to sea. At the same time he was in process of forcing further ships of the type on a reluctant Board, again on explicitly political grounds.[1] His admiration for the turret ship knew no bounds, and on Reed's resignation in July, Childers tried unsuccessfully to persuade Laird to accept his post.[2] The credentials of one who was both the Captain's builder and a Liberal M.P. were of course impeccable.

This primacy of the political over the professional outlook might have gone on indefinitely, had not the Admiralty been rudely shaken by a terrible disaster. On the night of 7th September 1870 the Captain capsized and foundered off Ushant, taking with her nearly five hundred men, including Captain Coles himself, and Childers's son Leonard. Carelessness in design and construction had allowed her to be sent to sea too crank to stand up to her canvas. The immediate blame belonged to Lairds and Captain Coles, but the ultimate cause was the employment by two Cabinets, and their Admiralties' acceptance, of political pressure. Some contributory negligence only might be attributed to Admiralty officers. Reed had expressed general misgivings about the stability of masted turret ships, but had failed to make specific reference to the Captain. His subordinates were in process of calculating her stability (a thing not then often done) but had scarcely finished, and Lairds had detected nothing amiss in the same figures. Robinson thought her an unsatisfactory design, but did not suppose her to be actually unsafe. Childers for his

[1] Memorandum by Robinson to Commitee on Designs, 25th January 1871 (NMM: PHI/110). Dacres to Milne, 5th August 1870 (NMM: MLN/P/A/1(A), sv. Dacres).

[2] Parkes, British Battleships, p. 203.

part suppressed Robinson's opinion,and published instead a laudatory report from the Admiral commanding the Channel Squadron. Childers and his Board held varying opinions of her military and political merits,but none suspected that she was dangerous at sea,and they were not primarily to blame that she was.

The question of formal,public responsibility,however,was clear. Childers had introduced a system of personal accountability, with himself at the head,taking all important decisions,including that to send the Captain to sea. There could be no doubt that he alone was publicly answerable for the Admiralty's actions. It was obviously incumbent on him to resign,or to justify a refusal to do so.[1]

He did neither. Instead,on 30th November,he wrote a minute, which neither the First nor Second Sea Lords saw until it was published in the papers 'by Command of their Lordships' the following day. This minute laid all the blame for the Captain's loss on Reed and Robinson,and flatly exonerated Childers. The paper offered no evidence to support its view,and gave no hint that it was not the considered opinion of the whole Board.[2]

It is hardly necessary to comment on this remarkable episode. Childers was ill,and distraught with the death of his son; if the minute were not so eminently characteristic of his methods it might be possible to overlook it. Almost as soon as it came out the Admiralty was embroiled in a fierce political row. In the course of this Robinson was personally dismissed by Gladstone,[3] (he was replaced on 14th February 1871 by Captain Robert Hall[4])

[1] Hansard,3rd.series,cxiv,873.

[2] Lords' Committee Report (PP: 1871 VII p.ix/9).Ibid.,Minutes of Evidence (PP:1871 VII p.8/22,QQ.65-6).Schurman,loc.cit..

[3] Sir John Briggs,Naval Administrations,1872-1892 (London,1897), p.193.The correspondence is in Gladstone's papers,British Museum (BM) Add.MSS Vol.44429,ff.125-285,Vol.44614,ff.95-113; partly published in The Times (London,1768ff),16th February 1871,p.10; 7th March,p.10; 9th March,p.6; & 11th March,p.4.

[4] See overleaf.

and on 13th March Childers followed him,broken in health and spirits,and unlamented by all who had worked with him.

* * * * *

The thankless task of restoring the Admiralty from its demoralized and disorganized state was entrusted to one of the leading financial experts of Gladstone's government,G.J.Göschen.[1] Of the former Board and officials of the Admiralty,only Sir Sydney Dacres and Lord John Hay[2] remained. W.G.Romaine,[3] for many years Permament Secretary,had resigned in disgust at Childers the previous year,[4] and his successor[5] had not yet been nine months in office. Göschen's conduct of the Admiralty was most unlike his predecessor's. 'You will find it so very different from what it was',wrote one of the clerks to Milne,'and such a pleasant change - I should think there never was a better Board as regards matter or manner - from the First Lord downwards all the members and Captain Hall are so charming to have to deal with - and Sir Spencer is now terrible only in the Times'.[6]

[4]Robert Hall,1817-1882: 1833 entered Navy,1839 Mate,1843 Lieutenant, 1850 Acting Commander,1842 Commander,1855 Captain (1864-6 Private Sec.to 1st.Lord,1871-2 Controller),1872 retired (1872-82 Naval Sec.),1873 Rear-Admiral,1878 Vice-Admiral (1882 Permament Sec.).

[1]George Joachim Göschen,1831-1907: Rugby & Oriel; 1858 Director of the Bank of England (1861 published 'The Theory of Foreign Exchanges') 1863-80 Liberal MP for the City (1865-6 PMG,1868-70 President of the Poor Law Board,1871-4 1st.Lord),1880-5 MP for Ripon,1885-6 MP for Edinburgh E.(1886 a moving spirit in Lib.Unionists),1887-1900 MP for St.George's,Hanover Sq.(1887-92 Chancellor of the Exchequer, 1893 joined Conservatives,1895-1900 1st.Lord),1900 1st.Viscount.

[2]Lord John Hay,1827-1916: 1839 entered Navy,1846 Lieutenant,1851 Commander,1854 Captain (1857-9 Liberal MP for Wick),1861-3 Commodore (1866-7 & 1868-71 MP for Ripon,1868-71 3rd.Sea Lord),1872 Rear-Admiral,1877 Vice-Admiral (1877-80 C-in-C Mediterranean,1886 GCB, 1886 1st.Sea Lord,1887-8 C-in-C Devonport),1888 Admiral of the Fleet,1897 retired.An eccentric but capable officer.

[3]William Govett Romaine,1815-1893: 1854-5 Deputy Judge-Advocate General in Crimea,1857-69 Permament Sec.,1869-73 DJAG of India, 1876-9 Controller-General of Finances of Egypt.

[4]Romaine to Milne,undated [late 1869 or early 1870] (NMM: MLN/P/A/1(A)).

[5]Vernon Lushington,QC,1832-1912: 1864-9 DJAG,1869-77 Permanent Sec.,1877-1900 County Court judge in Middlesex & Surrey.

[6]Vaughan Miller to Milne,14th November 1872 (NMM: MLN/P/A/1(A), ev.Miller).

All was not entirely sweetness and light,however. In particular, Göschen did not get on with Sir Sydney Dacres,who considered that he was 'entirely in the hands of his Private Secretary who crams him with his opinions on all subjects',and complained of the committees (scil.the Lords' Commitee and the Committee on Designs) which he regarded as political devices to obscure real issues,and of the new naval college at Greenwich,of which he disapproved.[1]

In spite of this friction,the cautious Göschen made no major changes until March 1872,apart from replacing Childers's Parliamentary and Private Secretaries,who had left with him, and Lord John Hay,whose period of office ended that summer when he was relieved by Rear-Admiral Tarleton.[2] Having thoroughly studied the Admiralty and pondered how to improve it,Göschen obtained an Order in Council,dated 19th March,which re-organized the Board.[3] The Controller was deprived of his seat,and the Board made up to three naval members.There was no Fourth Sea Lord,but in May,when further changes were announced,a new post of Naval Secretary was created,and Captain Hall appointed. He was replaced as Controller by Rear-Admiral Stewart.[4] The Controller's former seat at the Board was apparently offered to Admiral Hornby, but he refused,[5] so Tarleton moved up and was succeeded by Rear-

[1] Dacres to Milne,undated [November 1872] (NMM: MLN/P/A/1(A),sv.Dacres).

[2] John Walter Tarleton,1811-1880: 1830 Mate,1835 Lieutenant,1846 Commander,1852 Captain,1866-8 Commodore,1868 Rear-Admiral (1871-2 3rd.Sea Lord,1872-4 2nd.Sea Lord,1873 KCB),1873 Vice-Admiral, 1876 retired,1879 Admiral.

[3] Printed in Appendix I of Committee on Navy Estimates (PP: 1888 XII p.179/679).

[4] William Houston Stewart,1822-1901: 1835 entered Navy (served in Carlist War & at Acre),1841 Mate,1842 Lieutenant,1848 Commander, 1854 Captain (promoted for recapturing a treasure-ship from rebels at Sandy Point),1870 Rear-Admiral (1872-81 Controller), 1876 Vice-Admiral (1877 KCB),1881 Admiral (1881-4 C-in-C Devonport),1885 retired (1887 GCB).

[5] John Fisher to an unknown correspondent,31st May [1871 or 1872]: 'I was so sorry to hear that Adl.Hornby had refused a seat at the Admiralty'.This can only refer to Tarleton's seat in May 1872. (NMM: PHI/132)

Admiral Beauchamp Seymour.[1] At the same time Göschen instituted 'Daily Meetings', which were specifically not to be Board meetings, but were to serve to improve communication among the members of the Board.[2] Finally, at the end of 1872, Dacres was succeeded by Sir Alexander Milne. It is a tribute both to his own reputation and to Göschen's unpartisan spirit that Milne was invited to serve again under a Liberal administration. The Navy looked to him to remedy the disasters of Childers's régime, and stand up to Liberal parsimony. 'The Navy has cause to rejoice at the return of one who will, I am certain, not content himself with protesting against a Policy which should be injurious to the best interests of the service.'[3] His return to the Admiralty marked as great an improvement over Dacres's narrow mind and petulant spirit as did Göschen over Childers.

Göschen's alterations in procedure, and even more his humane and considerate character, greatly bettered the working of the Admiralty, but it continued to suffer from radical weaknesses. In spite of the 'Daily Meetings', the naval lords still had insufficient contact to understand the views, collect the information, or check the decisions of one another. In the absence of a naval staff they were grossly overworked, and they had neither incentive nor opportunity to discuss matters of general importance unconnected with particular administrative decisions. As a body, the Board of Admiralty ran the Navy from day to day, but it supplied no overall

[1] Frederick Beauchamp Paget Seymour, 1821-1895: 1834 entered Navy, 1840 Mate, 1842 Lieutenant, 1847 Commander (fought in Burmese War & in White Sea during Crimean War), 1854 Captain (1860-1 CO Naval Brigade in Maori War), 1861-2 Commodore (Australia) (1868-70 Private Sec. to 1st. Lord), 1870 Rear-Admiral (1870-2 FO Detached Squadron, 1872-4 3rd. Sea Lord), 1876 Vice-Admiral (1876-7 C-in-C Channel, 1877 KCB, 1878-80 President of Torpedo Committee. 1880-3 C-in-C Mediterranean, 1881 GCB), 1882 Admiral (1882 1st. Baron Alcester, 1883-5 2nd. Sea Lord), 1886 retired. 'The Ocean Swell' was a wealthy and aristocratic officer, but able and active.

[2] Minute of 15th May 1872 (NMM: MLN/P/B/1(B)).

[3] Lord Henry Lennox to Milne, 14th November [1872] (NMM: MLN/P/A/1(A), sv. Lennox) (original italics). Milne's decision was also approved or encouraged by Corry, Pakington & Robinson, among others.

direction,no unity of approach. The vacuum thus created was filled partly by the personal decisions of political heads, partly by the insidious influence of subordinate officials who were neither responsible for policy nor competent to decide it, and partly by the aimless accretion of numberless petty admininistrative acts.

Many of these deficiencies were clearly pointed out by Milne within a year of accepting office again. His views are important enough to be quoted at length:

> 'There is no cohesion between the Naval Element in the Board. Admiral Tarleton and Seymour are nominally ignorant of what is done by the Senior N[aval] Lord, great questions may be decided without their knowing what is being done; unless the Senior N[aval] Lord goes to them & tells them - I often go to their Rooms,I as often do not go,so there is no meeting to consider matters, no mutual accord,in fact it is the reverse.....
>
> The Senior N[aval] Lord is in his Room.....with a mass of papers of all descriptions to be read,considered, and minuted. He takes one after another to get thro' them, some paper of more importance than another turns up. He makes a minute in the hurry [sic] .....and it goes away - He has no one to consult with and the minute which has left his room may be executed without any check and unknown to any other Naval Member. Ad[miral] Seymour also makes minutes in the same manner sometimes very stiff ones; but he sends the papers to me....but Ad[miral] Tarleton does not see them.
>
> .....The question really is how to work the present arrangement,how to relieve the Senior N[aval] Lord,and how to get work done to prevent a mistakes [sic] ; also whether Naval Members of the Board should or should not act in some manner together in naval matters that is assist each other on the decision of purely Naval questions,also how the Secretary,or Secretaries,are to act in reference to the consideration of General Questions.'[1]

[1] Milne to Göschen,13th September 1873 (original italics) (NMM: MLN/P/A/1(A),sv.Goschen).

> 'You and I ought to be to a considerable extent relieved,or aided,by competent and qualified persons.... This is not work,but it is incessant daily labour,which cannot last,and everything thrown on my head to think of,and to keep in recollection.'[1]

These papers accurately describe many of the gravest weaknesses of Admiralty organization. Milne,with his common-sense and long experience of administration,perceived its fundamental flaws more clearly than any other naval officer. There was 'an invisible silken thread which is bound round and round you and at last subdues your efforts in spite of struggles',[2] and Milne was the first senior officer to try to free himself of its toils. He was thus a pioneer of what was in time to become a regular school of naval thinkers,in this study generically referred to as the 'reformers',one of whose pre-occupations was the reform of the Navy's central command as an essential part of any reform of the Navy as a whole. We shall see Milne's complaints echoed and amplified with greater force and greater effect by subsequent generations of senior officers.

Many of the greatest faults of the Admiralty about which Milne complained may be traced directly to Childers,without whose misguided zeal they would not have existed. Yet,paradoxically, it is hard to imagine the reformers' cause advocated,still less accepted,as early as it was,without him. Disastrous as his immediate influence undoubtedly was,his very failures cleared the way for much of vital importance. The comfortable system of the former Admiralty was in some ways better adapted to its purpose,but it actively discouraged the idea of internal reform. The theoretically collective organization of the Board involved

[1] Milne to Tarleton,10th April 1873 (Tarleton MSS: No.164,Reel 5/10).
[2] P.H.Colomb to Phipps Hornby,26th October 1874 (NMM: PHI/120(A), sa.1874).

all its members in the status quo, each with the maximum incentive to preserve the existing order, and the minimum opportunity to take decisive action on his own responsibility. By sharply reducing the opportunity for collective discussion and decision, Childers wrought abiding harm, but he also made it possible for the first time for a determined reformer to have an effective influence without having first to persuade a committee of probably hostile, and certainly indifferent beneficiaries of the existing system. Childers intended, like so many other would-be reformers, to replace the existing order with another, better, but quite as permanent; and like them, he succeeded only in producing

> 'A godly-thorough-Reformation,
> Which always must be carry'd on,
> And still be doing, never done'.

In this he rendered his second, equally important, and equally unintentional, service to the cause of reform. By subverting the established order he demonstrated the possibility of reform; by replacing it with one so manifestly unsatisfactory he emphasized its necessity. It is a classic example of a revolution of rising expectations. Childers ensured that, however much Admiralty organization might be improved, there would always be men able to point to its continuing failures, and willing to attempt to remedy them. He provided the initial impetus required to dislodge an intensely conservative institution from its position of monolithic immobility. The period of the 1870's has been called the 'Dark Ages of the Victorian Navy'[1], and Childers was responsible for much of the darkness, but by an irony of history, in the very actions which so darkened the decade, may be discerned the first glimmerings of subsequent enlightenment.

[1]Parkes, British Battleships, p.230

B. Strategic Theories

Strategic thought in the 1860's, insofar as it existed at all, was generated by isolated individuals, with little contact among themselves. Most of it came from within the Admiralty, in response to the challenge of particular problems. Sir Spencer Robinson was the most gifted thinker of the period, but even he seldom thought in very general terms, and his strategic ideas were firmly rooted in detail. In the 1870's two important developments led to thinking of much greater power and effect. Grand strategy and naval policy began to receive serious attention from naval officers and other professionally interested men, and there grew up outside the Admiralty a regular school of naval thinkers. The existence of an institution where they could meet and discuss one another's views removed one of the main impediments to the marriage of like minds, and permitted the formation of a body of opinion with coherent doctrines generally agreed. This seminary of naval thinking was the Royal United Service Institution, and its Journal gives a clear picture of the development of professional studies.

The R.U.S.I. was not without its disadvantages. It was a service club as well as a forum for debate, and those members, especially elderly retired flag-officers, who were attracted by its former character, did not invariably improve it in its latter capacity. Those who were able to attend at the presentation of papers and their subsequent discussion naturally tended to be retired or on half-pay, and the liberty they had for intellectual reflection did not always compensate for a lack of practical experience. As in any service gathering, senior officers were much deferred to (they were more numerous then than now, because of the habit of promoting 'yellow admirals' after retirement) and the experience of an era of rapid change was as yet so novel

that it was not always realized to what extent the practical wisdom of past ages had already been invalidated.

In spite of all its drawbacks,however,the R.U.S.I.was invaluable as a platform from which the best thinkers of the day could spread their opinions. Among the first and most important of these was John Colomb[1],who in 1869 read at the R.U.S.I.a paper (the substance of which he had formerly published as an anonymous pamphlet[2]) on 'The Distribution of Our War Forces.'[3] Colomb was an officer in the Royal Marine Artillery,whose early retirement and private means left him free to devote his life to the study of grand strategy. Like so many reformers,'He is a clever fellow. But he is also I think,pushing: & I suspect mischievous - I believe that he is perpetually striving on this subject in magazines and newspapers.'[4] In later life he entered politics in the cause of imperial federation. His influence was seminal,and he may justly be regarded as the author of a renaissance in strategic thinking. At a time when all known tactics and strategy were comprised in the geometrical manoeuvreings of battlefleets,Colomb treated the subject on the grand scale. His early paper contains all the essentials of his thinking. The Empire he conceived as an organic whole,to be defended by Army and Navy acting in concert according to a unified plan. The colonies and the mother-country were tied together by a network of ocean 'roads' along which flowed the trade upon which the whole system depended. The defence of these'great roads' was

[1]John Charles Ready Colomb,1838-1909: 1854 2nd.Lieutenant RMA, 1855 1st.Lieutenant,1867 Captain,1871 retired.1886-92 Conservative MP for Bow & Bromley (1888 KCMG),1895-1906 MP for Gt.Yarmouth.

[2]The Protection of Commerce and Distribution of our Naval Forces Considered (London,1867).

[3]JRUSI XIII p.57.

[4]Hicks-Beach to Carnarvon,12th September 1879 (PRO: PRO 30/6/52, SV.Hicks-Beach).

of paramount importance,and it was to be done by fortifying chains of bases around the world,from which the Navy would operate to patrol and protect floating trade.

Here at once all the strengths and weaknesses of Colomb's thinking are displayed. The unequalled sweep of his grand conception compelled acceptance. Within a decade it was almost the common coin of serious naval thinking. Where cruiser functions had formerly been conceived in terms of the minutest detail or the vaguest platitude ('the training of seamen....exhibiting the British flag in foreign ports,and especially in the harbours of semi-barbarous powers.....the repression of piracy and slavery, and....the punishment of savage tribes'[1]) Colomb provided as a foundation for proper strategic understanding a clear statement of the importance of the protection of trade.

At the same time his grand strategy contained,or rather, implied,certain dangerous misconceptions whose influence was to be at least as pervasive as any other parts of his thinking. The strategy was expressed throughout in military metaphors. No doubt they came easily to a Royal Marine Officer,but they represented more than simply a form of expression. Colomb really did think of the sea-lanes as roads,running from one defended fortress to another.[2] They came to have for him a tangible existence almost as physical features,to be attacked and defended like roads on land. This was a very influential concept,and it led generations of naval officers to think in military terms of controlling,or even conquering the sea,rather than protecting merchant ships. His phrases,and his ways of thinking,are clearly discernible not only among his contemporaries,but among subsequent

[1]T.Brassey,'Unarmoured Ships',Transactions of the Institute of Naval Architects (London,1860 et seq.) XVII (1876)p.13. Brassey,The British Navy (London,1882ff,6 vols.) II,263.

[2]Ranft,Naval Defence of Trade,p.10.

generations at least until the Great War.

Colomb's teaching was at first an isolated example of intelligent consideration of grand strategy. Indeed, almost all contributions at the R.U.S.I. during the early 1870's may be called isolated, because they represented, for the most part, individual ideas, conforming to no widely received opinion. The reports of debates during this period are eloquent of the inability of naval officers to think in general terms. A typical example of the time was awarded the Institution's Gold Medal in 1876. Commander Noel[1] wrote 'On the best Types of War-Vessels for the British Navy',[2] without discussing any general principles whatever. The whole lengthy section on cruisers was a catalogue raisonné of the existing ships, which were approved in decided terms. Apart from matters of trivial detail, Noel's conclusions were no more than that the older cruisers were out of date.

By 1876, however, the rising quality and unanimity of opinion at the R.U.S.I. already bespoke the beginnings of a school of thought, in which a number of officers became prominent. None of them had the seminal influence of John Colomb, but their collective importance is at least as great as his, because they developed his highly general and rather vague strategy into a comprehensive doctrine of detailed application. There has been a tendency among studies of the late Victorian period to speak of naval thinking as solely the product of a few men, principally Sir John Colomb and Sir Julian Corbett[3], but this is a distortion.

[1] Gerard Henry Uctred Noel, 1845-1918: 1864 Acting Sub-Lieutenant, 1865 Sub-Lieutenant, 1866 Lieutenant, 1874 Commander (1878-81 Commander of the Victoria & Albert RY), 1881 Captain (1893-7 4th. Sea Lord), 1896 Rear-Admiral (1898 KCMG), 1901 Vice-Admiral (1902 KCB, 1904-6 C-in-C China), 1905 Admiral (1907-8 C-in-C Nore), 1908 Admiral of the Fleet (1913 GCB), 1915 retired. He was a notorious martinet and a famous seaman, the last man ever to tack an ironclad. As a young officer he was counted a reformer, but the latter part of his professional life was largly devoted to a diehard advocacy of masts and yards.

[2] JRUSI XX p.253

[3] eg. D.M. Schurman, The Education of a Navy (London, 1965).

The work of such men as Currie,R.A.E.Scott,P.H.Colomb,Long,Bridge, Eardley-Wilmot,Custance,Fremantle,FitzGerald and Crutchley,built the general structure of a developed strategy on the foundations laid by J.C.R.Colomb. As one of them wrote,'He is the spring from which run numberless rivulets watering and irrigating all in their path.'[1]

Until the end of the 1870's it is hard to find a clear and explicit statement of this generally received opinion, but there is ample evidence among the sometimes ill-organized and obscure papers of the period that it was developing. In the same year as Noel won his prize,Colomb's principle that 'the immediate duty of fighting cruisers would be the protection of our commerce against the enemy's warships',[2] was evidently so well understood that Captain Scott[3] felt it too obvious to require much elaboration. In the same sentence,however,one of the continuing weaknesses of naval thinking,its distance from reality,was well exemplified: '[cruisers] would be spread out along the lines of traffic,keeping up communication with one another by means of electric lights at night,fog horns of great power,and other pre-arranged signals.'[4] It is hard to realize that the author of this fantasy had spent thirty years at sea.

Later in the same year Mr Brassey delivered a paper on 'The Mercantile Marine considered as an Auxiliary to the Royal Navy'.[5] Both the speaker and his subject were important,and

[1]Custance to Phipps Hornby,undated,but received 12th November 1886 (NMM: PHI/120 B,sa.1886).

[2]R.A.E.Scott,'The Maritime Defence of England,including Defensive and Offensive Warfare; Part I,The Organisation of our Maritime Forces',JRUSI XX p.455.

[3]Robert Anthony Edward Scott,ca.1818-1903: 1830 entered Navy, 1836 Mate,1842 Lieutenant,1848 Commander,1866 Captain (1867-70 Superintendant of Gun-Carriages),1870 retires,1885 Rear-Admiral.

[4]Scott,loc.cit..

[5]JRUSI XX p.493.

deserve attention. Thomas Brassey[1] was a Liberal M.P., one of those politicians who make it their business to campaign for good causes. Brassey's principal interests were the strength of the Royal and merchant navies, and the welfare of their seamen. On these subjects he was a tireless researcher and campaigner. He was accustomed to make himself an expert by collecting every available informed opinion, and he was one of the first to publish technical and statistical compendia on warships and navies.[2] But Brassey's indefatigable enquiries supplied not only his voluminous publications; his own opinions also were formed on the principle that 'in the multitude of counsellors there is safety'. At any period, his ideas were invariably a distillation of the currently received expert opinion, not unaffected by preconception, but quite unsullied by original thought. Brassey owned a yacht called the Sunbeam in which he and his wife made lengthy voyages to very remote parts of the world, and he held the first Board of Trade Yacht-Master's certificate ever issued. Among politicians he was therefore unique in possessing considerable sea-going experience, and first-hand knowledge of colonial problems, so that although he was in no way an original thinker, his opinion always commanded respect.

Brassey had a receptive mind, but it was not without prejudices, and among them was one so prevalent among men of his party that it might almost be called the 'Liberal' doctrine. It must be emphasized that this was not a political idea, but a professional doctrine of interest only to those concerned in

[1] Thomas Brassey, 1836-1918: (son of the railway magnate) Rugby & Univ; 1865 MP for Devonport, 1868-85 MP for Hastings (1881 KCB, 1880-4 Civil Lord & 1884-5 Secretary of the Admiralty), 1886 1st. Baron Brassey, 1895-1900 Governor of Victoria (1906 GCB), 1908-13 Lord Warden of the Cinque Ports (1911 1st. Earl Brassey).

[2] Brassey, British Navy, & (ed.) The Naval Annual (Portsmouth, 1886 et seq.)

naval affairs. It found no place in the corpus of Whig or Gladstonian beliefs. Consideration of the Navy was generally quite alien to such men,[1] and it is among professionally-interested men of Liberal leanings,rather than the leaders of their party,that it was chiefly to be found. Nevertheless it had a strong political flavour which justifies its name. It was the sort of opinion to which a Liberal in search of a ready-made argument would naturally turn.[2] It was neither invented by Liberals nor peculiar to them, but it was especially attractive to men of their principles, and it continued to find a home in their party long after most naval officers had abandoned it as untenable. In this view the Navy could be considered as divided into two parts. The 'fighting ships' were the ironclad battleships,maintained in home waters for defence against invasion. The cruising fleet was scattered over the world for peace-time police work. The phrase 'fighting ship' could sometimes be no more than a synonym for the modern 'battleship',for which no satisfactory contemporary equivalent existed,but very often it clearly implied the underlying assumption of the Liberal point of view; that there was no important form of warfare apart from fleet action,and any warship unable to lie in the line of battle was for purposes of real war virtually worthless. In peace,however,small and cheap ships were admirably adapted to find favour in Liberal eyes:

> 'Chastising pirates,slavers and savages,the Navy waged a relentless war on everyone who resisted the sacred Liberal virtues of parliamentary government, scientific progress,and free trade.'[3]

[1] It is instructive to note that in the seventy double-column index pages of Morley's Life of Gladstone,there is no entry under 'Navy' or 'Admiralty'.

[2] For examples of 'Liberal' views expressed by Liberals in Parliament, see Hansard,3rd.series,ccxxxix.653; ccxxxviii,1087-1101 & 1437; cclxxxvii,1738; ccxciv,503-4; & cccxxiii.1346.

[3] A.Preston & J.Major,Send a Gunboat ! A Study of the Gunboat and its Rôle in British Policy,1854-1904 (London,1967) p.32.

These functions were very little compatible with the purposes of war.

By the late 1870's this view, once common among naval officers, was becoming hard for even a layman to hold unmodified. Colomb and others had so well emphasized the importance of trade protection that, had the thesis not received unexpected support from a technical advance, even the most devoted economist could hardly have claimed that;

> 'Unprotected vessels, therefore, are of subordinate importance. They are required for the police of the seas and the protection of commerce; but I should consider it unwise on the part of the Admiralty to build a greater number of vessels of this class than are absolutely necessary <u>in order to meet the demands of the Foreign Office for protection to British interests abroad</u>.....Costly as they are, we are told by high authority that we may not reckon upon our unarmoured ships as forming any essential part of our armed strength for war.'[1]

It was this technical advance which suggested the subject of Brassey's paper. During the 1870's the surface-condensing compound engine came into use in all large merchant steamers, and dramatically increased their economic speed and range. By the late 1870's new steamers could carry a full cargo to Australia or China at a speed of twelve knots or more, without coaling on the voyage. Some ships could steam at ten knots for over two months on their bunkers alone, and by using their holds for bunkerage could remain at sea almost indefinitely. In 1878 there were already ten British steamers with speeds of fourteen knots or more, some of them faster than the <u>Inconstant</u>.

This naturally introduced a factor of some moment into

[1] T. Brassey, 'Unarmoured Ships' TINA XVII (1876) p.13 (my italics).

strategic calculations. If large merchant steamers were faster and of greater range than warships, there was an obvious argument for employing them in war-time. The debate over the proper use of armed merchant cruisers continued throughout the rest of the century, and it is an extremely complicated one, worthy of a study in itself. Some thought they should be taken up, armed, and used exactly as regular cruisers; some visualized them as auxiliary escorts on trade routes; some proposed to arm them for their own defence and keep them in their regular trades, or use them as colliers, troopships and transports; and some thought all trade protection unnecessary, since such fast ships could never be caught by an enemy. The Declaration of Paris, which had theoretically abolished privateering among civilized nations (America was not a signatory) led some sanguine spirits to predict that the guerre de course would never again be employed. Others pointed out how suitable the new merchantmen were to repeat the Alabama's exploits, and how unsuitable British warships to prevent them. The detail of the debate is beyond the scope of this study, but it had a direct bearing on the 'Liberal' school, who now modified their views to admit the importance of seaborne trade (not a difficult admission for a Liberal), and advocated the extensive use of armed merchantmen to protect it. Their crews and armaments would be turned over from decommissioned gunboats and small cruisers at the outbreak of war, so that the same forces which preserved order around the world in peacetime, would be magically transformed into a useful war fleet. The idea that the beneficent self-interest of the ship-owner, and the unseen machinery of free trade, would create for itself an efficient defence at no cost to the taxpayer, was one peculiarly delightful to the Liberal mind, and it is not hard to see how such a scheme, with all the virtues of efficiency, economy, autonomy, and philanthropy - everything, in fact, except

reality - so powerfully commended itself to its supporters.

In fact,of course,the armed merchantman was no panacea. Unprotected boiler crowns,cylinder heads and steering gear, with a bare minimum of watertight bulkheads,made most steamers of the day very vulnerable. Admiralty encouragement did in time considerably improve their designs,by having the tiller-flats built below the waterline,coal bunkers in wake of the machinery and sufficient bulkheads; and in time also arrangements were devised to arm and commission merchantmen in time of war. In 1876, however,all this was in the future. Merchant steamers could never be more than valuable auxiliaries,there were never enough of them, and,above all,they posed a greater threat as enemy raiders than they offered security as British auxiliaries.

In the late 1870's the proceedings of the R.U.S.I.and the Institute of Naval Architects show the rapid growth of the school of thought. The latter institution began to assume importance during this period,after early years of doubtful standing. It was primarily a professional body for naval architects and shipbuilders, but naval officers and other interested men were admitted as Associates. The papers were generally of more detailed range than those at the R.U.S.I.,and often narrowly technical.but this had a special merit,since practical problems,scientifically treated by acknowledged experts,provided a welcome contrast to the airy generalities and unsubstantiated assertions that so often bedevilled discussion at the R.U.S.I.. The same body of naval officers was usually to be found at either place.and the growing intellectual assurance of speakers at the R.U.S.I. probably owed something to the scientific arguments in which they had participated at the other body.

Whatever the cause,a series of papers were delivered in 1877 and 1878 in which the practical working of grand strategy

was analysed in detail. In 1877 Donald Currie,owner of the principal line of mail steamers trading to the Cape,discussed the bases and coaling stations needed to sustain naval operations.[1] Next year the Prize Essay again returned to the Navy,and a comprehensive subject was set,[2] on which some outstanding essays were submitted. The winner was P.H.Colomb.[3,4] Like all the other finalists,he accepted his brother's strategy as a foundation, and proceeded to elaborate on its practical working. He emphasized that the rôle of the fleet was essentially a defensive one, and examined in detail the bases and routes to be protected. Geographical conditions required,in his opinion,that British cruisers have a range under steam of at least 3,500 miles. Since Britain had something like a monopoly of coal supplies in most parts of the world,it was in our interests to abandon sail altogether,as it was hard to imagine steam cruisers being seriously threatened by raiders forced to rely largely on sail. Colomb's paper is of great length,and throughout displays careful and intelligent consideration. Other essays 'honourably mentioned' by Lieutenant J.B.Haye[5],Lieutenant S.H.Hardley-Milmot,[6] and Commander Noel,[7] were less outstanding,but all of them showed

[1] 'Maritime Warfare; The Importance to the British Empire of a complete System of Telegraphs,Coaling Stations and Graving Docks' JRUSI XXI p.228.

[2] 'Great Britain's Maritime Power; how best developed as regards:
1.Fighting Ships
2.Protection of Commerce
3.Naval Volunteer or Supplemental force
4.Colonial and Home Defence;
The Classes,Armament and Description of the Vessels needed: and the Organisation required to secure a Powerful and Economic Imperial Naval Force'.

[3] JRUSI XXII p.1.

[4] Philip Howard Colomb.1831-1899: 1846 entered Navy,1852 Acting Mate, 1854 Mate (promoted at capture of Rangoon),1855 Lieutenant,1863 Commander (1865-7 introduced signalling by flashing light),1870 Captain (1870-4 edited Manual of Evolutions,1878-80 Signal Committee), 1886 retired,1887 Rear-Admiral (1887 chief begetter and organizer of the Washington Maritime Conference),1892 Vice-Admiral.

[5] JRUSI XXII p.399 [6] Ibid.p.435 [7] Ibid.p.461

how far naval thinking had progressed in the decade. Logical argument closely substantiated by empirical evidence was now a commonplace where formerly it had hardly been known. All these essays, and the discussion on them,[1] were replete with practical suggestions and intelligent comments. Colomb's attack on sail was echoed by Haye, Eardley-Wilmot, and many other commentators. One officer went so far as to deride the 'sentimental notion' that sail evolutions alone produced good seamen:

> 'To my mind the seamanlike qualities are not engendered so much by those wonderful extravagancies which so many officers are so fond of.....which are very pretty and useful in their way, but which are better suited for the ship scene in the opera of l'Africaine, or as accompaniments to the gyrations of Zazel at the Aquarium'.[2]

Much attention was also devoted to the number and disposition of the bases required; the utility of gunboats and gunvessels, and the ideal type of cruiser; and the relative merits of patrols at focal areas, patrols along trade routes, and convoys. The Shah's action with the Huascar was analysed, and various lessons deduced from it.[3]

Perhaps the most striking example of the sophistication of naval thought outside the Admiralty was provided in the same year, again by P.H.Colomb.[4] By voluminous calculations of the wind-resistance, coal consumption, and weights of various warships he demonstrated that their full rig was an actual diseconomy. Far from saving coal, as the conventional wisdom laid down, it took more in wind resistance than it provided in propulsion, so that the weight of a full rig would be more effective if expended on coal.

[1] Ibid., p.765

[2] Ibid. p.800

[3] Infra, p.146.

[4] 'Steam Power versus Sail Power for Men-of-War', JRUSI XXII p.765.

The reception of this paper indicates how far the Admiralty, under Robinson in the forefront of serious thinking on cruisers, had been left behind. Colomb's conclusions were of some relevance to warship design,to put it no more strongly.but there is no evidence that they ever had the slightest influence on the Admiralty. They were neither accepted nor refuted,they were simply ignored.

The growth of an identifiable school of naval thinking, independent of the Admiralty,is one of the most striking and important developments of the 1870's. The intellectual progress made during the latter part of the decade was astonishing. Naval officers had almost all finished their regular schooling at twelve or thirteen. Those who devoted nice logic and careful calculation to the problems of their profession were no better educated than previous generations to whom such accomplishments were largely unknown,and it is something of a mystery why things improved when they did.[1] Some factors,however,can be identified. The unsettling effect of Childers's régime has already been noted. The researches of two committees into the Admiralty's working obviously prompted reflection among those who made the enquiries, those who offered the evidence,and those who read the reports. The Royal Naval College at Greenwich was founded in 1872,and although its staff included nobody to teach tactics,strategy or naval history,the example of professional studies officially encouraged must have been stimulating. The R.U.S.I.also enjoyed a measure of sponsorship from the Admiralty,including an annual subsidy,and the winner of its Gold Medal was specially mentioned in the Navy List. Among adventitious factors,the success of Prussian

[1] On the education and social standing of naval officers,see; W.C.B.Tunstall,Imperial Defence,1815-70,p.836; Bartlett,Great Britain & Sea Power,pp.319-320; C.C.Lloyd,The Nation and the Navy (London,1954),p.203; Michael Lewis, England's Sea Officers (London, 1939),p.103; Lewis,Navy in Transition,pp.99-112.

arms in 1870 concentrated attention on an efficiency which pointed unfavourable comparisons with the Navy's (and incidentally encouraged the use of military metaphor). and the rise of Social Darwinism lent an urgency to efforts of reform which they might otherwise have lacked.[1]

Whatever the causes of this rapid growth in professional thinking among naval officers, its effects were of the first importance. From this time forth there existed in the Navy what one might call a loyal opposition, outside the Admiralty, independent of, and often disagreeing with, it. Where formerly the Admiralty had had a near monopoly of serious considerations of naval questions, there was now a permanent alternative school of thought. The Admiralty's decisions were henceforth constantly influenced, modified, and criticized by a body of professional opinion with at least as good an intellectual standing as its own. If political leaders were dissatisfied with the opinions of their naval advisers, they had another source of counsel. The weaknesses of Admiralty thinking during the 1870's and 1880's constantly elevated the status of the alternative body of thinking, the 'reformers'' school as it may be generically named, until at last, as we shall see, it took over the Admiralty, and itself became the accepted orthodoxy of a new era.

[1] Speakers at the R.U.S.I. frequently called for the 'Prussianization' of the Navy, and commonly used the metaphors and arguments of Social Darwinism.

C. The Rise of the Belted Cruiser

George Göschen was a very different character from his predecessor, and we have already seen with what care and caution he set about remedying some of Childers's administrative errors. It was not until early 1873, nearly two years after he had taken office, that Göschen and his Board made any striking departures from the shipbuilding policies of their predecessors. Sir Alexander Milne was now First Sea Lord, with Tarleton and Beauchamp Seymour on the Board, Hall Naval Secretary, and Houston Stewart Controller, so that there was an entirely new body of men at the head of the Navy.

Besides these, one other important post had to be filled. After Reed's resignation, and Laird's refusal to take his place, his work was initially put in commission, with his former assistant (and brother-in-law) Nathaniel Barnaby[1] as President of the Council of Construction. In the summer of 1872 Barnaby became officially, as he already was in fact, Chief Naval Architect (later Director of Naval Construction). His influence on the shipbuilding policy of the Admiralty until his retirement in 1885 was probably more powerful than any other, and his views require careful attention.

Barnaby was a competent naval architect, if hardly brilliant. He held opinions, however, far beyond his professional concerns; opinions both unique in themselves, and uniquely influential. Like his predecessor, Barnaby had an overly theoretical conception of naval warfare; but whereas Reed had been firmly superintended by Robinson, a man of determined and practical ideas, Barnaby was responsible to Houston Stewart, an excellent administrator, but

[1] Nathaniel Barnaby, 1829-1915: of a family of Chatham shipwrights: 1843 shipwright apprentice, 1848-52 RNC Portsmouth, 1852-4 draughtsman at Woolwich, 1854-63 at Admiralty, 1863-71 Assistant to Chief Constructor, 1871-2 President of Council of Construction, 1872-5 Chief Naval Architect, 1875-85 DNC (1885 KCB). Co-founder of INA & RCNC.

cautious and unassertive. Thus Barnaby's views had full rein, and even in an age of peace, when unrealistic notions of warfare were frequently entertained, his were peculiarly fanciful. He was an extreme partisan of the 'Liberal' school, who held that no type of ship could be of any use in war, except ironclads and merchantmen. He contemplated with equanimity the prospect that the unarmoured ships of the Navy would infallibly be taken in wartime,[1] and attributed to them no other virtue than cheapness for peacetime service. At the same time he held an exaggerated opinion of the value of merchant cruisers. As raiders they would be so terrible that the protection of trade would be impossible:

> 'Many naval officers have written and spoken as if convoy were as possible under modern conditions as under those of seventy years ago. I therefore repeat, as a challenge, in the presence of this distinguished Assembly, the assertion that the successful convoy of sailing ships and slow steam ships in numbers, in the face of the attack of fast armed steam ships.....is impossible....
>
> And if successful navigation of sailing ships and slow steam ships under convoy is impossible, still less will it be possible to navigate such ships safely without convoy.'[2]

In Barnaby's view, some trade might evade capture by high speed, but it was idle to hope to defend it. As one might expect from this, he never recognized cruiser work as real warfare, and rated all ironclads, of whatever type, by their fitness to lie in the line of battle, which was the only true fighting. 'The line of battle', however, is a conventional phrase notably inappropriate to Barnaby's case, because he envisaged all actions as mêlées,

[1] Barnaby to Controller, 4th April 1874 (NMM: Adm.138/16, Cover of Wild Swan Class et al., p.141).

[2] N. Barnaby, 'On the Fighting Power of the Merchant Ship in Naval Warfare', TINA XVIII (1877), p.6 (original italics).

principally involving the ram. Since the battle of Lissa in 1866,[1] this weapon had dominated the minds of naval tacticians, and Barnaby's more than most. All actions, even between merchant ships, would consist of a series of charges, each ship approaching head-on, passing, turning, and charging again, like knights in a tilt-yard, until one or the other succeeded in ramming her opponent. Guns might be useful which fired, and armour which protected from ahead, and to a lesser extent astern, but as for the broadside guns, 'their importance in a ship with well-placed bow and stern guns does not appear to be considerable'.[2] If they were to be mounted at all, Barnaby expected them to be loaded at leisure, the crews withdrawn behind armour, and the broadside fired automatically as the enemy careered past a few feet away. In ramming tactics speed was unimportant, and handiness all, so his ships were usually bluff and slow. This was carried so far as to defeat even its own object, and some of his ironclads were so full-buttocked that they could not steer properly (the most notorious example, the battleship Ajax, was so dangerous that she was forbidden to steam in company with the fleet). None of them could maintain speed in a seaway, and although no-one was more insistent than Barnaby on the importance of sail, few of his designs could be safely handled under canvas alone, and none derived much benefit from it. As befitted one who attached little value to oceanic warfare, he usually gave his ships derisory bunkerage. But because these ships were generally deficient in speed and range, it must not be thought that he was unaware of these qualities; rather he consciously rejected them as unimportant:

[1] In which confused mêlée an Austrian fleet under Tegethoff defeated an Italian squadron under Persano, whose flagship, while lying disabled, was rammed and sunk by Tegethoff's ship.

[2] Barnaby to DNO, 2nd August 1877 (NMM: Adm.138/57, Cover of Iris & Mercury, p.135b).

> 'To justify it [low speed] we have to assume that - 1st.The English thirteen-knot ships are more powerful and better defended in an action than the foreign ships of the same size and complement,and in an engagement the more powerful broadside would tell at the longest ranges The English ships ought therefore to win. 2nd.That,the English ships of this size not being able to force action upon the foreign ships unless the fuel supply is better,[1] provision will be made for attacking the fast long foreign cruisers by still longer & faster merchant ships.'[2]

The principle is here applied to unarmoured cruisers,but if valid at all,it logically required to be extended to all cruiser classes,and called for British merchantmen capable of engaging all foreign warships,even armoured cruisers,which were faster than their British opposite numbers. No-one but Barnaby supposed that any such vessels existed. This was typical of his entirely theoretical,not to say fantastic conception of naval warfare. The era was bedevilled by unrealistic thinking,and Barnaby could justly claim that almost all his beliefs were held by some,often by many,naval officers; but few of them contrived to touch the real world so rarely as he. The misfortune of the Navy was not that the Chief Naval Architect held unreliable ideas on matters which it was not his business to decide,but that the organizational weaknesses of the Admiralty,and the personal failings of his superiors,came to give him a dominant influence on questions which he was incompetent to judge. Witnesses before successive commissions and committees differed in dividing responsibility within the Admiralty,but they were generally agreed that the Chief Constructor's task was to execute,not to initiate designs.

[1] In fact the fuel supply is nothing to the purpose; mutatis mutandis,speed alone enables one to force action.

[2] Memorandum of 3rd January 1880,quoted by Brassey in paper of 1880, 'Speed & Endurance of Unarmoured Vessels',p.19 (PRO: Adm.1/6626, 1st January 1882).

Often though the principle was ignored in practice, he was supposed to leave the conception of the types required to his naval superiors. It was their functions in this respect which Barnaby so frequently assumed.

Some of the developments which had begun to cast doubt on the value of large unarmoured cruisers by the early 1870's have already been mentioned.[1] Early in 1873, one in particular was brought to the attention of Göschen's Board by the arrival in the Pacific of the Russian ironclad Knias Pozharskii (Князь Пожарскій). This ship was the only sea-going first-generation ironclad built by Russia, and she represented the first tentative realisation of a policy which the Russian Admiralty had been maturing for over ten years. Their experiences during the Crimean War had convinced them that the best their navy could hope to do, in face of a superior enemy, was to defend their coastal waters. If, however, seagoing cruisers could be got to sea before the inevitable blockade, they might be able to emulate the exploits of the Alabama. This had been their object in 1863,[2] but at that time they had few ships suitable for oceanic warfare.

The Russian navy's first essay in designing raiding cruisers led to the type known to them as 'clippers'. The Razboynik and Vayezdnik, typical examples of the type as fully developed, were of 1,300 tons, steamed thirteen knots with coal for 1,750 miles at full speed, and mounted three 6-inch guns.[3] They could escape most warships, and catch most merchantmen, but they were vulnerable to such fast cruisers as the Inconstant and Volage, they could not safely engage even an armed merchantman, and their range was inadequate for oceanic operations.

[1] Ante, p.40. [2] Ante, p.18.

[3] Brassey, 'Speed & Coal Endurance, &c.', p.16 (PRO: Adm.1/6626, 1st. January 1882). Comments by Controller on Reports on Razbornik & Vayezdnik, 23rd December 1879 (PRO: Adm.1/6479/1791).

Much larger dimensions were required to reconcile the conditions imposed by the strategic geography of Russia's situation. Russia had only two harbours giving onto the open ocean,Vladivostok and Archangel. Both were remote anchorages. unable to refit,repair,or even coal a major warship,and both were icebound for much of the year. Any raiding cruiser would have to leave either port at or before the outbreak of war,and thenceforth rely entirely on her own resources. This dictated a type with long range and full rig,consequently large,costly, and hardly to be built in numbers. Such a ship could not simply flee any little gunboat she met,but must,if she were to achieve worthwhile results,be able to engage most,if not all warships on colonial stations. Since she had nowhere to repair battle damage,she had to secure by armour a degree of invulnerability, even if she never meant to fight other ironclads. Finally,if she were to catch her victims and escape her pursuers,she had to be fast. The Kniaz Pozharskii represented the first experimental embidoment of this concept. She displaced 4,506 tons,as designed, carried eight 9-inch guns behind five-inch armour,with a waterline belt of slightly less thickness,could steam eleven and three-quarter knots,and with 600 tons of coal could cover 3,000 miles at economical speed.[1] She was in appearance a conventional rigged belt-and-battery ironclad.but she was evidently far from conventional in function,and by implication in conception.because instead of wearing the flag of the Russian battlefleet in the Baltic - of which she would have been much the most powerful unit - she was sent to the distant Pacific,where she was almost the only Russian warship. By comparison with the Audacious and

[1] C.C.Wright,'Cruisers of the Imperial Russian Navy,Part I', Warship International (Radford,Virginia,later Toledo,Ohio,1963 et seq.) IX (1972) p.28.

Repulse, flagships on the China and Pacific stations, the smaller Russian ship was slightly less well-armed and armoured, and three-quarters of a knot slower, but of much greater range. Unlike her British opposite numbers, she was a fine sea-boat, dry and steady, and handled well under sail.

From the Russian point of view, she was only a limited success, her speed, especially, being inadequate, but both British and Russian Admiralties were impressed by the potential of the type. About the time the Captain was lost, the Russians laid down two more, the General Admiral (Генерала Адмирал), and the Gertsog Edinburgskii (Герцог Единбургский). The General Admiral was launched in October 1873, and she is generally regarded as the first true armoured cruiser.[1] With a full-load displacement of five thousand tons, she carried six 8-inch guns behind six-inch armour at a designed speed of thirteen and a half knots. The engines of both Russian ships proved notably unsuccessful; the General Admiral only made twelve and a quarter knots, and the Gertsog Edinburgskii, which was designed for fifteen knots, never made more than eleven and a half. Their range, however, was outstanding. The General Admiral carried a thousand tons of coal, giving a range of nearly six thousand miles at ten knots.[2] She was fully-rigged, sheathed and coppered, and in general arrangement a conventional belt-and-battery design.[3]

Even allowing for the poor performance of their engines, these ships were extremely formidable raiders. In early 1873, before either was launched, they may well have seemed more formidable than they really were. To the financial constraints

[1] Novgaard, Modern History of Warships, p. 203.
[2] cf. Inconstant 2,700 miles at this speed.
[3] C.C. Wright, loc. cit..

which had already dictated the abandonment of Robinson's former scheme of duplicating the elements of power and range in cruiser squadrons,was now added a compelling motive once more to try to combine them in a single ship. Early in the year Milne diverted the D.N.O.to do some staff work for him. The result was a general survey of the strengths and weaknesses of the Navy,and its probable strategy in war. Among other threats,Hood noted that:

> 'The two Russian fast iron corvettes protected with armour at the waterline and over the gun slides, would be most destructive cruisers,and every effort should be made to effect their capture by fast iron-clads, as soon as possible after the declaration of war.'.[1]

Evidently this seed fell upon receptive ground,for on 11th March Göschen,Stewart,Barnaby,and probably Milne,[2] decided on a 'Design for an Iron Clad.....to be capable of competing with the second class Iron Clads of Foreign Navies'.[3] Barnaby prepared the design on the twin principles which guided most of his work; namely that the ship should conform to the financial limits previously laid down,and that she should,on paper at least,be a match for her foreign opponents. In this case he informed the Controller on 24th March that the new ship was to cost half as much as the Superb,and at least match the Alma Class. Next day Stewart told Hood that 'This is a design for a partially armoured Corvette for protection of commerce and cruising duties'. Barnaby's design was approved of by all the Board,Seymour noting that she should be a match for the General Admiral.[4] Göschen's consent was no doubt encouraged by opposition pressure for such a ship.[5]

[1] Holograph paper by Hood,5th February 1873 (NMM: MLN/P/B/1(C)).
[2] Barnaby does not specifically mention Milne,but it is hardly likely that he was absent from so important a discussion.
[3] NMM: Adm.138/43,Shannon's Cover,p.1.
[4] Ibid.,pp.9,13 & 20.
[5] Ranft,Naval Defence of Trade,p.103.

The design of H.M.S. Shannon was approved on 27th May 1873, she was launched on 11th December 1875, and entered service in 1878. Her armament of two 10-inch and seven 9-inch guns behind six to nine-inch armour made her nominally superior to all other second-class ironclads, though the superior performance of French and Russian breech-loaders should not be forgotten. All her battery armour, however, and her two heaviest guns, were concentrated forward, with most of the battery unprotected. She was short and bluff, her maximum speed of twelve knots was seldom attained, and never in a seaway, and her legend bunkerage of 280 tons would have been hopelessly inadequate, even if she had performed well under sail, which was anything but the case.[1] A technical comparison with her foreign rivals is highly instructive:[2]

	Shannon	General Admiral	Alma	Victorieuse	
Displacement:	5,390	4,648	3,778	4.150	(tons)
% armament:	6.5%	3.3%	4.3%	7.5%	
% armour:	21.2%	11.3%	23.4%	17.2%	
% armament+armour:	27.7%	14.6%	27.7%	24.7%	
% machinery:	13.0%	19.7%	10.7%	9.6%	
% coal:	5.1%	21.8%	6.2%	6.8%	
% machinery+coal:	18.1%	41.5%	16.9%	16.4%	
% hull:	43.1%	37.9%	51.9%	47.5%	
length:beam ratio:	4.8:1	6:1	5:1	5.2:1	

The Russian designer, Admiral Popov,[3] sacrificed everything for speed and range, giving over 41% of displacement to them, whereas Barnaby held them in very low esteem, and devoted only 18% to them. It is impossible to doubt which design was better adapted to its purpose. The Shannon's speed and range were totally insufficient for a cruiser, and she served only one

[1] Parkes, British Battleships, p.237.
[2] See Appendix for sources and notes.
[3] Popov commanded the Pacific Squadron in 1863 (ante, p.18).

commission on a foreign station. At the same time her guns and armour were inadequate for first-line service,and their disposition,on the assumption that the enemy would always be dead ahead,was suspect,to put it no more strongly.

The Shannon so completely embodied Barnaby's ideas that one must infer that the design was his in conception as well as execution. The absence of any clear understanding of the requirements of cruiser work within the Admiralty,or of any determination to enforce it,allowed a subordinate to impose his view on matters which he was incompetent to judge.with the inevitable results.

In February 1874 Disraeli formed his second administration, and appointed as First Lord George Ward Hunt.[1] Hunt,like his predecessor,tried to persuade Phipps Hornby[2] to take over Tarleton's seat,and after an initial refusal,met with better success.[3] Hornby took office at the end of 1874,and at the same time Seymour was replaced by Lord Gilford.[4] Ward Hunt's first action was to review the needs of the Navy as a whole,

[1] George Ward Hunt,1825-77: Eton & Christ Church; 1846-57 Student of Ch.Ch.,1857-77 Conservative MP for Northamptonshire,1868 Chancellor of the Exchequer,1874-7 1st.Lord.

[2] Geoffrey Thomas Phipps Hornby,1825-1895: 1837 entered Navy, 1841 Mate (at bombardment of Acre),1844 Lieutenant,1850 Commander, 1852 Captain,1865-7 Commodore (N.Africa),1869 Rear-Admiral (1869-70 FO Particular Service Squadron,1871-4 C-in-C Channel, 1874-7 2nd.Sea Lord),1875 Vice-Admiral (1877-9 C-in-C Mediterranean, 1878 KCB),1879 Admiral (1881-2 President RNC Greenwich,1882-5 C-in-C Portsmouth,1885 C-in-C Evolutionary Squadron,1885 GCB), 1888 Admiral of the Fleet.

[3] Mrs Fred Egerton,Admiral of the Fleet Sir Geoffrey Phipps Hornby, G.C.B.,a Biography (Edinburgh,1896),p.133-4.

[4] Richard James Meade,Viscount Gilford,1832-1907: 1845 entered Navy,1852 Lieutenant,1858 Commander (severely wounded & promoted for gallantry at Canton),1859 Captain (1874-80 3rd.Sea Lord), 1876 Rear-Admiral (1879 4th Earl of Clanwilliam,1880 2nd Sea Lord, 1880-2 FO Detached Squadron),1881 Vice-Admiral (1882 KCMG,1885-6 C-in-C N.America & W.Indies),1886 Admiral (1887 KCB.1891-4 C-in-C Portsmouth),1895 Admiral of the Fleet (1895 GCB).1902 retired. A seaman of legendary exploits.and a diehard defender of masts and yards.

seeking the opinions of the Board and others.[1] Although the documents have not survived to confirm the supposition, it was probably as a result of this review that two more armoured cruisers were laid down late in the year. The Nelson and Northampton were launched in November 1876, and entered service in 1882, having been eight years in building. Superficially, they marked a great improvement over the Shannon. The Nelson was the first armoured ship in the Navy with compound engines, whose economical working considerably increased her range. Unlike her sister, moreover, the Nelson reached her designed speed of fourteen knots. She stowed a maximum of 1,200 tons of coal - over twice the full bunkerage of the Shannon - and with this could steam five thousand miles at ten knots.[2] The Northampton with her simple engines was in every respect a much worse steamer. After only five years in service she was unable to reach nine knots in calm water.[3]

Even the Nelson, however, though her speed and range entitle her to be called a cruiser, marked no real change of conception from the Shannon. Her guns and armour were disposed with an enemy in mind astern as well as ahead, but the broadside was still largely unprotected. The new ships, like the old, were extremely bluff, steered badly, trimmed by the head, and could not be steamed into a head sea or sailed in any circumstances.[4] A further technical comparison with the Shannon shows how nearly identical they were in conception:[5]

[1] Memorandum by Ward Hunt, 3rd April 1874 (PRO:PRO 30/6/115).
[2] Note that the Shannon's legend, not full load bunkerage is quoted p.101 supra; see Appendix.
[3] Report on the Naval Manoeuvres of 1888, p.180 (AL: Naval Intelligence Division (NID) Reports, Vol.XIV No.179 (October 1888).
[4] Phipps Hornby to Noel, 19th May 1877 (NMM: Noel Papers (cited as NOE) uncatalogued; Box.1A).
[5] See Appendix.

	Nelson		Shannon	
Displacement:	7,473		5,390 (tons)	
% armour	22.7%	29.5%	21.2%	27.7%
% armament:	6.8%		6.5%	
% machinery:	14.8%	21.9%	13.0%	18.1%
% coal:	7.1%		5.1%	
% hull:	39.9%		43.1%	
length:beam ratio:	4.6:1		4.8:1	

The whole improvement derived from the extra two thousand tons of displacement, and the introduction of compound engines. Barnaby's known opinions make it clear that his understanding of the realities of naval operations had not changed since the design of the Shannon. He was capable of the astonishing statement that an armoured ship would keep up her speed in a seaway better than an unarmoured one of the same speed - for which idea there is no technical justification whatsoever, except insofar as a large ship, mutatis mutandis, keeps up her speed better than a small one. Employed to justify the low speed of the Nelson (which lost speed rapidly in any sea) this argument is the reverse of the truth.[1] Barnaby still thought of his new ships simply as ironclads, and recognized no essential difference of function between cruisers and capital ships.[2]

The design of the three British armoured cruisers of the 1870's reveals a confusion of purpose in the Admiralty. There was no clear conception of the function of an armoured cruiser, and there was in practice no effective chain of command in the preparation of designs. We have spoken of the 'cruiser capital ship' which technical factors had prevented Robinson from achieving. The introduction of the compound engine and other advances in

[1] Barnaby to Controller, 15th January 1877, in 2nd. Report of the Carnarvon Commission, Appendix VI, p.200 (PRO: PRO 30/6/122).
[2] Barnaby, 'The Nelson Class', TINA XXI (1880), p.60.

engineering offered the men of the next decade a much greater chance of building such a type,and the appearance of the Russian armoured cruisers offered them a much stronger incentive to try. The Shannon.Nelson and Northampton were indeed intended for cruising dutues,and not as diminutive battleships,[1] yet the logical consequences of this were not realised. Instead of trying to build ironclads with the distinctive qualities of 'cruiser capital ships',the Admiralty only produced inferior battleships, incapable of adequately fulfilling any function. It seems there was nobody with the clarity of perception to realize that the distinction between the functions of battleship and cruiser implied a difference in design. These ships,as completed,were in most respects the products of Barnaby's mind in conception as well as execution,and he was evidently unable to judge the qualities required of an armoured cruiser. He is not to be held blameworthy for this; he was neither trained nor employed to decide such questions. There was a vacuum where the central decisions on designs should have been made,and Barnaby was naturally drawn into filling it. The underlying weakness was once again the Admiralty organization which left no-one time or incentive to decide these things except the First Lord,who,as a layman,turned to his professional advisers,especially the Chief Constructor. The faults of the organization were not redressed by strong men. Milne was more clear-headed than most,but also more overworked,and he was temperamentally attracted to cruisers of a different sort,and content to leave to the Chief Constructor the building of belted cruisers. Milne was succeeded in the

[1] Hansard,3rd series,ccxxix,252.

summer of 1876 by Sir Hastings Yelverton[1], an amiable old gentleman, but of torpid mind, and almost completely deaf. Under his régime the quality of thought and organization in the Admiralty did not improve.

The early history of the armoured cruiser in British service was not a happy one. Technical advances which offered hope of realizing a type formerly thought impossible were squandered by confusion of purpose and weakness of organization, and the attention which had been devoted to large cruisers was turned to different objects.

[1]Hastings Reginald Yelverton (né Henry), 1808-1878: 1823 1st.Cl. Volunteer, 1830 Lieutenant, 1838 Commander, 1843 Captain, 1859-62 Commodore, 1863 Rear-Admiral of the Blue (1863-5 2nd-in-C Mediterranean, 1865-6 2nd-in-C Channel, 1866-7 C-in-C Channel), 1869 Vice-Admiral (1869 KCB, 1870-4 C-in-C Mediterranean), 1875 Admiral (1875 GCB, 1876-7 1st.Sea Lord), 1877 retired.

D. Unarmoured Cruisers

For many reasons, the period between 1870 and 1877 was one in which Admiralty thinking on cruiser design and operation tended to concentrate on the unarmoured classes. We have seen how the Chief Constructor was largely left to his own devices in designing the belted cruisers of the period, and that for this faults of organization were largely responsible; but in addition, such attention as the naval members of the Board were able to devote to general considerations of cruiser work, went chiefly to unarmoured, and especially to small cruisers. To a Liberal administration such ships were ideologically palatable, and to any government cheap ships were attractive. It was an age when the numerical strength of the Navy was usually established by reference to the needs for reliefs to keep up existing numbers, rather than to fulfil any abstract strategical scheme, and the resulting concentration on sheer numbers again tended to favour smaller and cheaper ships. Milne was a leading proponent of greater cruiser strength, but his essentially old-fashioned mind still thought in terms of the traditional types, and his conservative spirit was naturally drawn to vessels which still carried masts and spars to some purpose. The Chief Constructor, whose views and influence have already been noted, also thought well of small cruisers. Finally, the technical advances of the period, especially the introduction of compound engines and the armour deck, naturally favoured smaller rather than larger warships.

In Construction, as in administration, Göschen initially continued the policy of his predecessor. The Euryalus, Boadicea and Bacchante were reduced copies of the Raleigh, armed entirely with light guns. The design was begun in September 1871, but the Boadicea, first of the class, was not laid down until January 1873, and the Bacchante was not completed until July 1879.

During Göschen's period of office, the first signs appeared of Admiralty thinking on cruiser functions in terms of a grand strategy of trade protection, and the numbers required to fulfil it. What had formerly been confined to individuals like Robinson and Milne became current coin throughout the organization. The development of a mature strategic understanding, however, was hampered by Göschen's strict Liberal belief that the size of the Navy was not merely ultimately governed by the Cabinet, but was a matter solely for them, and not to be raised by the Admiralty. Thus when the new First Sea Lord urged the 'absolute necessity for Frigates, Corvettes, Sloops, Gun Vessels and Gun Boats',[1] to maintain the establishment fixed by Childers, he was told,

> 'As the the ships that we <u>want</u>.....that is a matter of policy, and depends entirely upon the services the government intends to exact.'[2]

In other words, the size of the Navy was no concern of the Board. Milne complained that it was not, in practice, anyone else's:

> 'It has often been asked, what should be the number of ships of the various classes of the Navy - what should be the Policy of the Admiralty. I am not aware that the question has ever been answered or the policy decided.'[1]

Unfortunately, the Prime Minister's attitude made it unlikely that the Navy's policy, although reserved to the Cabinet, would be seriously considered by it.

> 'To Mr Gladstone, it was always especially distasteful to take expensive measures of precaution against events which his sanguine nature led him to think in the last degree improbable'.[3]

[1](<u>Bis</u>) Unsigned & undated holograph memorandum by Milne [1873] (NMM: MLN/P/B/1(C))(original italics).

[2]Göschen to Milne, 1st May 1873 (envelope endorsed by Milne, 'Letter from Mr Goschen. A Row with him on N[aval] Money') (NMM: MLN/P/A/1(A), <u>sv</u>. Goschen).

[3]Hon. Arthur Elliot, <u>The Life of George Joachim Goschen, First Viscount Goschen, 1831-1907</u> (London, 1911, 2 vols.) I, 122.

Gladstone's position was well exemplified in correspondence with Göschen. In September 1871 he wrote 'presuming that it would not be difficult' to reduce the Estimates by £1,300,000.[1] In reply the First Lord pointed out that the strength of the Navy was a matter for Cabinet decision, and that if the services demanded of it were to be carried out it could be reduced no further:

> 'The fact is, half our expenditure is not for war service in the strict sense, but for keeping the police of the seas and protecting commerce during times of peace, and for carrying out our views as to protecting semi-barbarous and barbarous men against various forms of outrage. Philanthropy decidedly costs money.'

Gladstone's reply is a masterpiece of judicious confusion. Carefully avoiding the issue of Cabinet responsibility, he wrote:

> 'Of the sufficiency of any given number of ships for any particular service I should be no judge, and I should accept your conclusions with full confidence'.

Notwithstanding Göschen's clearly-expressed conclusion that for the particular services with which the Navy was charged that existing fleet was barely sufficient, the Prime Minister looked to 'progressive though moderate reductions.'[2]

Under such a régime, it was difficult for the Board to get attention for their views on the strength of the Navy, but they were not altogether prevented from thinking on the subject. By diverting Hood from his proper duties as D.N.O. to staff work, Milne elicited the first serious consideration of cruiser strategy to be produced in the Admiralty. In the event of war with France:

[1] Elliot, op.cit. I, 115.
[2] Ibid. I, 118-119 (my italics).

> 'Her Policy on the declaration of War, would probably be to despatch at once fast vessels to cruise in the positions where the greatest amount of damage could be inflicted upon our trade afloat',

and to attack coaling stations and bases.

> 'Our policy would probably be to strain every effort for the protection of our trade, (this I look upon as the point of first importance) it would be necessary immediately to detach fast vessels to cruise in the position where our commerce is most open to attack.'

consequently,

> 'A considerable number of fast unarmoured cruisers for the protection of our enormous trade afloat is indispensable.'[1]

This study marked a considerable advance on previous Admiralty thinking, but under Göschen's régime it was still an unofficial approach. His successor, however, took a very different attitude, and one of his first actions was to ask for opinions on the forbidden subject.[2] He received, both then and later, numerous pleas for more cruisers,[3] but he was hardly more successful than his predecessor in getting Cabinet approval. The importance of Ward Hunt's attitude lies not in its slender effect on Disraelian parsimony, but in its powerful encouragement to the development of Admiralty thinking on cruiser strategy.

Soon after Ward Hunt took office, the Controller and Chief Constructor were sent to France to enquire into the policy of Britain's most likely enemy.

[1] Confidential holograph paper by Hood, 5th February 1873 (NMM: MLN/P/B/1(C)).

[2] Memorandum, 3rd April 1874 (PRO: PRO 30/6/115).

[3] Ibid. comments of Milne (18th April) & Tarleton (15th April). 'Times of Service of Sir Alexander Milne' (printed book), p.10 (NMM: MLN/P/3(B)). Milne to Ward Hunt, 29th October 1874 (loose in pages of idem). Memorandum by Ward Hunt on the State of H.M. Fleet, November 1875 (PRO: PRO 30/6/115, p.61).

> 'The object of the French Admiralty is clear and definite in respect to the unarmoured ships. They consider that in a Maritime War they will not have to defend but to attack merchant vessels. They remember that privateers are illegal as between ourselves and other European Powers, and that to harrass an Enemy's Commerce they must have in their Ships of War the qualities which made privateers so formidable in former years. They do not propose to engage other Ships of War, unless the latter are decidedly inferior to them, and perhaps not even then except at very long ranges, but by means of great and commanding speed and a few long range guns, they may commit much mischief and run but little risk themselves.'[1]

This threat prompted further study, and in December Milne submitted two papers which mark another important development in Admiralty thinking. One outlined the first real war plans,[2] in which he envisaged patrols at a series of named focal points, after Colomb's model. In the other,[3] Milne defended the usefulness of small sloops and gunboats against the modernist school:

> 'It has been asserted that to build these small classes of ships is a waste of public money, as they are not well adapted for war service, or to cope with the larger ships of foreign nations, and that we should only build efficient fighting ships, of great speed, power, and armament. If these views were adopted we must largely reduce the ships on our foreign stations, as it would not be possible to replace our smaller vessels, now so extensively employed abroad, by the same number of vessels of the larger class, nor could they perform the inshore and river duties of the smaller

[1] 'Report of a visit to Brest, L'Orient and Toulon, by Sir H. Stewart & Mr Barnaby', 27th October 1874 [*vera* by Stewart] (PRO: Adm.1/6329). See p.120 *infra* for evidence that Stewart in fact misinterpreted contemporary French policy.

[2] 'Position of Cruising Ships for the Protection of Trade', December 1874, p.3 (NMM: MLN/141/2).

[3] 'Paper relative to Unarmoured Ships and Proposals for an Establishment', 6th December 1874 (*Ibid.*).

ships. Under these circumstances it becomes a necessity to have two special classes of ships:

1. Our ironclad fleet with torpedo vessels, rams, fast frigates and corvettes, heavily armed for general war purposes and the protection of commerce.
2. Corvettes of a smaller class, sloops, gun-vessels, gun-boats, for foreign and home service, surveying duties, despatch vessels, and coast-guard service.'

Milne went on to propose an establishment of cruisers, which he suggested should be thirty frigates, thirty large and thirty small corvettes, forty-five sloops, and sixty each of gunboats and gunvessels. To reach this strength it would be necessary to build eighteen frigates, nineteen large and six small corvettes, six sloops, twenty-two gunvessels, and thirty-four gunboats.

'It is not a comparison with foreign nations in regard to our relative number of ships compared to theirs that we have to consider, but it is the vast extent of our commercial trade that we must protect.'[1]

These papers show all the strengths and weaknesses of Milne's thinking. On the one hand his conception of cruiser function was still a markedly 'Liberal' one, assigning high importance to peacetime duties. He proposed what amounts to two fleets, for war and peace. On the other hand, he here produced the first embryonic strategy of trade protection, and the first estimate since his own of 1858[2] of the numbers required to realize such a strategy. The question of numbers became a regular part of Admiralty thinking, and was raised again in October 1875, Milne, Hornby and Gilford each proposing his own figure.[3]

Milne's second term of office, especially under Ward Hunt, was fertile of thinking on cruiser function. The characteristic

[1] Idem, original italics.

[2] Reply to 'Questions submitted by Her Majesty thro' the Prime Minister to each member of the Board of Admiralty', 22nd May 1858, p.4 (NMM: MLN/141/2).

[3] Milne's 'Memorandum on Unarmoured Ships', 29th October 1875, with comments by Hornby & Gilford (PRO: PRO 30/6/115, p.67).

outlook of him and his colleagues,compounded of conservative and radical elements,was reflected in their concentration on the issues of strategy and numbers,especially numbers,avoiding a reconsideration of the old designs to which they were so attached. By attending to broad issues,they made it more certain that their general conclusions would in time be applied to the particular problem of cruiser design,but in the short term their influence was largely devoted to preserving the existing types, however ill-suited small and slow cruisers were to exercise the embryonic strategy of trade protection proposed. They were quite happy to support completely novel types,intended to answer new needs,rather than to replace older cruiser species in their traditional work. Here again,Milne and those who thought like him did not fully appreciate that the success of the new designs was bound to cast doubt on the old. Nowhere is this process more obvious than in the design of the first really fast light cruisers ever built.

The Report of the Committee on Designs in 1872 had suggested that unarmoured cruisers should be divided into two types,of which one would be fast and lightly sparred for service in home waters. This is usually regarded as the origin of the design of the Iris and Mercury,but if so,the idea was long in germination,because it was not until November 1874 that Barnaby initiated work on a sketch design for a 'fast corvette'.[1] A more likely immediate source of the concept is Houston Stewart's report on the French Navy,[2]which discusses the difficulty of protecting trade from fast cruisers:

[1]Barnaby to Crossland & Dunn,26th November 1874 (NMM: Adm.138/57. Cover of Iris & Mercury,p.1).
[2]Ante,p.110.

> 'This is the problem I propose to consider with the Chief Naval Architect immediately, and I will report fully upon it.'

The origins of the Iris's design, first traceable a month later, probably lie here. Barnaby was assisted in designing a very fast warship by various technical advances. The success of the Rover's engines on her trials in November 1874 established that compound engines could be fitted in large cruisers; experiments at the Landore steel works proved the suitability of the material for naval construction;[1] and gunnery trials against a target of the Shannon's armour were held to have established the efficiency of 64 pdr. guns for cruiser armament.[2]

The two ships were strikingly different, not only from any that had gone before, but from any contemporary ships of Barnaby's design, and it is easy to credit Manning's assertion that White had a large part in the design.[3] It was finally approved by the Board in June 1876; the Iris was laid down in November, launched in April 1877, and completed two years later. She was a lightly armed and lightly sparred cruiser, and on trials made eighteen knots. Although she was without armour, her heavily subdivided hull, with bunkers in wake of the machinery from the turn of the bilge to the upper deck, made her very much less vulnerable than any armed merchantman, or any other unarmoured cruiser. She was the fastest warship in the world, and the first to be able to catch all merchant steamers. Although she was fiercely attacked by the 'Liberal' school, especially Reed, (she being neither an armoured 'fighting ship' nor a fully-rigged 'cruiser') the validity of the concept of a fast cruiser to protect trade against raiders

[1] Manning, Life of White, p.64.
[2] Hovgaard, Modern History of Warships, p.168.
[3] Manning, op.cit., p.64.

seems obvious in retrospect. The Iris's speed,range,and armament were adequate for her intended rôle; but even more important than her success in this was the demonstration that it was possible to build effective warships of high speed,and consequently unnecessary to rely entirely on merchantmen.

The progress of the Iris's novel design provides an informative insight into the Admiralty of the time. That she was original in conception is shown by a comparison with two near contemporaries of Barnaby's design:

	Iris		Euryalus		Nelson	
Displacement:	3,624 tons		4,139 tons		7,473 tons	
% armament:	3.6%		6.1%		6.8%	
% armour:	0%		0%		22.7%	
% machinery:	29.7%	44.1%	21.6%	31.3%	14.8%	21.9%
% coal:	14.4%		9.7%		7.1%	
% hull:	43.9%		52.0%		39.9%	
length:beam ratio:	6.5:1		6.2:1		4.6:1	
speed:	18 knots		15 knots		14 knots	
Maximum range at 10 knots:	4,200 miles		2,880 miles		5,000 miles[1]	

This remarkable ship was not,as might have been expected, conceived either by collective judgement or by a single dominant mind. On the contrary,it is plain that there were at least three mutually contradictory ideas of her function simultaneously entertained in the Admiralty,and it does not seem that those involved realized how much they differed from one another. The Controller,as we have noted,wanted fast cruisers to protect trade in home waters;'armed vessels of the highest speed and smaller dimensions and at a lesser cost than such ships as the Shah & Inconstant.'[2] The Chief Constructor,though sometimes echoing his superior's view,generally considered that 'such a

[1] See Appendix.

[2] Controller's submission to the Board,18th January 1875 (NMM: Adm.138/57,Cover of Iris & Mercury,p.15).

vessel would be admirably suited for despatch service',[1] and referred to her throughout as an 'Armed Despatch Vessel'.[2] Milne and Phipps Hornby adhered to the Controller's opinion, though Milne wanted her to have more coal, and Hornby a lighter rig.[3] A third opinion, differing both from Barnaby's, and from the majority view of Milne, Stewart, and Hornby, was Lord Gilford's. The ships should be heavily rigged, because without canvas they could not economize on coal, 'which is to be their sole means of chasing and destroying the enemies [sic] commerce.'[4] Gilford, it seems, thought of her as a commerce raider, not an escort. Apart from a lengthy debate on her rig,[5] it does not appear that the conflicting understandings within the Admiralty were ever recognized, let alone reconciled. It was a good example of the practical consequences of Childers's fixing of the naval lords in mutual isolation.

The most important technical innovation in cruiser design during the 1870's was the armour deck. The idea of horizontal armour was not new; it was the essence of the design of the Monitor, and claims to have 'invented' it were misplaced. Guns of low muzzle velocity seldom penetrated below the waterline, and being of short range, had a flat trajectory. An armour deck over the vitals of the ship, on or about the waterline, offered nearly complete protection to the underwater hull, and since shot and shell could only strike the deck at an oblique angle, it offered the same resistance as a belt of several times the thickness. At the cost of leaving the upper-works and hull above the waterline entirely vulnerable, complete protection could be given the vitals

[1] Barnaby to Controller, 6th January 1875 (Ibid. p.12).
[2] Ibid. pp.45 & 86. [3] Ibid. p.15. [4] Ibid, p.16 (my italics)
[5] Ibid, pp.105 & 145-163 passim.

of the ship with very little sacrifice of weight. Unarmoured cruiser types could by an armour deck acquire a considerable measure of the invulnerability which had hitherto been reserved for ironclads. Such cruisers were always thought and spoken of as 'protected' cruisers,a species of unarmoured warship,distinct from 'armoured' warships,with · complete (that is,vertical) armour protection.

Throughout the subsequent decade,a debate on the merits of the 'protected cruiser' continued to range. It was ostensibly technical,but heavy with political and personal overtones,and the attack was led by Sir Edward Reed. Basicly his thesis was that armour existed only to keep a ship afloat; armour decks contributed nothing to buoyancy; therefore they were useless. The case may be seen as a new facet of the old 'Liberal' notion that only ironclads were 'real' warships. Depending on the position of the armour deck,it was theoretically possible in some protected cruiser designs,by entirely destroying the hull above the deck,to eliminate sufficient buoyancy to sink the ship. This remote possibility Reed considered probable to the point of certainty. In all his discussion of belted and protected armour schemes,Reed regarded the waterline with an almost mystic reverence. It was for him a fixed and immovable line,and it was in vain that his critics pointed out that in actual sea-going conditions,the whole hull from upper-deck to keel might be alternately submerged and exposed. Every Admiralty design with a protective deck was under a constant attack from Reed and other Liberals,in and out of Parliament.

Barnaby himself always preferred belt to deck,but was prepared to admit the armour deck in cruiser design as a useful expedient. In ironclad design he made the important transition to a 'central citadel' model with the Nelson,whose battery and

vitals amidships were protected by vertical armour, but bow and stern only by a deck. This 'soft-ended' type was to become the standard battleship design for the rest of the century. It naturally aroused the devoted opposition of Sir Edward Reed, who considered that the 'soft' ends, like the unprotected freeboard of a protected cruiser, would infallibly be blown to pieces, and without their buoyancy the ship would capsize.

Given his early success with the armour deck in ironclads, it was natural that Barnaby should consider fitting it to smaller cruisers. Early in 1876 a new sloop design to succeed the Opal Class was being prepared, and Barnaby ordered an armour deck to be worked in over the vitals.[1] It is not certain who prompted this idea, but Houston Stewart is the most likely candidate. At various times during the preparation of the design the possibilities of a belt (always Barnaby's favourite), and a complete deck were canvassed,[2] but the weight available was insufficient, and as completed the 'C' Class had only a partial deck amidships. It was flat, unlike the cambered or arched deck which became standard in all later protected cruisers.

The Comus, lead ship of a class of nine,[3] was launched in April 1878 and completed in October 1879. She was in all respects but her deck (and her iron hull, never before given to a sloop) a conventional small cruiser; slow, short-winded and heavily rigged; yet for a sacrifice of less than six per cent of her displacement, she secured near-invulnerability for her machinery and magazines. This greatly improved the fighting efficiency of the ship, and thus the strategic options available to British

[1] Barnaby to Morgan & Darley, 24th February 1876 (NMM: Adm.138/55, Cover of Comus Class, p.5).
[2] Ibid., pp.16 & 19.
[3] The Calliope & Calypso, nominally of this class, were built later to an improved design.

naval commanders. The full potential of the armour deck, however, was nullified by the Comus's extremely conservative design. A comparison of weights shows that she did not radically differ from the Nelson in anything but size:

	Comus	Nelson
Displacement:	2,383 tons	7,473 tons
% armament:	6.5%	6.8%
% armour:	5.8%	22.7%
% machinery:	16.0%	14.8%
% coal:	11.3%	7.1%
Max. range at 10 knots:	3,600 miles	5,000 miles
Speed:	13 knots	14 knots.[1]

Although the Comus saved 17% of her displacement which the ironclad devoted to armour, she was still slower and of shorter range, because so much weight was wasted on a heavy rig (the class sailed poorly) and an unnecessarily heavy armament.[2]

The burden of criticism against the 'C' Class and all other small cruisers of the day, both then and now, was that their speed and range were hopelessly inadequate for wartime cruiser work, especially the protection of trade. It was inherent in this position that a real threat from fast raiding cruisers existed. Such was in fact the universal assumption, both of the authors of Admiralty designs, like Hood and Houston Stewart, and their critics, like Colomb.[3] The Admiralty under Milne developed a good general grasp of the threat to trade, without drawing the logical conclusion that traditional cruiser types, so useful for peacetime service, were inadequate to meet it.

* * * * * *

[1] See Appendix.

[2] For a general description see G.A.Osbon, 'Passing of the Steam and Sail Corvette: The Comus and Calliope Classes', Mariner's Mirror, XLIX (1963) p.193.

[3] Ante, pp.110 & 113.

An appreciation of the imminent perils threatened by French schemes for a guerre de course had become the common coin of even the least informed naval thinkers in Britain in the late 1870's. It is therefore ironic to record that the French navy had no such plans. Dupuy de Lôme's original programme of 1857-70, insofar as it was directed against Britain at all, envisaged a superiority obtained by technical advance in battleship design.[1] French thinking on tactics and strategy was if anything less advanced than British. The defeat of 1870 turned the navy in on itself, and for some time extinguished strategic thinking altogether. In 1872 Pothuau, the Minister of Marine, summarized the duties of the navy as being: prestige; the preservation of the Evolutionary Squadron (France's only operational fleet) for training and emergencies; the repair and relief of existing ships; and the maintenance of the naval schools. The purpose of the navy, in short, was to exist - and indeed, this was by no means a foregone conclusion, as it had nearly been absorbed by the army in 1871. European war, insofar as it was envisaged at all, was to be against Germany and Italy, not Britain. The guerre de course, far from being the preferred strategy of the French navy, was condemned by most of its influential writers.[2] French cruiser design was if anything more conservative than British,[3] a weakness compounded by the weight and short life of the wooden hulls which industrial deficiencies forced on French designers, and the extremely long construction periods enjoined by financial stringency and inefficient dockyards. The last wooden sailing corvette, the Dubordieu, was commissioned in 1889, by which time even a

[1] Ante, p.39.

[2] Ropp, Development of a Modern Navy, pp.51-67 & 181. Jurien de la Gravière, La Marine Aujourd'hui (Paris, 1873); extracts trans. in JRUSI XVII p.250.

[3] See Appendix, and compare weights of Alma & Victorieuse with British contemporaries.

conservative officer was forced to lament 'ce n'est qu'un beau logement'.[1] French unarmoured cruisers were in general faster and of longer range than their British opposite numbers, and thus better suited to commerce raiding, but this was not primarily what they were intended for. The first fast cruisers, the Duquesne and Tourville, were laid down after the Franco-Prussian War in conscious imitation of the Inconstant, which they closely resembled.[2] The famous 'Jeune École', with its advocacy of the guerre de course, was as much or more a political and social movement as a professional school of thought, and it had no significant influence on naval policy until the Radicals came to power in the late 1880's.[3] The prevailing French attitude is well typified by the astonishment of Dislère, the influential Secretary of the Conseil des Travaux, that St. Bon, Chief Constructor of the Italian navy, should endow the 'mere avisos' Stafetta and Rapido[4] with high speed.[5] The only influential French proponent of fast light cruisers was Émile Bertin, in 1875 appointed Chief Constructor of Brest Dockyard, and his proposals of that year were rejected by the Conseil des Travaux. Fifteen knots, they considered, was an ample speed for a cruiser, and heavier armament and armour were more urgently needed.[6]

By the latter part of the 1870's Britain was at a turning point in naval policy. Strategic thinking inside, and even more outside the Admiralty, was rapidly developing, and already had a clear understanding of the potential threat to trade from a

[1] Ropp, op.cit., p.191.

[2] Paper by Brassey, 'Speed & Coal Endurance of Unarmoured Vessels', 1880 (PRO: Adm.1/6626, 1st. January 1882).

[3] Ropp, op.cit. pp. 259-288. Raoul Castex, Les Théories Stratégiques (Paris, 1929-35, 6 vols.) I, 50-51.

[4] Small cruisers not unlike the Iris & Mercury.

[5] Ropp, op.cit. p.179.

[6] Ropp, op.cit. p.73.

guerre de course. It was bound to be only a short time before the logical implications of this strategic concept began to affect cruiser design. At the same time the technicalities of such design were complicated by the development of two novel types, the belted and protected cruiser. All these currents of professional thinking and technical progress met in an Admiralty which suffered from crippling weaknesses of organization. These weaknesses in turn were emphasized during the years 1876 to 1879 by some of the worst leadership the Admiralty ever suffered. In the summer of 1876 Milne left the Admiralty, and Phipps Hornby refused to accept his post,[1] leaving as the best alternative Sir Hastings Yelverton, whose chief merit was that he was very near retiring age. In the spring of 1877 Rear-Admiral Hood became Second Sea Lord, and on Yelverton's illness and retirement later in the year, he was left in effective charge until December, when the new First Lord appointed Admiral Wellesley.[2] 'Old Wooden-Head' inherited few of the qualities of his uncle, the Duke of Wellington. His appointment was greeted with astonishment, and the most favourable comment from his brother officers was that 'of course he having possession of all his faculties makes him a great improvement on poor dear Sir Hastings.' Otherwise, he was 'rather too idle', 'had not an intimate knowledge of our service', 'quite a cypher at the Board', and 'one of the worst first Naval Lords we have had since Sir Frederick Grey.'[3]

The period of office of Yelverton, Hood and Wellesley was

[1] Egerton, Sir G.P.Hornby, pp.197-8.

[2] George Greville Wellesley, 1814-1901: 1828 entered Navy, 1834 Mate, 1838 Lieutenant, 1842 Commander, 1844 Captain, 1863 Rear-Admiral of the Blue, 1869 Vice-Admiral (1869-70 C-in-C N.America & W.Indies, 1870-1 C-in-C Channel, 1873-6 C-in-C N.A. & W.I.), 1875 Admiral, (1877-9 1st.Sea Lord), 1879 retired (1878 KCB, 1887 GCB).

[3] Beauchamp Seymour to Phipps Hornby, 1st November & 17th December 1877 (NMM: PHI/120(A), sa.1876-7); & 8th November 1879 (ibid.sa.1880). Admiral George Willes to Phipps Hornby, 22nd November 1878 (ibid.sa. 1878) & 26th October 1879 (ibid.sa.1880). George Woodhouse to Phipps Hornby, 20th October 1879 (idem).

perhaps the darkest time of the 'dark ages' of the Victorian Navy, and it was, as we have seen, a time of uncertainty in cruiser design and strategy. All these factors were reflected in the career of a ship which was never built, the Highflyer. This projected ship tied together all the tangled threads of cruiser design. She was conceived as a development of the Boadicea, herself a lineal descendant of the Inconstant, but she was to be either a belted or a protected cruiser. In January 1877, a week before the Euryalus was launched, Barnaby's subordinates were calculating for him how an armour deck might be worked into such a ship.[1] It seems unlikely, however, that Barnaby himself initiated this proposal, since a week earlier he had been strongly urging his usual 'Liberal' point of view, that all regular cruisers required vertical armour, and all tasks requiring speed and range were better left to merchantmen.[2] On 24th he issued preliminary instructions for two alternative versions of a fifteen-knot frigate design, one with an armour deck of one and a half inches, the other belted, with the belt roofed by a one-inch deck; 'The question of difference of cost of the two plans to be first considered.'[3] During March and April the two designs proceeded, and the two versions were worked out thus:

	Belted	Protected
Displacement:	6,160 tons	5,660 tons
Armament:	245 tons = 4.0%	245 tons = 4.5%
Machinery:	1,040 tons = 16.9%	1,000 tons = 17.7%
Coal:	520 tons = 8.4%	500 tons = 8.8%
Armour:	795 tons = 12.9%	350 tons = 6.2%
Hull:	3,050 tons = 49.6%	2,910 tons = 51.4%
Cost:	ca.£301,500	ca.£270,000[4]

[1] J.C.Smith to Chief Draughtsman, 23rd January 1877 (NMM: Adm.138/44, Cover of Boadicea Class, p.150).
[2] Barnaby to Controller, 15th January 1877; Carnarvon Commission, Second Report, Appendix No.6, pp.199-201 (PRO: PRO 30/6/131).
[3] Folio of 'Papers relating to Design of Highflyer', in cover of Boadicea Class (NMM: Adm.138/44), f.1.
[4] Ibid.ff.2 & 8.

On 29th March Barnaby presented these designs to the Board; 'Both designs rejected. Board asked for a new Boadicea with a single lifting screw,more sail,and protection for engines and boilers only by an underwater deck as in Comus.'[1] Barnaby set about sketching this design,and at the same time another, achieving the same performance on smaller dimensions by cutting down one deck. This smaller and cheaper version was approved by Yelverton,Gilford and Hood on 7th May,and on 15th August the completed design was ordered to be built,and named Highflyer. On the same day W.H.Smith became First Lord,and shortly afterwards Yelverton,already ill,retired. Although the documentary evidence is lacking to prove the supposition,it was probably this change which put a stop to what would have been the most antiquated design of the decade. By December,with the new Estimates being prepared,Barnaby was back to submitting his original two designs, now further refined,but the new Board rejected both,and there the matter rested for some time.[2] In the new year Barnaby's mind was running on a fast protected cruiser to employ his favourite weapons,the ram and the torpedo. Only in such a ship,without crowded batteries,he considered,could unprotected upperworks be tolerated.[3] In November 1878 Barnaby for the last time submitted the various designs,noting that he disapproved of protected cruisers,excepting only 'torpedo ships' with few men exposed. In spite of Houston Stewart's support,the submission was apparently without effect,and there the question was abandoned.[4]

The fortunes of the Highflyer's design at the hands of a rapid succession of reactionary and unenergetic Boards,and its technical metamorphosis from a derivative of the Inconstant,

[1] Ibid.f.13a. [2] Ibid.f.16. [3] Ibid.ff.17-19.
[4] Houston Stewart to Smith,28th December 1878 (Hambleden MSS, Strand House; W.H.Smith papers (cited as MS): P.56/274).

through protected and belted versions, back to the old steam-and-sail type, and finally looking forward to the new 'torpedo-cruisers' of the next decade, is an apt epitome of the end of the era. It reveals all the confusion of thinking and organization so characteristic of the Admiralty of the day, but also the sprouting seeds of the rapid progress of the next decade. On the whole, the Admiralty during these eight years declined in efficiency and capacity. The energies and abilities which Robinson and Reed had devoted to overcoming the weaknesses of the system were not replaced. Although individuals like Milne and Phipps Hornby devoted intelligent, and ultimately influential consideration to problems of general strategy and naval policy, they did not carry these general studies into practical effect. Throughout the decade the weaknesses of the Admiralty system vitiated the efforts of reformers. With the Board virtually abolished, and the naval lords heavily overworked, no effective supervision was exercised over their subordinates. In particular the Chief Constructor, who all authorities agreed was supposed to be the servant of the Board, putting into effect their requirements, seems in practice to have dictated to them the general character as well as the detailed designs of many of the ships he produced. Many of the deficiencies of the Navy in the 'Dark Age' may be blamed on the failure properly to superintend a subordinate in so important a position as Barnaby's.

At the same time many of the developments of the period gave hope of improvement. For the first time the Admiralty was beginning to evolve something like the embryo of a grand strategy. As yet it was exclusively theoretical, but it was a most important beginning. Even more significant was the growth of an independent school of naval thinking outside the Admiralty, in a position to consider what ought to be without being shackled by what was; and

in a position to publish and to publicize its views. By 1878 neither of these developments had seriously affected the progress of cruiser design, but the time was fast approaching when the proper types and numbers of cruisers to protect Britain's colonies and trade could remain abstract questions no longer.

CHAPTER IV: THE BEGINNINGS OF REFORM, 1878 - 1884

A. Changes at the Admiralty

In the early summer of 1877 Ward Hunt died, and W.H. Smith[1] was appointed in his place. Smith has been immortalized by W.S. Gilbert, not so much because he was incompetent (which he was not), nor because he had no previous naval experience (which was quite normal among First Lords), but because he was, as a businessman and a Methodist, an unusual figure in a Conservative Cabinet, and unlike the politicians of middle rank who usually occupied his post. Smith's time in office saw the first important advances out of the former 'dark age'. Like his predecessor, he was unable to impress on his Cabinet colleagues the need of great changes, so the apparent achievements of his régime were not great; but behind the scenes the foundations were being laid which permitted rapid advances in later years, and Smith's upright character and efficient mind contributed much to them.

The particular cross he had to bear was a succession of very poor senior naval advisers. Naval lords were usually appointed for three years, unless they reached retirement age earlier, and it was not considered possible to remove them. Only Childers had ever actually dismissed any of his naval colleagues. Smith could not therefore replace incompetent First Lords. His predecessor had suffered from the same problem, hence perhaps the appointment of Yelverton, who had to retire shortly. Faced with the same difficulty, Smith took a similar decision in appointing the elderly Wellesley. The following summer, shortly before he was due to retire, Wellesley resigned. The details of the issue are obscure,

[1] William Henry Smith, 1825-1891: a wholesale newsagent: 1868-85 Conservative MP for Westminster (1877-80 1st Lord), 1885-91 MP for the Strand (1885 Chief Sec. for Ireland, 1886 Sec. for War, 1886-91 1st. Lord of the Treasury & Leader of the House).

but it possibly revolved around the nomination to naval cadetships, hitherto a piece of patronage of the First Sea Lord's, which Smith wished to assume.[1] Once more Smith had to find a First Sea Lord, and once more his choice was complicated by a special factor.

In spite of the enormous flag-lists of Victorian times, there was never a wide choice of officers qualified by age, rank, and standing (to say nothing of politics) for the post of First Sea Lord, and it was sometimes necessary to accept less than ideal candidates. Nevertheless, neither Yelverton nor Wellesley had been by any means the best officers available for the job. There were other candidates, and among them one was pre-eminent. In the opinion of his contemporaries Sir Geoffrey Phipps Hornby[2] was the finest sea officer of the day. In an age when many admirals had never hoisted their flags at sea, Hornby had commanded almost every fleet and squadron in the Navy, and as a fleet commander he had no equal. He was the leading authority on battle tactics, and his work on the subject was a standard text-book.[3] His calm diplomacy had twice averted war.[4] His striking figure, commanding character, and stern discipline aroused respect, yet 'Uncle Geoff' also earned the affection of his subordinates, and the easy terms in which he conducted an extensive correspondence with officers of every age and rank bespoke the qualities which won him his avuncular nick-name. He was above all a practical sea commander, who hated all office work, and when not at sea, devoted his time to farming his lands in Sussex - a marked contrast to Milne, the

[1] Admiral George Willes to Phipps Hornby, 20th August & 26th October 1879 (NMM: PHI/120 (A), sa.1880).

[2] See p.102, n.2; & Sir William Laird-Clowes et al., The Royal Navy (London, 1897-1903, 7 vols.) VII, 291.

[3] Squadrons of Exercise (Portsmouth, 1885), privately circulated.

[4] In 1859 at San Juan, and in 1878 at Constantinople.

experienced administrator,with whom he can in other respects be compared. He never engaged in the serious intellectual studies which typified so many intelligent reformers of those days,but his thinking was perhaps deeper as well as more influential than theirs. Hornby was a man of large experience and practical wisdom, not subtle or brilliant,but with a clear and penetrating understanding. It was he who best perceived and publicized the organizational weaknesses of the Admiralty.

> 'Under its present organization the Service is not,& cannot be properly worked,.....there is no time or staff to enable fitting arrangements to be made for war,and thus the outbreak of one will go far to ruin our naval reputation.....
>
> The great fault is the absence of any qualified naval - i.e.professional - assistance to the naval Lords. The clerks are unable to assist them in naval matters,and keep them smothered in paper,so that they shall have no time for re-organization.....
>
> I shd.expect to obtain greater unity of plan in professional matters,and to form at Whitehall a staff wh.might have sufficient time to frame those orders which are essential for the concentration of our squadrons at the beginning of a war,for their provision during it, - but wh.at present have no existence.'[1]

Hornby had opportunities to urge these views possessed by no other officer,and his efforts to exploit them are of great importance. We have seen[2] that in 1872 he probably refused the post of Second Sea Lord,and again in 1874. On the latter occasion his terms for acceptance were that he should have a naval secretary,and that there should be an enquiry into the Admiralty's administration. Ward Hunt largly agreed with him,but evidently thought the demands impossible to meet; Hornby was pressed,

[1] Phipps Hornby to Key,12th October 1876 (NMM: PHI/121 A(1)). See also Egerton,Sir G.P.Hornby,pp.192-6.

[2] Ante,pp.74 & 102.

and yielded.[1] He detested his time at the Admiralty, but from it he derived fresh support for his views, and fresh resolution to uphold them. Hornby was uniquely placed to make terms. His standing was such that he was almost certain to be offered the post of First Sea Lord, and if he refused, could virtually take his choice of the Navy's commands. He had no need of the prestige or the salary of the office, and his personal inclination was strongly against it. He calculated in 1876 that the First Sea Lordship must in the near future be offered to one of three men; Beauchamp Seymour, Cooper Key, or himself. Therefore he wrote to the other two proposing that they form a compact, each undertaking to refuse office unless they were granted a naval staff.[2] On Milne's retirement Hornby was indeed offered the post, refused, and took the Mediterranean Fleet instead.[3] As neither Seymour nor Key was available, the post passed to Yelverton and Wellesley, and in the autumn of 1879 again fell vacant. Hornby was in the Mediterranean, and Seymour was occupied as President of the Torpedo Committee, and so it came to Key, who accepted.[4] Thus the best candidate for the post of First Sea Lord, acting from the best of motives, contributed to the appointment of an officer quite unequal to the post.

Sir Astley Cooper Key[5] became First Sea Lord at the cost, in the Navy's eyes, of betraying its interests. He did so at a time when the Navy's problems urgently required breadth of understanding and strength of character, but Cooper Key was peculiarly unfitted to supply either. His mind instinctively recoiled from large and general questions to take refuge in

[1] Egerton, op.cit. pp.183-4 & 198.

[2] Egerton, op.cit. p.195. Colomb, Memoirs of Key, pp.412-414. Phipps Hornby to Key, 12th October 1876 (NML: PHI/121 A(1)).

[3] Egerton, op.cit. p.197.

[4] Colomb, op.cit. p.414.

[5] Ante, p.50, n.5.

detail. He was never happier than when absorbed in administrative work,completely encased in a comforting cocoon of trivia. 'He could not bear to be without a full supply of "current business" to occupy his mind';'a desperate worker,and had a dislike to trusting [sic] what he thought his own business to others';'a man who had gradually become an administrator, disinclined to trust his mind beyond the solution of the mediate [sic]'.[1] Far from trying to delegate his crushing burden of overwork,Key revelled in it,and even tried to arrogate to himself the work of his colleagues and subordinates. He was unique in actually enjoying the duties of his office. He also had other reasons for rejecting Hornby's proposals. Key was a notoriously weak character,susceptible to all sorts of influence, especially from women. In 1879 he had recently married for a second time. His bride was a Miss Bartolucci,the daughter of an Italian dancing-master,and thirty-six years his junior. His wife's imminent confinement,and his eldest daughter's marriage,placed a desperate strain on his always precarious finances,and it was freely said that he could not afford to refuse any employment on full pay,let alone the First Sea Lord's salary. Lady Key was much attracted by the social consequence, and the elegant house,attached to the office,and she made as much use of the former as of the latter. It was notorious that Key was improperly influenced by,and through,his wife - 'The Key to promotion',as she was known.[2]

W.H.Smith presumably felt that Key was his only possible choice,but in 1882 his three-year term expired,and Northbrook

[1] Colomb,op.cit.pp.488,455 & 493.

[2] Colomb,op.cit.passim. Beauchamp Seymour to Phipps Hornby,7th October 1877 (NMM: PHI/120(A),sa.1876-7),20th October & 6th November 1879 (Ibid.sa.1880).

was able to offer Key the Portsmouth command,a comfortable and prestigious retirement post which was every First Sea Lord's due reward for his labour. Key,against all precedent,refused Portsmouth and preferred to remain at the Admiralty.[1] Something of Smith's opinion of Key may be judged by his urgent advice to Lord George Hamilton in 1885,to take his chance to get rid of Key and his whole Board.[2]

In January 1878,and for much of the rest of the year,war with Russia had seemed likely. For the Navy this represented the first general emergency since the Crimean War,and it proved a salutary experience. The organization required to mobilize the reserves was almost totally lacking. There was no information on Russian objectives and capabilities. The Russians fitted out merchant cruisers,but the Admiralty had no idea how many,or of what types. They sent a powerful squadron from the Baltic,but the Admiralty did not know of its existence until its arrival in New York was reported in the newspapers.[3] Sir Cooper Key,appointed to command the 'Particular Service Squadron' hurriedly assembled for the Baltic,was unable to obtain from the Admiralty any information about his enemy.[4] The Russians approached leading British shipowners with lucrative offers for their fast steamers, and only by their patriotism were the offers refused or the Admiralty informed.[5] It was rapidly discovered that most colonies and coaling stations were quite undefended. The subsequent history

[1] Egerton,Sir G.P.Hornby,p.338.

[2] Lord George Hamilton,Parliamentary Reminiscences and Reflections, 1868-1885 (London,1917)p.290.

[3] Carnarvon Commission,Second Report,p.l.(PRO: PRO 30/6/131). Undated memorandum by Milne[ca.1879] (NMM: MLN/P/B/1(C)).

[4] Cooper Key to Phipps Hornby,4th February 1888 (NMM: PHI/120 C, sa.1888).

[5] Carnarvon Commission,First Report; Minutes of Evidence,p.24, Q.699 (NMM: Milne papers,unnumbered).

of the Colonial Defence Committee and the Carnarvon Commission has been thoroughly studied,[1] and is not directly germane to this subject,but the 1878 war scare drew attention to two serious wants in the Admiralty; and organization for mobilization,and an intelligence department.

The organization of a plan of mobilization was not pressed with great enthusiasm. Only when MacGregor[2] circulated a strong advocacy of it on 1880[3] did the proposal get under way,even though it was ' want which has been grievously felt....painfully impressed upon the minds of the officers commanding stations in 1878',[4] and not until November 1884 did the Committee on Naval Matters, formerly on Mobilisation,submit its report.[5] MacGregor's report from 'M' Branch is eloquent of the spirit of urgency pervading the Admiralty secretariat:

> 'It is to be feared that the following list cannot be considered by any means complete,but attention having been called to the subject,new items will be jotted down from time to time as they occur to me'.[6]

The report was still under leisurely discussion seven years after the original crisis when the Pendjeh incident once more brought the Navy to the brink of war.

The jotting-down of items from time to time aptly describes the execution of another of MacGregor's responsibilities,the gathering of intelligence. The formation of a regular intelligence department to do this work had long been advocated by the reformers outside the Admiralty,and it was one of Hornby's main proposals, but it seems to have owed its first official inception to Key,

[1] Ranft,Naval Defence of Trade.Schurman,Imperial Defence.
[2] Ante,p.69,n.1.
[3] MacGregor,31st December 1880 (PRO: Adm.1/6584 & Adm.116/3106).
[4] Minute by Hoskins,(PRO: Adm.1/6584,14th January 1881).
[5] PRO: Adm.1/6681 Pt.1.
[6] Ibid..

whose experience in 1878 prompted him to suggest it to W.H.Smith.[1] In February 1879 a committee was appointed,and recommended creating an intelligence department,recalling the naval attachés to form its nucleus. Shortly after it reported,however, Key became First Sea Lord,and his attitude soon changed. An intelligence department would take over some of his beloved administration; moreover it was very unpopular with the clerks, and it would not be surprising if MacGregor had made his influence felt on this matter. He was glad to have such a department,so long as it remained under his control,but an independent body of naval officers was intolerable to him.[2] Further suggestions,such as that of one of the Constructors in 1881,[3] were firmly vetoed by Key. In March 1882,however,the second report of the Carnarvon Commission urged the creation of an intelligence department as a matter of urgency,and so another committee was set up,leading to the establishment by Board Order of 5th December 1882,of the Foreign Intelligence Committee (F.I.C.).

Considering that the proposal came only from the Carnarvon Commission,which was not in high favour with Gladstone's government,[4] and that it was opposed by the First Sea Lord and Secretariat, it is surprising that it was carried out. That it was was owing in great measure to Captain George Tryon,[5] who in 1882 became

[1] Cooper Key to Phipps Hornby,4th February 1888 (NMM: PHI/120 C, sa.1888).Colomb,Memoirs of Key,p.455. W.H.Smith to Derby,27th February 1878 (WHS: P.56/36).

[2] Vesey Hamilton to Hood,21st December 1886 (NMM: Vesey Hamilton papers (cited as VHM),VHH/4).W.H.Hall to Phipps Hornby,7th December 1886 (NMM: PHI/120 B,sa.1886),& 9th January 1888 (Ibid.sa.1888).

[3] Paper by Dunn on Mercantile Auxiliaries,prepared for Brassey, 2nd June 1881 (PRO: Adm.116/1224).

[4] Schurman,op.cit.pp.150-5.

[5] George Tryon,1832-1893: 1848 entered,1850 Midshipman,1854 Mate & Lieutenant,1860 Commander,1866 Captain (1866-7 in charge of Transport Service for Abyssinian Expedition,1871-3 Private Sec. to 1st.Lord,1882-4 Permanent Sec.),1884 Rear-Admiral (1884-7 C-in-C Australia,1887 KCB),1889 Vice-Admiral (1891-3 C-in-C Mediterranean)

Permanent Secretary. Tryon is best remembered for his extraordinary death,[1] but he was a highly gifted and unusually well-educated officer,a dedicated reformer,and a careful diplomat. It was this last quality which stood him in most stead in his new job. Tryon succeeded in enlisting Key's support for his new department by persuading him that he had really been advocating it since 1878, and had only been frustrated by the clerks.[2] By making Key the nominal President of the F.I.C.,Tryon gave it an official patronage which secured its precarious existence,without in any way affecting its practical working.[3] In fact,he incorporated into Key's administrative empire one of the principal agents of its subversion.

As an organizational reform,the creation of an embryonic intelligence department was of the first importance. Without detailed information on a host of subjects,no effective war organization was possible. Some idea of the scope of its responsibilities may be gained from the duties assigned to a young officer who joined it early in 1886:

> 'I had to know all about British defended harbours at home and abroad,with their defences and their resources that might be of value to the Navy; about communications (submarine cables) British and foreign; about all foreign guns (at sea and in coast defences) gun-mountings, submarine mines,and experiments connected therewith';

to which was soon added:

> 'British and Foreign Commerce,Defence and Attack'.[4]

These important matters,however,did not exhaust the significance

[1]He was drowned in 1893 when his flagship was lost by collision in circumstances which have never been fully explained.

[2]Cooper Key to Phipps Hornby,4th February 1888 (NMM: PHI/120 C,sa.1888).

[3]Tryon to Phipps Hornby,22nd January 1888 (Ibid.).

[4]General Sir George Aston,Secret Service (London,1930),p.33.

of the new Foreign Intelligence Committee. It was the first body of naval officers in Whitehall,indeed the only body of any sort,without administrative responsibilities. Carefully as the Committee's many enemies tried to restrain it from encroaching on their prerogatives,they could not destroy its character as the only part of the Admiralty which was essentially forward-looking. It existed to collect information useful only in some future situation,and it therefore had to formulate some hypotheses about the future. By its nature,it was bound to assume planning responsibilities,and become in some sense a naval staff.

It might be thought that Key would have joined his Liberal masters in objecting to such an embryonic staff,but the circumstances were more propitious for it than one might suppose. Lord Northbrook,[1] Gladstone's First Lord,did not intimately concern himself with the Navy. He was an expert on India and the colonies,and his advice on these matters was more sought-after by his Cabinet colleagues than his work in a department which neither he nor they valued highly. So long as the Estimates were kept down, Northbrook was content to leave the running of the Navy to those, like Key,who enjoyed it,[2] and to this end he strengthened the administrative capacity of the Board by appointing an additional Civil Lord 'with special engineering knowledge'[3] (de facto an assistant Controller),and by once more elevating the Controller

[1]Thomas George Baring,1826-1904: 1857-66 Liberal MP for Penryn & Falmouth (1857-9 Civil Lord,1866 Sec.of Admiralty),1866 2nd Baron Northbrook,1876 1st Earl of Northbrook (1876-80 Viceroy of India, 1880-5 1st Lord).

[2]Bernard Mallet,Thomas George,Earl of Northbrook (London,1908), pp.152-3.

[3]George Wrightwick Rendel,1833-1902: a civil engineer by training 1858-82 Partner of Armstrong's & Director of Ordnance Works,later of Warship Building Yard; 1882-5 Civil Lord; 1887-1902 Managing Director of Armstrong Pozzuoli Co.,Naples. He was a brilliant inventor and engineer,but a poor administrator and businessman.

to the Board. Houston Stewart retired at the end of 1881,and was replaced by Rear-Admiral Brandreth,[1] no more forceful a personality than he,and a good deal less able. Northbrook was not the man to detect the implications of the F.I.C.,nor to object on any but financial grounds,and most of his Board were made in his image. Key was the most dangerous enemy of the idea,and he,as we have seen,was won over by Tryon. This was a good example of the usefulness of Key's failings,which played a significant part in the history of the Admiralty during his régime; a man who treated everything as administrative details,he seldom detected the implications of potentially revolutionary ideas such as this, and his pliable nature allowed those more intelligent than he to direct him into courses to which he would certainly have objected if he had realized what was being done. In spite of a certain fondness for new inventions,Key was an essentially conservative man,but his limited understanding and impressionable spirit often left him an unwitting tool in the hands of men more able and less reactionary than he.

Among the more important of these was the new head of the F.I.C., W.H.Hall[2] was well thought-of by his contemporaries,but not often thought of,and in the minds of posterity he is almost forgotten beside his famous son and successor,'Blinkers' Hall. He seemed a quiet,colourless man;efficient,but in no way outstanding. No-one appeared less likely to extend the work of his department or usurp the functions of the clerks; but Hall had an unusually deceptive personality. Behind his nondescript façade was a master

[1] Thomas Brandreth,1825-1894: 1844 Mate,1845 Lieutenant,1858 Commander,1863 Captain,(1867-8 Private Sec.to 1st Lord,1874-6 Capt.of HMS Excellent),1878 Rear-Admiral (1881-5 Controller,& 1882-5 3rd Sea Lord),1884 Vice-Admiral (1885-8 President of RNC Greenwich,1887 KCB),1889 Admiral,1890 retired.

[2] William Henry Hall,ca.1842-1895: 1862 Lieutenant,1875 Commander, 1882 Captain (1882-6 head of FIC,1886-8 Director of Naval Intelligence).

of the subtleties of Admiralty politics. Under his guidance the Committee grew quietly but rapidly in influence until,as we shall see,in the war scare of 1884-5,less than three years after its creation,it had already become something like a naval staff. Few men have wielded influence so effectively,yet so unobtrusively, as W.H.Hall.

The work of Tryon and Hall behind the scenes at the Admiralty is typical of the sort of progress that was being made throughout the Navy between 1878 and 1884. Although the Service continued to suffer from the apathy of the public,the neglect of politicians, and the incompetence of its own senior officers,significant advances were being made in many areas,advances not the less important for being piecemeal,and in most cases unobvious. Many contemporaries, and many subsequent writers,have seen the period as a further extension of the 'dark ages',not materially different from that which had gone before,but this is to ignore the powerful undercurrent of reform which was gathering momentum.

B. The Growth of Strategic Comprehension

During the seven years from 1878 to 1884, strategic thought in Britain could, like Gaul, have been divided into three parts. In ascending order of sophistication these were; thought within the Admiralty, official thought outside the Admiralty, and unofficial thought within and without the Navy. The last continued to develop in competence and scope from the advances of earlier years; the second grew to prominence almost from nothing; and the first underwent a fragmentation, and to some extent a decline.

In previous sections sufficient of the circumstances of Admiralty organization and personalities during these years has been explained to suggest in what ways the Admiralty's strategic comprehension declined. Milne and Phipps Hornby, with the timorous support of Ward Hunt, had devoted serious attention to these problems, but Cooper Key was not the man to imitate them, and the less than benign neglect of Northbrook did not encourage others to do so. Strategic thinking was not absent from the Admiralty, but to some extent it was unofficial, even covert, and emerged only from deliberate obscurity only when time provided it with a more favourable climate. Key himself never understood the concept of sea power. The man who in 1859 had initiated the Royal Commission on National Defence, in 1880 still emphasized the importance of coast defences against ironclads, and saw little real usefulness in cruisers.[1] Any proposal to study grand strategy was regarded by Key simply as a potential usurpation of his administrative domain.

Another powerful influence at the Admiralty continued his former beliefs. Barnaby still valued armed merchantmen far more

[1] Colomb, Memoirs of Key, pp. 482-3. Tunstall, Imperial Defence 1815-70, p. 826.

highly than regular warships for cruiser work. Their capabilities were vague but extensive, and included convoy, coast defence, blockade and the prevention of blockade, and 'disabling or destroying the armed ships of the enemy'.[1] He foresaw no serious difficulty in dealing with commerce raiders,[2] and recognized no real difference between the battleship and the cruiser.[3] He was firmly convinced of the advantages of building many small ships, heavily rigged and poorly engined, and noted with satisfaction the findings of a French committee that the French navy annually burnt coal worth 22fr.60c. for each ton of displacement, and the Royal Navy coal worth only 14fr.10c..[4] (The coal consumption of the Navy for each installed indicated horse-power per annum, rose 38% between 1860 and 1870, but fell 24% during the following decade[5]). Barnaby adhered to the old 'Liberal' view of cruiser design and function, undermined in the previous decade by Hornby and Milne, and now under Key returned to its last period of dominance as the orthodoxy of the Admiralty. Key and Barnaby, indeed, produced the classic statement of the doctrines of the old school.[6] It is unnecessary to rehearse in detail a position which has so often been explained. Implicit throughout both memoranda is one of the fundamental axioms of the whole 'Liberal' school; that action was not only the final arbiter, but the only element of naval warfare. Any conception of grand strategy, of

[1] Confidential Memorandum on Cruising Ships of War, 12th December 1878, in Carnarvon Commission, 2nd. Report, Appendix 6, p.187. (PRO: PRO 30/3/131).

[2] Ibid., 1st. Report, Minutes of Evidence, pp.44-48 (NMM: Milne MSS, unnumbered). Note the typical contradiction of his own views, ante p.94.

[3] 'Battle-Ships, A Forecast', JRUSI XXVII p.127.

[4] Memorandum of 2nd January 1884 (PRO: Adm.1/7254).

[5] Sir Henry Oram, 'Fifty Years' Changes in British Warship Machinery', TINA LIII (1911) p.105.

[6] Key's memorandum 'On the Best Type of Small Unarmoured Vessels for the Navy', 6th March 1882 (PRO: Adm.1/7254). Barnaby's memorandum of 2nd January 1884, cited n.4 supra.

manoeuvres,combinations,and stratagems,of causes or effects,was entirely lacking. All was well so long as British ships were capable of meeting their foreign counterparts in battle. Barnaby made this assumption explicit in refuting the suggestion that the China Squadron was under any disadvantage because its flagship, H.M.S. Agamemnon,could seldom steam thirteen knots,and the French flagship,the Tourville,could make seventeen knots. The French ship was not an ironclad,Barnaby wrote,consequently could not face the Agamamnon in action,so offered no threat. It is worth going in some detail into the contrast between this simple and comfortable theory,and the actual situation in Chinese waters, because the contrast exemplifies the limitations of the 'Liberal' school.

The Tourville was well armed,but could not face the Agamemnon in close action because she was unarmoured. On the other hand she was more than four knots faster,carried coal for five thousand miles at ten knots,was sheathed and coppered to keep the sea without docking,and capable of cruising under sail. The Agamemnon, together with the sisters Audacious and Iron Duke which,apart from the Agamemnon's two years (1885-6) alternated as flagships in China from 1872 to 1889,were easily capable of sinking the Tourville,could they have brought her to action. All three ships were heavily rigged and very bluff,they could not be trusted under sail alone,[1] and their sea speed never approached the trial speed of thirteen knots with which they were credited. None was coppered, and in order to preserve some mobility,they had to be docked annually. There was only one dock on the station which could take them,at Nagasaki. None of the three carried enough coal

[1]Nor,in the Agamemnon's case,under steam. This sister of the Ajax shared her twin's notoriously unreliable steering,and it was said that she was sent to China as the only place where she could not possibly run into another British ironclad.

to steam against the monsoon from Singapore to Hong Kong,or from Hong Kong to Japan,so they could only go north to dock with the Spring Monsoon,and had then to remain in Japanese waters until the North-East Monsoon in the autumn allowed them to return. A large part of the squadron,being likewise unable to face the monsoon,and too weak to be left unsupported in the event of any emergency,accompanied the flagship,at her economical speed of three or four knots. For twenty years the China Squadron pursued a stately annual progress,as immutable as the changing round of seasons which dictated it. In the event of war it would have been physically impossible for the British commander to have altered it.[1] It is hardly necessary to comment on the strategic limitations thus imposed on him. Few more classic instances could have been found of the practical consequences of misconceived designs.

Outside the Admiralty,however,official thinking was making rapid progress. The work of the War Office Defence Committee, the 1878 Colonial Defence Committee,the Carnarvon Commission, and the 1885 Colonial Defence Committee,has been thoroughly studied,[2] and need not here be closely described. The great influence of Milne's thinking on these bodies provides a link with the Admiralty of the mid-1870's,and the growth of an alternative official school of policy,in Whitehall,but quite independent of the Admiralty,introduced a new and potent element into the balance of influences on naval policy. First Lords and Cabinets were no longer forced to choose between traditional ideas supported by all the prestige of the official system,and

[1] Vesey Hamilton to Hood,22nd December 1885,20th & 29th October 1886 (NMM: VHM/3,Admiral's Private Out-Letter Book,China,1885-6). Vesey Hamilton to Lord George Hamilton,19th January 1886,& to Lord John Hay,21st February [1886] & 9th March 1886 (Ibid.).

[2] Ranft,Naval Defence of Trade,& Schurman,Imperial Defence,passim.

radical ideas proposed by young officers with no formal standing. The new 'official' school,like so many other developments during this period,found itself ignored or even suppressed under Gladstone's administration,only to burst forth with increasing vigour and effect in 1885.

Of the three currents of naval thinking,only the unofficial, Service stream was unaffected by the chilly attitude of the Establishment. The R.U.S.I. and I.N.A. continued to flourish, to display ever-increasing sophistication and method,and ever-growing influence and standing.

Two papers of 1880 amply demonstrate the scientific approach of the best thinkers of the day. Captain Long[1] gave a paper on the use of merchant steamers in war.[2] It was a paper replete with practical information and statistics: statistics of trade and steam tonnage,or cruiser numbers,of the weight and power of all sorts of guns,of every detail of a wide variety of warships and merchantmen. These were not merely quoted for effect,but used to deduce practical conclusions about the limitations and capabilities of merchantmen in all sorts of situations,their tactics and strategy,the effctiveness of convoy and patrol,and many other points. That this empirical approach was not confined to Long was shown by the publication in the same volume of the J.R.U.S.I. of tabular details of all important foreign warships.[3] Evidently naval officers were feeling the need to inform themselves on such matters. Long's paper had itself followed another outstanding

[1]Samuel Long,1840-1893: 1859 Mate,1860 Lieutenant,1868 Commander, 1876 Captain,1891 Rear-Admiral. He was a torpedo expert,highly regarded by all,whose promising career was cut short by a riding accident.

[2]'Tactical Aspects of the Utilization of Ocean Steamers for War Purposes',JRUSI XXIV p.415.

[3]'Lists of Armoured Ships,and of Unarmoured Ships of the Newer Type,belonging to different Foreign Navies',JRUSI XXIV p.563.

contribution on the same subject.[1] Its author,Currie,dealt mainly with the strategy and organization of a merchant cruiser force. Something of the international standing of the R.U.S.I., as well as Russia's interest in the subject,was shown by Currie's paper being at once translated in the Morskoi Sbornik.

In 1881 J.C.R.Colomb again delivered an important paper at the R.U.S.I..[2] His subject was ostensibly the importance of an intelligence department. It was by now current coin of all serious naval thinkers that without detailed information of the extent and nature of British trade,how and where it passed,as well as the potential threats to it,it would be impossible to protect it. At the same time Colomb unconsciously demonstrated the implications of an intelligence department by extending his subject into the field of grand strategy. The paper is important, because it plainly states a strategic doctrine not,in itself, original,but never before codified; a doctrine which was to become the accepted orthodoxy of naval strategy in later decades. This was the plan of protecting trade by patrolling,or even controlling, what were later called 'focal areas',and patrolling the sea lanes between them. Here is a case where Colomb's enormous influence may justly be regretted. At this time,and for some time after,a flat rejection of convoy was chiefly typical of the older 'Liberal' school. Thinking officers of the younger school seldom condemned convoy out of hand,and many were enthusiasts for it. It was unfortunate that J.C.R.Colomb's great influence should have contributed to extinguish in later years the opinions,at least partly in favour of convoy,of such men as Long,P.H.Colomb, R.H.Harris,Crutchley,Houston Stewart,and even Key.

[1] Donald Currie,'Maritime Warfare; The Adaptation of Ocean Steamers to War Purposes',JRUSI XXIV p.81.

[2] 'Naval Intelligence and Protection of Commerce in War',JRUSI XXV p.553.

The years from 1878 to 1884 were outwardly a time of slight advance,even of regression,in naval thinking and organization, but the appearamce was to a large extent deceptive. Behind a façade of official neglect the study of grand strategy and naval policy was developing rapidly. It was becoming more and more difficult for Admiralty and Cabinet to adhere to the old 'Liberal' view of the Navy. Behind the scenes a pressure of discontent with the existing outlook was building up,not only among the young officers who might have been expected to harbour radical ideas,but also among experienced admirals,senior civil servants, and observant politicians. The apparently somnolent naval world of the early 1880's wanted only a suitable incident to provoke it into activity. The Pendjeh crisis and the downfall of Gladstone's government in 1885 provided it.

C. The Decline of the Belted Cruiser

Lord Northbrook's five years in office saw the last classes of belted cruisers ever built for the Navy. When he came to office the time was propitious for such ships. The 'Liberal' view itself, attaching high importance to ironclads, and very little to such ships as the Iris, (completed a year earlier) tended to favour the type. The pure 'Liberal' school, of course, deprecated the wastage of armoured warships on foreign stations, but once this position was abandoned, the armoured cruiser was much more palatable to men of such beliefs than its new rival, the protected cruiser. The 1878 war scare had shown the weakness of British squadrons against such adversaries as the Gertsog Edinburgskii (completed in 1877). In 1880 a new and more powerful successor, the Dmitri Donskoi, was under construction. At the same time the completion of the Northampton, which ran her trials in December 1878, had not encouraged faith in existing designs. The need for armoured flagships on overseas stations was further emphasized by an action off the Peruvian port of Ylo on 29th May 1877, in which the Shah, Pacific flag, and the corvette Amethyst, engaged the old Peruvian turret-ram Huascar, which had been seized by some failed rebels turned pirates. The resulting indecisive action demonstrated, among other things, the extreme inaccuracy of British gunnery, the great discrepancy between the theoretical power of guns on a proving range, and their actual effectiveness in action, and above all, the vulnerability of unarmoured warships, however powerful, in action against ironclads, however diminutive. The Shah might have done better had she been armed with heavy guns of long range, as Reed had intended, but she had only lighter pieces, and did not dare to close the range to a point at which they might have become effective. Here again was a powerful argument for building armoured cruisers for foreign

service.

With all these factors suggesting a new belted cruiser design, it is not surprising to find one under consideration a few months after Northbrook had assumed office. In August 1880 Barnaby was engaged in working out two designs; an improved Shannon/Nelson type, and a battleship like the Témméraire with her armament mounted en barbette.[1] In view of the enthusiasm of the Board, and especially the Controller, for barbette mountings, (of which the Témméraire carried the only examples in British service) as well as the fact of the battleship's design being among the cruiser's papers, we may infer that they were connected, and they were certainly submitted together on 6th November,[2] Barnaby objecting to barbettes for armoured cruisers. The Controller, Parliamentary Secretary,[3] Civil Lord,[4] and First Lord,[2] all expressed their approval of the idea of a fast armoured cruiser, and on 24th the Board instructed Barnaby to work out two alternative versions, one a protected, the other a belted cruiser, preferably with barbettes.[5] On 29th Barnaby was given the sketches by W.H.White, and next day he submitted them to the Controller, again objecting to the Board's preference for barbettes.[2] On 1st December the Board decided to have a sixteen-knot, 7,000 tons ship with a ten-inch belt. At the insistence of the D.N.O., his assistant, and the Controller, barbettes were to be fitted.[5] Thereafter the design proceeded under the charge of W.H.White.[6] On 10th December the

[1] Statement of Dimensions, etc., of 'New Témméraire', 19th August 1880 (NML: Adm.138/74, Cover of Warspite & Impérieuse, p.8).

[2 (ter)] PRO: Adm.1/6608, 1st. August 1881.

[3] George John Shaw-Lefevre, 1831-1928: Eton & Trinity, Camb.; 1863-85 Liberal MP for Winchester (1866 Civil Lord, 1871-4 & 1880-1 1st Sec. of Admiralty, 1883-5 PMG), 1886-95 MP for Bradford Central (1892-4 1st. Commr. for Works, 1894-5 Pres. Local Govt. Board), 1906 1st. Baron Eversley. A vain and unprepossessing man, but an able and devoted public servant. Although wedded to the strictest principles of economy, he was respected by naval men because, alone among Parliamentary Secretaries, he was thoroughly knowledgeable of naval affairs.

[4] Brassey

[5 (bis)] NMM: Adm.138/74, Cover of Warspite & Impérieuse, pp.10-12, 16, & 21-22.

[6] See overleaf.

Board ordered an armament of four 9.2-inch guns,hand loaded, in individual barbettes arranged lozenge-wise,although White and Rendel preferred twin mountings fore and aft, with power loading.[1] The Warspite and Impérieuse,as the new cruisers were called,were launched at the end of 1883,and completed in 1886. Like all British ships of the period,they suffered from very long construction periods,so that instead of being contrasted with the Nelson,over which they were an enormous improvement,they were compared with later and better ships. They carried a heavy armament at sixteen knots,were well armoured,and had a maximum range at ten knots of over seven thousand miles. On the other hand,the disposition of armament on which the Board had insisted was not a success. It absorbed too much weight,and the tumblehome introduced to give the beam guns fine arcs of fire forward and aft reduced stability but not blast effect. The brig rig which the Board had demanded was an unmitigated failure,and indeed,the cause of all remaining rigged ironclads being cut down. Various improvements ordered by the Board during construction of the ships made them overweight on completion,and to those,like Reed,who attached enormous importance to the position of the waterline on the armour belt, this was a serious matter. Nevertheless,the Warspite and Impérieuse must be counted a qualified success. In 1890,when the design was already ten years old,they were still superior to the new

[6] William Henry White,1845-1913: son of a Devonport currier; 1859 shipwright apprentice,1864-7 RSNA Kensington,1867-83 Constructors' Dept.(Reed's professional Sec.,then Sec.of Council of Construction; 1870-81 Professor of Naval Architecture at RSNA & RNC Greenwich),1883-5 Director of Elswick Yard,1885-1902 DNC & Asst.Controller (1895 KCB).

[1] NMM: Adm.138/74,Cover of Warspite & Impérieuse,pp.368 & 373.

Russian armoured cruiser Admiral Nakhimov.[1] White had produced the first belted cruiser in which cruiser qualities had plainly been given priority over all others.

Before these ships were completed, however, the Admiralty had designed the last class of belted cruisers ever built for the Royal Navy. The Orlando Class became celebrated, not for their own qualities, but as a test case, which finally and publicly exemplified the lack of any overriding direction of design policy.

In the early part of 1884 the Navy was viewed by the public and by politicians with the usual placid complacency. In the House of Lords on 10th July Lord Northbrook incautiously declared that, in the uncertain state of naval architecture, 'The great difficulty the Admiralty would have to contend with if they were granted £3,000,000 or £4,000,000 to-morrow for the purpose referred to [scil. building battleships] would be to decide how they should spend the money.'[2] On 2nd August Northbrook, as the Cabinet's expert on these matters, was asked to go to Egypt with his cousin Sir Evelyn Baring to suggest a cure for the critical condition of Egyptian finances. He was thus absent from the country when, on 15th September, the Pall Mall Gazette published the first of its famous articles 'What is the Truth about the Navy ?'. It is beyond the scope of this study to examine how and why public opinion was ripe for such an appeal;[3] it is sufficient to note that it was instantly and fiercely aroused, and the government, hard-pressed on several fronts, determined to

[1] Ibid. p.196.

[2] Mallet, Northbrook, p.200.

[3] A.H.Marder, British Naval Policy, 1880-1905 (London, 1940), pp.121-2. J.C.B.Tunstall, Imperial Defence, 1870-97, p.243 (in Cambridge History of the British Empire, Vol III). Frederic Whyte, The Life of W.T.Stead (London, 1925, 2 vols.) I, 145-158.

yield. In Northbrook's absence, and against his judgement, an emergency programme of £3,000,000 was decided on. This programme Northbrook had to announce in Parliament on 4th December, and it has ever afterwards borne his name. By a cruel irony, he became known, and has since been remembered, as the man who asked for three million pounds less than six months after he had declared that he would not know how to spend such a sum.[1]

In the autumn the Admiralty were thus faced with the task of deciding what to build in the supplementary programme. They had to do so in great haste, and in the absence of the First Lord. On 6th October Rendel proposed a belted cruiser design, to be based on the Mersey Class protected cruisers.[2] The constructors had already been thinking along these lines, whence no doubt Rendel's proposal, and there survive sketches for an enlarged Mersey type with 9.2-inch guns, dated 15th June 1884, and for a belted cruiser based on the Mersey's design, dated 19th August.[3] Evidently the suggestion was well received, because the surviving papers show intense activity thereafter. By 27th October a preliminary design for the new belted cruiser was ready, suggesting an armament of two 9.2-inch and twelve six-inch guns. On 1st November, the day before Northbrook returned, Barnaby presented it to the Controller. During that month the question of belt or deck was canvassed, and Rendel's advocacy of the former carried the day.[2] The design received the Board stamp on 24th November, but the following January was revised and enlarged,[2] and it was to this enlarged design that the seven ships of the Orlando Class were built.

[1] Mallet, op.cit. p.206.
[2(ter)] NMM: Adm.138/77, Cover of Orlando Class, ff.1-3, 9, 12-16, & 32.
[3] NMM: Adm.138/80, Cover of Mersey Class, ff.106 & 107.

The class was judged, and has been remembered, rather unfavourably, but it was unfortunate in the time and circumstances of its building. A cruiser of 5,600 tons, carrying two 9.2-inch and ten 6-inch guns at nineteen knots, with a ten-inch belt and coal for eight thousand miles at ten knots was a formidable unit, a vast improvement on those that had gone before, and, more importantly, fully adequate for her duties. The class did combine the functions required of an armoured cruiser, being both a match for foreign ironclads likely to be met overseas, and genuine cruisers with the necessary qualities of speed and range. The Orlando's are remembered, however, as the classic example of the failings of the Admiralty system. We have seen how there was no formal division of responsibility in the preparation of designs, but rather an informal process of influence.[1] The evils of this system, or lack of system, were amply demonstrated by the Orlando. Barnaby's initial calculations of weights were optimistic, and included, as usual, only a 'legend' coal capacity.[2] After the design had been approved, numerous extra weights were added (notably triple-expansion engines in place of the original compound), and although the design was somewhat expanded, no full account of the extra weights was taken. Barnaby and the Board each assumed that the other bore responsibility. The result was that the ships turned out, like the Impérieuse and Warspite, but to a greater

[1] There is most illuminating material on this in the varying opinions of witnesses before the Contract Committee. See Report of the Committee appointed to enquire into the Conditions under which Contracts are invited for the Building or Repairing of Ships, including their Engines, for Her Majesty's Navy, and into the Mode in which Repairs and Refits of Ships are effected in Her Majesty's Dockyards. With Minutes of Evidence and Appendix [C.4219] (PP: 1884-5 XIV pp.125-364), especially the evidence of Barnaby (p.43/171, QQ. 280-297), Brandreth (pp.34/162, 35/163 & 38/166, QQ.99-107 & 187-192), Reed (pp.108/236, 109/237, 113/241, & 115/243, QQ.1827-1835, 1884-1889, & 1914), & Houston Stewart (p.139/267, Q.2498).

[2] See note on coal stowage in the Appendix.

extent,much overweight. Fully laden,their belts were nearly submerged. In that position the belt protected the vitals as well or better than when exposed,but it was generally admitted that a deck offered more economical protection to the vitals,and the advantage of the belt was the security it gave to the waterline, and hence to buoyancy and stability. These advantages were negated if the belt were submerged. Probably the effect on the ships' fighting capabilities in practical circumstances was much exaggerated by contemporaries,but the real issue,as they rightly saw,was the failure of the Admiralty which the episode revealed:

> 'These papers are very unpleasant reading,and they exhibit a want of co-operation and foresight amongst the different officers and departments in 1885 which is quite inexcusable. Five vessels of a new type costing nearly £1,500,000 are ordered on a design approved hastily by the Board....no consultation takes place between the designer and the officers responsible for gunnery, complement or engines,the weight for each being either arbitrarily assumed or insufficiently considered. Yet with his own weights ——————— [word illegible] favourably calculated a design is put forward by the late DNC and passed,which with all her coal aboard immerses the whole of the belt except 3 inches. No margin for additional weights is allowed,triple expansion engines and electrical lighting are ignored. Even assuming that no extra weights during construction were added,an impossible contingency to an experienced designer,the utility of the belt from its deep immersion is largely reduced.....
>
> A Board of Admiralty is for naval purposes a most effective system of administration,providing there is thorough cooperation between its different members,and the departments they respectively supervise. If no such co-operation with its attendant responsibility exists, the Board in its corporate capacity is simply a system for the avoidance of personal responsibility.'[1]

[1] Minute of Lord George Hamilton,11th February 1887 (PRO: Adm.1/6873, 5th December 1887).

The design of the Orlando Class thus served to epitomize the faults of the old system of which they were the last products. They were the last belted cruisers ever constructed for the Navy, and when armoured cruisers were again built at the end of the century,it was to very different models. The belted cruiser type, propelled before the winds of engineering advance,had evolved from the unsatisfactory second-class ironclads of the 1860's into a genuine 'cruiser capital ship'. During that twenty years, however,the general understanding of cruiser functions had grown further and faster. It was no longer sufficient that the Orlando's were a great improvement on their predecessors; they were compared with rival designs,existing and projected,and they were found wanting. In particular,the protected cruiser seemed to offer far better cruiser qualities for only a notional sacrifice of fighting capacity. The Orlando Class were the last and finest representatives of a species which was already becoming obsolete. In themselves they may be thought of as well-conceived and reasonably successful,but built at an unfortunate time,when the belted cruiser type was already suspect. They might never have been built at all if the autumn of 1884 had offered more time for reflection. In the circumstances of their conception and creation they represented the last of a long line of warships, chosen in haste,for political rather than military reasons, evolved in a confused and irresponsible system,to serve ends never clearly identified,by means never fully discussed.

D. Elswick and Other Cruisers

In previous sections the original 'Liberal' school of thought has been described in decline during the early 1880's. This was the last period during which it enjoyed any official status and, indeed,Northbrook's and Key's administration represented the swan-song of the old 'Liberal' school,at a time when most experts were rapidly abandoning it. That reliable barometer of informed opinion,Thomas Brassey,who was Civil Lord in Northbrook's Board,had thrown off his former allegiance by 1880,and was advocating large cruisers of great speed and range,rather than numerous small gunboats.[1] While the pure 'Liberal' school declined,however,a related body of opinion was enjoying new influence.

Ever since the introduction of ironclad battleships,if not before,there had been naval officers and civilians ready to advocate as 'giant-killers' some form of small warship. Little gunboats,each armed with a single heavy gun,were the fashionable type during the 1860's and 1870's,and a large fleet of them was built. Even in those days of limited strategic understanding, few naval men could be convinced that a swarm of miniscule gunboats,incapable of operating on the high seas,could usurp the functions of a battleship,even if they could sink her in favourable circumstances. The idea,however,remained highly attractive, though the means to realize it were still wanting. Throughout the history of naval design,there has been a tension between those wanting few ships of surpassing power,and those advocating more ships,individually weaker,but collectively stronger,and strategically more flexible. To replace battleships by small

[1] Brassey,British Navy,II,292-313. 'Observations on the Strength of Foreign Squadrons,and the Ship-Building Policy of the Navy', 25th November 1881 (PRO: Adm.1/6600/B.331).

boats might be thought an extreme example of the trend,but the idea had desirable associations. Small,cheap and simple warships, perhaps even manned by reservists and volunteers,were obviously attractive to Liberal principles. But it is not only a common political connection which links this school of thought with the 'Liberal' school,so superficially opposite with its advocacy of battleships to the exclusion of cruisers. Both depended on the same limited view of the character of naval warfare,seeing it as the clash of battlefleets in narrow seas to promote or frustrate schemes of invasion. Any idea of grand strategy or command of the sea would at once have exposed the absurdity of eliminating either the battleships which should secure it,or the cruisers which should exercise it. In practice the pure 'Liberal' school and the 'David and Goliath' school were closely linked,usually advocated by the same sort of people,and sometimes even combined.

One who managed to associate these apparently incompatible doctrines was Barnaby,who towards the end of his career was much influenced by the Italian designer Benedetto Brin. He had designed battleships of great speed and power,which entirely discarded vertical armour and relied on an armour deck and complete subdivision,thus being in effect gigantic protected cruisers. This was one aspect of the revulsion against armour produced by the era of the monster gun. In his latter years as D.N.C.Barnaby added to the confusion which had always characterized his view of naval warfare by rejecting protected cruisers without vertical armour at the same time as he advocated battleships without vertical armour.[1]

[1] 'Battle-Ships,A Forecast',JRUSI XXVII p.127. Papers by Barnaby with comments by the Board (PRO: Adm.1/6608.1st August 1881); in these Barnaby simultaneously submitted the draft design of the Impérieuse,and suggested a fast unbelted battleship of the Italian type.

At the end of the 1880's technical advances once more offered hope of evolving small warships capable of matching the ironclad battleship. On the one hand the development of the Whitehead torpedo presented an obvious threat to the ironclad, and on the other breech-loading guns and compound engines greatly improved the capabilities of conventional warships.

The torpedo was most eagerly seized upon in France, where the famous 'Jeune École' may be regarded as the counterpart of the 'David and Goliath' school in Britain. Like it, the 'Jeune École' was closely associated with political radicalism; indeed, so intimately bound up was it with political and social movements that there is some doubt whether they may be called strictly professional doctrines,[1] which:

> 'étaient prônées par des ésprits sérieux, mais aussi par un certain nombre de personnalités pittoresques de notre métier, bohèmes militaires en quête d'inédit, auxquelles s'étaient joints quelques civils bien intentionnés mais incompétents'.[2]

During the 1880's the principal exponents of the Jeune École were Théophile Aube and Gabriel Charmes. Admiral Aube, who became Minister of Marine in the short-lived Radical government of 1886, had spent almost all his career as a colonial administrator, and was rumoured never to have seen a torpedo-boat before he took office. Charmes was a journalist with no knowledge of the sea.[3]

If the Jeune École may be ragarded as the French counterpart of the 'David and Goliath' school in Britain, it is certain that the latter was led by very different men, and took a very different

[1] Ante, p.121.

[2] Castex, Théories Stratégiques, I, 51.

[3] For succinct analyses of their beliefs see P.H. Colomb's review of the English translation of Charmes's principal work (JRUSI XXXI p.767), and Le Masson, 'Politique Navale Française' (Revue Maritime, 1968, pp.189-196.)

course. Its chief proponent was Sir William Armstrong, and the progress of his ideas closely followed the progress of his firm. Originally manufacturers of hydraulic machinery, Armstrongs branched into ordnance in the 1860's, and when the growing size of their pieces caused the citizens of Wallasey to forbid the use of Whitley Sands for proving, Armstrongs built a gun-raft for trials out to sea. This was their first ship, and from her derived the design of the 'flat-iron' coast-defence gunboats, most of which Armstrongs built. During the 1870's they became more ambitious, building small but powerful coast-defence ships for China (the 'Greek Alphabet' Classes). All this was in concert with the developing ideas of Sir William himself, which may be discerned in embryo as early as 1872,[1] and were fully expounded in his address as President of the Institution of Civil Engineers on 10th January 1882.[2] The essence of his thesis was that small protected cruisers, of high speed and heavy armament, would sink and supersede battleships. His views were fully developed at a time when his firm was the only one able to build such vessels. Armstrong took the decision to undertake the building of major warships only in 1878. A new shipyard at Elswick-on-Tyne was begun, and in the meantime he rented slips at Mitchell's Low Walker Yard. In 1882 Armstrong bought Mitchells, and the 'Elswick' cruisers continued to be built at Low Walker until the Elswick yard was opened in 1884. The new enterprise was run by Armstrong's partner George Rendel,[3] and the first ships he produced were three large gunboats or coast-defence ships laid down for China and Japan in 1879 and 1880. On a displacement of less than 1,400

[1] Letter to Lord Dufferin in Report of Committee on Designs (PP: 1872 XIV pp.xxiv/524-xxvi/526).

[2] Minutes of Proceedings of the Institution of Civil Engineers (London, 1837 et seq.) LXVIII p.36.

[3] Ante, p.136 n.3.

tons,these remarkable little vessels carried two 10-inch guns at sixteen knots,with a range of five thousand miles at eight knots,and a partial armour deck in wake of the machinery. These were vessels of great power for their size and function,although they were poor seaboats,and their guns,albeit very heavy,had restricted arcs of training and slow rates of fire.

These ships were the immediate ancestors of the famous Esmeralda,laid down at Low Walker for the Chilean Navy in April 1881,to Rendel's design. This ship made the fortunes of the Armstrong company,and established a type which in essence remained unaltered until recent times. She is usually regarded as the first true protected cruiser,although of course many ships partly protected (with an incomplete deck) such as the Comus Class,had already been built. When the Esmeralda ran trials in July 1884,she created an enormous sensation. She was widely compared with the then just created Comus Class,a comparison in itself unfair,because their design was four years older and somewhat smaller,but one which brings out something of the dissatisfaction with Admiralty designs that was engendered:

	Comus	Esmeralda
Displacement (tons):	2,383 (legend)	3,050 (full load)
% armament:	6.5%	7.6%
% armour:	5.8%	3.5%
% machinery:	16.0%	20.8%
% coal:	11.3% (14.9% full load)	19.7%
% hull:	55.8%	42.6%
Trial speed:	13 knots	18.3 knots
Range at 10 knots:	3,600 miles (max.)	6,000 miles
Armament:	2 4½ ton,7-in.RML	2 10-in.RBL
	12 64 pdr.RML	6 6-in.RBL
Armour:	1-in.flat deck amidships	1-in.arched steel deck throughout [1]

[1] See Appendix

The Esmeralda, over five knots faster, could stand off and sink the Comus, and most other British cruisers, at a range which their muzzle-loaders could not hope to match. If she chose to close the range, the superior rate of fire and muzzle velocity of her breech-loaders, and her own relative invulnerability with a complete armour deck, still gave her an enormous advantage. In strategical terms, a sea speed and range nearly double that of the Comus vastly improved on her potential. The Esmeralda's trial speed was obtained under forced draught, but she could maintain a speed of fifteen or sixteen knots under natural draught for long periods. The Comus Class, with their heavy rig and full lines, had a sea speed of only about eight knots.

Certain things must be said in favour of the Admiralty design. It was older, and it was smaller, though if a full-load displacement be taken, comparable with the Esmeralda's, the difference was not great. The Chileans, having an excellent graving dock, did not consider it necessary to copper their ship, which saved some weight. Moreover the Esmeralda was not without her defects. Her freeboard forward was only eleven feet, and with heavy guns fore and aft and fine lines, she was always wet and lively, whereas the Comus Class were excellent seaboats, dry and steady.

The real faults of the Esmeralda lay in her conception. She was a cruiser; she was conceived and employed by the Chileans as a cruiser, and she was treated by everyone as a cruiser, but Armstrong and Rendel intended her as a battleship-destroyer, and therefore endowed her with two 10-inch guns. Like the heavy guns Reed had given the Inconstant fifteen years earlier, they were meant to allow her to stand off from powerful opponents and fight at a range at which she was relatively invulnerable. The new Armstrong 10-inch breech-loader was as powerful, and of longer range, than much larger muzzle-loading pieces, and the Esmeralda's

speed allowed her to dictate the range. In practice, this conception of Armstrong's was probably a chimaera, and it may be ignored, because it was never put into effect, and the Elswick cruisers and all their descendants were always treated as cruisers pure and simple. For such ships 10-inch guns were quite unnecessary. The Esmeralda could have doubled the number of 6-inch guns instead, and the new Armstrong 6-inch breech-loader could outrange almost all other cruiser weapons, besides firing heavier shell faster. She had no need of the 10-inch to outrange other cruisers, and moreover she had no real need to outrange them, since her complete steel armour deck gave her an enormously greater degree of security than any unarmoured or partly protected cruiser, and a consequent superiority at close range. Perhaps for the Chileans, who had no battleship, and would have had to rely on the Esmeralda in the unlikely event of being attacked by one, the heavy guns were excusable, but they were certainly pointless in the second Elswick cruiser, the Giovanni Bausan, whose Italian owners were clearly not going to employ her against ironclads.

One of the ironies of naval development in the early 1880's is that at least two men, Armstrong and Key, found that they had designed important new cruiser types while trying to do something quite different. It is equally ironic to see Rendel as the designer of a new and all-powerful type, which he was to abandon four years later in favour of the Orlando design, so that the much-vaunted battleship-destroyer was apparently considered by its designer inferior to the old (and many would have said discredited) type, the belted cruiser.

While Rendel was designing the Esmeralda, the Admiralty were discussing a new class of fast cruisers for the protection of trade, and it is instructive to compare this design with the Esmeralda's. Within the Admiralty there was a sharp difference

of opinion,Sir Cooper Key wanting an improved Comus type with full rig.to steam fifteen knots,while others wanted a lightly-sparred seventeen-knot ship. This latter view,endorsed by W.H. Smith,prevailed.[1] The three ships of the Leander Class were the first fruits of the success of the Iris,completed in April 1879. They were based on her lines,with a sacrifice of a knot to obtain an armour deck amidships.[2] As fast cruisers exactly contemporary with the Esmeralda they may be compared with her:

	Leander	Esmeralda
Displacement:	3,800 tons (legend)	3,050 tons
% armament:	4.4%	7.6%
% armour:	5.3%	3.5%
% machinery:	20.5%	20.8%
% coal:	19.4% (24.5% full load)	19.7%
% hull:	41.6%	42.6%
Speed (forced draught):	17 knots	18.3 knots
Range at 10 knots:	8,000 miles (max.)	6,000 miles
Armament:	10 6-in.RBL	2 10-in.RBL 6 6-in.RBL
Armour:	1½-in.deck amidships	1-in.deck throughout
Length:Beam ratio:	6.5:1	6.5:1 [3]

The comparison is not discreditable to the Admiralty. The Leander was larger,slightly slower but of greater range when fully stowed. She carried more armour less well disposed,but on the other hand her lighter armament was much better chosen for her work. With higher freeboard and light pieces fore and aft, the Leander was much the better seaboat.

The real differences between the two ships lay in the philosophy behind them. In their different ways both parties misconceived their very successful ships. The Admiralty,at least

[1] Brassey,British Navy,I,477 & II,303. Admiralty Digest of Correspondence. 1880,Sect.91-2 (PRO: IND 18286)

[2] Philip Watts,'Warship Building,1860-1910',TINA LIII Pt.I (1910), p.314.

[3] See Appendix.

under Northbrook, regarded the Leander's as an interesting and useful new type, but no substitute for the traditional rigged cruiser. Armstrong saw the Esmeralda as a battleship-destroyer. The importance of both designs lies in their impact on the public and professional mind. When they were completed in 1884 both types, and above all the Esmeralda, were at once recognized as cruisers obviously and dramatically superior to existing types. It was no longer possible to accept the old designs as adequate, because substitutes of proven worth existed, not as gleams in a reformer's eye, but as actual operational warships. Thus the completion of the Esmeralda in the summer of 1884 was not the least important of the influences which combined to produce a period of rapid change in naval policy.

E. Torpedoes and Torpedo-Cruisers

The direct influence of the Whitehead torpedo on naval policy and design has often been noted. In due course the weapon called forth new types of warship,new tactics and new strategy. The torpedo-boat,from which descend destroyers,and through them many modern types,has been noticed briefly in these pages,and copiously in others. Less well-known is the influence of the torpedo on the development of cruiser design. Just as Sir William Armstrong,in attempting to evolve a rival for contemporary battleships,actually created a new cruiser type, so Sir Cooper Key,seeking for a warship to carry the torpedo in fleet actions,inadvertently produced a powerful cruiser type.

The technical progress of the Whitehead torpedo was comparatively slow,and it was recognized as a potentially decisive weapon some time before it actually became one. In the early 1880's,when the fish torpedo was already nearly twenty years old,it was only beginning to be a practical weapon,but there already existed a considerable body of doctrine on its use. The torpedo was obviously best used against ironclads,which it threatened at their most vulnerable point. Thinking therefore concentrated on the question of what sort of ship should carry the weapon in fleet actions. There was general agreement that the ironclads,though they might themselves carry torpedoes, should be supplemented by smaller vessels of higher speed,to work with them as auxiliaries for attack with,and perhaps defence from,torpedoes. Opinions differed on the best size of ship to use. The French favoured torpedo-boats,which were cheap enough to be numerous,and small enough to be difficult targets. They were,on the other hand,unseaworthy,very flimsy,fast for their size but barely faster than ironclads at sea; and British opinion tended to favour a larger vessel,better able to keep up

her speed in a seaway, better able to fight off enemy torpedo attacks, and perhaps also better protected. The successful construction of the Heroine Class sloop had shown that warships as small as 1,400 tons could be given an armour deck, and a vessel so fitted would obviously be more able to hold her own in a fleet action. There was much disagreement about the optimum size of a 'torpedo-cruiser', but with Sir Cooper Key's arrival at the Admiralty it was certain that the question would receive a practical test, for he was one of the leading enthusiasts for the idea.

It may seem paradoxical that Key, a man of limited comprehension and basicly conservative mind, should have been a supporter of a novel type like this, but in fact it was thoroughly in character. Like so many of the conservative officers of the day, he was happy to admit new ideas so long as they were expressed in new types to fulfil new functions. What they always fought was any suggestion of replacing the old types to which they were so attached. So long as Key was allowed to keep up a fleet of the old steam-and-sail cruisers, he would happily experiment with any number of torpedo-cruisers. Furthermore Key, with his myopic view of naval warfare, did not understand until too late that the new type he had created was certain to supplant the old types he so cherished. In this, as with the creation of the Foreign Intelligence Committee, Key's very fault was a virtue, in that he cheerfully supported innovations which he would have fiercely resisted if he had realized that by implication they subverted so much that he wished to preserve.

It is therefore no surprise to find Key staunchly resisting any replacement of the old cruiser types, and at the same time proposing a torpedo-cruiser which was in fact to do just that. In December 1881 he advocated;

> 'The designing of a small sea-going vessel to be attached to a squadron, and not to attach so much

importance to the torpedo armament of our large ironclads'.[1]

In the same month he roundly rejected Brassey's assault on the traditional types of cruiser and gunboat.[2] Meanwhile the project for a torpedo-cruiser was gathering way. Barnaby favoured the Polyphemus type of armoured torpedo-ram,[3] but a lighter and cheaper vessel was decided on, and W.H. White was instructed to work out a design based on the Leander/Iris type.[4] During April and May 1882 White was working on this design with the plans of the early Elswick cruisers beside him.[5] His sketch based on the Leander was to be of 2,800 tons, with a two-inch armour deck, four 6-inch guns and about ten torpedo tubes, with a speed of sixteen knots. The submerged torpedo tubes, however, posed a problem, because they had never been tried at sea, and could not be until the Polyphemus ran trials (she was launched in June 1881). 'Should the experiment with submerged torpedo tubes prove unsuccessful', White proposed an armament with heavy guns on the model of the Elswick cruisers.[6] At the beginning of July the Board asked for such a design.[7] In November they asked for two alternative armaments, one with two 9.2-inch and six 6-inch, the other with a poop and forecastle and fourteen 6-inch. In both cases the torpedoes were omitted. The Mersey design now had three quite different armaments, each corresponding to a distinct possible function. With ten torpedo tubes and four 6-inch guns she was

[1] 'Remarks by Sir Cooper Key, and the Director of Naval Construction, upon the Necessity of providing Small Sea-Going Torpedo Vessels', (NMM: Adm.138/80, Cover of Mersey Class, f.17, p.1).

[2] 'Observations on the Strength of Foreign Squadrons, and the Ship-Building policy of the Navy', T. Brassey, 25th November 1881, with remarks by Key, 29th December 1881 (PRO: Adm.1/6600/B.331). Memorandum by Key 'On the Best Type of Small Unarmoured Vessels for the Navy, 6th March 1882 (PRO: Adm.1/7254, 13th May 1895).

[3] NMM: Adm.138/80, Cover of Mersey Class, f.17, pp.1-2

[4] Ibid., unfoliated leaves between ff.16 & 17.

[5] Ibid., ff.1-2. [6] Ibid., f.24 [7] Ibid., f.25a.

equipped to deliver and fight off torpedo attacks. With two 9.2-inch and six 6-inch guns, she was armed as a 'battleship-destroyer' on the Elswick model. With an armament solely of 6-inch guns she was simply a powerful cruiser. The first armament was of course Sir Cooper Key's favourite, but the torpedo-tubes were still completely untried, and he was forced reluctantly to accept the ships as 'convertible'.[1] This, at least, was his official position, but the constructors understood that the ship was now to be entirely gun-armed, and on the following day White informed the Chief Draughtsman that the spaces formerly assigned to torpedo flats could be used for other purposes.[2]

In this case, as with several previous designs, there was a diversity of opinion in the Admiralty, though the different parties do seem to have appreciated the fact better than in the case of the Iris. Key of course wanted a torpedo-cruiser, and continued to think of the class as potentially capable of being converted, though the constructors regarded the contingency as improbable.[3] Barnaby, characteristically confused, suggested at various times that the new type might replace ironclads, or alternatively would make good despatch vessels.[4] Cooper Key, who for all his faults had much sea-going experience, argued strongly for a forecastle and poop, and if possible a complete upper deck, to improve seaworthiness, and was prepared to accept the lighter gun armament as ample for a cruiser. Rendel, newly appointed as additional Civil Lord, naturally adhered to the 'David and Goliath' school of which he, as the designer of the Esmeralda, was the chief exponent. The ships, he argued, were

[1] Memorandum of 10 th November 1882 (Ibid.f.40).
[2] Ibid.f.135
[3] W.C.Smith to Morgan, 7th December 1883, à propos magazine arrangements, speaks of 'a sufficient concession to the possibility of eventually fitting under water torpedo tubes' (Ibid.f.110).
[4] Unsigned memorandum of 24th February 1883 (Ibid.f.61). Unsigned & undated memorandum, probably by Barnaby (Ibid.f.71).

meant to fight ironclads, and it was essential that they have heavy guns to do so. The D.N.O., on the other hand, held that they were essentially cruisers, and should be armed accordingly.[1]

The argument was brought to no conclusion, and in the spring of 1883 the Mersey and Severn were ordered with their armament still undecided. In July 1883 the Mersey was officially given with fourteen 6-inch and ten torpedo-tubes - but in fact this impossible combination merely reflected the general uncertainty. In December an armament of four 7-inch and eight 6-inch was chosen,[2] but in January 1884 the Forth was ordered with her armament undecided,[3] and in February not less than five alternative gun armaments of the Mersey were under discussion.[4] In June, in a comparison with the germ of the Orlando design, the Mersey was given with two 7-inch and ten 6-inch,[5] but in July the D.N.O. persuaded Key that it was needless to build a new 7-inch gun especially for this class[6] (the calibre was otherwise unknown in the Service) so Key recommended 8-inch for the Mersey and Severn, and fourteen 6-inch for the Thames. By this time the moment was approaching when a decision had to be made, and Rendel's influence evidently carried the day over the objections of Key and the D.N.O., since the entire class were built with two 8-inch and ten 6-inch guns. They were the only class ever built for the Navy to embody the opinions of the Liberal 'David and Goliath' school.

Sir Cooper Key's first attempt to build a torpedo-cruiser had resulted in a class of powerful protected cruisers armed only with guns, and a few experimental torpedo-tubes, but he did not relax his efforts to obtain a real torpedo-cruiser. The spur

[1] Ibid. ff. 40-41. [2] Ibid. f. 72. [3] Ibid. f. 94.
[4] Ibid. f. 83. [5] Ibid. f. 106. [6] Ibid. f. 115.

for a new proposal was applied by Messrs.Yarrow,the torpedo-boat builders,who on 9th March 1883 wrote suggesting a large armoured torpedo-boat.[1] The idea was passed around the Admiralty,and on 21st March Key urged the great need of building some vessels to settle the best type. A report by Barnaby on French torpedo-cruisers added point to the proposal,and the other members of the Board supported it.[2] Captain Tryon,the Permament Secretary, produced a cogent and comprehensive paper,[3] also advocating building such a type to establish its value,but questioning whether a vessel of 1,200 tons was not too large for torpedo work and too small for a proper cruiser. He considered the French torpedo-cruisers referred to by Barnaby had probably been built as much for commerce-raiding as for torpedo work. Further fuel was added to the discussion by a proposal of Thornycrofts, Yarrow's rivals,for enlarged 600-ton torpedo-boats,lightly armoured with belt and deck,and steaming twenty knots.[4] These daring suggestions were not preferred over the Admiralty design, which proceeded with general consent. On 13th July Northbrook approved,[5] but on 25th he produced something of a bombshell,in the form of a counter-proposal of his own.[6] This was effectively Key's ship stripped of her armament and called a despatch vessel, thus saving £20,000. To deprive a warship of her armament to save money might well be supposed an extreme example of misapplied economy,and the suggestion seems to have been abandoned. Key's original proposals went forward,and in March 1884 the Scout's final design was ready.The Scout and her sister Fearless were completed in June 1887,and their particulars stood thus:

[1] N.M.: Adm.138/82,Cover of Scout & Fearless,f.31.
[2] Ibid.ff.32-34. [3] Ibid.ff.35-37. [4] Ibid.f.38.
[5] Ibid.f.43. [6] Ibid.f.11.

Displacement:	1,596 tons at 14ft.7ins.mean draught
Armament:	4 5-in.RBL & 3 torpedo-tubes
	(73.5 tons = 4.6%)
Machinery:	330 tons = 20.7%
Speed:	16.7 knots
Coal (legend):	250 tons = 16.7%
Range (legend):	3,825 miles at ten knots.
Coal (maximum):	450 tons = 25%
Range (maximum):	6,900 miles at ten knots.
Armour:	½-in.deck
Hull & armour:	46.4%
Ballast:	51 tons = 3.2%[1]

As so often, the designers had overburdened the ships in an effort to be all things to all men. In particular, the addition of two more 5-inch guns during construction made them top-heavy, and they had to be ballasted. They were always crank, wet, and overweighted, and proved only a limited success in service, but they had an important influence on subsequent designs. These torpedo-cruisers are usually regarded as the forerunners of the torpedo-gunboats, and through them of destroyers, and so they were in conception. In design, however, the Scout, through the later Archer Class torpedo-cruisers, was the begetter of the 'Scouts' of the 1890's, and thence of the light cruisers of the Great War and later. These ships fall outside the scope of this study, but it is interesting to see how Key's second attempt to produce a torpedo-cruiser, though more successful in its object than his first, was also more important in cruiser design than in the evolution of torpedo craft.

When the efforts of Key and his Board to evolve torpedo-cruisers only multiplied the modern cruiser types whose performance cast so unfavourable a light on that of traditional British cruisers, it was only to be expected that intelligent officers

[1] See Appendix.

would question the utility of the old types. Key and Barnaby, as we have seen, adhered staunchly to the old position, but they came under increasing attack. The classic 'Liberal' belief that the training of seamen and the police of the seas required large numbers of fully rigged cruisers was widely questioned inside as well as outside the Admiralty. In January 1884 Barnaby's and Key's opinions were directly opposed with cogent arguments by the new D.N.O. Captain Hopkins,[1] and by Lord Alcester.[23] The same debate was continued in August 1885 under a new First Lord, with Codrington,[4] Hood, and Kerr all urging the 'modernist' point of view,[2] and here, as we shall see, their arguments had more effect.

The overall effect of five years striving after a successful torpedo-cruiser was to give more ammunition to campaigns for general reform. Sir Cooper Key made the mistake so characteristic of the conservative of mind, in supposing that change can be localized. Even if he had produced a successful torpedo-cruiser instead of the Mersey, it would certainly have reflected poorly on traditional designs. As it was, he and Sir William Armstrong, each aiming for very different targets, simultaneously struck on a powerful cruiser type, which was bound to supersede those that went before.

The notable characteristic of the developments of Smith's and Northbrook's Boards is their haphazard nature. In an earlier

[1] John Ommaney Hopkins, 1834-1916: 1854 Mate & Acting Lieutenant, 1857 Lieutenant, 1862 Commander, 1867 Captain (1880-1 Captain of HMS Excellent, 1881-3 Private Sec. to 1st Lord, 1883-6 DNO), 1885 Rear-Admiral (1888-91 3rd Sea Lord & Controller), 1891 Vice-Admiral (1892 KCB, 1892-5 C-in-C N. America & W. Indies), 1896 Admiral (1896-9 C-in-C Mediterranean) 1899 retired, (1899 GCB). An energetic & intelligent officer, Jacres's son-in-law.

[2(bis)] PRO: Adm.1/7254, 13th May 1895.

[3] Ante, p.75, n.1.

[4] William Codrington, 1832-1883: 1847 entered Navy, 1853 Mate, 1855 Lieutenant, 1864 Commander, 1869 Captain (1876-80 Private Sec. to 1st Lord), 1881-3 Captain of HMS Excellent, 1885-6 3rd Sea Lord) 1886 Rear-Admiral. W.H. Smith's son-in-law.

era there had been some men at the Admiralty with a broad grasp of naval affairs,capable of producing something like general policy,but in this age progress within the Admiralty depended more upon the accretion of many small measures,without any guiding policies. Sir Cooper Key was destitute of any broad understanding of policy,and under him the Admiralty drifted through a period of rapid technical progress. It is arguable that in that uncertain time Key was the last man for the job - having no policy,he was unable to make major errors,and having no understanding of broad issues,he failed to recognize reform when he saw it - and by allowing itself to be carried by a current of change,the Navy made a surprisingly painless entry into a new era.

By 1885,however,the pressures for a radical change were rapidly increasing. Successive war scares had revealed to a public increasingly conscious of such things,how weak the Navy was,and how vital the interests it had to protect. With intelligent and able civilians taking serious interest in naval affairs, pertinent questions about policy-formation and decision-making in the Admiralty were being asked. A developed body of professional opinion outside the Admiralty provided increasingly attractive alternative doctrines for interested politicians and civilians to draw upon. Last,but not least.the existence of actual warships manifestly superior to the traditional types emphasized the inadequacy of the old ideas in a new age. In 1885 a host of influences were poised to push the Navy into a new age,and it wanted only a trigger to precipitate the change.

CHAPTER V: THE END OF THE 'DARK AGES', 1885-1890

A. Reform from Within and Without

On 30th March 1885 Russian forces attacked Pendjeh on the Afghan frontier, and by their action revived in an acute form perennial fears for the security of British India. For several weeks war with Russia seemed likely, and the Navy did its best to make ready for it, but 'A lamentable want of precision and organization, & a general unreadiness prevailed at the Admiralty'.[1] In the matter of merchant cruisers, a subject continually discussed for twenty years, so little had been prepared that the Admiralty could think of no other way to prevent the fastest steamers being sold to the Russians than to charter them wholesale, at a cost of over three-quarters of a million pounds spent to no useful purpose.[2] Of nine unarmoured cruisers in the First Reserve, supposedly ready for instant commissioning, only one actually was. Seven others took between thirty-eight and one hundred and thirty-four days to prepare for sea, and one was never got ready at all.[3]

This unpreparedness was typical of the Navy as it had been for many years, and the reader of this study will not be surprised at it. One who was unpleasantly surprised was Lord George Hamilton,[4] who took office as First Lord in Lord Salisbury's government on 24th June 1885, when the crisis was virtually over. Hamilton and his colleagues were finally responsible for carrying out the major reforms which had for years been required, and he and they deserve attention.

[1] Minute by Bartlett of 12th November 1886 on Beresford's paper on War Organization of 6th October 1886 (PRO: Adm.116/3106).

[2] Minute by Forwood, 28th August 1886, on a letter from Messrs. Ismay, Imrie of 17th August (PRO: Adm.116/271). Beresford's memorandum, cited above (see also Briggs, Naval Administrations, p.234).

[3] 'Report of the Preparations made by the Admiralty in Anticipation of an Outbreak of War in the Spring of 1885'. FIC Report No.21, (PRO: Adm.116/3409).

[4] Lord George Francis Hamilton, 1845-1927: 1868-85 Conservative MP for Middlesex, 1885-1906 MP for Ealing (1885-6 & 1886-92 1st Lord, 1895-1903 Sec. for India), 1913 GCSI.

Lord George Hamilton was no more a naval expert than most of his predecessors and successors, but he worked easily with naval men, and took advice readily. He was a man of pleasant and tactful manner, and sound judgement of character; a capable administrator without being brilliant; a politician who never rose to the highest rank, and probably never deserved to, but one of the most successful First Lords of the century. As a reformer he was cautious and pragmatic; wildly energetic, indeed, by the standards of Key and Northbrook, but making haste too slowly for the agitated public temper of the late 1880's. He was by temperament somewhat pedestrian, even unimaginative; happiest working methodically through unspectacular but vital reforms. It was typical of him to concentrate on remodelling the 'infrastructure' of a Service he found in decay, and an administration in disarray. Financial control was poor; Northbrook's programme had been so hurriedly prepared that there was an error of a million pounds, which Hamilton was able to turn to the Navy's benefit, and Gladstone's discomfiture.[1] With so little regard for realities had Liberal economies been pressed that the Estimates of 1886-7 provided for guns the ammunition for which had been struck out.[2] More seriously, the dockyard administration was chaotic, and politicians' habit of beginning ships, (which could then be shown on the annual returns) but begrudging the money to finish them, had led to very long construction periods. In 1885 twenty-one armoured ships were building or completing. No ironclad had been constructed in less than five years since the 1860's, and recently they had averaged 145% of their intended cost.[3] By reforming dockyard administration,

[1] Lord George Hamilton, Parliamentary Reminiscences and Reflections, 1886-1906 (London, 1922) pp. 45-6. Idem, 1868-85, p. 279.

[2] Idem, 1885-1906, p. 108. [3] Ibid., p. 84. Idem, 1868-85, p. 298.

completing ships under construction, and correcting the anomalies of his predecessors' financial management, Hamilton was able to increase the efficiency of the Navy in his first few years in office, while actually reducing the Navy Estimates.[1] In doing so he laid the groundwork for reform while the pressures for it were fast increasing. Hamilton was not himself the man to detect these pressures, nor had he the imagination to lead the Navy into a new era of reform on his own initiative. On the other hand, he and his Board were well adapted to command from the rear. They were cautious but pragmatic men, able to channel the sometimes undisciplined enthusiasm of the reformers into the most productive courses. In many ways Hamilton was fortunate in coming to office at a time when public opinion demanded and obtained long-overdue reforms for which he was not solely responsible, but his essentially limited talents were admirably disposed to make the best use of the chances which the course of outside events thrust at him, and it is not unfair that he should have received the credit for the Naval Defence Act.

The Board with its subordinate officials which Hamilton appointed was in some ways one of the strongest, as well as one of the most disparate, of Victorian times. It contained several men of outstanding abilities and striking character, but the First and Second Sea Lords were not of their number. How a good judge of men like Hamilton came to appoint Sir Arthur Hood[2] First Sea Lord is something of a mystery. His published description

[1] Ibid. pp.301-2. Idem, 1885-1906, pp.45-6 & 82-6. Memorandum of 16th April 1890 by W.J.Greene, Asst.Private Sec.to 1st Lord (PRO: Adm.1/7465c, 31st December 1890). Hampshire Record Office, Forwood MSS (cited by call no., thus: HRO: 19M62/), Hamilton to Forwood, 21st & 31st December 1886 (HRO: 19M62/25).

[2] Arthur William Acland Hood, 1824-1901, 1836 entered Navy, 1843 mate, 1846 Lieutenant, 1854 Commander (served at bombardment of Acre, in Crimean Naval Brigade, & at capture of Canton), 1858 Captain, (1866-8 Captain of HMS Excellent, 1868-74 DNO), 1876 Rear-Admiral, (1877-9 2nd Sea Lord, 1879-81 C-in-C Channel), 1880 Vice-Admiral (1885 KCB, 1885-6 1st Sea Lord), 1886 Admiral (1886-9 1st Sea Lord, (1889 GCB), 1889 retired (1892 1st.Baron Hood of Avalon).

of Hood[1] scarcely qualifies as an encomium by the standards of Victorian biography, and might be thought to damn with faint praise. Hood had already been de facto First Sea Lord for several months,[2] he came of a famous old naval family with much prestige and influence, and it seems that considerations other than his abilities may have played their part in his appointment (and subsequently in his peerage, which was greeted by the Navy with general amazement). So well-informed an observer as Phipps Hornby certainly thought so:

> 'To quiet party exigencies, an admiral is placed at the head of the navy who was incompetent to have the Channel Squadron. He was, I believe, a gunnery officer of repute, but never a seaman.'[3]

Hood was indeed a man ill-fitted to his post:

> 'A careful, painstaking officer, though without the genius that was much needed in a period of great change, and clinging by temperment to the ideas of the past when they had ceased to be suitable.....
>
> The four years which followed [1885] were years of great change and great advance, but it was commonly supposed that Hood's efforts were mainly devoted to preventing the advance from becoming too rapid. Like his predecessor, he scarcely understood the essential needs of England as a great naval power; and several of his public declarations might be thought equivalent to an expression of belief that, useful as the Navy was, the country could get on very well without it.'[4]

He was a stubborn and touchy man, who took advice very ill, especially from subordinates, and his evidence before the Select Committee on the Navy Estimates gives an unflattering impression

[1] Hamilton, Parliamentary Reminiscences, 1885-1906, p.86.

[2] Ante, p.122.

[3] Phipps Hornby to Noel, 16th May 1889 (NMM: NOE Box 5).

[4] J.K.Laughton in Dictionary of National Biography, sv. Sir Arthur Hood, Lord Hood of Avalon.

of his character and abilities.[1] Though capable of sound judgement of details, he had no comprehension of broad issues.

Whatever the reasons compelling his appointment, they were still powerful in August 1886, when Hamilton returned to the Admiralty after the brief Liberal interregnum of Gladstone's third administration, in which Lord Ripon and Lord John Hay[2] had taken over the Admiralty, but for too short a time to effect any real changes. Hood returned as First Sea Lord, and Sir Anthony Hoskins[3] retained his seat, as he had done under Liberal and Conservative alike. Hoskins is tactfully described by Hamilton as a man of no great drive[4], and this was not an exaggeration. His evidence in 1888 suggests an idle and indifferent mind, which did not really know or greatly care who fixed the size of the Navy or planned its conduct in war.[5] He knew nothing of the strength of foreign navies,[6] he condemned torpedo-cruisers by implication on the grounds that they were useful only in war-time,[7] and as late as 1893 he was still strongly in favour of sail.[8]

Vice-Admiral Graham,[9] appointed Third Sea Lord and Controller

[1] Ranft, Naval Defence of Trade, p.197, calls him 'stupid and irascible'.

[2] Ante, p.73 n.2.

[3] Anthony Miley Hoskins, 1828-1901: 1842 entered Navy, 1849 Lieutenant, (1851-3 Naval ADC to Sir Harry Smith in the Kaffir War, 1857 at capture of Canton), 1857 Commander, 1863 Captain, 1875-8 Commodore (Australia), 1879 Rear-Admiral (1880-2 3rd Sea Lord, 1882 KCB), 1885 Vice-Admiral (1885-9 2nd Sea Lord, 1889-91 C-in-C Mediterranean), 1891 Admiral (1891-3 1st. Sea Lord, 1893 GCB), 1893 retired.

[4] Hamilton, Parliamentary Reminiscences, 1885-1906, p.87.

[5] Committee on Navy Estimates, Minutes of Evidence, (PP: 1888 XII p.74/574, Q.1022; pp.59/559, QQ.836-7 & p.67/567, QQ.910-912).

[6] Ibid., p.66/566, QQ.906-7.

[7] NMM: Adm.138/86, Cover of Bramble et al., unfoliated; 'précis of correspondence' loose in back cover.

[8] NMM: Adm.138/89, Cover of Buzzard et al., f.52 (?-foliation defective).

[9] William Graham, 1825-1907: 1842 entered Navy, 1849 Lieutenant, 1858 Commander, 1863 Captain, 1879 Rear-Admiral, 1885 Vice-Admiral, (1885-8 Controller & 1886-8 3rd Sea Lord, 1887 KCB), 1890 Admiral & retired (1902 GCB).

in succession to Brandreth late in 1885,was already worn out by his work when Hamilton resumed office,and had retired to bed by 1889.[1]

It was the junior members of the Board,and its immediate subordinates,who provided much of the quality,and caused many of the vicissitudes of Hamilton's régime. Lord Charles Beresford, who succeeded Codrington as Junior Naval Lord in the second of Hamilton's Boards; Mr Bartlett,the Civil Lord; Mr Forwood,the Parliamentary Secretary; Lord Walter Kerr,the First Lord's Private Secretary; and W.H.White the new D.N.C.; to say nothing of Captain John Fisher,who succeeded Hopkins as D.N.O. in the autumn of 1886,were all men of an ability and character seldom seen,and never combined,in previous Admiralties.

In the last generation of naval officers to be brought up under sail,there were many outstanding seamen whose exploits are remembered with something like awe; there were celebrated leaders of men renowned for their enterprise and daring; there were noblemen of wealth and charm,who moved easily in the highest political and social circles; there were eccentric individualists who never hesitated to express irrational fancy or outrageous prejudice; but no-one ever combined these qualities as Lord Charles Beresford did.[2] He had all the characteristics traditionally associated with his Irish birth. He was charming,brave,generous, unsystemmatic and impulsive,a superb leader but a poor organiser.

[1] Hamilton,Parliamentary Reminiscences,1885-1906,p.87. Lord G. Hamilton to Forwood,9th November 1889 & Forwood to Lord G.Hamilton, 24th November [1887] (BRO: 19M62/25 & 45).

[2] Lord Charles William de la Poer Beresford,1846-1919: 1859 entered Navy,1862 Midshipman,1866 Sub-Lieutenant,1868 Lieutenant (1874-80 Conservative MP for Waterford),1875 Commander (1875 ADC to the Prince of Wales in India),1882 Captain (promoted for his command of the Condor gunvessel at the bombardment of Alexandria)(1884 Naval ADC to Lord Wolseley & later CO of the Naval Brigade in Egypt,1885-9 MP for E.Marylebone,1886-8 4th Sea Lord),1897 Rear-Admiral (1897-1900 MP for York,1900-2 2nd-in-C Mediterranean), 1902 Vice-Admiral (1902-3 MP for Woolwich,1903 KCB & KCVO,1903-5 C-in-C Channel,1905-6 C-in-C Mediterranean),1906 Admiral (1906 GCVO, 1907-9 C-in-C Channel,1910-16 MP for Portsmouth),1911 retired (1911 GCB,1916 1st Baron).

The attractiveness of his character and the fame of his courage made him a public hero for most of his life,and by the mid-1880's he was regarded by millions of ordinary people as the epitome of the naval officer; bluff,frank,and cheerful,courageous in war and guileless in peace. At the same time his wealth,charm, and noble birth won him easy acceptance in the highest society, and he was a personal friend of the Prince of Wales,whose influence secured him his seat at the Board. His fellow officers,though sometimes alarmed by his imprudence,could not but admire his superb seamanship,his leadership,and his dedication to the Service in which he had made his career. He was a man of tireless energy and enthusiasm for many causes,especially the reform of the Navy. He was also intemperate and incautious,very ready to allow his passions and prejudices to run away with him, and hardly to be restrained by cooler spirits than he. As a political campaigner,Beresford was likened to a torpedo: a weapon of devastating power,but difficult to aim,and impossible to control. Few men were temperamentally less suited to office work,and his time at the Admiralty was a severe trial to Hamilton,[1] but his enthusiastic,not to say immoderate support for reform was of the greatest effect.

Beresford's civilian colleagues,Bartlett[2] and Forwood,[3] were able men,but neither worked easily with others. Forwood,in particular,was an energetic and experienced administrator with an incisive mind,but his waspish pen brought him few friends, and the qualities which had won him wealth as a shipowner did

[1] Hamilton,Parliamentary Reminiscences,1886-1906,pp.84-92.6th January 1888, Ld.G.Hamilton to Salisbury (Salisbury MSS,Christ Church,Oxford: H/Hamilton/122).Salisbury to the Queen,9th January 1888 (PRO: Cab.41/21/1).

[2] Ellis Ashmead Bartlett,1849-1902: 1872 Ba Ch.Ch.,1877 called to the Bar,1880-5 Conservative MP for Eye,1885-1902 MP for Ecclesall (1885 & 1886-92 Civil Lord,1892 Kt.).

[3] Arthur Bower Forwood,1836-1898: 1878-9 Mayor of Liverpool,1886-92 Parliamentary Sec,1895 1st.Lt.

not include tolerance for those less intelligent or industrious than himself.[1] Forwood played an important and hitherto unrecognized part in Hamilton's Board. He and the First Lord worked closely together, and perfectly complemented each other. Forwood was the reformer; vigorous, indeed ruthless in the pursuit of change, he never knew or cared how to be conciliatory. Hamilton supported his objectives, indeed leant on Forwood for many of his ideas; he used Forwood as the blunt spear-head of his reforms; but to his colleagues he was ever the tactful mediator, smoothing the anger which Forwood provoked, while quietly supporting him on all matters of substance. Hamilton often found it difficult to keep his team together - indeed, he lost one member of it from Forwood's conduct,[2] and feared to lose more, but he valued Forwood as the real motor of many of his reforms. No other political member of any Board of this period was as knowledgable of naval affairs or as willing to interfere in them as he. Forwood is nowadays remembered, if at all, only as a local politician, but he deserves to be known also for his work at the Admiralty.[3]

The First Lord's Private Secretary, Lord Walter Kerr,[4] was a reformer of rather different character. A quiet, diplomatic man of conservative temperament, with sound judgement and common-sense rather than the more spectacular qualities of his colleagues, he was a reluctant reformer by conviction. His cautious and

[1] Hamilton, op.cit. (1886-1906) pp.35 & 87.

[2] Sir.Elgar, the Director of Dockyards.

[3] See Forwood's papers passim, especially 1962/45.

[4] Lord Walter Talbot Kerr, 1839-1927: 1853 Cadet, 1855 Midshipman, 1857 Mate (with Naval Brigade at Relief of Lucknow), 1859 Lieutenant, 1868 Commander, 1872 Captain (1885-9 Private Sec. to 1st Lord), 1889 Rear-Admiral, (1890-2 2nd-in-C Mediterranean, 1892-3 4th Sea Lord, 1893-5 2nd Sea Lord), 1895 Vice-Admiral (1895-7 C-in-C Channel, 1896 KCB, 1899-1904 1st Sea Lord), 1900 Admiral (1902 GCB), 1904 Admiral of the Fleet, 1909 retired.

moderate views, so similar to Hamilton's, probably played their part in guiding the First Lord's measured progress.

When Lord George Hamilton came to the Admiralty he found Barnaby occupying the post he had held for fifteen years, and he had Northbrook's advice to leave him there. But Hamilton, an intelligent student of naval affairs as well as human nature, disagreed:

> 'He seemed to me to exercise his ability more in showing the great variety of combinations that could be obtained on a given displacement.....than in ascertaining what was best for the Navy and what the Naval officers required.'[1]

Barnaby was exhausted by the family troubles engendered by his brother-in-law's constant attacks on the Admiralty, and offered to resign.[2] On Hood's advice Hamilton invited W.H. White[3] to succeed him. White had been only two years at Elswick, but Armstrong agreed to release him provided he could select another Admiralty constructor to take his place,[4] and White for his part accepted a large reduction of salary in returning to the Admiralty. White was D.N.C. for seventeen years, and responsible for designing what may be called the 'Pre-Dreadnought Navy', the last, largest and finest of Queen Victoria's many fleets. Unlike Barnaby, White had a questioning mind, which constantly sought out novel ideas, experimented with fresh techniques, and investigated new discoveries. In marked contrast to his predecessor, he was flexible and pragmatic in outlook. He constantly canvassed the opinions of naval officers, and lost no opportunity to observe

[1] Hamilton, op.cit.(1868-1885), pp.295-6. See also Ld.G.Hamilton to Forwood, 15th October 1886 (HRO: 19M62/25).

[2] Parkes, British Battleships, p.340.

[3] Ante, p.147 n.6.

[4] He chose Philip Watts, who succeeded White as DNC.

the behaviour of his designs at sea. White was wholly a 'modernist', and a convinced proponent of the protected instead of the belted cruiser. As the leading naval architect of the day, and author of a standard text-book,[1] his professional competence was beyond question; he was widely known as the designer of the famous Elswick cruisers, whose performance cast so unfavourable a light on Barnaby's designs; and consequently his support for reformist positions was of the greatest influence.[2]

In its early years Hamilton's régime displayed little outward evidence of reform. The lay observer might have supposed that nothing much had changed from Northbrook's time, but he would have been mistaken. Where Northbrook and Key had obstructed change and obfuscated policy-making, Hamilton, without exactly encouraging radical developments, worked steadily at the unspectacular business of reforming administration and laying a groundwork of sound policy on which to found more rapid advance.[3]

Typical of him was his approach to the gunboat question. We have already seen how the success of torpedo-cruisers had raised fresh doubts about the utility of the traditional gunboats and small cruisers.[4] Hamilton questioned their usefulness, but his senior naval advisers scouted his suggestions. Between October and December 1886 there was a prolonged controversy over whether to repeat the Buzzard Class gunboats, the chief protagonists being Hood on one side, and Forwood on the other.[5]

[1] A Manual of Naval Architecture (London, 1877, 1882, 1894 &c., 2 vols.).

[2] See character of White by Commander S.King-Hall, The Evolution of the Cruiser, pp.29-33 (PRO: Adm.1/8724/93, 15th December 1920).

[3] Ld.G.Hamilton to Forwood, 21st & 31st December 1886 (HRO: 19M62/25).

[4] Ante, p.170.

[5] PRO: Adm.138/89, Cover of Buzzard, Nymphe & Daphne. f.1. 'New Construction; Design of Ships & Machinery; Allocation of Vessels' (HRO: 19M62/40).

Hamilton reacted characteristically by writing to a wide range of senior officers asking for their opinions on the question:

> 'It is proposed to keep on foreign stations 10 gunboats,[1] & I am told that "these vessels from their light draught etc. are indispensable in time of war". I should like to get rid of all gunboats, replacing them by sloops and vessels of the Rattlesnake type.[2] I feel these small vessels are not much use in protecting commerce, can be easily taken on the open sea, & would at times be a hindrance rather than an advantage. Still if they are necessary I must yield to naval experience.'[3]

To the Commander-in-Chief in China he wrote:

> 'I am very anxious to reduce the number of small useless craft now on certain stations and especially China. Could we not substitute large sloops and abolish the slow bulky gunboats and sloops now in commission. A few large vessels would do the work of many small ones, they would instill more respect for the flag, & afford much greater protection to our trade ------ [word illegible] in peace & war.'[4]

Vesey Hamilton[5] agreed: 'You might economize on this station very much by having fast vessels of a decent size - the day of gunboats has gone by',[6] and his judgement was supported by a

[1] This should perhaps read 100; even after the Naval Defence Act the Navy still kept over seventy gunboats in commission.

[2] The first of the torpedo-gunboats, which were smaller and faster successors to the early torpedo-cruisers.

[3] Ld.G.Hamilton to Phipps Hornby, 10th August 1887 (NMM: PHI/120 B, sa.1887)

[4] Ld.G.Hamilton to Vesey Hamilton, 27th December 1886 (NMM: VHM/9).

[5] Richard Vesey Hamilton, 1829-1912: 1843 entered Navy, 1849 Mate, 1851 Lieutenant, (1850-1 & 1852-4 in Arctic, in 1852 made 52-day sledge journey, discovering part of Melville Island), 1857 Commander, (promoted for his part in the Battle of Fatshan Creek), 1862 Captain, 1877 Rear-Admiral (1878-80 DNO), 1884 Vice-Admiral (1885-8 C-in-C China), 1887 Admiral (1887 KCB, 1889-91 1st Sea Lord, 1891-4 President of RNC Greenwich), 1894 retired (1895 GCB).

[6] Vesey Hamilton to Ld.G.Hamilton, 19th January 1886 (NMM: VHM/3).

damning catalogue of the cruisers under his command, which might be summarized thus:

Cruiser:	Leander	A fine steamer, but her engines delicate.
Corvettes:	Sapphire	'useless, can neither steam, sail nor fight'.
	'C' Class	Fine steamers; their rig should be cut down and their useless armament of 64 pdrs. replaced.
	Heroine, Satellite	Vastly inferior to their nominal strength and no better than the aged ships they replaced.
Sloops:	Penguin	Inferior to the Swift she is to relieve.
	Wanderer	No merit but a heavy armament
	Daring	Even worse
Gunvessels:	Swift, Linnet	'Most efficient small craft in every respect'
	Lidge	'Useless for years'
Gunboats:		All worthless for squadron service and far too slow.[1]

The First Lord's approach to the problem was typical of him. His sound judgement questioned the existing ways, and so he carefully sounded as wide a range of expert opinion as possible, and gradually built up a coherent new outlook. We shall see in the Naval Defence Act the fruits of his cautious and systematic methods of forming policy.

When Hamilton came to the Admiralty he found that the F.I.C. had grown greatly in power and influence. Even under Ley's rule, Hall had felt able to undertake the preparation of war plans. On 24th September 1884, while Northbrook was in Egypt and W.T. Stead was publishing 'The Truth about the Navy', Hall completed his 'Remarks on a Naval Campaign',[2] offering tentative plans

[1] Vesey Hamilton to Ld.G.Hamilton, undated [ca.16th November 1886] (NMM: VHH/4).

[2] Ibid: FIC Report No.51.

for operations against France. With equally good timing he submitted his 'General Outline of Possible Naval Operations against Russia'[1] a fortnight before the Russians attacked Pendjeh. These were followed by 'The Protection of Commerce by Patrolling the Ocean Highways and by Convoy'.[2] in May 1885, the month before Hamilton took office. By these papers Hall demonstrated the status his nascent department had already achieved, but in them he also showed the limitations of his own thinking. Though a subtle diplomat and a skilful administrator, Hall was not a strategist of the first rank, and he does not seem to have been familiar with the latest naval thinking, especially outside the Admiralty. All three papers were largely concerned with the protection of trade, and he made a broad distinction between two possible schemes; one of patrol and convoy of trade, the other of blockade and hunting of raiders. The latter, he considered, was both more efficient and more consonant with British offensive traditions. Convoy in particular he condemned as generally impossible, and invariably undesirable. All three papers are loosely argued, full of unsubstantiated assumptions and unjustified inferences. Nevertheless, it was their position which became in later years the accepted orthodoxy, and it is difficult to avoid the suspicion that W.H.Hall's skilful diplomacy, so admirably devoted to the foundation and nurture of his intelligence department, was less happily, though no less effectively used to propagate his sometimes ill-founded strategic opinions.

The intelligence department owed its major advance during these years, however, not to Hall, but to Beresford. He joined Hamilton's Board as Junior Naval Lord when Salisbury's government returned in 1886, and within a few months he had produced an unro r. A fortnight after taking office, he was already appalled at what

[1] Ibid. No. 64, 14th March 1884 [2] Ibid. No. 73.

he had,or rather,had not found:

> 'The most astonishing revelation that has come to me is the fact that at the moment there is no sort of power of organization,as to what our fleet would be required to do,& what would actually be wanted..... Everything connected with this gigantic organisation would have to be met <u>after</u> war was declared.'[1]

This was no exaggeration,as a more experienced and less excitable observer confirmed:

> 'During my Admiralty experience of forty-four years,I may safely affirm that no measures were devised, nor no [sic] practical arrangements thought out,to meet the numerous duties which devolve upon the Admiralty, and which at once present themselves at the very beginning of a war.'[2]

On 6th October Beresford circulated his famous paper on war organization:

> 'It is quite <u>incredible</u> that with the knowledge we possess as to what will actually be required at the moment of a declaration of war,no steps have been taken to organize or prepare any method of plan for showing how or where these <u>absolutely necessary</u> requirements are to be obtained.....
>
> The provision of these necessities is at present left to Providence,as it appears to be <u>nobody's duty to undertake the organization</u>.....
>
> It is <u>disgraceful</u>,I will go so far as to say <u>positively criminal</u>,that no organization exists.'[3]

This was substantiated by copious detail. By comparison with the French ships of the First Reserve[4],for example,ready for sea at forty-eight hours notice,the best that could be said of

[1] Beresford to Phipps Hornby,24th August 1886 (NMM: PHI/120 B, ca.1886)(original italics).

[2] Briggs,<u>Naval Administrations</u>,p.224.

[3] PRO: Adm.116/3106 & Cab.37/18/45 (original italics).See also Briggs,<u>op.cit</u>..

[4] Beresford presumably refers to the French reserve 'disponible en rade',roughly corresponding to the British First Reserve.

the twenty ships of the British First Reserve, supposedly prepared for instant commissioning, was that three might be got to sea in a week. Even this was of little use, since there were no reserves of ammunition, and it would take six weeks to fill the shell to arm them. This sort of information, to say nothing of a style of presentation not often seen in Whitehall, created something of an impression. Beresford proposed to create a Naval Intelligence Division (N.I.D.) with two parts, one to absorb the work of the existing F.I.C., the other to plan and organize for mobilization. MacGregor, Bartlett and Hoskins concurred; Hood was defensive, claiming that he had been thinking of such a thing for some time; Graham refused to believe that no plans existed, and deprecated collecting information, as it would be bound to be found out by an enemy, so it would be better for the Admiralty to remain in ignorance ! Forwood also disbelieved Beresford, until disabused by his naval colleagues.[1] It was not only the Board who were struck by Beresford's argument. On 13th October, a week after it was written, the entire text was published by the Pall Mall Gazette. It had supposedly been revealed through the dishonesty of an Admiralty messenger, but it is hard to believe that Beresford had no part in an action so eminently characteristic of him. He certainly prefixed to the marking 'Confidential' on the cover of the original paper, the remark 'I wish it to be understood that this is not.....' The effect on a public mind already disturbed by the Pendjeh crisis and the previous year's naval agitation, was immediate and dramatic.[2] Meanwhile a Board committee was sitting on the question, and on 25th November it

[1] The Board's comments are appended to the original paper, cited above.
[2] Marder, British Naval Policy, p.133.

recommended that an Intelligence Division to plan for war be established 'at once'.[1] By the beginning of December the question was decided in principle, though not without argument over detail,[2] and on 24th January the new Naval Intelligence Division was constituted, with W.H.Hall the first Director of Naval Intelligence (D.N.I.), and Captains Custance and Hardley-Wilmot in charge of the Intelligence and Mobilization Divisions.[3]

Ironically enough, Beresford's greatest triumph was also the cause of his resignation. Under Treasury pressure Hamilton agreed to reduce the proposed salaries of the D.N.I. and his assistants, and on this issue Beresford chose to resign. Neither he nor the First Lord were sorry at his departure.[4] Nevertheless, Beresford's brief and turbulent career at the Board had lasting consequences. The N.I.D. grew rapidly in stature and strength. Custance[5] and Hardley-Wilmot[6] were two of the best known of the young officers at the centre of the independent Service school of reformist thought, and among the first to reach influential positions within the Admiralty. By 1891 the N.I.D. had already

1 'Report of the Board Committee on Re-organisation of the Foreign Intelligence Committee' (PRO: Adm.116/3106)(original italics).

2 W.H.Hall to Phipps Hornby, 7th December 1886 (NMM: PHI/120B, sa.1886).

3 A slightly different account of the foundation of the NID is given in Aston, Secret Service, p.28ff.

4 Hamilton, Parliamentary Reminiscences, 1886-1906, pp.88-92.
Ld.G.Hamilton to Salisbury, 6th January 1888 (Salisbury MSS: E/Hamilton/12
Salisbury to the Queen, 9th January 1888 (PRO: Cab.41/21/1).

5 Reginald Neville Custance, 1847-1935: 1862 Midshipman, 1868 Lieutenant, 1878 Commander, 1885 Captain (1886-9 Asst.DNI, 1893-4 attaché in Washington & Paris), 1899 Rear-Admiral (1899-1902 DNI, 1902-4 2nd-in-C Mediterranean), 1904 Vice-Admiral (1904 KCMG, 1907-8 2nd-in-C Channel, 1908 KCB), 1908 Admiral, 1912 retired, (1913 GCB). His abilities and mastery of professional subjects were expected to take him to the highest office, but his withdrawn personality and strong opposition to official policies prevented this. He was a naval historian and strategist of importance.

6 Sydney Marow Hardley-Wilmot, 1847-1929: 1860 entered, 1866 Sub-Lieutenant, 1869 Lieutenant, 1881 Commander (1881-4 in HMS), 1886 Captain (1887-90 Asst.DNI), 1891 Rear-Admiral, 1893 retired (1902-9 Supt.Ordnance Stores, 1908 Kt.).

attained the status of a naval staff,[1] and was to be among the most important,if not the most important,of the Admiralty departments.

It is needless to say that Beresford's influence was not confined to the Admiralty. As soon as he resigned,he continued the work begun by the publication of his memorandum. No-one was so well qualified to rouse the public temper as he,but he was far from alone. By mid-1887 a vigorous public campaign was in progress to which almost every prominent naval officer,and not a few others,contributed.[2] Phipps Hornby,to take an obvious case, undertook many speaking engagements,and the prestige of the Navy's elder statesman contributed much to the education of the public mind. In May 1888,for example,at a dinner given by the London Chamber of Commerce,[3] he gave a detailed analysis (explicitly founded on Colomb) of Britain's strategic position,and made the first public estimate of the number of cruisers the Navy required. Previous estimates had been made,(notably by Milne[4]) but Hornby was the first influential public figure to work out how Britain's cruiser strength should be calculated. His method was to trace a strategic plan,estimating the numbers required to fulfil it at each point,and testing these estimates by reference to the experience of the Napoleonic Wars,making due allowance for changed circumstances. On this basis he considered that 186 cruisers capable of sixteen knots or more was the minimum required,of which forty-two were available. Hornby's estimate was not only influential in itself,but the first of a long line of attempts to

[1] Hoskins to Phipps Hornby,21st October 1891 (NMM: PHI/120C,sa.1891).
[2] Marder,op.cit.,pp.44-8 & 131ff.. Tunstall,Imperial Defence 1870-87,p.243
[3] The Times,29th May 1888,pp.9&11.
[4] Ante,p.112.

calculate the Navy's strength from the duties required of it.

Thipps Hornby had already been responsible for an innovation of the greatest importance, the annual manoeuvres. The Pendjeh crisis, like its predecessor, caused the Admiralty hastily to assemble a 'Particular Service Squadron' for the Baltic, and Hornby was appointed to command. By the time the fleet was ready the crisis had receded, but Hornby persuaded the new First Lord to allow him to keep it together for ten days for manoeuvres. These were the first of what became a regular series, and it would be hard to overestimate their importance. The manoeuvres yielded practical lessons of great usefulness,[1] but even more significant were the indirect effects. Mimic warfare concentrated naval officers' minds on the real thing, for which they were supposed to be preparing, but which so many of them had almost forgotten. The vexed question of whether the umpires' rules were realistic led to intense discussion of the detailed conduct of future warfare. The manoeuvres caught the imagination of the general public to an extraordinary extent, and every year millions of people followed with eager interest the fortunes of Red and Blue Fleets. Naval officers were quick to appreciate and exploit the value of the manoeuvres for publicity, and they were undoubtedly one of the principal engines of greater public awareness of naval questions.[2] At times this public attention was almost embarrassing; Tryon, in command of a fleet based on Berehaven and Lough Swilly during the 1888 manoeuvres, had to exercise some ingenuity to avoid giving the impression that he was an 'Irish' admiral fighting an 'English' fleet.

The immediate lessons of the manoeuvres were of great relevance

[1] See for example White's comments on the 1889 manoeuvres, which he had witnessed; 'Notes on Recent Naval Manoeuvres', [illegible] (1890), p.1.

[2] King-Hall, Evolution of the Cruiser, p.6.

to policy. Close blockade was found to be difficult, if not impossible, with torpedo-boats on both sides, although in general they could not be used on the high seas. Torpedo-cruisers were too slow at sea, and as a direct result of experience in the manoeuvres the torpedo-gunboat type was evolved. Coast defence flotillas were shown to be virtually useless. In cruiser work two lessons of fundamental importance were soon learnt. The first was the necessity of having scouts for a battle fleet, a point which had been largely forgotten during generations of peace. The Iris and Mercury, hitherto despised by many officers, suddenly became the most sought-after ships in home waters, since they alone could be relied on for this work.[1] Even more striking was the success of commerce-raiding cruisers. The significance of nominal 'captures' in peacetime, with the 'victims' mostly ignoring the manoeuvres, was hotly debated, but there was no doubting the dramatic results achieved by some ships, especially Tryon's cruisers in 1888. The Calypso captured Oban, Port Ellen, Penzance and possibly Falmouth, with all the shipping in these ports. The Spider torpedo-gunboat achieved similar results in the Clyde, and neither was detected or opposed. In a fortnight's cruising in the Western Approaches, the Calypso captured nearly 60,000 tons of shipping, and the Volage took ten ships in nine days. Most dramatic were the results of a squadron Tryon despatched to raid the East Coast, which without opposition 'destroyed' the ports and shipping of Aberdeen, Leith, the Tyne, Sunderland, Hartlepool, Scarborough and Grimsby. The Warspite alone claimed in thirty

[1] Rear-Admiral Richard Hayne, 'On Lessons to be learned from Naval Manoeuvres', JRUSI XXXIV p.339. 'Report on the Naval Manoeuvres of 1887' (AL: NID Report No.137, November 1887). 'Extracts from the Report of the Committee on the Naval Manoeuvres, 1888, Together with the Narrative of the Operations and the Rules for conducting the Same' (cited as 'Three Admirals' Report') (PP: 1889 L p.735). 'Report on the Naval Manoeuvres of 1888' (AL: NID Report No.179, October 1888). 'Narrative of the 1889 Manoeuvres' (PP: 1890 XLIV p.665) [C.5890]

hours to have sunk forty-five steamers and fifty-three sailing vessels, and the Severn claimed thirteen steamers and an entire fishing fleet in three hours.[1] The umpires rightly dismissed many of these claims as fanciful, but it was impossible to ignore them, not least because of their effect on the public mind. In the following year, under much stricter rules, six cruisers in a fortnight 'captured' ninety-five merchantmen totalling 162,730 tons.[2]

The impression of the manoeuvres on the naval and public minds was exemplified and distilled by the report of Admirals Dowell, Vesey Hamilton and Richards, the 'Three Admirals' who were chief umpires of the 1888 Manoeuvres. After a copious account of the actual operations, replete with comments, they concluded with more general remarks on the strength of the Navy.[3] This they considered was quite inadequate, especially against an alliance of two powers. Trade in particular was likely to be in grave peril, and if war were declared Britain would probably 'lose her place among the nations'; money spent on military defences against invasions was money wasted. None of these comments was original, but in their context, backed by the tangible evidence of the manoeuvres, the report made a powerful impression on a public consciousness already thoroughly aroused. It was published, nearly complete, by the Admiralty, with comments by Hood and Hamilton. The former's consist of an angry refutation, and assertion that the Navy was adequate for any emergency. Hamilton, on the other hand, was so muted in defence that he gives the impression of oblique approval, and this, together with his decision to publish

[1] 'Three Admirals' Report, pp.8/742-11/745.
[2] 'Narrative of the 1889 Manoeuvres', cited above, p.17/681.
[3] 'Three Admirals' Report', pp.29/763-31/765.

the report,has given rise to the plausible suggestion that he was not averse to adding fuel to the flame of public agitation for an increase in the Navy Estimates.[1]

Whether or not that was his intention,he certainly achieved that effect. Even before the 'Three Admirals' Report' was published, public opinion had developed to such an extent that in 1888 a Select Committee on the Navy Estimates had been set up.[2] The Committee concentrated on the organization of the Admiralty, and the preparation of policy. It was especially anxious to uncover exactly who had responsibility for deciding the strength of the Navy,the shipbuilding programme required in peace,and the strategy required in war. It is abundantly clear from the Minutes of Evidence that the members of the Committee,many of them laymen in naval affairs,thoroughly understood the importance of these issues to any sound naval policy. It is equally clear that few, if any,of the expert witnesses had given them much thought.

Greatly though Lord George Hamilton and his Board had advanced on the thinking of their predecessors,they had been overtaken by the rapid march of public opinion under the tutelage of the 'unofficial' school of naval thinkers.[3] These naval men,led by Beresford,Hornby,Colomb,and a host of others,now found their opinions almost universally adopted by informed and influential laymen. J.C.R.Colomb,for example,formerly neglected by the 'Establishment'[4],now achieved official recognition. In 1886 the

[1] Manning,Life of White.p.244. Hamilton quoted extensively from the report in his arguments in Cabinet for the Naval Defence Act (Infra.p.210).

[2] Select Committee on the Navy Estimates: First Report,with Minutes of Evidence and Appendix,(PP: 1888 XII pp.491-707); Second,Third and Fourth Reports,with Minutes of Evidence and Appendices (PP: 1888 XIII pp.1-756).

[3] For an example of the sophistication of educated lay opinion.see Sir Charles Dilke,Problems of Greater Britain (London.1890.2 vols.,. I,491-575.

[4] Ante,p.80.

Prince of Wales attended one of his lectures,[1] and in 1888 he was knighted.

Closely interrogated by intelligent and well-informed men, the spokesmen of the Admiralty presented a sorry spectacle. Hamilton came out best,but even he had to admit that no programme of naval requirements had ever been drawn up,and that it would be 'dragging in a good deal' to say that they considered the 'possible eventuality of war'.[2] Hoskins had no idea who decided the strength of the fleet,disapproved of dangerous ideas like planning for war, and had no notion how the size of the Navy compared with that of its foreign rivals.[3] Even Hotham,[4] the able young reformer who had succeeded Beresford,considered the strength of the Navy a matter quite outside the Admiralty's purview.[5] Hood made much the worst impression. He disclaimed any special responsibility for the strength of the Navy,which was not his job,but the Board's, to decide. As no estimate of requirements had ever been drawn up, and as it was no-one's business to raise the matter at the Board, the Committee found it hard to see how the Board was to consider it.[6] On every question,Hood struggled hard to avoid committing himself on anything,but he was forced to admit that a war plan 'has been considered,and I think arranged for,so far as my personal knowledge goes'. Pressed on this,he insisted that he personally had drawn up the plan. Later he claimed in quick succession that

[1] 'Imperial Federation,Naval and Military',JRUSI XXX p.837.

[2] PP: 1888 XIII pp.67/281-68/282,QQ.4668-73,& p.65/279,Q.4648.

[3] PP: 1888 XII p.66/566,QQ.906-7; p.67/567,QQ.910-12; & p.74/574,Q.1022.

[4] Charles Frederick Hotham,1843-1925: ca.1856 entered (1860-4 Maori War),1863 Lieutenant,1865 Commander,1871 Captain,1888 Rear-Admiral (1888-9 4th Sea Lord,1890-3 C-in-C Pacific),1893 Vice-Admiral (1895 KCB,1897-9 C-in-C Nore),1899 Admiral (1900-2 C-in-C Portsmouth,1901 GCVO,1902 GCB),1903 Admiral of the Fleet,1913 retired.

[5] PP: 1888 XII p.409/623,Q.8834; p.411/625,QQ.8858-66; & p.413/627, QQ.8894-8.

[6] Ibid.p.17/231,QQ.4120-2; pp.21/235-24/238,QQ.4155-7,4167-3, 4175-8,4183-96;& p.46/260,QQ.4440-9.

advance planning was impossible and unnecessary, and that in any case the plans had been drawn up by the Board as a whole, and not by any individual.[1] Hood was questioned especially closely on the strength of the Navy, the Committee refusing to accept his confident assertion that it was strong enough. Eventually he suggested that six more cruisers would be an advantage, but this only caused him fresh trouble, as he was forced to try to justify his suggestion by claiming that the ships were needed, and at the same time to justify his admitted failure previously to mention the matter to anyone.[2] It would not be surprising if Lord George Hamilton, a member of as well as a witness before the Committee, pondered how soon he might replace his principal naval adviser.

The Committee was the last and most powerful agent of the demise of the old ways. In effect, the new men, the reformers, having infiltrated and converted the centres of political influence and power, were sitting in judgement on the old system. After the Committee's work, nothing less than a radical revision of policy, and still more of ways of thinking about policy, could satisfy the public temper.

The first step was to improve the quality of the Board, and providentially for Hamilton he had the chance during the next eighteen months to replace the Controller and the D.N.I., then the Second Sea Lord, and last of all Sir Arthur Hood. The new Controller was Rear-Admiral Hopkins,[3] a capable and energetic officer, in marked contrast to his predecessor. The new D.N.I., Bridge,[4] was

[1] Ibid. p.29/243, QQ.4252-7; p.44/253, QQ.4423-4; p.59/273, QQ.4606-16; & p.68/282, Q.4673.

[2] Ibid. p.23/237, QQ.4179-82; p.27/241, QQ.4225-9 & 4233-4; p.29/243, Q.4239; p.30/244, QQ.4267-70; pp.33/247-34/248, QQ.4315, 4318-23 & 4327-30; & pp.40/254-42/256, QQ.4390-4 & 4404-5.

[3] Ante, p.170, n.1.

[4] Cyprian Arthur George Bridge, 1839-1924: 1853 entered Navy, 1855 Midshipman (1857 Burmese War), 1858 Mate, 1859 Lieutenant, 1869 Commander, 1877 Captain, (1886-94 DNI), 1892 Rear-Admiral (1894-8 C-in-C Australia), 1898 Vice-Admiral, (1899 KCB, 1901-3 C-in-C China) 1903 Admiral (1903 GCB), 1904 retired.

one of the profoundest thinkers of the new generation, a man of wide reading (in six languages besides his own) and deep reflection, whose well-founded and forcefully-expressed opinions had a strong influence on naval doctrine in later years, and a blighting effect on his own career. In the spring of 1889 Hopkins was replaced by Vesey Hamilton, who that autumn moved up to be First Sea Lord in succession to Hood. It is appropriate that a quarter-century of reform should have ended with the most capable leadership installed at the Admiralty which the Navy had yet seen, but it is largely a symbolic conclusion, because by the time Hood finally left Whitehall the Naval Defence Act had already been passed, and the great changes of twenty-five years had reached their expression and fulfilment.

B. William White and the Great Age of the Protected Cruiser

With William White's appointment to the post of D.N.C. in 1885 the protected cruiser really came into its own. The great success of the Elswick ships, the Leander and Mersey Classes, and other early protected cruisers, together with the unsatisfactory performance of the existing belted cruisers, had already prepared the way for a change, and only the influence of Barnaby and a Liberal Board had hitherto prevented it. The former Manager and Chief Designer of the Elswick Yard could be relied upon to see the merits of the rival schemes in a different light.[1]

By 1885 he had a great majority of naval architects behind him. Sir Edward Reed and others who rejected any but vertical armour along the waterline had become a distinct, though still influential minority. In the succeeding years their support among informed observers dwindled. The final acceptance of the protected cruiser was marked by a celebrated paper[2] given at the I.N.A. in 1887 by White's erstwhile colleague at the Admiralty, John Biles. This paper achieved wide acceptance, and for many years was often cited by naval architects in proof of the superiority of the type.[3] Biles made detailed comparisons of the advantage of belt and deck, taking as his basis the design of the Orlando Class, and demonstrating how much greater might have been their speed, range, protection and armament had they been built as protected cruisers.

The public acceptance of protected cruisers in Britain was encouraged by their adoption in France. The French Navy was enjoying a brief resurgence during the first part of the decade,

[1] Manning, Life of White, pp.109-111.

[2] 'Comparative Effects of Belted and Internal Protection upon the other Elements of Design of a Cruiser', TINA XXVIII (1887) p.335.

[3] Hovgaard, Modern History of Warships, p.204.

and although its expansion was not directed against Britain,it caused alarm in Britain which fuelled the agitation for increased naval spending. This French renaissance was both a technical and a quantitative one,but its achievement in both respects was fragile. The improvements in artillery and armour which France had achieved were bound to be adopted in due course by her rivals, and the financial basis of the French naval budgets of the period, depending as they did upon Freycinet's and Ferry's loans,was always precarious,and was largely destroyed by the slump of 1885.[1] For a brief period,however,French expansion seemed to present a serious threat. Even at this date British fears of a guerre de course were largely unfounded; indeed,in 1886,though nearly equal to Britain in battleships,France had only one modern cruiser suitable for raiding work. This was the Sfax,designed by Bertin,[2] whose protests had finally halted the building of the old sailing corvettes.[3] The Sfax was a ship of 4,488 tons,carrying six 6.3-inch and ten 5.5-inch guns at sixteen knots. She was the first protected cruiser in French service,and the first ship with the 'tranche cellulaire' of Bertin's invention; a layer of heavily subdivided compartments filled with buoyant cellulose packing, lying above the armour deck along the waterline,and intended to preserve the buoyancy and stability of the ship. Apart from this feature,the design of the new ship was unremarkable,but she demonstrably marked a change of policy,and a new threat to British trade. She was followed by two larger protected cruisers,the Tage,launched in 1886,and the Cécille,launched in 1888. They carried the same armament as the Sfax,with a three-inch armour

[1] Ropp,Development of a Modern Navy,pp.163-171,181 & 257.
[2] Ante,p.121.
[3] Ropp,op.cit.,pp.190-1.

deck and a speed of nineteen knots, which the Tage achieved on a displacement of 7,045 tons, but the Cécille on only 5,776 tons.[1]

In retrospect, these three large and powerful cruisers seem somewhat isolated in French naval development. The brief period of expansion ended in 1885, in which year also Bertin was seconded as Chief Constructor to the Japanese navy, and no more of the type were built. Nevertheless, these three ships had a considerable influence in Britain, and added much weight to other arguments for the protected cruiser type.

White first turned his attention to small cruisers:

> 'A survey of the lists of unarmoured and protected ships of the Royal Navy shows that, while a considerable amount has been done towards strengthening the larger class of swift cruisers, protected or partially protected, the corvettes have not as yet been similarly reconstructed.'[2]

To meet this want White produced, in November and December 1885, sketches for a protected cruiser of similar size to the Comus:

> 'This class may be described as the modern corvette.... In speed the proposed ship will exceed anything yet constructed and as a protector of commerce - against the depredations of improvised cruizers or regular built cruisers belonging to foreign fleets - it represents a type which might be multiplied. Nor would it seem that the usefulness of the type would be limited to these detached services. It represents the protected Torpedo Cruiser which by their Lordships minutes ..... is considered preferable to the Scout or Archer Classes now under construction.'[3]

This class, the Medusa or 'M' Class as it became known, was derived from the latest Elswick cruiser, which White had left on the stocks.[4]

[1] Aide-Mémoire de l'Officier de la Marine, ed. Edouard Durassier (later Charles Valentino) (Paris, 1886-1903 annually), 1888 ed., p.1873.
[2] NMM: Adm.138/97, Cover of 'M' Class, p.50.
[3] Ibid., pp.48-9 (original italics). [4] Ibid., p.55.

His perfect understanding of the dominant part trade protection must play in British cruiser work is clearly shown in his submission quoted above, and it was a leitmotiv of all his thinking on cruiser design. In the same month (December 1885) he noted of a projected class of torpedo-cruisers, 'These vessels have been designed with special regard to the protection of our commerce and merchant marine.'[1]

White's 'M' Class was approved by the Board, but its career was abruptly halted by the change of government, as Lord Ripon refused any money for the ships in the Estimates for 1886-7.[2] As soon as Hamilton returned, however, it was taken up again. In the meantime the original speed of nineteen knots seems to have been questioned, as a twenty-knot design was now prepared. White's formal submission of the two alternatives refers to the Board's instructions for the faster ship,[3] but this conventional phraseology does not necessarily mean that the latter had initiated the idea, and a memorandum to the Controller of 13th December 1886,[4] in which White presents the case for higher speed in a way that implies he was meeting opposition, suggests that he was the real author of the proposal. There followed a further controversy among the members of the Board about whether the engines should be horizontal or vertical, and whether the ships need be coppered. The result was a compromise, and the three ships with coppered bottoms and horizontal engines were slightly slower than their two sisters.

The 'M' Class proved highly successful in service, and fully

[1] 'Report on the Probable Number of efficient Ships in H.M.Navy in a few years from this date, with reference to Programme of Shipbuilding for 1886-7', W.H.White, December 1885 (PRO: Adm.1/7254, 13th May 1895).

[2] NMM: Adm.138/97, Cover of 'M' Class, p.62.

[3] Ibid., pp.94, 140-3 & 146.

[4] Ibid., pp.156-8.

realized their designer's hopes. A comparison with the Comus and Esmeralda is eloquent of the technical advances made during the decade, and of the chasm separating Barnaby's outlook from Rendel's or White's:

	Comus	Esmeralda	Medea
Displacement:	2,383 tons (legend)	3,050 tons (full load)	2,800 tons (legend)
% armament:	6.5%	7.6%	6.4%
% armour:	5.8%	3.5%	11.8%
% machinery:	16.0%	20.8%	24.2%
% coal (max.)	14.9%	19.7%	14.3%
% hull:	55.8%	42.6%	36.4%
Length: beam ratio:	5.1:1	6.5:1	6.5:1
Max. speed:	13 knots	18.3 knots	20 knots
Sea speed:	ca.8 knots	ca.16 knots	ca.17 knots
Coal (legend):	270 tons	———	400 tons
Range at 10 knots:	ca.2,600 miles	———	8,000 miles
Coal (max.):	370 tons	600 tons	500 tons
Range at 10 knots:	3,600 miles	6,000 miles	10,000 miles
Armament:	2 4 ton, 7-in. RML 12 64pdr. RML	2 10-in. RBL 6 6-in. RBL	6 6-in. RBL
Mountings:	Service Broadside	Vavasseur CP	Vavasseur CP[1]
Engines:	Horizontal Compound	Horizontal Compound	Vertical Triple-Expansion
Hull:	Iron, sheathed & coppered	Steel	Steel
Rig:	Barque	None	None
Armour Deck forward:	None	1-in.	curved 1-in.
Armour Deck amidships:	1-in. flat	1-in.	curved 2-in.
Armour Deck aft:	None	1-in.	curved 1-in.
			+ 5-in. engine-room hatch-coamings[2]

For the 1888-9 Estimates White designed another class of protected cruiser. This was one of the fruits of the Colonial Conference, at which the delegates of the Australian colonies had agreed to pay the running costs for ten years of a squadron of cruisers to be provided by the Imperial government, and stationed in Australian waters. In wartime the Admiralty were to have the

[1] Infra, p.203

[2] See Appendix.

complete disposal of the ships,and they were to revert to British control at the end of the ten years.[1] White's initial design was ready at the end of 1887,but in January 1888 he proposed a revised version,with a higher speed and longer range,and this was in due course approved. The 'P',Pandora,or Katoomba Class (they were begun with British but completed with Australian names) were of very similar type to the 'M' Class. On a displacement of 2,575 tons they carried eight 36pdr.quick-firing guns,and an armour deck,at nineteen knots,with coal for six thousand (in emergency eight thousand) miles at ten knots.[2] With minor improvements such ships as these remained the backbone of the Navy's cruiser forces for twenty years. The basic design could be reduced to very small dimensions,as in the Bellona Class Third Class protected cruisers,designed for scouting; or expanded to the size of the Blake and Blenheim. For the first time in a quarter-century a type had been evolved which was generally accepted as satisfactory, and formed the basis for steady development in succeeding years.

This is an impressive tribute to White's professional abilities, and his grasp of the proper objects of cruiser design,and it is all the more so as this was a period of more rapid technical advance than Barnaby had had to face. Since Rendel and White had established the basic Elswick,and later Admiralty type,at least three inventions of fundamental importance had come into service. The least momentous of these was the triple-expansion engine,which was no more than a logical extension of the compound principle to higher steam pressures,but it nonetheless had significant consequences. Its greatly increased economy and efficiency were a pure gain,but on the other hand its higher

[1]For colonial naval development see D.G.Gordon,The Dominion Partnership in Imperial Defence (Baltimore,Md.,1965).

[2]PRO: Adm.1/6924b,12th June 1888.

running speeds made more acute the problem of uneven wear which plagued horizontal engines. With a horizontal compound engine constant maintenance and reduced efficiency were acceptable for the sake of placing the engines entirely under the armour deck, but triple-expansion engines generally had to be fitted vertically, and this usually involved cutting hatches in the armour deck in wake of the cylinder heads,which had then to be screened by armoured hatch-coamings. This entailed additional weight,[1] and weakened protection and watertight integrity.

Much more fundamental in their effects were two other advances, both still in common use to-day,both products of the Armstrong company,one very well-known,but the other seldom noted. These were quick-firing (Q.F.)guns,and Vavasseur mountings.[2]

The Q.F.gun was first produced by Armstrongs early in the decade in small sizes,and gradually developed into a cruiser weapon. The 4.7-inch 36 pdr.was first tried in 1887,and the 6-inch 100 pdr. shortly after. The Q.F.gun was in principle no more than a breech-loader with a partly automatic breech mechanism, but in effect it was revolutionary. No only was the rate of fire many times faster than Service pieces could achieve,but with continuous pointing and a very short interval between shots, accuracy was vastly increased,and higher muzzle velocity gave greater range and penetration. The 4.7-inch could fire ten rounds in forty-seven seconds,or fifteen rounds a minute. The Service 5-inch fired ten rounds in six minutes sixteen seconds. At a range of 1,300 yards the 4.7-inch hit a six-foot target five times running in half a minute. With a broadside of five 6-inch Q.F.,one ship fired 148 rounds in three minutes,and hit

[1]Thus the Medea devoted 100 tons (4%) more to armour than her horizontally-engined sisters.

[2]Vavasseur mountings are here described for convenience,although strictly speaking they slightly predate the Elswick cruisers.

a target between 1,600 and 2,200 yards away 110 times. One crew fired eighteen rounds and hit fifteen times.[1] These guns at once reduced all other weapons of similar calibre to hopeless obsolescence, and presented the naval architect with new problems and opportunities. One of the new pieces could replace several larger and heavier pieces of the old type - as White superseded the Medea's 6-inch with the Katoomba's 4.7-inch Q.F. - but the Q.F. needed much more ammunition than the old guns. The 6-inch Q.F. with ammunition weighed twice as much as the old 6-inch.[2] In face of an enemy armed with such guns, the designer had to reckon that his ship would be hit many more times than had ever been possible before, and this immediately affected all considerations of protection.

The second of Armstrong's developments was in its way as important as the Q.F. gun, though rarely noticed. Vavasseur was one of Armstrong's partners, and manager of the Ordnance Works. The new breech-loaders he was producing in the late 1870's, with their greatly increased muzzle energy, threatened to overtax the standard Service pivot-and-racer broadside carriage, in which the recoil was absorbed by screw clamps acting on slides. Vavasseur therefore designed an hydraulic recoil system, in which the same cylinders which damped the recoil provided the energy to run out the gun. Initially this system was fitted to the existing broadside carriages, producing the Vavasseur Broadside (V.B.) carriage, but soon he went further, and designed the Vavasseur Central Pivot (V.C.P.) mounting. In this there was no gun-carriage as such, the gun being mounted on a fixed pedestal, with hydraulic cylinders interposed to damp the recoil and run out the gun. The axes of elevation and training passed through the chase in wake of the

[1] P. Watts, 'The Italian Cruiser Piemonte', TINA XXX (1889), p.261. Sir Andrew Noble, 'The Rise and Progress of Rifled Naval Artillery', Ibid., XLI (1899), p.235.

[2] W.H. White, 'On the Designs for the new Battle-Ships', Ibid., XXX (1889), p.157.

trunnions,on the gun's centre of balance,so that it could be easily and swiftly laid on any bearing. The new mounting was lighter and imposed less strain on the deck than the old. More importantly,it freed designers from the necessity of mounting all medium artillery at ports in the side,since the V.C.P. mounting could be fitted wherever the deck would bear a gun,and offered unlimited arcs of fire. This made possible not the least of the radical features of the Elswick cruisers,the mounting of the heaviest guns on poop and forecastle; no longer merely chasers, auxiliaries to the main armament on the broadside,but an integral part,indeed the principal part,of the broadside armament. Only the V.C.P. mounting made possible the centre-line and superfiring armament which characterize almost all warships to-day. In fact the tradition of broadside armament died hard,and it was not until after the Great War that British cruisers were built with an armament entirely on the centre-line,but the freedom offered the naval architect to mount guns on any deck of adequate strength, and lay them in any direction,was a revolutionary development, and freed warship design from one of the most crippling technical restraints of the old era.

On taking office White had,as we have seen,first turned his attention to smaller cruisers,but he did not neglect larger types,and for the Estimates of 1888-9 he proposed two large protected cruisers,larger than any in the world. These cruisers, the last to be designed before the Naval Defence Act,form a fitting end to the story of a quarter-century of naval development. In one sense they mark an object achieved,even a conclusion. A type of cruiser had been evolved which could be multiplied in all sizes and answer every need of the fleet. An age of stability and steady progress in warship design had succeeded one of aimless confusion. Instead of the bizarre collection of prototypes which

Barnaby had produced,here was a reliable basic design for all purposes.

In other ways,these ships,the Blake and Blenheim,were less the embodiment of a new era than a swan-song of the old. They represented the culmination of an age of innocence for White and others,in which it was possible to believe that the basic Elswick design would do anything; by the 1890's technical advances had underlined the fact that no individual type,however excellent, could hope to be absolutely universal. White never lost his faith in protected cruisers,and they continued to form the bulk of the Navy's cruisers almost until the Great War,but it was never again possible to take it for granted that the protected cruiser pur sang was the ideal answer to every problem. Among the 'cruiser capital ships',whose capacity to fight the best ships an enemy could send into colonial waters was crucial,the armoured cruiser was soon to experience a renaissance. In a real sense,the last half of the 1880's was a golden age for the protected cruiser, in which it seemed able to do anything; whereas in later years it was recognized as a valuable type,but no panacea.

White formally submitted his new design on 14th January 1888,remarking on 'the absolute necessity of possessing a type of vessel capable of catching and destroying the regular or improvised cruisers of a Foreign Power'.[1] He had the Tage and Cécille very much in mind,and the new ships were specifically designed to match them.[2] It was clearly understood that their main function was the protection of trade,and that to fulfil it they had to be able to catch and sink enemy raiding cruisers.[3]

[1] NMM: Adm.138/106,Cover of Blake & Blenheim,p.54.

[2] Committee on Navy Estimates,Minutes of Evidence (PP: 1888 XIII p.25/234,Q.4215). For a contemporary analysis of the situation, see NID Report No.149 (December 1887),'Comparison of the Fleets of England,France,and Russia'.

[3] 'Statement of the First Lord of the Admiralty explanatory of the Navy Estimates,1888-9 [C.5311] (PP: 1888 LXVIII p.9/333).

As completed,the Blake and Blenheim were the largest,fastest, and most powerful protected cruisers in the world. On a displacement of 9,067 tons they carried two 9.2-inch and ten 6-inch Q.F.guns, with a three to six-inch armour deck and coal for at least 9,000 miles, and a speed of twenty-two knots. No other cruiser could match their speed and armament. By the time they were completed in November 1891 and January 1892,however,there were several serpents loose in the protected cruiser's paradise.

These were the technical advances which may be thought of as closing the old era and presaging the new. They came too late to affect the ships built under the Naval Defence Act,but their influence on the 1890's and later was pervasive. There were three principal engines of changes which were nearing perfection.

The first was the armour-piercing shell. Until the end of the 1880's A.P.shell,though experimentally used,were still inferior to shot for penetrating armour. The Blake and Blenheim, for example,carried 120 round for each 9.2-inch gun,divided thus: 31 common shell,16 shrapnel shell,20 Service A.P.shot,and 53 Palliser A.P.shot.[1] A gunner fired shot to penetrate armour, hoping to sink the ship if he hit below the waterline,or kill the gunners with splinters if he struck the battery. He fired shell at unarmoured parts of the ship to cause general destruction. He could not hope to cause great destruction to the vitals of the ship if they were adequately armoured. The perfection,largely in France,of A.P.shell naturally changed one of the most important circumstances of naval fighting,and thus design.

Closely linked with this in effect,though unrelated in cause, was the invention of mélinite,the first high explosive. This was several times more powerful than the powder then in use,so that

[1]NMM: Adm.138/106,Cover of Blake and Blenheim,p.43.

the new A.P.shell could deliver a much more effective bursting charge,and Q.F.guns much more of it. Besides being more powerful, high explosive also behaved differently from powder. Shells filled with powder did not generally explode until they had penetrated some distance,which was excellent for armour piercing,but unsatisfactory if,for example,the object were to blow a large hole in the unarmoured side of a ship. High explosive could be fused for impact or delay as desired. On the other hand,mélinite shells produced smaller splinters,and fairly light screens would localize their effect in,for example,a broadside battery.[1]

The introduction of Q.F.guns,A.P.shell and high explosive completely altered the nature of naval gunnery. Only one element in the equation remained,armour,and this too was revolutionized by the invention of steel armour with a toughened alloy face. The first nickel-steel armour was produced by Le Creusot in 1890,and chrome-steel armour by Saint-Chamond in 1892. Finally in 1895 the Harvey-Nickel process was invented in America. All these new techniques permitted the production of plates greatly superior in strength and lightness to compound or ordinary steel armour.

The protected cruiser was armoured to resist the fire of heavy guns firing slowly. It was implicitly assumed that the ship would not be hit often,so that if the vitals were protected,the risk could reasonably be incurred of leaving exposed the hull and armament above the waterline. Q.F.guns and high explosive completely changed this. The designer had now to anticipate a large number of hits,each of great effect,and the substantial destruction of large parts of the unprotected hull was no longer just one of Sir Edward Reed's fancies.

[1]Sir A.Noble,'The Rise and Progress of Rifled Naval Artillery', TINA XLI (1899),pp.251-3.

In France and Britain the new inventions were tested in a series of experiments. In France the Belliqueuse, and in Britain the Resistance and Nettle Tests produced data on which the designs of a new era were based. The first of these was the French armoured cruiser Dupuy de Lôme, designed by de Bussy. She was launched in 1888, and was thus a near contemporary of the Blake and Blenheim, and as a twenty-knot commerce-raiding cruiser a direct rival to them, but in design they were worlds apart. The Belliqueuse Tests had shown that relatively thin steel armour would keep out shell of the largest size fired by Q.F. guns. By covering the entire hull from end to end, and from below the waterline to the upper deck, with four-inch armour, de Bussy guarded against the anticipated hail of high-explosive shells. The wheel of development thus turned full circle, and a ship was built thirty years after the Gloire which exactly reproduced her armour scheme. The ship was still vulnerable to heavy shell, but to protect the vitals de Bussy fitted an armour deck of the standard type, joined to the belt at its lower edge, so that to reach the vitals a shell would have to penetrate belt and deck in succession. Because of the lightness of the armour, and because he was protecting only the vitals from heavy shell, de Bussy was able to achieve all this with only 15% of displacement. Two years earlier the Tage had given 14% of a larger displacement to armour, yet carried a weaker armament and was a knot slower.[1]

The Dupuy de Lôme may fittingly close the quarter-century of naval development, or rather, open the next. From her stemmed a new breed of armoured cruisers, quite unlike the old belted cruisers. She represented the new era in the same way that the Blake and

[1] Parkes, British Battleships, p.359. Hovgaard, Modern History of Warships, pp.206-8. Barnaby, 'On the Protection of Buoyancy and Stability in Ships.' TINA XXX (1889), p.217.

Blenheim did the old,but she also looked back to the first ironclads whose armour scheme she reproduced,as her British rivals looked forward to a new age of confidence and purpose in naval design.

* * * * *

Likewise,the great Naval Defence Act of 1889,which this study takes as its finishing point,was also the starting point of a new era. This famous measure had its origins in July 1888. Public agitation for naval increases was at its height; Hornby had delivered his famous estimate of the cruiser strength required by the Navy on 29th May.[1] On 13th and 15th June Hood appeared before the Committee on the Navy Estimates to give his damaging revelations of lack of planning for war.[2] Early next month the Cabinet instructed Hood to prepare detailed plans for war against an alliance of France and Russia,and on this basis to calculate the forces required to carry them out.[3] The decision to work solely from an estimate of need,with no prior financial limits laid down,was actually taken by Lord Salisbury against his First Lord's advice.[4] Hood's reply,signed also by Hoskins,Graham and Hotham,was received by the Cabinet by the end of the month.[5] Hood's war plans followed closely on those previously proposed by Milne and himself,and for trade protection relied on cruiser patrols in focal areas. In order to attain and retain the required strength against an alliance of France and Russia Hood proposed a building programme of eight first-class and two second-class battleships,eight large and twenty-five smaller protected cruisers, four scouts and eighteen torpedo-gunboats. With the addition of one more first-class cruiser this was the programme carried

[1] Ante,p.188. [2] Ante,p.193.

[3] PRO: Cab.37/22/36 p.2

[4] L.C.Hamilton to Salisbury,3rd July 1888 (Salisbury MSS: E/Hamilton/142). It is interesting to note that the political expediency of increased expenditure was being urged on Salisbury from some quarters; see Bartlett to Salisbury,15th May 1888 (Salisbury MSS: E/Bartlett/64).

[5] PRO: Cab.37/22/24.

into effect by the Naval Defence Act. The details of the programme were presented to the Cabinet on 1st November 1888, and finally sanctioned on 1st December.[1] In his arguments to his Cabinet colleagues Hamilton appealed to the sources which have in this study been adduced as powerful motors of public opinion - notably the lessons of the manoeuvres,and the (then unpublished) Three Admirals' Report. The whole of an unprecedented building programme,to say nothing of elaborate financial arrangements,were thus concerted in only four months. With such a short time available it would have been impossible for White to have worked out any radically new designs,and it was fortunate that he had to hand tried and successful types from which to work. As built,the first-class cruisers were improved Mersey's, the second-class improved 'M' or 'P' Class,and the four third-class scout cruisers reduced versions of the same universal protected design.

The Naval Defence Act marks a milestone in the development of naval policy. For the first time in twenty-five years it is possible to trace a policy formed and carried into execution on completely logical lines. The Cabinet,led by the Prime Minister, decided what enemies the Navy was to face. The naval members of the Board then produced plans for such a war,and from them calculated the force they would require. The D.N.C.worked out a building programme to attain that strength,basing his designs on those which had already proved successful. Finally the Cabinet sanctioned the completed programme and it was presented to Parliament. It is because it shows for the first time a perfectly logical system of policy-formation that the Naval Defence Act has been chosen as the terminus ad quem of the study,just as the

[1]PRO: Cab.37/22/30 & 37/22/40.

protected cruisers built under it represent the culmination of a quarter-century of warship design.

At the same time the historian must enter the same sort of reservation about the perfection of naval policy as about the perfection of cruiser design. Glancing at later naval programmes, which this study has not covered,one must ask oneself if the proper chains of responsibility were always followed. As before, doubts centre on the figure of the D.N.C.,so often more powerful and influential than he was supposed to be. The Board in 1889 was still overworked with trivia,and still lacked an effective machinery for the continuous review of policy; the same opportunity and need existed for a vigorous man to exceed the theoretical limitations of his subordinate office. In the opinion of an acute observer of White's later years,'He did for the naval officer what the naval officer could not or did not do for himself'; 'He would first look upon himself,as it were,as a co-ordinator of naval thought'.[1]

In spite of the shining example of the Naval Defence Act,the Admiralty in 1890,and for a long time afterwards,was not very well adapted for the formation of policy:

> 'It was a system not wholly bad,but dependent for its success upon the personality of the D.N.C.. Provided he was an able and broadminded man,the system would work, but even so it was a method which tended to make the D.N.C.indispensable [sic] ,and which gave too much power and influence to the holder of a technical appointment. Only when the D.N.C.realised,as White did,that in order to exercise his great powers in an efficient manner he must make himself a hybrid,something greater and wider-reaching than a technical adviser,could the system work.'[2]

This was the continuing weakness of the Admiralty; too much of its success in 1890,even the evolution of the Naval Defence Act, depended on the initiative of able individuals:

[1] King-Hall,Evolution of the Cruiser,pp.29 &32.
[2] Ibid.,p.32.

> 'It cannot be too strongly stressed that the foundations of policy will not be sound if they depend upon the expressions of individual opinions and not upon the impersonal labours of a staff.'[1]

These percipient comments upon White's later years at the Admiralty must be borne in mind as a qualification to the opinions earlier expressed on the Naval Defence Act. It did mark a new standard for the logical formation of policy, but it was a standard not always adhered to. As with the earlier judgement on the progress of cruiser design, one must record a qualified verdict on the Naval Defence Act; it was the end and beginning of important eras, but not a turning-point in history.

[1] Ibid., p.37 (original italics).

CONCLUSIONS

In surveying a quarter-century of naval development,one seems to see two sorts of influence as largely responsible for shaping the course of warship design; technical and personal. These may be identified at work in the evolution of both the species of cruiser with which this study has been chiefly concerned; the large ships which approached more or less closely to the concept of the 'cruiser capital ship',and the bulk of the smaller vessels designed to exercise the command of the sea.

Among most subordinate types of cruiser,technical influences were predominant throughout the 1860's and 1870's. There was no serious reconsideration of the proper functions and nature of these types. Instead,technological developments were incorporated piecemeal,leading to a gradual improvement of an essentially unsatisfactory species,evolved for a time of peace rather than war,and inadequate to carry out the new strategies which were growing up. Then,in the early 1880's,various individuals,in reacting to new technologies,inadvertently created a new species of small cruiser which was at once seen to fulfil cruiser functions much better than the old. Finally,in the late 1880's,we appear to see the Admiralty for the first time firmly in command of its technical resources,conscious of what it was trying to do,and how best to do it. Whereas the men of earlier years had to a great extent reacted to the changes which an era of rapid evolution constantly thrust at them,those of the late 1880's seem once more to have been masters of the course of events.

With the larger cruisers the story is rather different. At the end of the 1860's a small group of men,pre-eminent among them Sir Spencer Robinson,made strenuous efforts to achieve the 'cruiser capital ship' which the needs of the time suggested,but they were frustrated by the limitations of contemporary engineering.

During the 1870's and early 1880's,Parkes's 'Dark Ages of the Victorian Navy',this unity and direction were largely lost,and the development of larger,as well as smaller cruisers,seems to have been heavily conditioned by the haphazard accumulation of technical improvements. There was no overall perception of development,no unity of approach. The men of the day were reacting to events rather than controlling them.

Finally,in the 1880's,the belted cruiser type evolved by the 'ancien régime' of the Admiralty was replaced by a version of the same protected cruiser design which had taken over throughout the cruiser fleet.

The Naval Defence Act laid down a fleet consisting essentially of only two designs,one for battleships,and one for cruisers. Every cruiser,from the tiny Third Class Scout Cruisers,to the enormous Blake and Blenheim 'cruiser capital ships',conformed to a single basic design. Throughout the cruiser fleet was reflected a unified concept in which the cruiser qualities of speed and range were properly paramount. Engineering and naval architecture were once more the servants of policy and strategy.

Such,at least,was the apparent situation,but there are grounds for thinking it misleading. It cannot be doubted that the men of 1890 had a far more complete grasp of the objects of British strategy,and the consequent priorities of British cruiser design than their predecessors. One may,however,suspect that they had not entirely escaped from the tyranny of technology; that to some extent they still allowed piecemeal improvements to influence their designs. The unity of the cruiser fleet in 1890 was partly the product of the temporary 'golden age' of the protected cruiser. If one glances at the subsequent history of the'cruiser capital ship' type,on which the protected cruiser's grasp was weakest, one is forced to wonder whether the essential nature of the

type,which should be a cruiser type first and foremost,but one capable of matching the most powerful enemy cruisers in chase or action,was realized. In later years the growth of the armoured cruiser,and the introduction of the battle-cruiser,produced types which fell uncomfortably between two functions,being too large, powerful and costly for cruiser work,but,as experience proved, inadequate for fleet action. Such ships could not have been built if the nature of the 'cruiser capital ship' element in a colonial cruiser force had been properly understood. One must infer that the men of 1890 were still to some extent the prisoners and not the masters of engineering progress,and that the splendid unity of the Naval Defence Act was the chance product of technological advance as well as the conscious design of policy and strategy. It is in fact no surprise to find that naval architecture and policy-making displayed a tendency to incorporate endless technical improvements without re-thinking basic approaches,when the habit has hardly been shaken off a century later.

The second great influence on naval policy was that of personalities. This study has devoted much attention to the characters of the men who rules the Queen's Navy,in the belief that their characters were the most formative influence on its development. Again and again it was the ideas of individuals, and the way they worked with one another,which shaped naval policy. There were no developed schools of naval thought until the 1880's,and even when the Naval Defence Act allows one to speak of a coherent strategy reflected in naval policy,it was a strategy largely generated outside the Admiralty,and adopted by it without serious consideration,in response to political pressure.

What the Navy needed in a time of rapid technical change was some machinery to review the progress of the naval world,and to suggest the broad lines of policy. The Admiralty,like any

administrative body,was chronically unable to take the long view. By 1890 the machinery to evolve policy was only beginning to be created. It is a tribute to the efforts of unofficial bodies like the R.U.S.I.,and the officers who attended them,that so sophisticated and intelligent a school of naval thought did grow up,but if the same work had been done systemmatically by men trained to adopt scientific methods,it might have avoided many of the errors which official policy in 1890 was in process of adopting from the unofficial school of naval thinkers together with their sound principles. It is idle to criticize the Victorian Navy for its slowness in finding an answer to a problem which it was historically ill-equipped to recognize,let alone solve,but it offers a lesson to modern times which has not yet been completely learnt.

One of the salient characteristics of personal influence on naval policy during this period was precisely that it was so personal . The administrative structure of the Admiralty frequently seems to have had little effect on a balance of influence and even intrigue which resembled less the smooth machinery of an efficient 'bureaucracy' than the court of an absolute monarch. The Admiralty chronically lacked an administration with clearly-defined chains of command and responsibility,of information and consultation. It was never obvious who was supposed to take what decisions,upon what grounds,and with whose advice. In consequence,questions of fundamental importance were answered by people incompetent to do so,and often they were never answered at all. The study points the absolute need for a Service department,indeed,for any government department,of proper administrative machinery.In part the weaknessses arose from a persistent confusion of the functions of administration and policy-making. Naval lords,even if they had received the professional assistance they so much wanted,would have found their administrative concerns sufficient to distract them from overall

policy. On the other hand,it is probably idle to suggest that the two could ever have been completely separated. Policy,if it be effective,must permeate every aspect of administration,and vice versa. What was required was that the naval lords be assisted, on the one hand by a staff competent to deal with all but the most important administrative details,and on the other by a staff of a different sort,concerned with advance planning and policy-formation,and able to undertake the groundwork upon which their chiefs might build a fabric of decision. Professor Northcote Parkinson has made famous the tendency of the Admiralty to increase in size regardless of the size of the fleet; this study shows the Navy valiantly resisting the trend even as it entered an age of increasingly rapid and complex technical change. Hindsight makes it clear that this well-intentioned effort was misguided,and that the conservative admirals and thrifty politicians who for so long denied the Navy a proper administrative structure of command gravely weakened its effectiveness.

The new age also required a body of officers (and indeed men) far better trained and educated than those who guided the Navy through this period. In an age of great changes it was no longer adequate to finish school at twelve or thirteen and go straight to sea to be brought up in the ways of seamanship. Reasonably as that system had served an age when seamanship was the only technology at sea,it was outdated by the early 1870's. It was not so serious that officers were untrained in what had become important parts of their profession. Their crucial failing was simply that they lacked the intellectual capacity which comes from training the mind. No-one who reads the papers of the time, the evidence of naval witnesses before the Lords' Committee or the Committee on Designs,or the reports of debates at the R.U.S.I., can fail to be struck by the poor mental abilities of the mid-

Victorian naval officer. It is extraordinary that the sophisticated and effective naval thought which has been described in these pages was nurtured in such unpromising soil.

The poor education of the naval officer contributed to another prominent feature of the times. The Navy has always been in a measure isolated from the national life, and no doubt this is an inevitable concomitant of a seafaring profession, but has never been so marked as in the 1860's and 1870's. Decades of peace, or of war in which the Army had chiefly figured, had allowed the Navy to slip out of the public view. Lip-service might still be paid to the primacy of the Senior Service, but public attention was given more to the Army. Naval officers, formerly honoured and respected members of society (cf. Jane Austen's characters, and indeed relations), became somewhat obscure, even uncouth and comical figures. The great revolution in middle-class education brought about by public schools and railways had passed them by, and men bred up at sea from boyhood no longer fitted easily into polite society. This contributed to a sort of diffidence which is characteristic of naval officers, especially the older ones, during this period. None of them could remember the great age of the Navy's fame, and very few of them had studied it even as history. Not only did they forget the strategy learned in generations of warfare, they also in a measure lost the self-confidence born of generations of success. One seems to see a sort of secret conviction of inferiority which tempered the Navy's dealings with the outside world. Again and again naval lords pressed for what they regarded as essential increases in the Estimates, or protested at what they saw as disastrous reductions, with a sort of hopeless resignation. Frequently they accepted defeat in advance as inevitable. They were not only willing, but apparently even eager, to resign all policy-making to the Cabinet,

and free themselves from the burdensome responsibility of decision. Something of this lies behind their reluctance properly to consider the overall policy and grand strategy of the Navy,which so urgently required re-examination. One of the most fundamental weaknesses of the mid-Victorian Navy was simply a lack of self-respect, and the recovery of the Navy both reflected and was reflected by a recovery of self-confidence which led up to the assertive spirit of the turn of the century.

This study has examined the designs of cruisers as a reflection of contemporary strategy,as well as other factors. It must also be remembered that they were themselves an influence upon it. We have already mentioned how outside forces,especially technical ones,could give naval design an impetus of its own, quite independent of the strategy supposedly guiding it. In practice strategy seems often to have been as much influenced by the ships available as vice versa. Officers,particularly those like Milne or Key who were temperamentally attached to the old types,often argued that the existence of a fleet of older ships, which could not immediately be replaced,made it difficult to replace the strategy they had been designed to fulfil - as of course it did,in the short term. From there it was but a short step to arguing that it was undesirable to replace the old ways. Thus a lack of rigorous thinking allowed design in some measure to influence strategy. One might almost say that naval design had a life of its own,and an influence on policy and strategy when it should only have been influenced by them. The concept would seem strange if it were not familiar to us in our own days.

The mid-Victorian Navy entered on a period of transition with many chronic defects,the gradual correction of some of which forms the theme of this study. By the time of the Naval Defence Act it had succeeded in reforming itself out of the

worst of these,and had evolved a basic sound strategy which has never since been abandoned. At the same time one must doubt if the achievement of the Naval Defence Act was quite as solidly based as it appeared to be. Nevertheless,the Navy came far and fast during the quarter-century. The Service of those days may seem almost comical in retrospect,as it seemed to many contemporaries, but the historian must wonder that a Service so conservative in spirit met so well the unprecedented demands of a new world. The officers of the Queen's Navy had been brought up in an era in which rapid technical change was unknown and unknowable,and the fundamentals of naval warfare changed so slowly, and were so deeply implicit in every facet of naval life,that they needed no formal teaching. These men were the products of an age in which naval fighting was predominantly a practical and empirical art, and they were forced to adapt to one in which it became an intellectual science. It must remain a subject of astonishment that they reacted so well to situations for which their training and upbringing had left them quite unfitted. They were members of a warlike Service,who had never known war; leaders of an increasingly technical profession,whose technical training was minimal; educated in a tradition which had failed either to preserve the wisdom garnered by their forefathers,or to prepare them for the new challenges of a time of bewildering change; they badly needed the power of analysis and breadth of understanding of the educated mind,and yet they had only the slightest formal schooling; worst of all they subconsciously recognized enough of their deficiencies to deprive them of the confidence and drive which would have helped in overcoming these deficiencies. The impartial observer of the Royal Navy in 1865 could scarcely have foreseen the extent to which these men transformed their Service in the following twenty-five years.

Glossary

Barbette

A fixed armoured emplacement surrounding a gun, its mounting, handling chamber and trunk. The gun was trained and elevated on a revolving platform inside the barbette, and fired over the rim of the armour glacis. A barbette was originally roofless, but in later years an armoured hood was fitted over the gun to protect the crew from machine-gun fire.

Barque

A three (rarely four or five) masted vessel, square-rigged on fore and main masts.

belt-and-battery (ironclad)

One with an armour scheme consisting of a waterline belt and an armoured box battery above it amidships.

bluff

(Otherwise 'bluff-bowed') With a coarse entry, a full bow; ie. with the bows blunt or squared-off.

Brig

A two-masted square-rigged vessel.

Builders' Old Measurement

(Otherwise 'tons burthen') A number of formulae for calculating tonnage, all derived from one devised by Matthew Baker, Master Shipwright to Queen Elizabeth I, to provide a notional equivalent of a ship's capacity to carry actual tuns of wine.

Buttocks

The rising stream-lines of the underwater hull aft, about the quarters.

central citadel (ironclad)

One with battery and vitals enclosed within an armoured citadel amidships, leaving bow and stern protected only with an armour deck.

Chase

The barrel of a gun from breech to muzzle.

Chaser

(Otherwise 'bow chaser'or 'stern chaser') A gun mounted forward or aft, firing along the line of the keel.

compound (engine)

One working steam through two stages of expansion.

Corvette

A ship-rigged man-of-war carrying her main battery on the upper deck.

crank

Unstable.

(Boiler) Crown

The top of the boiler shell.

dry

Shipping little water on deck in heavy weather.

en barbette

Vide supra sv. 'Barbette'.

Flat

A small compartment (eg. Tiller Flat; the compartment containing the steering-gear).

Forced Draught

Air forced into the boilers under pressure to improve their combustion.

Forecastle

The forward end of the upper deck. Also loosely used for 'Topgallant Forecastle'; a short deck raised above the forecastle.

Freeboard

The distance from waterline to upper deck,or; the exposed side of the ship.

Frigate

A ship-rigged man-of-war carrying her main battery on the main deck.

Full Rig

A complete rig,especially that of a ship (qv.).

Gunboat,Gunvessel

Small warships armed with one or two heavy guns; originally designed for inshore bombardment.

handy

Readily answering the helm,manoeuvrable.

Hatch-Coaming

A raised sill or breakwater armound a hatch in a weather deck,or an armoured breastwork around a hatch in an armour deck.

Langridge

Splinters from shot,or thrown up by shot.

Lugger

A small vessel rigged with lug-sails; quadrangular fore-and-aft sails bent to running yards at their heads.

Main Deck

The deck below the upper deck (qv.).

Plain Sail

All the usual square and fore-and-aft sails,excluding exotica like studding-sails.

Poop

A short deck raised above the quarter deck,which is the after end of the upper deck (qv.).

pounder

(Usually abbreviated to 'pdr.').A gun throwing shot or shell of the specified weight.

Privateer

A merchant vessel licensed by letter of marque to prey upon the shipping of the enemy.

Scantlings

The materials of the ship's structure,especially the sides.

Sea-keeping

The capacity to stay at sea,especially in bad weather.

Sheathing

An outer cladding or skin applied to the hull,often to allow an iron hull to be coppered without setting up corrosive electrolytic action.

Shell Plating

Plating worked in a continuous skin,especially that of the ship's side.

Ship

A three (rarely four or five) masted vessel,square-rigged on all masts. In the period of this study the word was already losing its precise sense. I have followed the usual contemporary (and current) practice of preserving the proper meaning in speaking of pure sailing vessels,and falling into the modern usage with steamers or hybrids,or in compound words such as 'warship'.

short-winded

Of short range,or poor steaming powers generally. (This is something of a colloquialism).

simple,or simple-expansion (engine)

One working steam through only one stage of expansion.

slack in stays

Unhandy in going about,slow in tacking.

Sloop

A small ship or brig-rigged man-of-war carrying her battery on the upper deck.

stiff

With large reserves of stability,and consequently lively and uncomfortable in a seaway.

superfiring (gun)

One mounted above and behind another,and firing over it.

Surface Condenser

One in which the exhaust steam condenses on surfaces cooled by internal circulation of sea water,so that cooling water and boiler feed water are isolated from one another. It replaced the jet condenser,in which steam was injected into a bath of sea water from which feed water was drawn off.

taunt

(Of a rig) tall in proportion to its spread; (of sails) deep in the hoist or drop in proportion to their spread.

tender

With small reserves of stability,consequently steady and comfortable in a seaway.

Trim

The attitude of a ship in the water,whether on an even keel,down by the head or stern,&c..

triple-expansion (engine)

One working steam through three stages of expansion.

Trunnions

A pair of heavy bosses on either side the chase of the gun,by which it is mounted.

Tumblehome

An inward sloping of the ship' side.

Turn of the Bilge

The angle between bottom and side.

Upper Deck

The highest deck running continuously from bow to stern.

Upper-Works

The upper part of the exposed hull,or; the superstructure.

in wake of

(Otherwise 'in way of') Behind,beside,above,in line with.

weatherly

Holding a good lee,going well to windward.

wet

Tending to ship seas in heavy weather.

APPENDIX

Table of Legend Weights, &c.

Name	Laid Down	Displacement	Speed (kn.)	% Armament	% Armour	% Machinery	% Coal	% Hull	Length: Beam Ratio
Wampanoag	1863	4,570	16	4.4*	0	27.6	16.4	45.0[1]	7.6:1
Alma	1865	3,778	11.9	4.3	23.4	10.7	6.2	51.9[1]	5.0:1
Volage	1867	3,080	15	4.4	0	19.4	13.4	48.6	6.4:1
Victorieuse	1869	4,150	12.7	7.5	17.2	9.6	6.8	47.5[1]	5.2:1
Shah	1870	6,208	16.2	7.4	0	19.3	9.7	47.8	6.4:1
General Admiral	1870	4,648	12.3	3.3	11.3	19.7	21.8	37.9	6.2:1
Raleigh	1871	5,200	15.2	5.5	0	20.4	11.8	50.2	5.8:1
Duguay-Trouin[2]	1872	3,126	16	4*	0	22*	14.5	50*	7.2:1
Shannon	1873	5,390	12.3	6.5	21.2	13.0	5.1	43.1	4.8:1
Téméraire[3]	1873	8,540	14.6	5.3	23.9	14.9	4.7	43.1	4.6:1
Ruby[4]	1873	2,162	12.3	5.5	0	16.6	11.1	51.3[5]	5.5:1
Euryalus	1873	4,139	15	6.1	0	21.6	9.7	52.0	6.2:1
Nelson	1874	7,473	14	6.8	22.7	14.8	7.1	39.9	4.6:1
Iris	1875	3,624	17.5	3.6	0	29.7	14.4	43.9	6.5:1
Comus	1876	2,383	13	6.5	5.8	16.0	11.3	55.8	5.1:1
Yaroslavl[6]	1878*	3,050	14.7	4*	0	16*	32*	43*	
Heroine	1880	1,468	13	7.8	2.0*	12.9	9.6	54.4*	5.2:1
Leander	1880	3,800	17	4.4	5.3	20.5	19.4	41.6	6.5:1
Almirante Brown[7]	1880	4,300	13.7	6.4	23.9	17.8	10.7	35.1	4.8:1
Impérieuse	1881	8,400	17	5.0*	21.0*	16.4*	10.7	45.4*	5.1:1
Esmeralda	1881	3,050	18.3	7.6	3.5	20.8	19.7	42.6	6.5:1
Giovanni Bausan	1882	3,074	17.4	7.5	5.0	20.4	19.4		6.4:1
Mersey	1883	3,605	17	7.5	13.9	15.8	13.9	41.3	5.4:1
Scout	1884	1,596	16.7	4.6	?	20.7	15.7	46.4[8]	6.6:1
Orlando	1885	5,600	19.1	7.1	17.5	15.3	13.4	40.3	5.3:1
Calypso	1885	2,835	13.7	6.5	4.6*	17.3	11.4	46.3*	5.3:1
Archer	1885	1,771	16.5	8.4	5.6	19.9	14.1	46.3	6.2:1
Medea[9]	1887	2,800	20	6.1	11.8	24.2	14.3	36.4	6.5:1
Blake	1888	9,067	21	5.9	13.2*	17.6	16.5	40.6*	5.8:1

In this table displacement (in tons) is usually as designed, speed is trial speed, armament includes ammunition and gun mountings, armour includes backing, machinery includes boiler feed water, coal is legend capacity where applicable (see later table), and length to beam ratio is calculated on overall length without bowsprits or figureheads. Figures marked with an asterisk are approximate.

1 (Ter) Wooden hulls.

[2]A smaller derivative of the Duquesne and Tourville, roughly corresponding to the Volage.

[3]A battleship of Barnaby's design, included for comparison with the armoured cruisers.

[4]One of the Opal Class sloops, which preceded the Comus Class.

[5]Composite built.

[6]An armed merchantman of the Russian Volunteer Fleet, included for comparison with unarmoured cruisers. Unladen displacement is quoted; with her holds fully stowed with coal the displacement might have been double that given, and the legend weights quite different.

[7]An Argentinean belted cruiser built to White's design, included for comparison with Barnaby's designs.

[8]Including armour, which was probably no more than 2-3%.

[9]Three sisters with horizontal engines had less armour and heavier hulls, and displaced 150 tons more.

Table of Range and Bunkerage

The displacement of a warship is very variable, ranging from the lightest possible figure, with the ship stripped of all stores and movable equipment, to the heaviest, including the maximum quantity of stores, ammunition, coal, water, men and their effects, and spare gear of all kinds, which might be 50% greater than the former figure. It was the practice of British naval architects to fix a 'legend' displacement, on which all calculations of stability, draught, trim, &c., were based. This included a 'normal' quantity of consumable stores, which was usually less than the maximum which could be stowed. Reed was accustomed to include full bunkerage in his 'legend' displacement, and this practice was required by the Board Order of 21st September 1886, but Barnaby always fixed his legend weights with less than the maximum coal bunkerage, on the assumption that only in exceptional circumstances would the full supply be required. Although all calculations of trim and stability were based on this legend displacement, at which trials were also run, published figures of range were usually based on the maximum bunkerage, thus getting the best of both worlds. The following table attempts as far as possible to distinguish the legend and maximum coal capacities, and the consequent ranges, of the ships in the previous table.

It should be borne in mind that the speed and range of coal-burning ships varied considerably with the quality of the coal and the stokers. Admiralty figures of range were calculated on the fairly realistic assumption of good, but not unusually good stoking, and best Welsh steam coal. Trials, however, were often run with picked stokers and Nixon's Navigation Coal, giving superior results.

Figures marked with an asterisk are approximate.

Name	Coal (tons)		Range (miles) at 10 knots	
	Legend	Maximum	Legend	Maximum
Wampanoag		750 = 16.4%		4,600*
Alma		235* = 6.2%[1]		1,360
Volage	414 = 13.4%		2,520	
Victorieuse		275* = 6.8%		2,740
Shah	600 = 9.7%		3,480	
General Admiral		1,016 = 21.8%		5,900
Raleigh	550 = 11.8%		2,040	
Duguay-Trouin		430 = 14.5%		4,000
Shannon	280 = 5.1%	560 = 9.9%	?	?
Téméraire	400 = 4.7%	620 = 7.0%	?	?
Ruby	240 = 11.1%	260 = 11.9%	1,870*	2,040
Euryalus	400 = 9.7%	540 = 12.6%	2,130*	2,880
Nelson	600 = 7.1%	1,200 = 14%	2,500*	5,000
Iris	500 = 14.4%	750 = 19.7%	2,800*	4,200
Comus	270 = 11.3%	370 = 14.9%	2,600*	3,600
Yaroslavl	980* = 32%		?	
Heroine	140 = 9.6%	400 = 23.7%	1,760*	5,050
Leander	725 = 19.4%	1,000 = 24.5%	6,000*	8,000
Almirante Brown		650 = 10.7%		4,500
Impérieuse	900 = 10.7%	1,130 = 13.4%	4,320	7,230
Esmeralda		600 = 19.7%		6,000
Giovanni Bausan		560 = 19.4%		5,000
Mersey	500 = 13.9%	750 = 19.4%	4,800*	7,200
Scout	250 = 15.7%	450 = 25%	3,825	6,900
Orlando	750 = 13.4%	900 = 15.6%	6,600*	8,000
Calypso	320 = 11.4%	575 = 18.6%	2,750*	4,970
Archer	250 = 14.1%	475 = 23.8%	3,650*	7,000
Medea	400 = 13.6%	500 = 16.4%	8,000	10,000
Blake		1,500 = 16.5%		9,000*[2]

[1] Admiralty figures gave 300 tons (= 7.9%), or 2,740 miles at 10 knots, but this was probably too high.

[2] Sources differ, some quoting figures as high as 15,000 miles. Probably this ship, like most others, could in emergency stow even more than her 'maximum' capacity.

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Medea: NMM: Adm.138/97,Cover of 'M' Class,p.293.

Blake: NMM: Adm.138/106,Cover of Blake & Blenheim,p.188. Warship International,1970 No.1,p.47.

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Adm.1:

This contains the most important surviving Admiralty papers, but has been heavily weeded. Most other Admiralty papers in the P.R.O.are almost useless for the student of policy in this period, with the exception of:

Adm.116:

This contains a number of cases on subjects relevant to the study. The system of gathering the papers bearing on a particular subject into a single file was only begun in the 188♦s,and had not by 1890 attained the scope and importance familiar to historians of later periods.

PRO 30/6:

The papers of the Earl of Carnarvon; contain copies of the Second and Third Reports of the Royal Commission of his chairmanship, together with much other material,especially on colonial defence.

Cab.37/22:

This includes a small number of important documents bearing on the origins of the Naval Defence Act.

National Maritime Museum

Adm.138,Ships' Covers:

Formerly in the P.R.O.. These constitute the Constructors' Branch records of each ship or class. Many are now missing,and the quantity and quality of information in the remainder are variable,but this is an indispensable source,and often contains material of surprisingly wide scope.

Milne Papers:

An archive of great value. Milne removed from the Admiralty many important papers which have thus been preserved,and his extensive correspondence is most valuable. With the Milne Papers, but un-numbered,is the only surviving copy of the First Report of the Carnarvon Commission,with most of the Minutes of Evidence.

Vesey Hamilton Papers:

His correspondence and professional papers are very informative for the late 1880's.

Phipps Hornby Papers:

The most important surviving collection of private papers of the period. Hornby's status is reflected in the wide variety of his correspondence,and the close touch he kept with policy even when not at the Admiralty. There is a complete set of the unpublished papers and evidence of the Committee on Designs.

Noel Papers:

A large archive,as yet uncatalogued. There is some interesting correspondence,but Noel did not reach sufficiently high rank to be much involved with policy until after 1890.

British Museum

Gladstone's MSS contain nothing of much relevance to the Navy, except for his correspondence with Childers and Robinson over the latter's dismissal. Otherwise there seems to be little of value apart from a few interesting letters among Lord Ripon's papers in the Additional MSS.

Buckinghamshire Record Office

Ramsden Collection:

The includes the Duke of Somerset's correspondence with various naval officers and others,some of which is of interest.

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Tarleton Papers:

Microfilm of papers,the originals of which are held by Sir John Tarleton's grand-daughter Mrs.H.M.Fagan. There is a useful collection of letters from Milne among them.

Hampshire Record Office

Forwood Papers:

This is a small archive,but of great importance for Hamilton's Board. Besides preserving official documents and private correspondence, Forwood had copies or précis made of many Admiralty files.

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There are some interesting letters,but in the main W.H.Smith's correspondence typifies the lack of interest in the Navy felt by politicians of the day.

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The surviving archives of First Lords of the day are hardly more helpful. Only Somerset is really informative,but not often on subjects relevant to this study. Pakington's correspondence in the Worcestershire Record Office,of which a detailed list is available at the National Register of Archives,seems to contain nothing of value. The N.R.A.also has lists of Göschen's and Ward Hunt's MSS,neither of which contain any material relevant to this thesis. Many of Childers's papers were destroyed by enemy action; those remaining,at the Royal Commonwealth Society and among the Granville MSS in the P.R.O.,are largely concerned with political questions,and his time at the War Office. I have been unable to trace any important archive of Northbrook or Hamilton papers,other than the correspondence with others whose papers are cited elsewhere.

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Hansard

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Raoul Castex: Les Théories Stratégiques (Paris,1929-35,5 vols.). A somewhat academic work,relevant to this period only for its neat historical introduction.

Lt.Col.Spencer Childers: Life and Correspondence of H.C.E.Childers (London,1901). Slight and sycophantic,in the worst Victorian style.

Admiral Philip H.Colomb: Memoirs of Sir Astley Cooper Key (London, 1898). An excellent biography and important source.

Sir Julian S.Corbett: Some Principles of Maritime Strategy (London,1911).

Howard d'Egville: Imperial Defence and Closer Union (London,1913). A brief biography of J.C.R.Colomb,concentrating on his political career.

Sir Charles Dilke: Problems of Greater Britain (London,1890,2 vols.). A good example of a sophisticated lay thinker of the period.

Mrs.Fred Egerton: Admiral of the Fleet Sir Geoffrey Phipps Hornby G.C.B. (Edinburgh,1896). A work of filial piety,disappointing to the historian.

Hon Arthur Elliott: The Life of George Joachim,First Viscount Goschen,1831-1907 (London,1911). A good political biography.

Arvel B.Erickson: Sir James Graham (Oxford,1952). Contains an uncritical account of his Admiralty reforms.

Leslie Gardiner: The British Admiralty (Edinburgh,1968). A popular account,inclined to favour good stories over good history.

D.G.Gordon: The Dominion Partnership in Imperial Defense,1870-1914 (Baltimore,1965). Describes the early colonial naval forces.

Sir R.Vesey Hamilton: Naval Administration (London,1896). A brief handbook for laymen on the theoretical constitution of the Admiralty; useful for reference.

William Hovgaard: Modern History of Warships (London,1920). A useful general survey,but the analysis is superficial; badly needs to be replaced.

A.W.Kirkaldy: British Shipping: Its History,Organisation and Importance (London,1914). A standard work of reference.

Sir William Laird Clowes et al.: The Royal Navy (London,1897-1903,7 vols.);Vol.VII,1856-1900. A disorganized and somewhat inaccurate history,but still unsurpassed.

Michael Lewis: England's Sea Officers (London,1939); The Navy in Transition,1814-1864 (London,1965). Two excellent studies in social history.

C.C.Lloyd: The Nation and the Navy (London,1954). An informative piece of general social history.

Bernard Mallett: Thomas George,Earl of Northbrook (London & New York,1908). Reflects its subject's lack of interest in naval affairs.

Frederick Manning: The Life of Sir William White (London,1923). An indispensable work for the development of warship design during White's lifetime,as well as for White himself.

Arthur C.Marder: The Anatomy of British Sea Power,1880-1905;alias British Naval Policy,1880-1905 (New York and London,1940,1964). Largely an account of the influence of public,political,and commercial opinion on the formation of naval policy. As such it is a study of the greatest importance.

Sir Herbert Maxwell: Life and Times of the Rt.Hon.William Henry Smith (London,1893; Edinburgh,1894). Average political biography,with little on the Admiralty.

B.R.Mitchell & Phyllis Deane: Abstract of British Historical Statistics (Cambridge,1962).

N.Monasterev & Sergei Tereshchenko: Histoire de la Marine Russe (Paris,1892 & 1932,trans.Jean Perceau). A slender and partisan work.

Elting Elmore Morison: Men,Machines and Modern Times (Cambridge, Mass.,1966). A series of papers,one of them on Isherwood. Stimulating,but not all it might be.

Dr.Oscar Parkes: British Battleships (London,1958 & 1966). A monumental historical and technical survey,including the early armoured cruisers.

Anthony Preston & John Major: Send a Gunboat ! A Study of the Gunboat and its Rôle in British Policy,1854-1904 (London, 1967). An illuminating study.

B.McL.Ranft: The Naval Defence of British Sea-Borne Trade,1860-1905 (Oxford D.Phil.thesis,1967). An indispensable study of the formation of policy.

Commander Frederick Robinson: The Evolution of Naval Armament (London,1921). A standard history.

Theodore Ropp: The Development of a Modern Navy: French Naval Policy 1871-1904 (Harvard Ph.D.thesis,1937). An extensive compilation from secondary sources,lacking in primary research or reliable judgement,but important in the absence of anything better.

D.M.Schurman: Imperial Defence,1868-1887 (Cambridge Ph.D.thesis, 1955). Traces the progress of the concept in political and administrative circles.

Edward William Sloan: Benjamin Franklin Isherwood,Naval Engineer; The Years as Engineer in Chief,1861-1869 (Annapolis,Md.,1965). The first scholarly and comprehensive account of Isherwood's work.

E.C.Smith: A Short History of Naval and Marine Engineering (Cambridge,1938). Useful basic reference.

James Russell Soley: The Navy in the Civil War; The Blockade and the Cruisers (New York,1883; London,1898). An official history.

Harold & Margaret Sprout: The Rise of American Naval Power,1776-1918 (Princeton,1939). An excellent historical survey.

J.Tramond & A.Reussner: Éléments d'Histoire Maritime et Coloniale Contemporaine (Paris,1924). An historical survey,especially good on social aspects. Forms a supplement to Tramond's Manuel d'Histoire Maritime de la France.

W.C.B.Tunstall: Imperial Defence,1815-1870,& Idem,1870-1897, in Vols.II & III of The Cambridge History of the British Empire (Cambridge,1928ff.). Excellent and comprehensive general surveys.

Frederic Whyte: The Life of W.T.Stead (London,1925,2 vols.).

Contains an account of the 'Truth about the Navy' campaign.

H.W.Wilson: Ironclads in Action (London,1896,2 vols.). Contains colourful,uncritical,and wildly biased accounts of the principal naval actions of the latter half of the century.

Lucien Wolfe: The Life of the First Marquess of Ripon (London,1921). Moderately good biography,covering his short time at the Admiralty.