

SECRET

The United States
NAVAL WAR COLLEGE

Copy No. 1

DECLASSIFIED BY M.C. Nijh ON 10-31-74 IAW DOD MEMO OF
4/12/74, SUBJ: DOWNGRADE/DECLASS OF HISTORICAL RECORDS

ASW - PRESENT AND FUTURE

Lecture by

Vice Admiral F. S. Low, USN

Naval War College
Newport, R.I.
22 March 1950



This document contains information affecting the national defense of the United States within the meaning of the Espionage Act, 18 U.S.C., 793 and 794. Its transmission or the revelation of its contents in any manner to an unauthorized person is prohibited by law.

This document is to be returned to the Archives, Mahan Hall or to the Archives, Sims Hall when no longer required for use.

DEPARTMENT OF INTELLIGENCE

SECRET

Lec. 368

7440

SECRET

DECLASSIFIED BY M.L. Riddle ON 10-31-74 IAW DOD MEMO OF
4/12/74, SUBJ: DOWNGRADE/DECLASS OF HISTORICAL RECORDS

SECRET

SECRET

SECRET

ADDRESS BY VICE ADMIRAL F.S. LOW
AT THE NAVAL WAR COLLEGE
22 MARCH 1950
ASW - PRESENT AND FUTURE

IN MAKING ANY EVALUATION OF OUR PRESENT ASW CAPABILITIES AND OF DEVELOPMENTS THAT ARE LIKELY TO LEAD TO VALID PREDICTIONS AS TO FUTURE CAPABILITIES, A BRIEF LOOK INTO THE PAST IS ESSENTIAL. THIS IS SO BECAUSE (CONSIDERING THAT ASW REALLY STARTED IN 1918) BY SUCH A REVIEW, THE EXTENT AND PACE OF DEVELOPMENT WILL BE BROUGHT MORE CLEARLY INTO FOCUS WHICH WILL ENABLE US MORE ACCURATELY TO PREDICT THE FUTURE.

ASIDE FROM ELECTRONIC IMPROVEMENTS, THE GERMAN U-BOAT OF WORLD WAR II WAS NOT APPRECIABLY MORE ABLE THAN THE U-BOAT OF WORLD WAR I. ON THE OTHER SIDE OF THE LEDGER, I.E., ASW, THE SITUATION IS QUITE DIFFERENT. IN WORLD WAR I, SONIC DETECTION GEAR WAS LARGELY BASED ON THE PRINCIPLE OF PASSIVE LISTENING AND ONLY A FEW ELEMENTARY ELECTRIC CIRCUITS WERE USED. THE STANDARD ORDNANCE OF WORLD WAR I CONSISTED OF THE MK. 3 DEPTH CHARGE (SLOW SINKING AND HYDROSTATICALLY FUSED) WHICH WAS DROPPED FROM RACKS OVER THE STERN AND PROJECTED FROM "Y" GUNS TO BOTH SIDES.

BETWEEN WORLD WARS I AND II, CONSIDERABLE IMPROVEMENTS WERE MADE IN UNDERWATER DETECTION RESULTING IN THE SO-CALLED SEARCHLIGHT TYPE OF ECHO-RANGING PROJECTER THAT WAS LARGELY USED IN WORLD WAR II. IMPROVEMENTS IN ORDNANCE DID NOT KEEP PACE. WE STARTED WORLD WAR II WITH ESSENTIALLY THE SAME DEPTH CHARGES WITH WHICH WE FINISHED WORLD WAR I. BUT ONCE RESEARCH AND DEVELOPMENT IN WORLD WAR II GATHERED A FULL HEAD OF STEAM, THERE BECAME AVAILABLE VASTLY IMPROVED PIECES OF ORDNANCE AND BY MID-1943 THE AIRPLANE AND ITS EQUIPMENTS AND WEAPONS CAME INTO ITS OWN. STATED IN SIMPLEST TERMS,

SECRET
SECRET

SECRET
SECRET

THE FACT THAT OUR ASW DEVELOPMENTS IN WORLD WAR II EXCEEDED GERMAN U-BOAT DEVELOPMENTS IN PACE IS WHAT ENABLED US TO SUBDUCE THE U-BOAT. THE GERMAN TYPE 21 CAME TOO LATE.

FROM THE FOREGOING BRIEF SKETCH IT IS ONLY TOO PAINFULLY EVIDENT THAT THE PACE AND DEGREE OF DEVELOPMENT FROM 1918 TO 1941 WAS SLOW AND SHAKY. IN LIGHT OF THE FACT THAT, RELATIVELY, THE U-BOAT MENACE OF WORLD WAR I WAS COMPARABLE TO THAT OF WORLD WAR II, THIS FAILURE TO RECOGNIZE THE TRUE EXTENT OF THE MENACE IS DIFFICULT FOR US TO UNDERSTAND. SINCE IT IS PAST AND BEYOND CORRECTION, WE CAN ONLY DRAW FROM IT THE LESSON THAT SUCH LACK OF FORESIGHT CANNOT BE PERMITTED EVER TO HAPPEN AGAIN.

COMING TO THE PRESENT, IT IS ENCOURAGING TO KNOW THAT THE HUGE IMPETUS THAT WAS GIVEN TO ASW DEVELOPMENTS DURING WORLD WAR II HAS NOT BEEN ALLOWED TO DIE. TRUE, THE BUDGETARY LIMITATIONS OF PEACETIME OPERATIONS HAVE NECESSARILY SLOWED DEVELOPMENT. BUT THE STRUCTURE IS INTACT AND THERE IS IN OPERATION A LARGE, WELL INTEGRATED ORGANIZATION IN THE OFFICE OF CNO THAT COVERS THE ENTIRE FIELD OF ASW AND IS CAPABLE OF RAPID EXPANSION IN THE EVENT OF EMERGENCY.

(PLATE I - OP-31 ORGANIZATION)

THIS ORGANIZATION IS SIMILAR TO THAT WHICH WAS SUCCESSFULLY EMPLOYED AS THE TENTH FLEET IN WORLD WAR II. WITH APPROPRIATE ADDITIONS OF AN INTELLIGENCE DIVISION AND A SCIENTIFIC COUNSEL TO ADVISE ON RESEARCH AND TECHNICAL PHASES OF DEVELOPMENTS, IT IS A SUITABLE ORGANIZATION FOR WORLD WAR III, EITHER AS A SEPARATE FLEET OR AS PRESENTLY CONSTITUTED.

THERE HAS BEEN ESTABLISHED BY THE CNO A TWO PHASE ASW PROGRAM - THE

SECRET
SECRET

SECRET
SECRET

FIRST, KNOWN AS THE SHORT-RANGE PROGRAM, CONTEMPLATES USE OF PRESENTLY INSTALLED EQUIPMENTS OR OF THOSE THAT CAN READILY BE MADE AVAILABLE AND IS CALCULATED TO SUFFICE UNTIL ABOUT 1955. THE SECOND, KNOWN AS THE LONG-RANGE PROGRAM, IS DESIGNED TO MAKE USE OF EQUIPMENTS AND TECHNIQUES THAT ARE ON THE HORIZON FOR ABOUT 1955 OR LATER. BOTH PROGRAMS TAKE INTO ACCOUNT THE BEST ESTIMATED CAPABILITIES OF A POTENTIAL ENEMY WITHIN THE PERIODS OF THE PROGRAMS.

AS I AM SURE MOST OF YOU MUST KNOW, THE MOST EFFECTIVE SONAR TODAY IS THE SCANNING SONAR, KNOWN AS QHB. ASSOCIATED WITH THIS SONAR IS AN ATTACK SONAR WITH DEPTH-DETERMINING FEATURES. THE PRESENTLY AVAILABLE SURFACE CRAFT ORDNANCE CONSISTS OF MK. 14 (ACOUSTIC PROXIMITY FUSE) AND MK. 9 (HYDROSTATIC FUZE) DEPTH CHARGES WHICH HAVE HIGH SINKING RATES AND THE HEDGEHOG, AN AHEAD THROWN WEAPON WHICH PLANTS A PATTERN OF 24 CONTACT CHARGES AT A RANGE OF ABOUT 300 YARDS. THE HEDGEHOG COMES IN FIXED AND TRAINABLE MOUNTS. WITHIN THE PERIOD OF THE SHORT-RANGE PROGRAM THERE WILL ALSO BE AVAILABLE (AND THIS COULD BE GREATLY EXPEDITED IN THE EVENT OF AN EMERGENCY) AN AHEAD THROWN WEAPON KNOWN AS WEAPON A (A VARIATION OF THE BRITISH SQUID WHICH WAS DEVELOPED IN THE LATTER PART OF WORLD WAR II) AND A COMPLEX FIRE CONTROL SYSTEM (MK. 102) WHICH CAN HANDLE ANY OF THE ASW ORDNANCE COMPONENTS. ALSO A TARGET-SEEKING TORPEDO COMES WITHIN THE SCOPE OF THE SHORT-RANGE PROGRAM. (HERE - AD LIB EVALUATION)

IN THE AIR WE HAVE IMPROVED RADAR - THE APS 20 AND THE 31 AND 33 SERIES WHICH ARE MODERATELY EFFECTIVE AGAINST SNORKEL, AND STANDARD DEPTH BOMBS, AND OLD TYPE OF TARGET SEEKING WEAPON AND A NEW TYPE IN DEVELOPMENT. MAD IN

SECRET
SECRET

SECRET

SECRET

BLIMPS HAS BEEN CONSIDERABLY IMPROVED AND IS VALUABLE IN CERTAIN LIMITED CIRCUMSTANCES.

A FURTHER WORD SHOULD HAVE BEEN SAID AS TO ANTI-SNORKEL RADAR. FROM THE NATURE OF ITS TARGET IT IS BOUND TO BE ONLY MODERATELY EFFECTIVE. DEVELOPMENT OF A PLASTIC, OR SOME SIMILAR TYPE OF SNORKEL MAY FURTHER REDUCE THE PRESENT MARGINAL EFFECTIVENESS.

THIS SUMS UP THE MOST IMPORTANT FEATURES OF OUR PRESENT CAPABILITIES. SINCE, IN ASW, AS IN PRACTICALLY EVERYTHING ELSE IN LIFE, ALL IS RELATIVE, IT IS A FAIR QUESTION TO ASK WHETHER THESE PRESENT CAPABILITIES ARE ADEQUATE TO COPE WITH THE CAPABILITIES OF OUR MOST PROBABLE OPPONENT. IT IS UNFORTUNATE BUT TRUE THAT OUR INTELLIGENCE IS NOT TOO GOOD NOR IS THERE REASON TO BELIEVE THAT IT WILL MATERIALLY IMPROVE WITHIN THE FORSEEABLE FUTURE. I THINK, HOWEVER, IT IS CORRECT AND NOT OVERLY OPTIMISTIC TO TAKE THE VIEW THAT THERE IS NO EVIDENCE THAT WOULD LEAD US TO BELIEVE THAT WITHIN THE NEXT FEW YEARS WE WILL BE OPPOSED BY U-BOATS IN NUMBERS ANY MORE FORMIDABLE THAN THE LATEST U-BOAT OF WORLD WAR II. BY THIS I MEAN THE U-BOATS THAT WERE OPERATIONAL AT THE END OF WORLD WAR II. AS YOU ALL KNOW, MUCH PUBLICITY HAS BEEN ACCORDED THE TYPE XXI U-BOAT. THIS WAS NOT OPERATIONAL AT THE END OF WORLD WAR II. THERE IS NO EVIDENCE TO INDICATE THAT THIS TYPE COULD BE OPERATIONAL IN NUMBERS WITHIN THE NEXT FEW YEARS. OUR PRESENT INSTALLATIONS, TECHNIQUES AND TACTICS ARE CAPABLE OF DEALING WITH ANY PROSPECTIVE THREAT THAT MIGHT DEVELOP DURING THE SHORT-RANGE PERIOD. IN MAKING THIS UNQUALIFIED STATEMENT, I THINK I SHOULD WARN YOU THAT WE MUST VISUALIZE HEAVY INITIAL LOSSES. THIS IS SO BECAUSE WE CANNOT

SECRET
SECRET

SECRET

SECRET

POSSIBLY KEEP IN COMMISSION ALL OF THE SHIPS AND PLANES NECESSARY FOR FULL PROTECTION OF ALL SEA ROUTES IMMEDIATELY ON THE OUTBREAK OF WAR. THERE IS THE VAST DIFFERENCE THOUGH THAT NOW WE ARE ALIVE TO THE THREAT AND CAN EXPAND MUCH MORE RAPIDLY THAN WE DID IN WORLD WAR II.

(PLATES 2, 3 AND 4)

AS TO ASW OF THE FUTURE, WHICH IS WHAT IS CONTEMPLATED BY THE CNO'S LONG RANGE PROGRAM, THERE ARE, NATURALLY, MANY QUESTIONS REMAINING TO BE SOLVED. IF THERE IS ONE SINGLE FEATURE THAT HIGHLIGHTS THE DIFFERENCE BETWEEN THE PRESENT AND THE FUTURE, IT IS THE PROSPECTIVE REVERSAL OF POSITIONS AS BETWEEN THE U-BOAT AND THE ANTI-SUBMARINE SURFACE CRAFT. DURING ALL OF WORLD WAR I AND UNTIL 1944 IN WORLD WAR II, A SUBMERGED U-BOAT ONCE CONTACTED BY SONAR FROM SURFACE CRAFT HAD ONLY EVASIVE MANEUVERS TO RELY UPON. IN 1944 THE GERMANS PLACED IN LIMITED OPERATIONAL USE A TARGET-SEEKING TORPEDO KNOWN AS T-5 AND A PATTERN-RUNNING TORPEDO KNOWN AS LUT. THESE ARE BOTH ANTI-CONVOY AND ANTI-ESCORT WEAPONS. AT ABOUT THE SAME TIME, WE PLACED IN OPERATION IN OUR PACIFIC FLEET SUBMARINES A SOMEWHAT SIMILAR WEAPON DESIGNED FOR USE AGAINST ESCORTS, WHICH, DURING ITS SHORT PERIOD OF USE WAS EMINENTLY SUCCESSFUL.

WITH THIS BACKGROUND KNOWLEDGE AS TO WHAT WE ACCOMPLISHED AND WHAT THE GERMANS ACCOMPLISHED, WITH THE KNOWLEDGE THAT ALL GERMAN DEVELOPMENT AS WELL AS SCIENTIFIC PERSONNEL ALONG THESE LINES IS AVAILABLE TO THE RUSSIANS AND, IN LIGHT OF OUR OWN CURRENT DEVELOPMENTS IN TARGET-SEEKING AND PATTERN-RUNNING TORPEDOES, THE POSITION, AS I PREVIOUSLY STATED, CAN WELL BE REVERSED WITHIN THE NEXT FEW YEARS.

PUT IN OTHER WORDS, WITH A MAXIMUM SONAR RANGE IN A/S SURFACE CRAFT OF

SECRET
SECRET

SECRET

SECRET

ABOUT 3,000 YARDS AND A PASSIVE SONAR RANGE IN A U-BOAT OF SEVERAL TIMES THAT FIGURE, TOGETHER WITH THE LONG-RANGE TARGET-SEEKING PATTERN-RUNNING TORPEDO AVAILABLE TO THE U-BOAT, IT BECOMES PLAINLY EVIDENT THAT THE U-BOAT CAN FIRE DESTRUCTIVE SHOTS BEFORE HER PRESENCE IS EVEN KNOWN TO THE ESCORT SHIPS. OUR OPERATIONAL AND RESEARCH PEOPLE ARE KEENLY AND ACUTELY AWARE OF THIS SITUATION AND ARE BENDING EVERY EFFORT TO INCREASE THE RANGE OF ECHO-RANGING SONAR. UNHAPPILY, THERE IS NO PROSPECT IN SIGHT OF INCREASING THIS RANGE TO ANYTHING COMPARABLE TO THAT NECESSARY TO DETECT A U-BOAT THAT CAN CARRY A 15 OR 20,000 YARD TORPEDO. FIELDS IN LOW FREQUENCY SONAR HAVE NEVER BEEN THOROUGHLY COVERED AND ARE IN PROCESS OF INVESTIGATION NOW BY BOTH THE BRITISH AND OURSELVES. WHILE THEORY INDICATES THAT RANGES WILL BE MATERIALLY IMPROVED, THERE IS NOT IN THIS FIELD ANY HOPE OF THE IMPROVEMENT NECESSARY. FURTHER, THE USE OF LOW FREQUENCY SONAR INTRODUCES MANY OTHER PROBLEMS AS TO SIZE OF EQUIPMENT, ETC., THAT WILL PRESENT GREAT PRACTICAL DIFFICULTIES AND MAY OFFSET, OR PARTIALLY SO, ANY MAJOR ADVANTAGES GAINED.

WITH THE UNHAPPY KNOWLEDGE THAT WE MAY EXPECT INSUFFICIENT IMPROVEMENTS IN PRESENT ECHO-RANGING SONAR TO ANSWER OUR REQUIREMENTS, WE ARE THEN FACED WITH THE NEED OF DOING ONE OF TWO THINGS:

EITHER DEVELOP AN ENTIRELY NEW METHOD OF UNDERWATER DETECTION

OR

CONTRIVE, IN SOME WAY, TO MOVE OUR PRESENT SONAR SCREEN TO A POSITION THAT WILL COUNTER THE INCREASED RANGE OF THE U-BOAT TORPEDO.

AS TO THE DEVELOPMENT OF A NEW SYSTEM OF UNDERWATER DETECTION, IT CAN ONLY BE SAID THAT ITS DESIRABILITY IS FULLY APPRECIATED AND THAT RESEARCH ALONG THESE LINES CONTINUES. THAT ANY SUCH SYSTEM MIGHT BE DISCOVERED IN

SECRET
SECRET

SECRET

SECRET

THE NEAR FUTURE IS HIGHLY IMPROBABLE. THAT ONE MAY BE DISCOVERED IN THE DISTANT FUTURE IS ONLY POSSIBLE.

AS TO MOVING THE SURFACE SHIP SONAR SCREEN A DISTANCE SUFFICIENT TO COUNTER-ACT THE LONG-RANGE U-BOAT TORPEDO, WHILE THIS WOULD BE POSSIBLE FROM THE STANDPOINT OF CONVOY PROTECTION, IT WOULD ENTAIL ASTRONOMICAL INCREASES IN NUMBERS OF ESCORT CRAFT REQUIRED AND WOULD STILL AFFORD NO ADDITIONAL PROTECTION TO SUCH ESCORT CRAFT.

EXCEPT FOR TWO RELATIVELY UNEXPLORED POSSIBILITIES, WE THEREFORE, FIND OURSELVES AT AN IMPASSE - WITH NOTHING IN SIGHT THAT WILL COPE WITH LONG-RANGE U-BOAT TORPEDOES. THESE RELATIVELY UNEXPLORED POSSIBILITIES ARE AIRBORNE SONAR OR SMALL ESCORT CRAFT THAT COULD BE BUILT CHEAPLY AND IN GREAT QUANTITY. AS TO THE LATTER, (SMALL ESCORT CRAFT), WHILE MANY NOVEL IDEAS HAVE BEEN PRESENTED TO OR GENERATED IN THE NAVY DEPARTMENT, THERE IS NOTHING OF IMMEDIATE ENCOURAGEMENT. THERE SEEMS SMALL PROMISE OF MAKING A CRAFT OF THE CONVENTIONAL SIZE AND HULL FRAME OF AN SC, OR SMALLER, INTO A COMPETENT CRAFT THAT CAN KEEP THE SEA IN ALL REASONABLE WEATHER AND DO AN EFFECTIVE JOB. HERE THE KEY IS FITNESS OF PERSONNEL.

UNDER RESEARCH IS THE APPLICATION OF A NEW DEVELOPMENT OF THE HYDRO-FOIL. IT MAY HOLD PROMISE AFTER EVALUATION THROUGH SMALL TEST TYPES, BUT IS DEFINITELY NOT SOMETHING TO BE COUNTED ON IN THE NEAR FUTURE.

BLIMPS HAVE TOWED ECHO-RANGING EQUIPMENTS UP TO SPEEDS OF 30 KNOTS. HELICOPTERS, USING A "DUNKED" SONAR ON A REEL, HAVE HAD GREAT SUCCESS. THESE DEVELOPMENTS ARE OF FAIRLY RECENT DATE. MAXIMUM EFFORT IS NOW BEING EXERTED ALONG THESE LINES AND IT IS HIGHLY PROBABLE THAT THESE VEHICLES

SECRET
SECRET

SECRET
SECRET

WILL BE THE ANSWER TO THIS PART OF OUR FUTURE PROBLEM.

YOU WILL NOTE THAT SUCH AIRBORNE SONAR ANSWERS MANY OTHER ASSOCIATED PROBLEMS. SOME OF THESE ARE THAT A SONAR, FREE FROM THE NOISES THAT ARE INESCAPABLE IN A HULLBORNE SONAR HAS GREATLY IMPROVED RANGE CAPABILITIES; AN AIRBORNE SONAR MAY BE PLACED AT THE DEPTH WHICH WILL BRING IT INTO THE BEST SOUND CHANNELS; THE HELICOPTER, IN PARTICULAR, IS RELATIVELY INEXPENSIVE, CAN BE PROVIDED IN NUMBERS AND THE LOSS OF ONE MACHINE INVOLVES MINOR LOSSES OF PERSONNEL AS COMPARED TO THE LOSS OF A DESTROYER TYPE ESCORT.

SATISFACTORY SERVICE TESTS OF THESE EQUIPMENTS WILL NECESSARILY WORK GREAT CHANGES IN OUR CONCEPT OF OCEAN ASW IN THE FUTURE; PRINCIPLE AMONG WHICH WILL BE THE NEED FOR AND USE OF FEW LARGE, EXPENSIVE SURFACE ESCORT CRAFT. SHOULD HELICOPTERS PROVE THE BETTER VEHICLE, IT IS EVIDENT THAT THEY CAN BE OPERATED IN NUMBER BOTH FROM CARRIERS AND FROM MERCHANT SHIPS. THERE ARE ALSO DISTINCT POSSIBILITIES FOR THE BLIMP. AS SOME OF YOU MAY KNOW, IN RECENT TESTS, BLIMPS HAVE OPERATED FROM CARRIERS FOR PERIODS AS LONG AS TWO WEEKS.

WITH THE USE OF AIRBORNE SONAR, THERE WILL ALSO HAVE TO BE DEVELOPED (AND WORK IS PROGRESSING) ATTACK INSTRUMENTS AND WEAPONS THAT CAN BE CARRIED IN BLIMPS AND HELICOPTERS. THIS PRESENTS NO PROBLEM THAT CANNOT BE SOLVED.

SOMEWHERE IN BETWEEN, OR COMBINED WITH, THE SHORT-RANGE AND LONG-RANGE PROGRAMS, THERE ARE TWO MATTERS THAT DESERVE MENTION BECAUSE THEY MAY WORK INTO ONE OR THE OTHER, OR BOTH. FIRST IS A DEVICE KNOWN IN WORLD WAR II AS THE HOLM DEVICE (MK. 29) WHICH CONSISTED OF STREAMERS TOWED ON EITHER

SECRET
SECRET

SECRET

SECRET

SIDE OF A MERCHANT SHIP, CALCULATED TO DEFEAT A TORPEDO. THIS THOUGHT IS NOW BEING PROSECUTED UNDER THE TITLE OF PROJECT GENERAL 2A. THE THOUGHT OF SUCH PROTECTION IS VERY OLD. THE MATTER OF ITS PRACTICAL APPLICATION IS VERY DIFFICULT. IT MAY OR MAY NOT BE SUSCEPTIBLE OF SUFFICIENT IMPROVEMENT TO RENDER IT AN EFFECTIVE, PRACTICAL INSTRUMENT, BUT THE AGENCIES IN THE DEPARTMENT CHARGED WITH THE RESPONSIBILITY FOR ITS THOROUGH INVESTIGATION ARE EXHAUSTING ALL MEANS TO DETERMINE WHETHER OR NOT IT MAY HOLD REAL PROMISE.

THE SECOND IS THE QUESTION OF THE SO-CALLED ANTISUBMARINE SUBMARINE. THIS THOUGHT IS NOT NEW INASMUCH AS IT WAS PRACTICED IN WORLD WAR I. TO DATE VERY ENCOURAGING TESTS HAVE INDICATED THAT ANTISUBMARINE SUBMARINE, WHICH RELIES PRINCIPALLY ON PASSIVE LISTENING, MAY BE MOST EFFECTIVE ANTIDOTE IN CERTAIN AREAS. IN EACH FLEET NOW, ONE DIVISION OF SUBMARINES IS BEING DEVOTED ENTIRELY TO THE TASK OF DETERMINING THE EFFECTIVENESS OF THIS MEASURE. MUCH BASIC DATA ARE BEING DEVELOPED. WHETHER THIS WILL WORK INTO THE SHORT-RANGE OR LONG-RANGE PROGRAMS IS SOMETHING THAT PROBABLY WILL NOT BE DETERMINED BEFORE ONE OR TWO YEARS.

ALL OF THE FOREGOING REMARKS WITH RESPECT TO ASW OF THE FUTURE ARE, I AM FIRMLY CONVINCED, BASED ON THINGS THAT CAN BE ACCOMPLISHED. ADDITIONALLY, THERE ARE, UNDER TEST, INFRA-RED DETECTION INSTRUMENTS THAT SHOW DISTINCT POSSIBILITIES. HOWEVER, WITH THE DEVELOPMENT OF A SATISFACTORY AIRBORNE SONAR, WHETHER U-BOATS OF THE ENEMY ARE FAST OR SLOW, WHETHER THEY SNORKEL OR DO NOT SNORKEL AND EVEN WHETHER THEY HAVE CLOSED CYCLE MACHINERY THAT PERMITS OF LONG PERIODS SUBMERGED AT HIGH SPEEDS, THEY CAN EITHER BE DETECTED AT SAFE RANGES OR THEY CAN BE MADE TO STAY BLIND AND THEIR MOBILITY

SECRET
SECRET

SECRET

SECRET

CAN THUS BE GREATLY REDUCED BY KEEPING THEM SUBMERGED SO THAT THE NET RESULT WILL BE MARKED DECREASE IN U-BOAT EFFECTIVENESS.

ALL THAT I HAVE SAID UP TO NOW, BOTH AS TO THE PRESENT AND THE FUTURE, IS ASSOCIATED WITH WHAT, FOR LACK OF A BETTER TERM, MIGHT BE REFERRED TO AS OCEAN ASW, I.E., COMBATTING THE U-BOAT ON THE HIGH SEAS. THIS HAS BEEN THE PRIMARY FORM OF ASW IN TWO WORLD WARS. IT HAS BEEN HIGHLY PUBLICIZED. IT IS LARGELY THE ONLY KIND OF ASW THAT IS GIVEN MORE THAN PASSING CONSIDERATION. IT IS THE MOST DIFFICULT AND MOST EXPENSIVE OF ALL FORMS OF ASW. IT IS THE LAST RESORT. ITS USE AS AN INSTRUMENT OF ASW INDICATES THAT OTHER MORE EFFECTIVE METHODS ARE EITHER NOT UNDERSTOOD, OR, FOR SOME OVER-RIDING REASONS, ARE NOT PRACTICED.

A CASE IN POINT IS THE BAY OF BISCAY OFFENSIVE OF WORLD WAR II. THIS WAS AN OPERATION THAT SATURATED THE BAY OF BISCAY WITH AIRPLANES (SOMETIMES ASSISTED BY SURFACE CRAFT) TO A DEGREE THAT THEORETICALLY INSURED THAT ANY U-BOAT IN TRANSIT WOULD BE CONTACTED. FOR EFFORT EXPENDED, IT WAS THE MOST SUCCESSFUL OF ALL ASW OPERATIONS. IT WAS DEVISED BY THE BRITISH AND PARTICIPATED IN BY US, FIRST USING ARMY AIR FORCE AIRCRAFT AND LATER NAVAL AIRCRAFT. SUCH AN OPERATION MAY BE DESCRIBED AS ONE AT, OF CLOSE TO, THE SOURCE. IT IS A FORM OF BLOCKADE. HERE, I THINK, IS THE ANSWER TO A LARGE PART OF THE ASW PROBLEM WHETHER IT BE OF THE PRESENT OR OF THE FUTURE. IF, BY CAREFULLY PLANNED HEAVY BOMBING ATTACKS AND STRONGLY SUPPORTED MINING OPERATIONS, U-BOAT BUILDING AND ASSEMBLY YARDS AND OPERATING BASES CAN BE MARKEDLY REDUCED IN EFFECTIVENESS AND TRANSIT AREAS CAN BE MADE DANGEROUS, A LARGE PART OF THE U-BOAT POTENTIAL WILL BE PERMANENTLY STOPPED. WE CANNOT, OF COURSE, COUNT ON ANY SUCH OPERATION BEING SUFFICIENTLY EFFECTIVE TO PREVENT

SECRET
SECRET

SECRET
SECRET

OCEAN OPERATIONS OF U-BOATS AND WE MUST NOT, THEREFORE, SLACKEN OUR PACE IN THE DEVELOPMENT OF ALL POSSIBLE MEANS FOR COMBATTING THE U-BOAT AT SEA. BUT ALL OF US (AND BY THIS I MEAN NOT ONLY THOSE OF US WHO HAVE CURRENT RESPONSIBILITIES FOR ASW, BUT ALSO MANY OF YOU WHO WILL HAVE THEM IN THE FUTURE) MUST NEVER LOSE SIGHT OF THE LONG VIEW, AND IN OUR COUNSELS MUST URGE WITH ALL THE POWER AND LOGIC AT OUR DISPOSAL, THAT WITH PROPER PLANS THAT ARE IMMEDIATELY AND EFFECTIVELY IMPLEMENTED AT THE OUTBREAK OF WAR, WE WILL REDUCE THE U-BOAT CAPABILITIES FROM A SERIOUS MENACE TO A THREAT THAT CAN ADEQUATELY BE CONTROLLED.

SECRET
SECRET

SECRET