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INITIAL INSERTION OF URANIUM SLUGS IN THE SUB-CRITICAL NUCLEAR REACTOR

New equipment is only one item in the development of the course of studies at the U. S. Naval Academy to give an undergraduate education appropriate for the needs of the career officer. The exact nature of the various changes taking place on the banks of the Severn, which are described by some as the most important in the past century, is set forth in the accompanying article.

Installed this spring, the reactor contains 5,500 pounds of natural uranium and a five curie neutron source. The fuel and source are on loan from the Atomic Energy Commission, and the reactor body is a product of Curtiss Wright Corp. The natural water moderated reactor will be used in connection with elective courses taught by the Engineering and Science Departments, starting this fall.

New Directions in Naval Academy Education

By

Lieutenant WAYNE HUGHES, JR., USN

"To develop midshipmen morally, mentally and physically and to imbue them with the highest ideals of duty, honor and loyalty in order to provide graduates who are dedicated to a career of Naval Service and have potential for future development in mind and character to assume the highest responsibilities of command, citizenship and government."

—United States Naval Academy Mission, 1960

Last fall newspapers and magazines announced the Naval Academy's new "Space Age Curriculum" in glowing terms. Here was change; since change is always news, in reporters' eyes it is usually equated with progress. But too often the changes were characterized as a "break with hoary tradition," as *Newsweek* put it, or the first big change "since 1850, when the Navy began sending its men to sea in steamships."

The Fleet deserves a less sensational report of what has happened. Modifications last fall were hardly the first big change, and *Newsweek* omits mention of almost annual updating of the curriculum in recent years. Yet it would not be far wrong to call the steps taken last fall the most important since 1850. They were three-fold. First, the four-year basic curriculum was revised and strengthened. Second, entering midshipmen were authorized to seek credit for previous work essentially the same as subjects in the basic curriculum. And third, qualified midshipmen were allowed to elect courses in addition to those prescribed in the basic curriculum.

Accompanying the revised educational program, the revised wording of the Naval Academy mission appearing above was authorized by the Secretary of the Navy this March. One of the reasons for the rewording was to emphasize that the Naval Academy's goal is the preparation of officers for a career of naval service. There was to be no ambiguity which might result in misconstruing the

mission as primarily the preparation of junior officers, of engineers, or of any other special Service need to the detriment of a balanced program for career naval officers.

Changes in the Basic Curriculum

Though the curriculum changes were widely hailed outside the Navy, it is not so evident that the reasons behind them were really understood. The roots rest in two changes in the naval profession itself. One is the increased breadth of knowledge required of the naval officer. The second is the rapid physical transformation of the Fleet, with correspondingly rapid new developments in Fleet doctrine and procedures.

"Never before has there been so much for the line officer to master," the Chief of Naval Personnel wrote recently. "The effort must be truly majestic." At the Naval Academy new facets of essential knowledge had to be squeezed somehow into the already packed curriculum. Innovations such as nuclear propulsion, missile systems, and electronic fire control required more extensive scientific background. The enlarged educational program for line officers, which augurs the sending of virtually every Academy graduate to a year or more of graduate school, called for completion of more prerequisite courses at the Navy's undergraduate college.

Simultaneously, new developments promised to change the Fleet so quickly that by the time a midshipman drilled in one system was

Graduated from the Naval Academy in the Class of 1952, Lieutenant Hughes is Flag Secretary and Aide to the Superintendent, U. S. Naval Academy, having served most of his tour as Assistant Secretary, Academic Board. After a tour of duty in USS *Cushing* (DD-797), he was executive officer of USS *Shrike* (MSC-201) and then commanding officer of USS *Hummingbird* (MSC-192).

graduated, he was likely to be faced with something different. As a business executive faced with the same accelerated pace put it, "The faster you move, the farther you have to look ahead." But the Academy couldn't teach undeveloped fire control systems of five years hence, nor had it time to teach both today's systems and tomorrow's in four short years.

It seemed clear that the Naval Academy had to concentrate on a sound educational *foundation*. Midshipmen had to be taught to reason and solve problems for whatever the job, whenever they had it. The Academy had to reaffirm old objectives and strive more diligently than ever to achieve them: goals of developing logical thought, based on facts, and of imparting an awareness of concrete and abstract relationships in the art of naval warfare.

Science and engineering subjects were affected the most. Basic physics was increased 20%, with most of the additional time going into nuclear and other matters basic to an understanding of modern weapons and propulsion plants. Separate courses in Electrical Engineering and Electronics were combined in a two year course in Electrical Science, with more time devoted to basic electricity and electronics, less to electrical engineering machinery. Coverage of vector algebra and calculus was added to the mechanics course, and a full three semester hours in differential equations was added.

The course in Engineering Drawing was replaced by a slightly shorter course in Engineering Graphics, which incorporated some graphical mathematics and decreased emphasis on drawing and descriptive geometry. The Engineering Materials course was expanded to a full term. Courses in basic and applied fluid mechanics and thermodynamics were expanded to a full two-year program

and include the principles of stability, hydrodynamics, combustion, and turbo-machinery. New emphasis was placed on engineering principles and basic engineering cycles, purely descriptive courses such as Naval Boilers and Naval Machinery having been dropped.

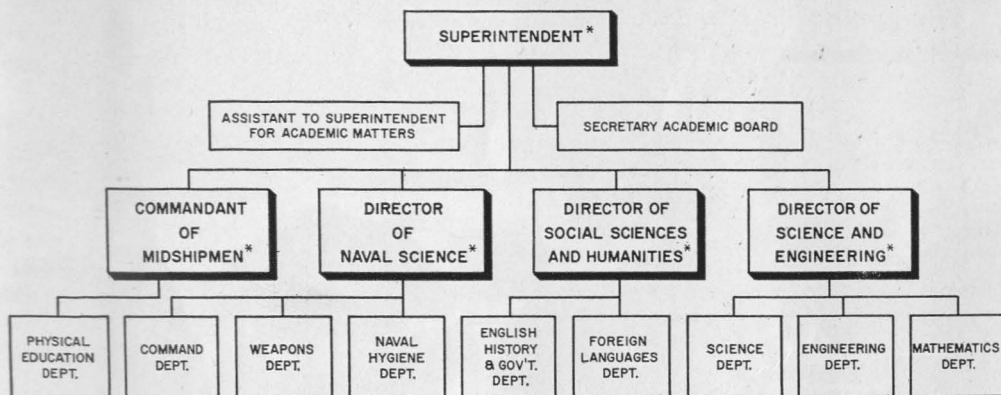
But the full story isn't told in the listings of new courses and changes. Equally significant is a redirected effort toward understanding reasons behind solutions to problems as well as the solutions themselves. This sounds more altruistic than new, but a look at textbook changes and efforts to make laboratory work more independent will lend weight to the argument that this is no mere incantation of old ideals.

The basic curriculum in the Social Sciences and Humanities was not changed. The explanation is partly that, allotted fewer hours than science and engineering, it afforded less room for maneuver. Also an important consideration was the fact that the courses in language, composition, history, government, and economics already stressed basic principles and knowledge, powers of reasoning and analysis, and clear expression. Nevertheless some opportunity for a greater depth in this area is now possible through electives. There is a wider choice of elective subjects in the humanities and social sciences than in any other area.

In the Naval Science division, details of curriculum content and approach are still under study. The latest course plans published for the Weapons Department, which supplanted the Department of Ordnance and Gunnery last year, show a Second Class course devoted to weapon components, followed First Class year by a term's study of weapons systems and a concluding term of trajectory mechanics. The trend has been toward a more analytical study of weapons and weapons systems, using specific guns, ASW weapons, missiles, and guidance systems for concrete illustration.

The Command Department assumed the curricula of the old Seamanship and Navigation, Aviation, and Executive Departments. The reorganization has made possible a synthesis of studies formerly split among the three. The Command Department's effort has been toward developing a course of studies basic to the naval profession in the

ACADEMIC ORGANIZATION OF THE U. S. NAVAL ACADEMY



*Members of the Naval Academy Academic Board

long view—what a line officer will need throughout his career. (In essence, its effort amounts to a new look at courses in the light of old objectives, something newsmen speaking of “sweeping reforms” are prone to overlook.)

One result has been new emphasis, first and foremost, on military leadership. Although the Naval Academy has always subscribed to the postulate that every course, and indeed every facet of midshipman training and indoctrination, aims to make better leaders, more attention has been given to formal instruction in psychology and leadership during the past two years. Not only has class time been increased, but a separate staff within the Command Department now teaches the course, using a revised and enriched Naval Leadership textbook and new supplementary material. Allied subject matter in watch standing, division officer duties, military law, and management are now integral with the course. It is significant that instructors endeavor not merely to teach the “right” answer, but to develop good judgment based on a sound evaluation of the facts of leadership problems.

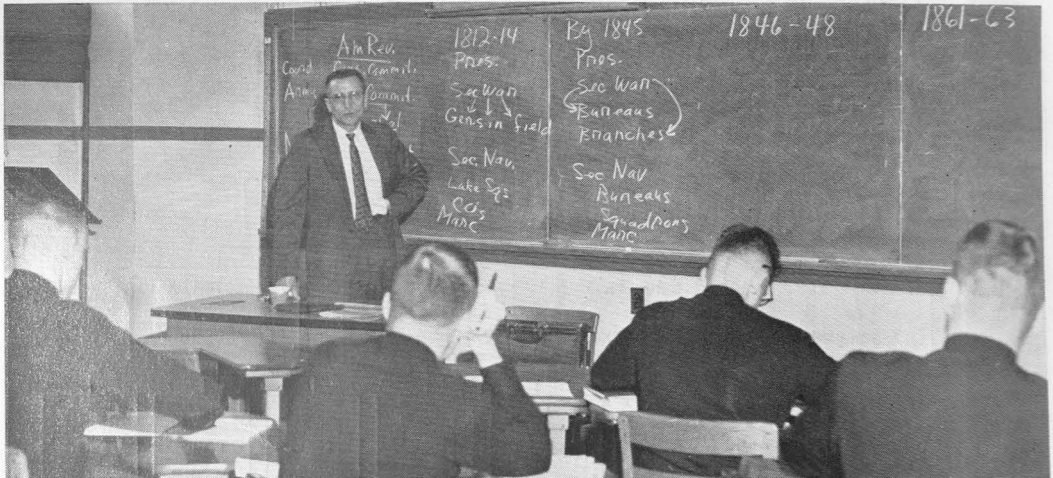
Shiphandling, navigation, tactics, operations, and seamanship are stressed as before. Yet teaching these subjects is one of the Academy’s most difficult tasks. The navigation course illustrates the difficulty. Always regarded as among the most unchanging ele-

ments of professional knowledge, in recent years navigation and piloting have become complicated by electronic devices such as loran, shoran, and radar. Now inertial navigation introduces whole new complexities of scientific background, teaching, and understanding. Not only has every aspect of professional knowledge grown more complex, but modern technology threatens to make obsolete even the most stable procedures and doctrines. There is a quotation in *Annapolis Today* which runs something like this: “What you don’t know can hurt you; what murders you is what you know for sure and ain’t so.”

The Validation Program

Every officer who serves a tour at the Naval Academy is struck by how short the time is to prepare midshipmen for their future profession. Coming from the Fleet, he knows that the Academy graduate today must be prepared to assume serious responsibilities in a matter of months at a time when peacetime operations were never more rigorous, demands for sound leadership greater, or the need for professional and technical ability so vast.¹ He sees letters from the Fleet pleading

¹ But the number of graduates reporting to the Fleet seems to diminish every year. At this writing, plans are for only 306 of 792 being commissioned in the Class of 1960 to be assigned to forces afloat, and ten of this number have already requested flight training after one year at sea. Only 207 graduates will



MEETING OF AN ELECTIVE IN U. S. MILITARY HISTORY AND POLICY

for better OOD training, better preparation for engineering duties, more emphasis on nuclear power, more leadership training, and perhaps the most frequent plea of all, that Academy graduates be taught to express themselves clearly. Whatever subject he teaches, he probably feels frustrated because there just isn't enough time in the classroom to get across everything he'd like.

Yet last fall about 35% of the entering Class of 1963 had been to college, and this was the lowest percentage in several years. Another 15% had had some other post high school work—an extra year at a good prep school, perhaps. Most of this group would have to repeat courses they had already taken. Hence a paradox: though the curriculum was so crowded that much needed material had to be omitted, an appreciable number of mid-

shipmen were repeating courses. The paradox was resolved by authorizing validation.

The validation program permits Fourth Classmen to seek credit for previous work substantially the same as courses in the basic Academy curriculum. Established in conservative fashion this first year, validation was permitted of Fourth Class subjects only. In most cases a midshipman proceeded to the next course in the same department. For example, a plebe validated in English Composition and Literature commenced the Third Class European History course last fall, and in an upper class year he will fill the vacancy with an elective in the area of his choice. However, the validated plebe attends recitations only with his classmates, not with Third Classmen.

Last summer 228 midshipmen out of a class of 1222 requested one or more validations. Accreditation was based on departmental examinations or previous scholastic records, or often on both. Of 510 separate validations requested, 297 were effected. Departments were very cautious in judging qualifications. So many courses taken later depend on a sound foundation that a doubtful candidate who was passed would probably be in academic difficulty later.

Each validating plebe is assigned an adviser in the department in which he indicates that his greatest interest lies (whether or not he validated a course in that department). The adviser will help work out a sound pro-

enter another Service or a Staff Corps, but of the remaining 585 commissioned in the Line, 206 will immediately enter flight training; for the first time fifty will report directly to submarine school; and also for the first time, about 25 will report to Nuclear Power School directly, after graduation leave. Five others are tabbed for science postgraduate schooling after one year in ASW forces, and a few are also under consideration for Rhodes Scholarships. This is a far cry from the Class of 1938 in which more than 90% of commissioned graduates joined the Fleet. For better or worse, the Navy is rapidly approaching the situation of the Army and Air Force in which every Academy graduate received further training before joining the operating forces.

gram for the midshipman when the time comes to choose electives.

The Electives Program

Generally speaking, a single, prescribed curriculum is ideal for an institution with a single purpose such as the Naval Academy. The primary disadvantage is that the curriculum must be geared to the pace of the average student. Top students can, and sometimes do, coast. Even those who are working diligently for high class standing are not being developed as fully as possible, and there is much more they might well be studying. In the past several decades the Academy established "savvy section" of good students, to give them more difficult work in the basic courses. Two years ago three special non-credit seminars were instituted, in mathematics and science, basic psychology, and Russian. Interestingly, the latter two were begun at the request of the midshipmen. Last fall the program was enlarged, made formal, and given more flexibility by offering a wide selection of elective courses for credit to midshipmen who could qualify scholastically. As in the case of validation, the first year has been governed by a conservative plan. Midshipmen may take one additional course a semester if they are qualified. Only a member of an upper class may carry an elective, and only if he has attained a grade of at least 3.0 (75%) in each basic course taken the previous term. Last fall 720 midshipmen were so eligible out of 2,540 in the upper three classes. Of those qualified, 412 enrolled in one of sixteen elective courses. Over half the midshipmen, 210 in fact, took courses in the Mathematics Department, strong evidence that additional electives are not being taken just for fun. The extent of interest was surprising—*gratifying* is perhaps the better word.

Attrition during the First Term was severe, down to 250 from 412. The reason was simple. Many midshipmen just couldn't keep up the pace. Yet the drop was not unexpected, and 250 is 10% of the upper classes, a reasonable number to be undertaking additional work. Furthermore, 410 applied and 350 were enrolled for the Second Term, and in a total of 21 different courses² as compared with sixteen the First Term.

One of the incentives for doing additional

work is the opportunity to fulfill requirements for a major, with notation to that effect in the graduate's transcript. Copies of the transcripts filed in BuPers could help to determine, for example, Academy graduates' areas of interest for later graduate school placement. Under the guidance of a faculty adviser, midshipmen may undertake studies in the major areas of English, social science, foreign language, mathematics, marine engineering, electrical engineering, aeronautical engineering, and engineering physics. Each major requires about eighteen semester hours of work beyond the basic curriculum.

There had been some concern that elective courses might be detrimental to Brigade *esprit de corps*. Rather than being regarded as special privilege for a select few, the reaction seems to be the opposite. A company officer expressed it this way: "The program extends the brighter fellows so that they have to put out as much as the average. It's not favoritism; it's equalization."

The Background

It is significant that the study which led to the present changes began two-and-one-half years ago—before *Sputnik*, and before the hue and cry against soft American education. The first of the changes mentioned was introduced two years ago. Action was in timely response to the Navy's needs and not to public sentiment.

Studies were predicated on several basic assumptions, which were, generally speaking, as follows. The Naval Academy's academic program had as its objective the education of young men for careers as naval officers. The program had to be considered with regard for the military, physical, moral, and idealistic preparation of these young men.

² Second Term courses were Oceanography, General Psychology, Digital Computers, Naval Architecture, Strength of Materials, Modern Algebra, Mathematics for Engineers and Physicists, Vector Analysis, Advanced Inorganic Chemistry, Atomic and Nuclear Physics, Underwater Acoustics, Modern British Literature, History of Russia, Communism: Theory and Practice, United States Military History and Policy, Seminar in Literature, Public Speaking, and four language courses, Readings in French Literature, German Literature since Goethe, the Soviet Press, Survey of Spanish Literature.

For these two reasons the curriculum was unlike those of engineering schools, liberal arts colleges, or universities. The course must continue to be of four years' duration. It was also assumed that a basic sequence of courses in common for all midshipmen was preferable, in contrast with the program planned at West Point, which will introduce elective courses into the basic curriculum.

The distribution of studies was to be approximately maintained. Fifty per cent of the curriculum was to remain devoted to mathematics, physics, chemistry, and engineering subjects. A quarter of the courses would continue to be in social sciences and humanities, and a quarter in naval subjects and physical education. Therefore the appropriate degree would continue to be a Bachelor of Science.³

A major step toward changing the course of instruction was a reorganization of academic departments. The new organization, approved in January 1959, became effective last June. It established directors over the divisions of Naval Science, Science and Engineering, and Social Sciences and Humanities. The Academic Board was reduced from the Superintendent and eleven department heads to five: the Superintendent, the Commandant of Midshipmen, and the three Directors. The eleven man Academic Board had often been hamstrung by its very size. The new Board, comprised of members whose point of view and responsibilities transcended those of the department head, was better suited for positive action.

Another advantage was that Directors could coordinate instruction among departments under their cognizance. Upon approval of the new organization by the Secretary of the Navy, the prospective directors, aided by teams of officers and civilian professors in the divisions, began studying possible inter-departmental realignments of courses and course syllabi that would be more complementary with prerequisites or offer better continuity. For example, the Strength of Materials course was shifted from the Mathematics to the Engineering Department and replaced in the Mathematics Department

³ This is a good time to end an old myth among Naval Academy graduates that the Academy awards a degree of Bachelor of Science in Electrical Engineering. It doesn't, and never has. Look at the diploma.

by the new differential equations course.

After a presentation of the new course at the Naval Academy late in January 1959, Assistant Secretary of the Navy Richard Jackson endorsed the general plans for curriculum changes substantially as they were implemented. Last August the Secretary of the Navy's Advisory Board on Educational Requirements was briefed on the plans while visiting the Naval Academy. The Board's comments were highly favorable and encouraging.

Part of the impetus behind the curriculum studies came from the recommendation of the 1957 Naval Academy Board of Visitors that the course of instruction be subjected to an over-all evaluation. In April 1959, the Board of Visitors was briefed on the new academic organization and curriculum plans. The Board commented favorably on the reorganization and went on to note "a strong trend in course content toward basic principles and away from hardware details. The Board emphatically concurs with this thinking." The Board of Visitors broke long-standing precedent and reconvened last November 30th to review the report of the Curriculum Review Board which had just been submitted. The members approved in principle the recommendations of the report and reiterated their approval of "the steps recently taken by the Superintendent and by the faculty to improve the course content and methods of instruction at the Academy."

The Curriculum Review Board

The Curriculum Review Board was established last March by the Chief of Naval Personnel upon the recommendation of the Superintendent. It was headed by Dr. Richard G. Folsom, President of Rensselaer Polytechnic Institute, and was composed of four other distinguished educators and Rear Admirals Horacio Rivero, Jr., and Frederick L. Ashworth. It met at the Naval Academy four times between April and November 1959 and studied and visited various naval activities during the interim periods. Its report was submitted at the conclusion of its final meeting last November.

The report, submitted simultaneously to the Superintendent and the Chief of Naval Personnel, spoke favorably of improvements

affecting the curriculum and in some instances recommended further steps in the same direction. Some of the major recommendations concerning the curriculum were a new sequence in the social sciences and humanities to provide greater depth for all midshipmen, a continuation of the trend toward a more analytical treatment of naval science subjects, a realignment of the curriculum to spread naval science subjects more evenly over all four years, and more effective employment of summer terms. Concerning educational procedures, the Board stressed the need for still greater effort to develop judgment, initiative, and reasoning power.

Prospects

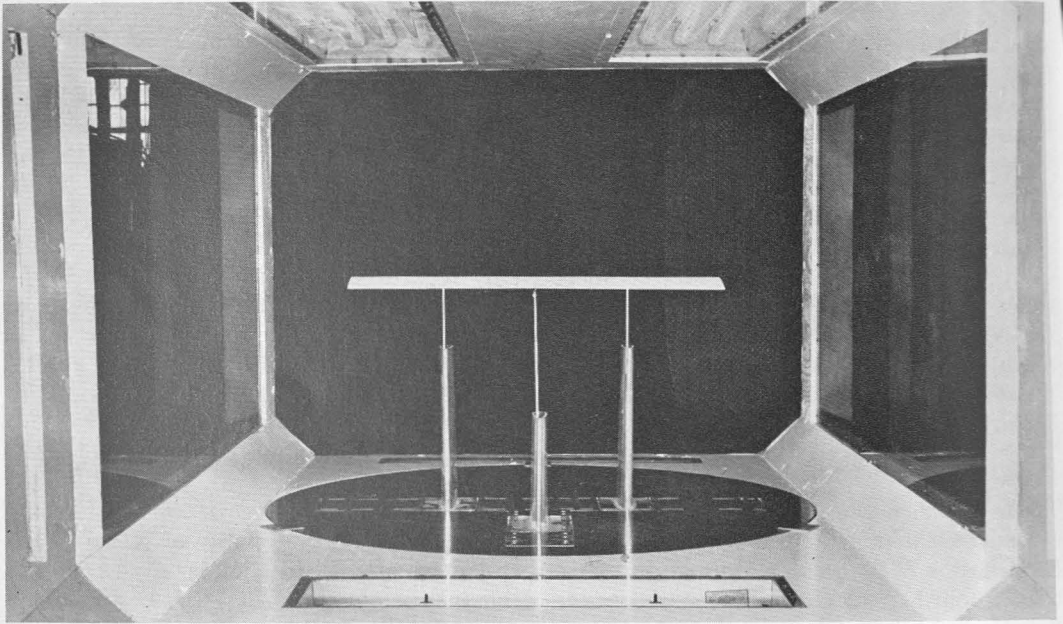
The Curriculum Review Board Report makes it clear that there is room for further examination of the academic program. Some of the Board's recommendations are outside

of the purview of the Superintendent, but others are under study or have already been approved for adoption. An adoption of one recommendation will be the teaching of plane trigonometry during the coming plebe summer to the small percentage of the Fourth Class who have not previously completed the subject, in this way eliminating the course from the academic year. No one at the Academy regards the present curriculum as the last word. Although this is not the place to speculate what further changes may be in offing, mention should be made that studies are presently underway which seem bound to bear fruit by the time this appears in print. These are exciting times at the Naval Academy.

But the course of instruction is only one factor governing the quality of Naval Academy graduates. Instruction is only as good as the instructors. Securing the best possible

SECOND TERM 1/C		APPLIED THERMODYNAMICS	ELECTRICAL SCIENCE	LEADERSHIP	TRAJECTORY MECHANICS	OPERATIONS	ADV. COMPOSITION & LITERATURE	RESEARCH PAPER	OPER. DRILL	PHYS. ED.
FIRST TERM		APPLIED FLUID MECHANICS			WEAPONS SYSTEMS		RESEARCH PAPER	RESEARCH PAPER	OPER. DRILL	PHYS. ED.
							NAV. HYGIENE	NAVAL HISTORY	OPER. DRILL	EXEC. DRILL
SUMMER PRACTICE CRUISE										
SECOND TERM 2/C		BASIC FLUID MECHANICS	ELECTRICAL SCIENCE	LEADERSHIP	NAVIGATION		ECONOMICS		OPER. DRILL	PHYS. ED.
FIRST TERM		BASIC THERMODYNAMICS			DIFFERENTIAL EQUATIONS	SPER. TRIG.	WEAPONS COMPONENTS	SPEECH	OPER. DRILL	PHYS. ED.
							METEOROLOGY PILOTING	U.S. GOVT.	OPER. DRILL	EXEC. DRILL
SECOND CLASS SUMMER										
SECOND TERM 3/C		STRENGTH OF MATERIALS	PHYSICS		MECHANICS		U.S. FOREIGN POLICY		PHYS. ED.	EXEC. DRILL
FIRST TERM		ENGINEERING MATERIALS			CALCULUS		EUROPEAN HISTORY	FOREIGN LANGUAGE	PHYS. ED.	EXEC. DRILL
SUMMER PRACTICE CRUISE										
SECOND TERM 4/C		ENGINEERING GRAPHICS	CHEMISTRY		CALCULUS		SURVEY OF LITERATURE	FOREIGN LANGUAGE	OPER. DRILL	PHYS. ED.
FIRST TERM					TRIG. · ALG. · ANAL.		ENGLISH COMPOSITION		OPER. DRILL	EXEC. DRILL
PLEBE SUMMER										

U. S. NAVAL ACADEMY'S BASIC REQUIRED CURRICULUM NOW IN EFFECT



NEWLY INSTALLED WIND TUNNEL FOR USE IN AERODYNAMICS STUDY

faculty is equally as important as constructing the best curriculum and is a major consideration in present planning. Steps are under way to improve the qualifications of officer instructors and increase the size of the civilian faculty in the appropriate departments.

The quality of the incoming class is another prominent factor in the quality of the graduates. Evidence of the top notch caliber of recent entering classes should be a real delight to the Fleet. In recent years the numbers of candidates for the Naval Academy have been at record highs. Two years ago the Academy started using the College Entrance Examination Board tests, the most widely favored entrance examinations in the country. Comparison with freshman classes entering leading civilian institutions shows that the Fourth Class stacks up favorably with those of any university in the country. Nor is the charge well founded that the Naval Academy's attention to intercollegiate sports is detrimental to scholastic standards. The composite of mean scores on the entrance exams for the Class of 1963 as a whole was 614; that of the Plebe football team was 596; yet for entering freshmen at leading engineering schools the mean was only 586 and for liberal arts schools it was 579. Furthermore,

test scores don't tell the whole story, for, in every instance permitted by law, the Academy evaluates candidates on not only their entrance examinations, but weighs *all* available evidence of leadership potential.

The curriculum, instruction, and candidate quality are important. But most important to the Naval Academy remains the inculcation of attitudes—developing leadership, high principle, and dedication to the Service.

Dominating every stage of curriculum planning has been regard for possible conflict between academic rigor and military discipline. The Naval Academy is not justified on grounds that it offers a superior education (although an excellent case can be made that it does). Last summer a member of the Board of Visitors to the Air Force Academy suggested that equally good officers could be had more economically if the Service Academies were abolished. After receiving their degrees, college graduates could be given a short course in military skills and commissioned. This argument, no matter how well intentioned, avoids the issue. The truth is the Academy's *raison d'être* has never been that it offers unique professional training. The Navy *can* teach Rules of the Road just as well at Newport as at Annapolis. Service

Academies exist because they do what no other schools can do as well: develop the capacity for military leadership and inspire career dedication for a lifetime of service. The Navy Blue water which flows only from the taps in Bancroft Hall and the Gold hue the sun casts only into the Yard during the four years of each midshipman's life are the priceless assets which must be safeguarded.

Could an academic program change Navy Blue to Robin's Egg Blue? Perhaps it could. It seems certain that the new program is going to be of far reaching significance. But it could also develop graduates who are better prepared and even more deeply devoted to the Service. It would be blind optimism to assert that every aspect of the program is successful. It is too new and must stand the test of time. Yet enlightened optimism seems warranted that the steps, developed and refined where necessary, are sound.

To the faculty, the changes have meant a great deal of extra work. New courses need new textbooks and syllabi. Validation has thorny scheduling and administrative problems. Electives mean extra hours of teaching.

Yet the faculty has reason to be enthusiastic, too. Civilian professors returning from meetings of professional societies remark of a new respect for the Naval Academy among their colleagues. Electives offer an opportunity to teach courses to good students who are avidly interested. One professor was overheard saying he hadn't been so excited over anything at the Academy in years as he was in the elective course in literature he was teaching.

Officers of the Executive Department accept the academic changes rather calmly. They've spoken of little effect on life in Bancroft Hall. But the company officer of the color company mentioned one big advantage. He pointed out that intelligent midshipmen now had something more rewarding to do than get into mischief.

The midshipmen would add a footnote. Practically all favor the changes in principle. Yet upper classmen say this year's course of instruction has called forth a greater effort than ever. One earnestly summarized their feelings to his instructor in the new Science Department: "Midshipmen are studying harder this year, sir."



WHO GOES THERE?

Contributed by THOMAS M. SLOANE

The U. S. Naval Reserve Force, set up by Congress in 1916, was by modern standards, a pretty funny outfit. Its members, of whom I was one, were recruited to officer and man a "mosquito fleet"—a term reminiscent of the Spanish-American War—to strike terror in the hearts of the Imperial Germany Navy and to sink every one of their submarines.

The ships we were to man turned out to be anything that would float, from an open motor boat to a 200-foot steam yacht. We were enlisted in units of about twelve men including an ensign, who got his commission, I suppose, by an Act of God. This was a sort of naval answer to Plattsburg. My ensign was a former schoolmaster of mine, who was a pretty good yachtsman and a first-rate teacher of U. S. history.

The unit system in which a crowd of jolly good fellows would man a dashing little craft and go after submarines soon broke down, of course, but our ensign kept hold of his original cadre, all college men and also very cagily latched on to some other likely boys, such as two railroad firemen, an aging plumber, a Maine farmer, and such useful types. (The plumber later built a pipeline for oil across the neck of Scotland. I think he had risen to Chief's status by then. I suppose that in the imbroglio of 1941-45 that job would have had to be headed by a flag officer, who would now be chairman of the board of Consolidated Super-Colossal Industries, Inc.)

Well, our augmented unit, about 26 men plus a new ensign—a medical student who was very useful for taking care of minor ailments and checking up on the captain's