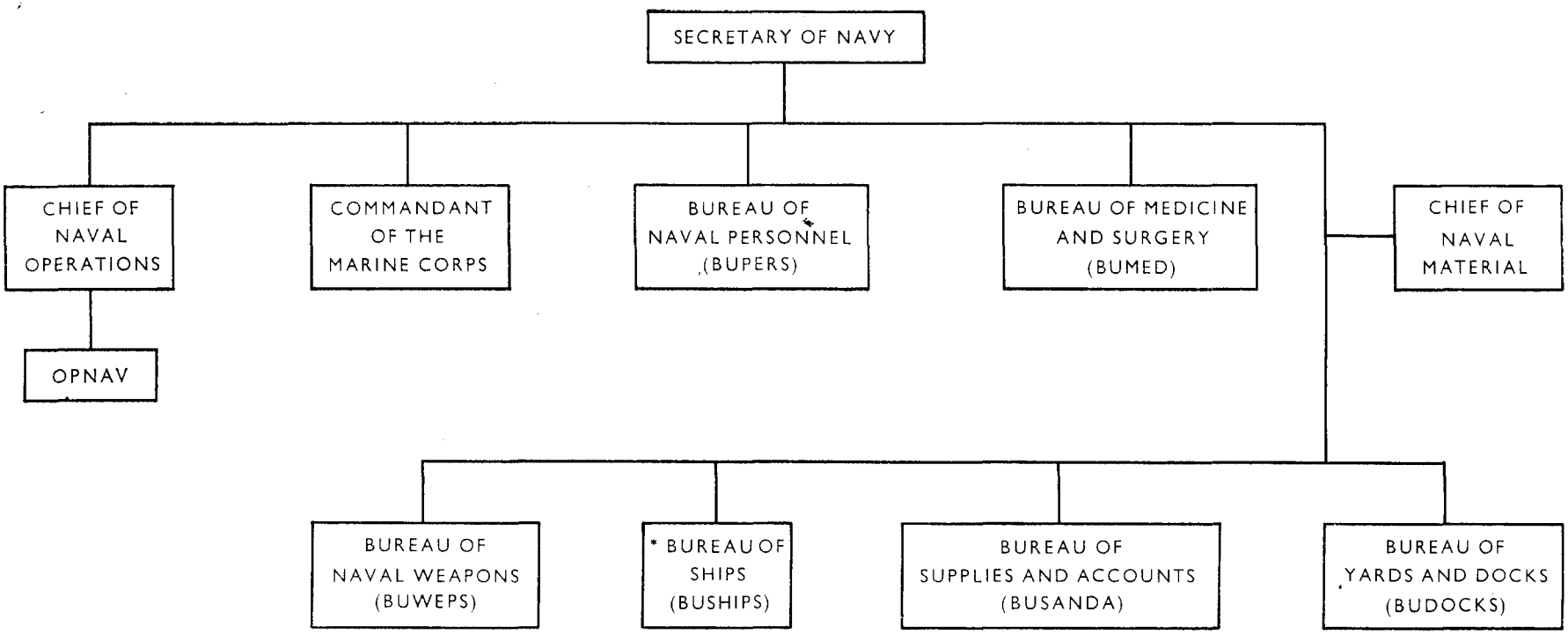


* 'SPONSOR' OF ED OFFICER APPOINTMENTS, EDUCATION, CAREER DEVELOPMENT AND PERSONNEL PLANNING

FIG. 1—PRE-1966 ORGANIZATION

UNITED STATES NAVY ENGINEERING DUTY OFFICERS

BY

COMMANDER J. C. WARSOP, R.N.

Introduction

The last decade has seen significant developments in the activities of the U.S. Department of Defense. The potential of systems analysis is being exploited by management, particularly in examination of cost and effectiveness of alternative Force structures and equipments; project management has evolved and application intensified; the task of headquarters has been sharply focused on determining and defining the material needs of the Services and complementary to which is an increasingly outward look to industry to provide both software and hardware for all phases from analytical studies and research through to manufacture.

On the naval front the Fast Deployment Logistic Ship (FDL) and the General Purpose Amphibious Assault Ship (LHA) programmes exemplify these developments. For the FDL the USN defined the mission for a total force of ships and material standards for construction of ships. Industry was then invited to propose the number and design of ships to meet the specified mission. In the case of the LHA, individual ship missions and number were specified but ship design is with industry. In both projects emphasis has been placed on mission performance and capability compared to life cycle costs. The current destroyer programme (DX/DXG) is following a similar pattern, albeit with differences in detail.

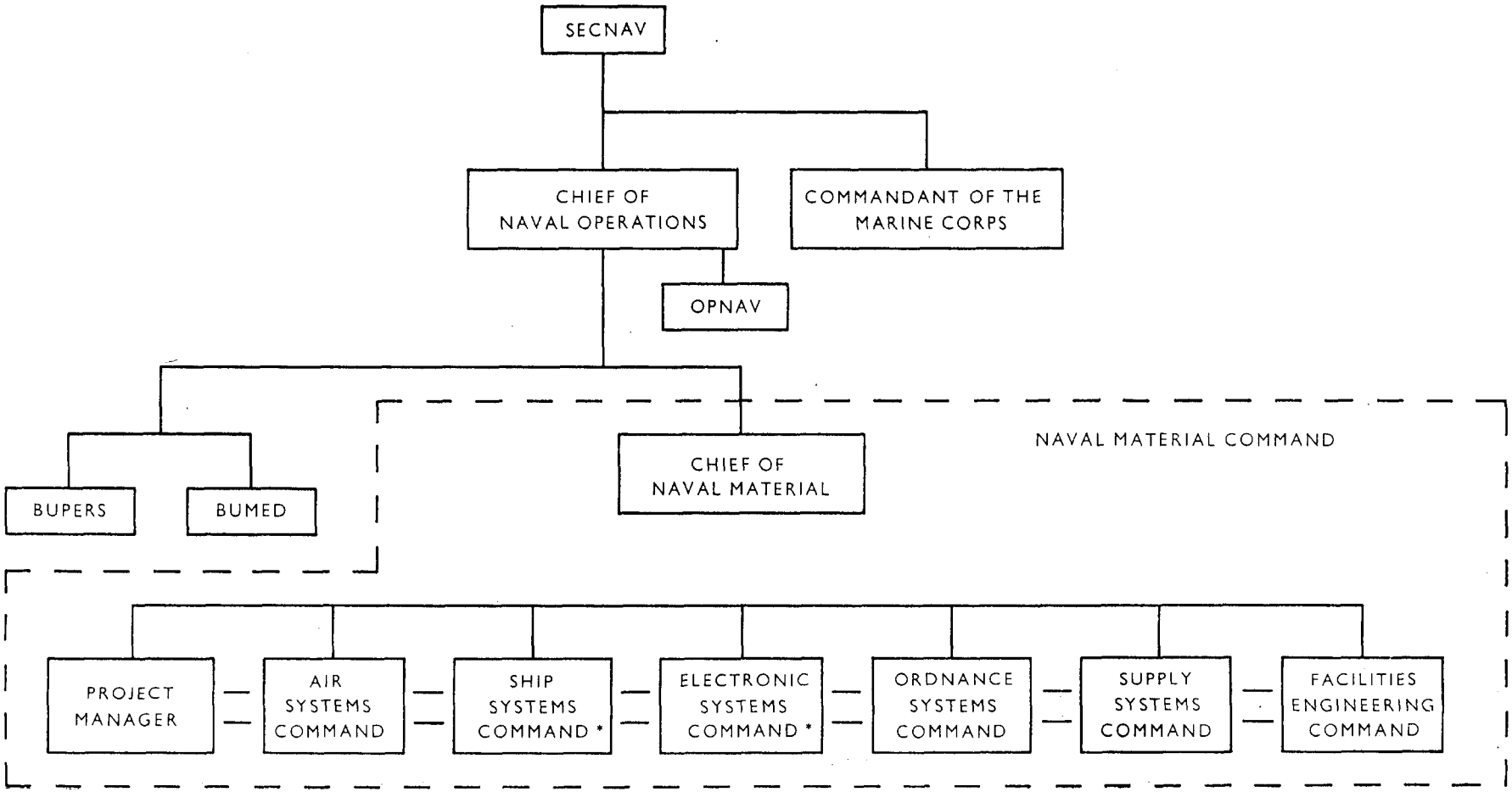
As the tasks change so have the organizational structures and *modus operandi.* The most significant change in USN headquarters organization occurred in 1966 when the hitherto autonomous material bureaux were unified into a single Naval Material Command. At the same time the bilateral organization whereby the 'Chiefs' of the Material Bureaux reported directly to the Secretary of the Navy was abolished and a linear organization in which the Commander, Naval Material Command, reports to the Chief of Naval Operations, introduced. These changes are depicted in FIGS. 1 and 2.

The objective of this article is not to expound on the environment which is evolving in headquarters but rather to review USN officer education in general and Engineering Duty officer education in particular to show how officers are professionally equipped for a naval career, which for many will include duty in headquarters. To some extent the article will also be, therefore, an updating of Captain Tatton Brown's articles in Vol. 9, No. 2 and Vol. 10, No. 4, of the *Journal.*

PART I

OFFICER ENTRY AND GENERAL OFFICER EDUCATION IN U.S. NAVY

The Standard U.S. Navy currently used for planning purposes requires 81,000 officers of which 69,000 are lieutenant-commander and below. The annual entry to maintain these levels is around 6,000 and prime sources of entry are:



* JOINT SPONSORS OF ED GROUP

FIG. 2—PRESENT ORGANIZATION

US Naval Academy, Annapolis (NA)	Approx. 800 per year
Naval Reserve Officer Training Corps (NROTC)	Up to 1,500 per year
Officer Candidate School (OCS)	Up to 3,500 per year
Aviation Programmes	Up to 2,000 per year

Graduate Courses

U.S. Naval Academy, Annapolis, Maryland

Officers enter the Academy at about the age of 18 and serve as midshipmen for the four-year course. The course is roughly 75 per cent Academic Sciences with small Liberal Arts content and 25 per cent Military Sciences. Officers graduate with an undesignated but accredited Bachelor of Science Degree (BS) and at which time they are promoted Ensign in the Regular Navy (USN).

Naval Reserve Officer Training Corps

The NROTC, which was approved in 1946 for Reserve Officer training, is now considered a prime source for permanent service (USN) officers. Currently there are 53 NROTC units associated with civilian universities and colleges. Under this scheme the USN pays all university/college fees, cost of uniforms and 50 dollars per month retainer. These subsidies cost the USN, on average, 10,000 dollars per officer. In the main NROTC 'Regular' officers graduate with accredited BS in Engineering Sciences when they are commisioned Ensign in the Regular Navy (USN).

NROTC also has a three-year 'contract' scheme under which the USN pay 40 dollars per month retainer during the final two years and for naval science books and uniform, but not for tuition. Graduates are commissioned Ensign in the Naval Reserve (USNR).

Officer Candidate School

Entrants to the OCS are graduates from accredited civilian universities and colleges. The school is situated in Newport, Rhode Island, and the course, which is military science biased, lasts four months. Graduates are commissioned Ensign in the USNR.

Length of Service

NA graduates are obligated to five years' service from graduation but it is generally accepted that the majority will be career officers. NROTC Regular Navy graduates are obligated to four years' service from graduation, but are administered as career officers in line with NA graduates. NROTC 'contract' and OCS graduates, who are required to serve in active list appointments for three years, may apply for permanent commissions in the last year of obligated service.

Statistical evidence shows that 90 per cent of officers serving at 10-year mark will continue to full pensionable age (20 years' service) and at this mark 80–85 per cent Naval Academy, 35 per cent NROTC and about 5 per cent OCS entries remain. Thus the mean distribution pattern in 1,200 lieutenant-commanders promoted per year (current mean rate excluding aviation entries and Limited Duty officers) will be 650 NA, 390 NROTC and 160 OCS graduates.

The USN judges these sources of officer entry to be proper and numbers in reasonable balance.

Post-Graduate Education

Post-graduate education in the USN is aimed at providing advanced education in engineering, scientific and management disciplines to broaden the professional knowledge and capability of officers.

The Superintendent of the USN Post-Graduate School (USNPGS) exercises administrative control of all post-graduate courses be they conducted within the USNPGS or at civilian universities. All post-graduate courses are sponsored by an appropriate USN headquarters division, e.g., the Naval Engineering Course is sponsored by NAVSHIPS and NAVELEX.

The courses offered fall into three general categories:

(i) Engineering and scientific education leading to designated bachelors and/or advanced degree

(ii) Navy professional type education designed to build upon and/or broaden the base of professional experience

Note: these courses should not be confused with War College courses which are in addition to post-graduate courses and are not administered by Superintendent, USNPGS.

(iii) Management education to masters level.

For the first two categories Naval Academy graduates generally require two years for bachelors, three years for masters and five years for doctorate, while NROTC graduates who hold designated degrees (e.g., BSEE) may obtain a masters in two years. The masters course in management takes one year.

Officers may first apply for entry to post-graduate courses two to four years after graduation from the Naval Academy or equivalent. If not selected in the first instance they may re-apply through the rank of Commander for some courses. Current annual entry to courses is about 1,200 to USNPGS and 160 to civilian universities with 2 : 1 ratio younger/older officers. Of the 160 at civilian universities some 60 are at the MIT for construction/mechanical engineering course with the remainder at a range of universities for courses in Business Management, International Affairs, etc.

The obligation for service is two years for each year on course.

U.S.N. Post-Graduate School, Monterey, California

The USNPGS, Monterey, California, was opened in 1948 as an outlying component of the USN Post-Graduate School, Annapolis, and General Line School, Newport, Rhode Island. On closing the schools at Annapolis and Newport in 1951 the school at Monterey became the USNPGS. In 1956 the Navy Management School was established as an additional component of the USNPGS.

The defined mission of the school is: 'to conduct and direct the advanced education of commissioned officers, to broaden the professional knowledge of General Line officers, and to provide such other indoctrination, technical and professional instruction as may be prescribed to meet the needs of the Naval Service, and in support of the foregoing to foster and encourage a programme of research in order to sustain academic excellence'.

Officer students are grouped into eight curricula programme areas:

Aeronautical Engineering
Electronics and Communications Engineering
Ordnance Engineering
Naval Engineering
Environmental Sciences
Naval Management and Operations Analysis
Engineering Science
Baccalaureate

The teaching functions of classroom and laboratory instruction and thesis supervision are accomplished by a faculty which is organized into ten academic departments:

Aeronautics
Business Administration and Economics
Electrical Engineering
Government and Humanities
Material Science and Chemistry
Mathematics
Mechanical Engineering
Meteorology and Oceanography
Operations Analysis
Physics

Some three-quarters of the teaching staff of 340 are civilians of varying professional rank and the remainder are naval officers.

The school is well provided with lecture rooms and laboratories as appropriate to the courses offered and the atmosphere of the school is that of an academic institution rather than military establishment. All students irrespective of rank wear plain clothes and are given complete freedom outside compulsory attendance of lectures and laboratory periods which, on average, total 20 hours per week. It is generally considered, however, that to keep up with the hunt two hours' private study is necessary for each one hour of set instruction.

PART II

THE ENGINEERING DUTY (ED) OFFICER

Engineering specialists in the USN are found in four groups: Engineering Duty (about 1,000 officers); Aeronautical Engineering Duty (about 350 officers); Weapons Engineering Duty (about 100 officers) and Civil Engineering Corps (about 1,700 officers). These 'restricted line' and staff corps officers may not command at sea. They may command shore establishments of their speciality. An ED officer, for example, normally commands a naval shipyard.

The ED officer is a Ship Engineering Specialist and the basic requirements for transfer to this group from the unrestricted line are:

Education—Graduate of the NA or accredited university or college and masters degree (or demonstrably have potential to earn through USN post-graduate course) in engineering or science which is related to responsibilities of NAVSHIPS or NAVELEX.

Experience—Three years afloat, which preferably includes one year in the Engineering Department.

Candidates for transfer to the various restricted line groups are considered by an annual Board convened by the Chief of Naval Personnel. The senior member of the Board is an unrestricted line officer; he is assisted by several officers from each group (ED, AED, etc.) who are familiar with the requirements of their speciality.

Unrestricted Line officers may request to become ED at any time up through rank of Commander, but 3–8 years after graduation from the NA (or equivalent) is the more usual. However, earliest selection is generally accepted to be towards the end of Masters courses when students' results can at least be anticipated with some confidence. Since the mid-1950s the background of officers selected for ED is in line with the distribution of NA, NROTC and OCS graduates still serving at the 10-year mark. Prior to the mid-1950s the majority of ED officers were NA graduates.

Up to the present Mechanical, Electronic and Electrical Specialist EDOs invariably completed qualifying courses at the USN Post-Graduate School with

Congineers attending Massachusetts Institute of Technology or the Webb Institute. There will be no further entries to Webb and in future all Congineers will attend MIT.

The MIT course leads to the professional degree of Naval Engineer and, concurrently, to MS in a designated engineering field. Nearly all naval officers who attend the MIT courses become ED upon graduation.

There are no courses at the USNPGS which are solely for the ED. However, since NAVSHIPS and NAVELEX sponsor the ship engineering courses they are able to influence and, within certain limits, direct curricula.

While the courses at the USNPGS and current courses at RNEC have much in common, the increasing emphasis in the U.S. towards management sciences has lead to some paring down of engineering subject matter. This has amounted to removal of a summer industrial tour, some laboratory time and specialist courses in areas such as fuels, gas turbines and nuclear engineering for the mechanical engineering course at USNPGS; these have been replaced by courses in operations analysis, material management and management of human resources.

It is pertinent to add here that it has become practice in the USN to educate its technical leaders in engineering at junior level, then in management in the middle and senior ranks. This is the normal development followed in U.S. industry.

Further Education

In addition to PG education the USN encourages officers to participate in Further Education courses. The response of officers is exemplified by the 125 EDOs in the Washington area currently participating in Government-sponsored extra-curricula evening courses at local universities. The cost to the USN of these courses averages 295 dollars per officer per year.

In addition there is a continuous input of EDOs to following courses:

Advanced Management, Harvard University	13 weeks
General Electric Modern Engineering (refresher)	6 weeks
Defence Logistic Management, Wright Patterson	12 weeks

Armed Forces Staff College and other War College courses.

Strength of the E.D. Group

In 1959 the Keith Board, which investigated the employment of officers in the USN, recommended that more use be made of sub-specialist officers (line officers with bachelors or masters degree in engineering sciences) in hitherto engineering specialist appointments. A consequential recommendation was to progressively reduce the strength of the ED Group to 850 from the 1,250 then approved. The recommendations were accepted and implemented. However, experience has shown that use of sub-specialists at working levels is not as effective as planned nor compatible with present rate of technological development. Further, junior sub-specialist officers invariably judge employment in ship material posts anything but career enhancing, as contrasted with command or staff positions, and consequently only accept such appointments with reluctance.

This situation is recognized at high levels and a permanent Career Planning Board has been established in BuPers to attack the problem. In addition, although the sub-speciality concept is still official policy, there has been in practice a de-emphasis on sub-specialists through designating more technical billets as requiring specialist (ED) incumbents. The effect of this trend is that requirements for EDOs now amount to about 1,100 officers. It is projected there will be 990 EDOs on 1st July, 1968; a vigorous campaign is underway to

attract and retain 70–80 new officers per year to build up and maintain the necessary strength.

The desired distribution in the various EDO specializations is:

Congineer (Construction/Mechanical)	—30 per cent
Mechanical	—30 per cent
Electronics	—30 per cent
Electrical	—10 per cent

Official Career Prospects of E.D. Officer.

The career prospects of ED are:

26–31 Majority of EDOs accepted in this age bracket.

26 Promotion to Lieutenant.

31–32 Promotion to Lieutenant-Commander.
Stated as selection but in absence of adverse reports currently 100 per cent are promoted.

36–37 Promotion to Commander.
In recent years 85 per cent of Lieutenant-Commanders have been selected.

42–45 Promotion to Captain.
Regulations permit 60 per cent of Commanders to be selected. However, since this promotion zone coincides with average officer attaining full pensionable age (20 years service) a number leave and, in effect, 75–80 per cent of officers remaining on active service are selected.

49–52 Promotion to Flag Rank.
There are 23 approved posts for EDO Rear Admirals, which, on numbers borne, gives a Captain a 15 per cent chance of being selected for Flag Rank. However, since peak retirement benefits are realized after 26 years' service (average age 48) a number of officers leave thus enhancing opportunity for officers remaining on active service.

Employment of E.D. Officers

ED designated appointments and distribution of EDOs in these appointments are:

NAVSHIPS and NAVELEX and the field activities they command, *viz:* shipyards, supervisors of shipbuilding, laboratories, etc.	—65 per cent (about 650)
Sea Exchange Billets. In this scheme a Line Officer (invariably subspecialist) takes an ED designated post while the ED is at sea.	—50
Junior EDOs at sea. These officers are generally completing appointments during which they have been accepted as ED and/or meeting general sea time requirements for junior officer.	—usually about 25 —usually about 25
Non NAVSHIPS and NAVELEX managed appointments such as Fleet staffs, Type Commanders staffs, Naval Material Command HQ, repair officers in submarine tenders and naval attaches.	—Remainder (about 250)

Recently (1967) the following seagoing appointments have been designated ED:

Commanders	—Engineer Officers of CVAs—14
Lieutenant-Commanders and Lieutenants	—Engineer Officers of cruisers and and DLGs and in CVAs—42

In addition to the above, it is probable that in not too distant future repair officers in destroyer tenders will also be designated ED.

In 1967, precedents were created with appointment of ED Flag Officers to the Office of the Chief of Naval Operations, Naval Material Command Headquarters and CINCLANTFLT and CINCPACFLT staffs. At the same time an unrestricted line officer was appointed to NAVSHIPS as Deputy Commander for Fleet Maintenance.

REFLECTIONS

It would be foolhardy to venture any sweeping conclusions from such a brief survey but it will be evident that:

(*a*) the USN attaches significance to post graduate education of officers

(*b*) A USN commander who has not completed PG education is becoming an increasing rarity

(*c*) RN executive and technical officer education is dichotomic compared to USN counterparts, but in career patterns the trend is reversed

(*d*) The recent Flag Officer appointments could be indicative of future trends

(*e*) ED professional education has a management bias compared to RNEC courses. This is not to infer the ED officer is not a well-qualified and competent engineer; his development is similar to that of U.S. industry.

The attributes which flow from above will be conspicuous to all who come into contact with the USN.

Readers are left to judge whether USN scheme(s) of education professionally equip officers for the evolving needs of tomorrow and, for the ED in particular, a career pattern which in rank of Commander and above will be primarily concerned with technical management. To those who venture comparisons with RN schemes I commend:

'Impartially their talents scan
Just Education forms the man!'

(*Gay:* The owl, swans, cock, spider, ass and the farmer)

Acknowledgement

I am indebted to the staff of the USN Post-Graduate School and USN officers who provided source material for this article and so freely gave of their time to discussion.