THE CHANGING FACE OF 'SULTAN'

BY

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(*H.M.S. Sultan*)

Introduction

The very comprehensive article[1] in the June 1981 volume of the *Journal* was written to mark *Sultan*'s Silver Jubilee and describe its evolution to become the Alma Mater of the Marine Engineering Branch. Today *Sultan* is seeing the most rapid change in its thirty year history, and will shortly become the Royal Navy's largest shore establishment. The purpose of this article is to high-light some of the new facilities and the associated change in training emphasis.

Artificer Training

With the closure of *Caledonia* last December, the number of artificers under training on *Sultan*'s books has risen from the 250 that was the norm in the days of mechanician training, to well over 1000 today. The decision to transfer training under plan PROCTIS (Phased Relocation of 'Caledonia' Training in 'Sultan') gave the Establishment the opportunity to completely re-design the apprenticeship and tailor it to the EBD requirement[2]. The first four terms consist of about equal measures of craft and academic training. There then follows a term in the Harbour Training Ships (currently *Londonderry* and *Falmouth*, where the substitution of paddlewheels for propellers allows steaming up to 80% power and the practising of realistic breakdown drills). The following term is spent in the Sea Training Ship, after which apprentices return to *Sultan* for the final four terms of marine engineering technology and craft in proportions which vary according to sub-specialization (FIG. 1).

Two significant changes within the new apprenticeship are the re-introduction of the Metalworker specialist and an enhanced EL package. Metalworkers will form approximately one third of the ML stream. The major emphasis is on allied trades skills which are achieved at the expense of some fitting and turning practice. The EL sub-specialist receives a greater depth of electronics training with new modules of diagnostic studies, digital techniques and microprocessor training, again at the expense of some craft training. The first apprentices to complete these courses will arrive in the Fleet in early 1987. The experience gained with the new apprenticeship has similarly

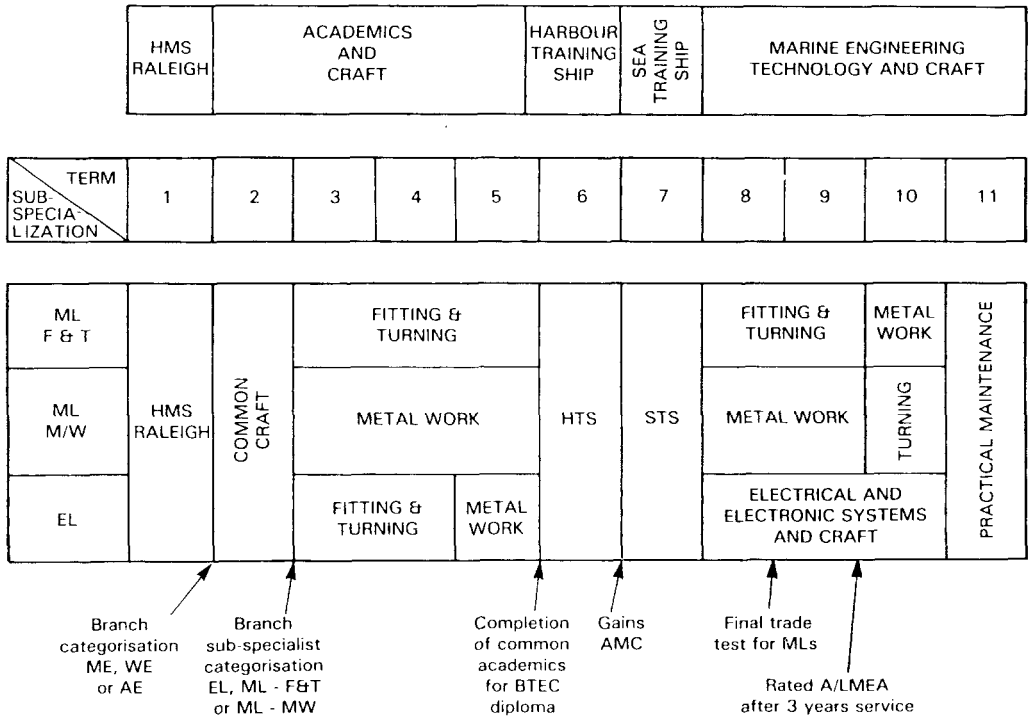

FIG. 1—H.M.S. 'SULTAN': ME ARTIFICER APPRENTICESHIP

been incorporated into the Artificer Candidate course (the successor to the Mechanician's course). Both lead to a Business and Technician Education Council (BTEC) Diploma in Marine Engineering and, for the MLs, a City and Guilds Skill of Hand Certificate.

The artificer apprentice influx has not only placed high demands on academic and craft training; there is hardly a corner of the camp—from Naval General Training, Sport and Recreation, to accommodation and Captain's Requestmen and Defaulters—which has not felt an increased load and artificer administration justifiably now has its own Training Commander.

Electrical Training

At the time of EBD, in 1979, the responsibility for the heavy 'L' commitment was fairly quickly transferred to the ME branch. It has taken considerably longer to produce our own breed of EL artificer and even today a large proportion of our training is still undertaken by the PD group within *Collingwood*. The Electical Training School (ETS), to be commissioned in mid 1987, will finally place the training equipment totally under *Sultan*'s roof.

Computer-based simulations of the LEANDER and Type 42 switchboards are currently being procured, complete with sound effects. Even a vibrating deck was offered in the manufacturer's proposals, but resources were diverted to a complementary graphics package which presents, on VDU, the theoretical aspects of switchboard operation to give enhanced training value. This will be available not only for career and pre-joining training (PJT), but also for ship's team training.

The ETS will encompass a wide range of training equipments representing the Branch's full electrical responsibilities from motors, starters, AVRs, SFCs and domestics to those equipments destined for the Type 23. Many will be

'breadboarded' with the emphasis firmly on diagnostic studies, practical maintenance and EL craft, where, for the first time, a trade test is to be introduced in mid 1987.

The school will also include a dedicated damage control facility, loosely based on Type 42 equipment standards, with an HQ1 and two section bases. The complete practice of electrical damage control can thus be exercised, from the command and communications aspects to the running of emergency cables.

The phased transfer of equipments from *Collingwood* will begin in April 1987 and complete within that summer term, the plan being that there shall be no break in training.

Parsons Block

Parsons Block, best known to the prospective sea-goer for its PJT courses, also houses a Controls Engineering School (CES) where pneumatics and analogue electric controls are taught. The CES is shortly to see an expansion to accommodate diagnostic case studies and microprocessor training, the latter in support of the Type 23, Single Role Mine Hunter (SRMH) and Type 2400 submarine control and surveillance systems.

To support PJTs, four SCC simulators for procedure training are currently available: Type 22, CVS (FIG. 2) MCMV, and a combined one for Types 21 and 42. These have proved invaluable for exercising the student in the normal and reversionary modes of machinery operation. Their cost-effectiveness is further enhanced when used for team training by ships' watchkeeping teams. Complementary controls system maintainer training is provided by simulators for the EL specialist.

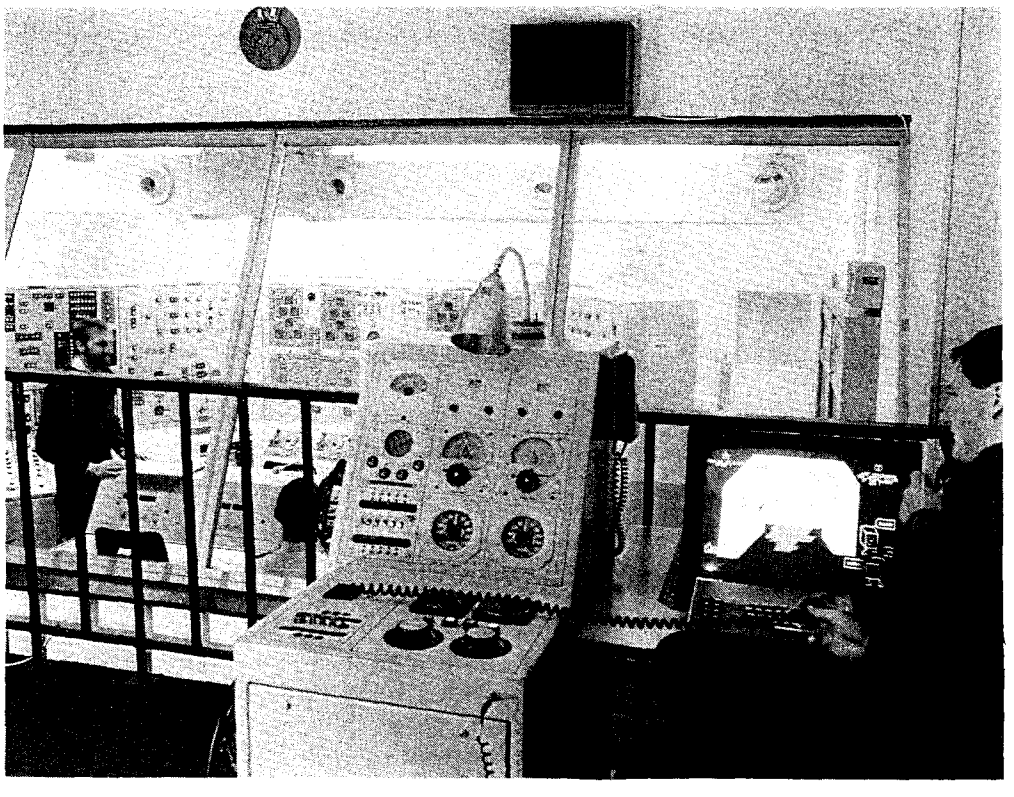

FIG. 2—CVS SIMULATOR, LOOKING DOWN FROM THE INSTRUCTOR/OOW CONSOLE INTO THE SCC

Type 23

Looking ahead to the Type 23, attention is already being paid to the structure and content of the PJT. Procurement of a Ship Control Centre (SCC) procedural trainer has begun and we are confident that with the advanced simulation techniques now available, a more comprehensive machinery space facility will be possible, to allow for more realistic practice of reversionary modes of local control. A possible layout is shown in FIG. 3.

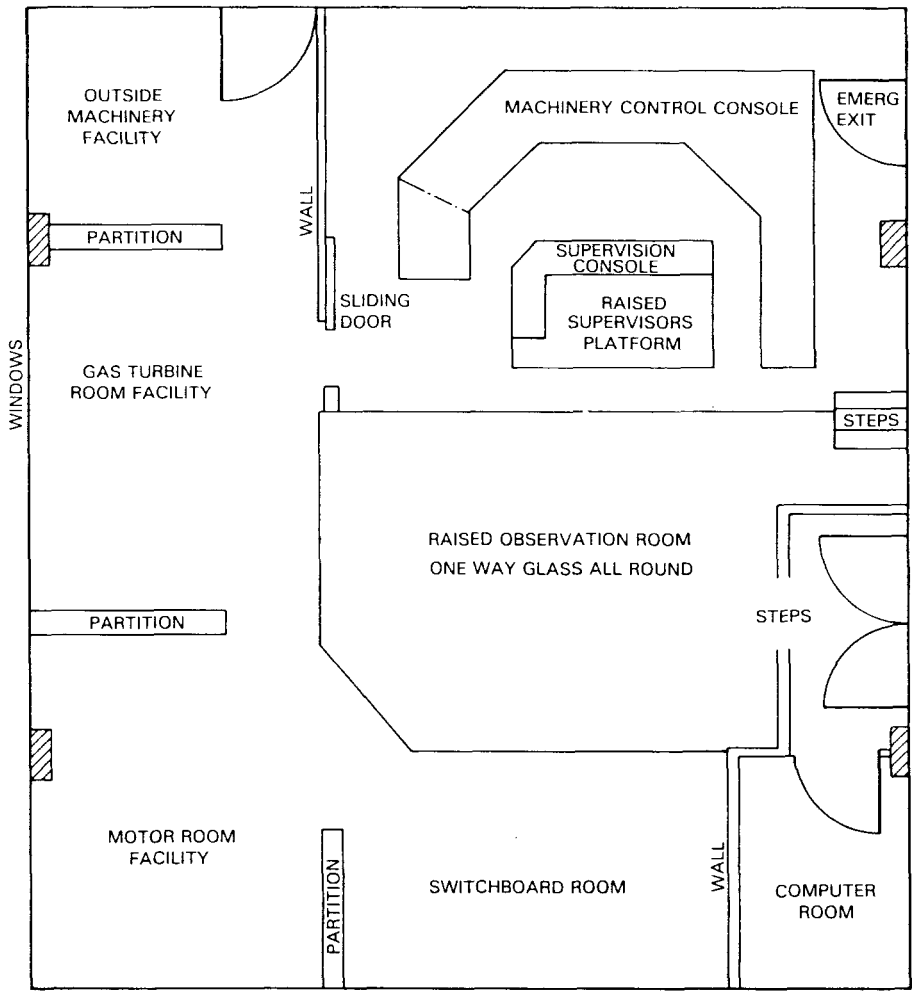

FIG. 3—TYPE 23 TRAINER

The schematic systems held in the main simulator computer can also be relayed to the PJT classroom and displayed on a large screen using a data projector, thus replacing the overhead projector and vu-graphs. It will therefore become simpler to illustrate normal operator practices and break-down drills before the simulator time, which normally forms the final week of any course.

Microprocessor Training

Immediately following EBD, the new Branch responsibilities appeared to be essentially related to power and distribution. In pursuit of reduced manning, this is now heavily overshadowed by the rapid expansion of remote control and surveillance systems and the associated digital-based technology. Microprocessor training courses, essentially for the EL specialist, have been included in artificer courses since April 1986. Versatile training microprocessors have been procured, with a number of peripheral equipments to add interest and application to this training (FIG. 4).

FIG. 4—A TRAINING MICROPROCESSOR WITH PERIPHERAL EQUIPMENTS

As the Type 23, SRMH and Type 2400 submarine machinery and control surveillance systems are all based on D86 microprocessor technology, a single common maintainer trainer is to be procured and housed at *Sultan*. The trainer will consist of representative elements of the real control systems, but naturally can be much smaller than the Type 23's 20 distributed microprocessors. It represents a significant departure from previous practice where a separate maintainer trainer was justified for each class of ship. In the early years of the corresponding PJTs, it will be necessary to run microprocessor 'enabling' courses for those ELs who did not receive this during career training.

Single Role Mine Hunter

An examination of the requirements for SRMH training has revealed a change of emphasis from previous SCC training. Control of the main propulsion in both normal and reversionary modes is exercised from the bridge. The SCC watchkeeper performs essentially a surveillance role, with responsibilities for stopping and starting machinery and operating the switch-

board. A study into the possible combination of Ops, WE, and ME training and simulators has concluded that there is insufficient common ground for a single trainer. However, we foresee a greater emphasis on the practising of communications and combined training with the OOW and helmsman.

In many respects small ships pose greater training problems. The technology is just as complicated as in larger ships. The crews are small and thus each man's contribution is that more significant. Comprehensive prejoining training is therfore that more essential.

Machinery Training

With the increase in artificer numbers, The Machinery Group has experienced a change of emphasis from PJT and Adqual training to fundamental machinery training for artificers on career courses.

To complement the 'controlling microchip', the Group is expanding to include the latest equipments in service: a Spey gas turbine (FIG. 5) is to be installed in the original G6 cell later this year and Valentas are being added to the range of diesel engines. A prototype reverse osmosis desalination plant heralds the demise of auxiliary steam and the birth of the all-electric ship.

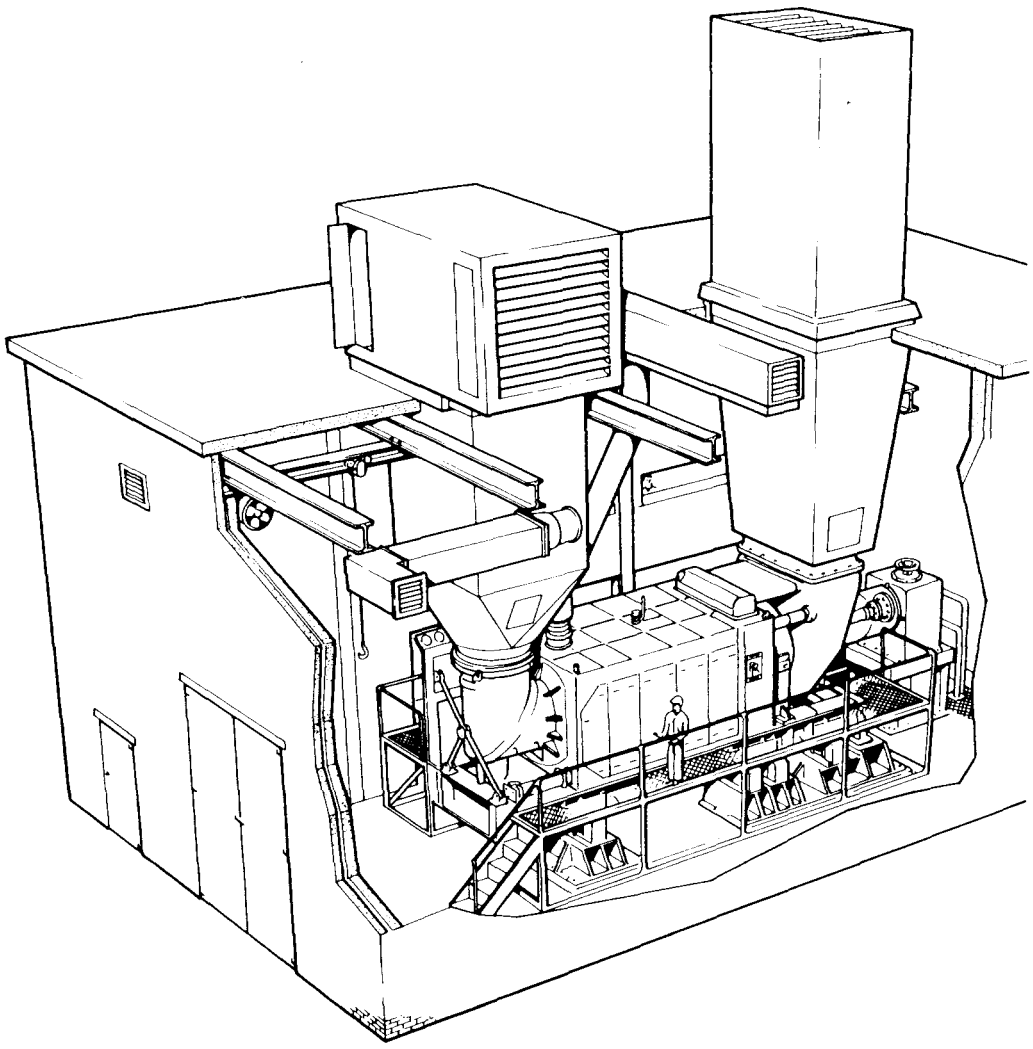

FIG. 5—SPEY TRAINING FACILITY AT 'SULTAN'

Nuclear Training

Nuclear training for artificers currently consists of the Nuclear Propulsion Short Course (NPSC) of 11 weeks, a period at sea, the Nuclear Propulsion Long Course (NPLC) of 25 weeks[3], followed by further sea training to qualify as the Nuclear Chief of the Watch. Charge Chiefs subsequently return to *Sultan* for their Career Course.

A proposal is now in hand to replace the NPLC with training, the emphasis of which is directed more at the man's immediate employment. Thus on completion of the NPSC and sea experience, the artificer will return to *Sultan* for a new Nuclear Propulsion Operators Course (8 – 10 weeks). After further sea time, he will complete a Nuclear Propulsion Charge Course (about 15 weeks), which will incorporate the Charge Chief's Career Course. Thereafter the man returns to sea to qualify as Nuclear Chief of the Watch.

As in surface ship PJTs, Rutherford Block places a heavy reliance on simulator training, the TRAFALGAR Class simulator being the latest addition in April 1985. Thoughts are now directed towards a simulator for the Trident submarine, to be commissioned in the early 1990s.

New Machine Shop

Before 1982 *Sultan* was hard pressed to fill the then existing 360 fitting benches and 106 lathes. As PROCTIS advanced, trainee numbers increased and additional lathes had to be borrowed from the machinery pool to satisfy demand, and in September 1985 the new Machine Shop (FIG. 6), with a further 288 lathes, was commissioned; predicted usage figures for 1986/7 are 85%. The original Main Workshop is now designated the Fitting Shop.

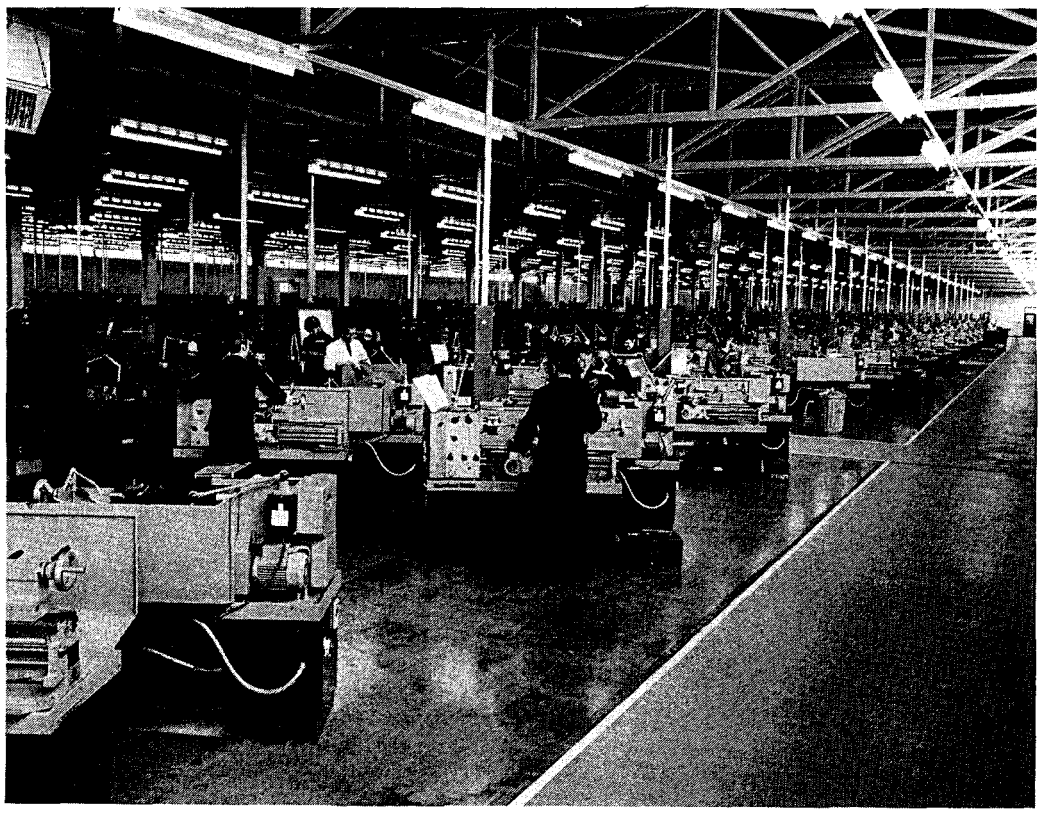

FIG. 6—NEW MACHINE SHOP AT 'SULTAN'

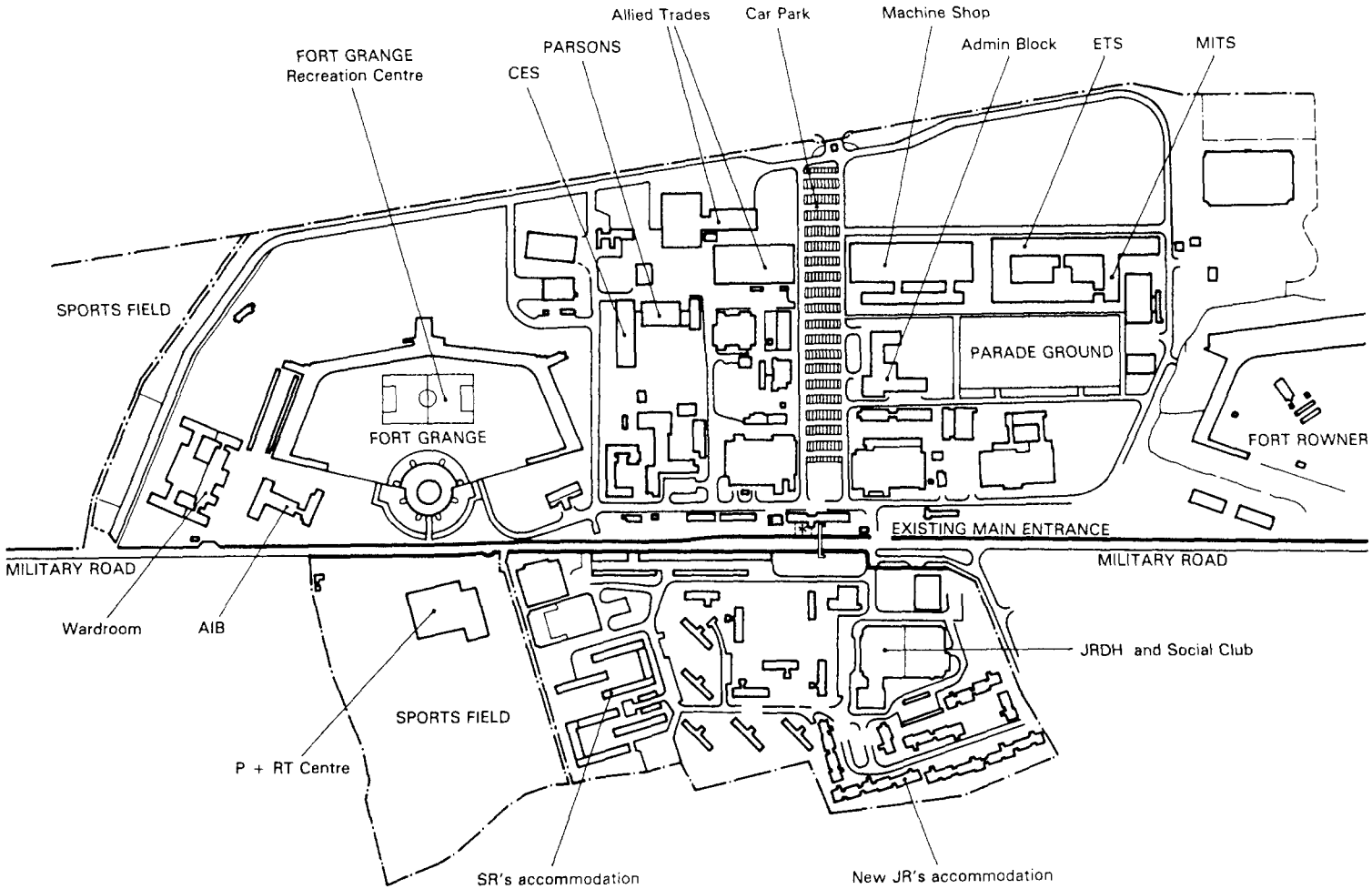

FIG. 7—THE FUTURE 'SULTAN', ACCORDING TO THE DEVELOPMENT PLAN
*proposed new position of main entrance

A wide variety of machine tools, normally associated with the Dockyards, have also been incorporated, ranging from boring machines to an engraving pantograph. These will form the basis of an Advanced Machine Tool Course (Admachinist) which is being intoduced in August 1986 for selected Charge Chief and CPOMEA (ML)s, drafted to Fleet Maintenance Groups.

The Redevelopment Plan

The Redevelopment Plan (see FIG. 7) falls broadly into three phases.

The first phase, now complete, was necessary to support the full apprentice intake and consisted of:

(*a*) The Allied Trades Workshop.
(*b*) Classroom, laboratory and a library extension to Brunel Block.
(*c*) The new Machine Shop.
(*d*) A larger parade ground.
(*e*) 15 new accommodation blocks.
(*f*) The new junior rates' dining hall, galley, and social club.

The second and current phase of work includes the following:

(*a*) An extension to the Controls Engineering School.
(*b*) The Electrical Training School.
(*c*) A new Mechanics Initial Training School to house Part II Training, displaced by the expansion of the Machinery Group.
(*d*) The wardroom expansion and modernization.
(*e*) A new building for the Admiralty Interview Board.
(*f*) Centralized car parking.
(*g*) The necessary supporting infrastructure of roads and services, including a district heating system.

The third and future phase stretching into the 1990s encompasses a physical and recreational training centre, an administration block, a senior rates' mess and accommodation and an extension to Rutherford Block to house Trident training.

Management Organization

As in 1981, H.M.S. *Sultan*'s primary task still remains clearly defined: to provide career and specialist training for officers and ratings of the Marine Engineering Branch. The basic management organization is also little changed and has coped well with the major expansion that has taken place over the last three years, both in the size of the training task and in the facilities provided to carry it out. The size of the Training Department has grown as necessary to cope with the major increase in trainee numbers and the upper management organization of the Department is now as shown in FIG. 8.

The Director of Training is responsible to the Captain for all training undertaken in *Sultan*. To help in the task he has four Training Commanders accountable to him, each of whom has responsibility for two or more Training Groups. Individual Training Groups are headed by lieutenant-commanders, the size of a typical group being of the order of 6 officers, 2 warrant officers and 60 senior ratings. Overall, the Training Department is some 94 officers, 17 warrant officers, 300 senior and 130 junior ratings strong, and deals with a throughput of some 10 000 trainees a year.

The picture of the *Sultan* of the mid 80s is of an establishment that is in the midst of a major £50m re-development programme which is well on course for completion in the early 1990s as scheduled. The Establishment

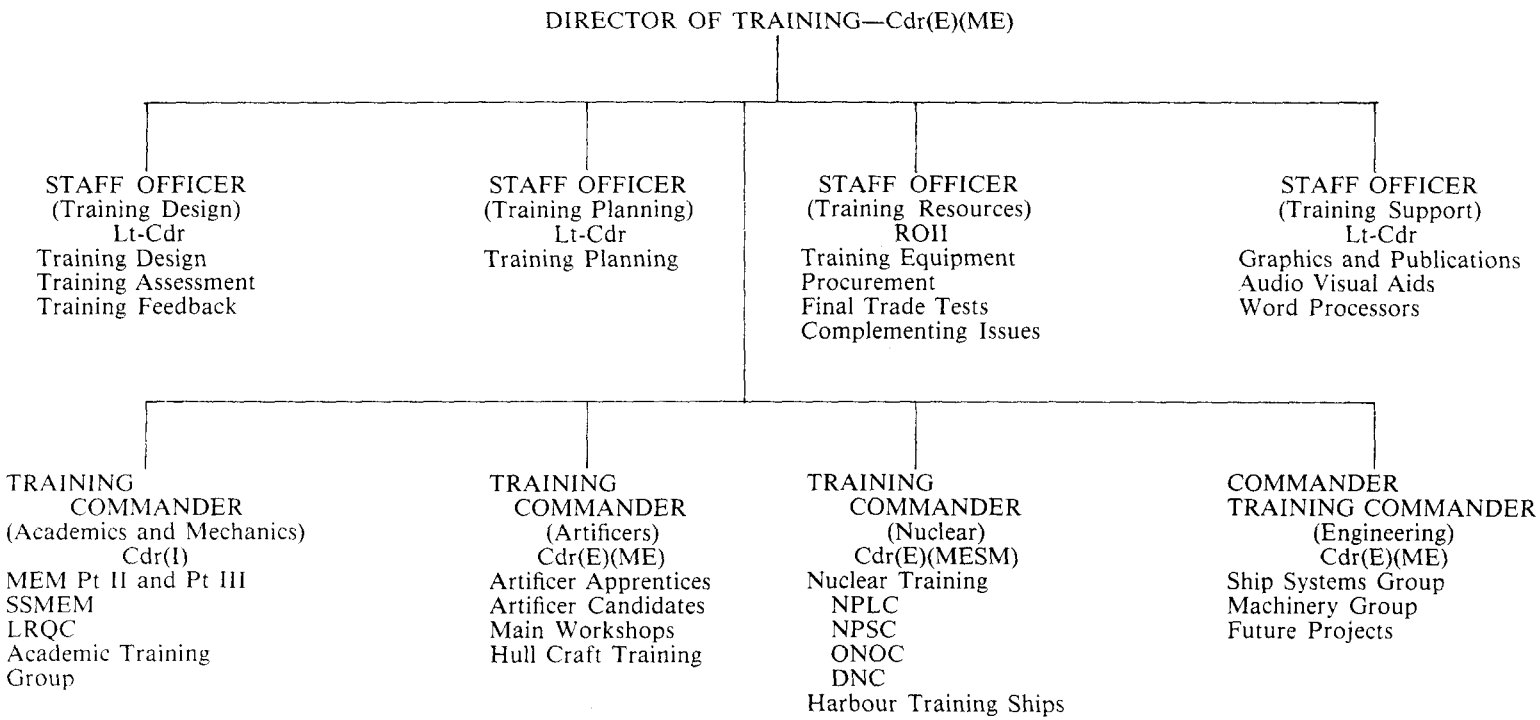

FIG. 8—H.M.S. 'SULTAN': TRAINING DEPARTMENT ORGANIZATION

has grown as it has successfully assimilated artificer apprentice training and all the signs are that by mid 1987 transfer of electrical training from H.M.S. *Collingwood* will also have been successfully achieved. New equipment and facilities have given *Sultan* the capability to offer training in the advanced technology of the ships of the future. Ten years ago not many would have thought that in the mid 80s we would be training Marine Engineering ratings in digital electronics and micro-processor techniques. Both *Sultan* and the Branch are on the threshold of an exciting new era and one in which it will be vitally important that the Alma Mater of the Marine Engineering Branch continues to pay as much attention to forming the character of the man as it does to the advances in technology.

References

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3. Davis, J., Thomas, R., and Lockwood, J. R.: Nuclear Long Course 84; *Journal of Naval Engineering*, vol. 29, no. 1, June 1985, pp. 180 – 186.