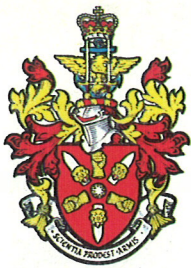


WASC 1997

RARE News
Autumn 1990
incl article
on N_2O_5 Nitrogen
Pentoxide



RARDE ^{MRS Kemp}News

ROYAL ARMAMENT RESEARCH AND DEVELOPMENT ESTABLISHMENT
HOUSE JOURNAL © 1990

Autumn Issue No. 2



The Old Main Gate at RARDE, Chertsey.

It's good to know that there is life out there! I enjoyed reading your letters, nice and not so nice, and was greatly heartened by the contributions sent for future issues of RARDE News. For those interested, DRA News will always be on Page 7.

Many thanks to all who made the effort to contribute. If you are not in this issue, do not despair, there will be more opportunities in the future.

I am now building up my network of reporters and would be pleased to hear from anyone else who is interested — it involves very little work, so phone me at the Fort on x2299.

As you can see, Chertsey is the

front page feature this season and I intend all our sites to receive the same attention in future editions.

For those of you who wondered, the following are the members of the RARDE News Editorial Board:

David Packer — Secretary
Tony Sheward for DD(A)
Andrew Macbeth for DD(V)
Richard Johns for CE
Brian Bestley for NITU
Steve Brooker for ITU
Elaine Morrison — Editor
Andy Allison — Asst Editor.

All the representatives would be pleased to hear your views and opinions on each issue.

Copy deadline 15 October

Elaine Morrison

In This Issue:

- Royal Tank Regiment
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- PUS Visit
- Profile
- N₂O₅
- DRA News
- Chertsey Conservation
- Margaret Newton Award
- RATS III
- Package Management
- RARDE Sports Day

THE ROYAL TANK REGIMENT

From material provided by
Captain Geoff Orchestron-Findlay

"The first tank lumbered 'galumphant' into action at dawn on September 15, 1916. 'Look here!' said the weary soldiers in the trenches. 'Have you heard about the tanks?' At last the men had found themselves able to laugh in exultation at life which had been a story of misery and death in a land of mud and machine guns. Warfare had taken a new turn; the British had something new — armoured cars that could climb trees."

The 1st World War saw the advent of the tank and the Tank Regiment received its name by Royal Warrant in 1928. The RTR were the first soldiers to train on and use tanks in open warfare. They wear distinctive black berets and black coveralls (the rest wear green) which stem from the various forms of protective clothing required for the extremely dirty and dangerous environment in early tanks.

The RTR is part of the Royal Armoured Corps and provides 4 regiments of tanks. The 1st, 3rd and 4th RTR are stationed in Germany with the 2nd in the UK as a training regiment.

They are all equipped with main battle tanks. Each regiment has small indicators to indicate which number he belongs to.

1st — red lanyards, no shoulder board flashes, this regiment recruits mainly in the N.E.

2nd — saffron lanyards, saffron stripe with RTR colours on the shoulder board flashes, recruitment in London and the Home Counties.

3rd — green lanyards, green stripe on black shoulder board flashes, this regiment recruits in the West Country.

4th — blue lanyards and shoulder board flashes with recruitment in Scotland and the Borders.

The Royal Tank Regiment provides 60% of the officers (including the C.O., 2 1/2 Colonels, the Adjutant, 2 of 4 Trials officers) and 35% of the soldiers at RARDE Kircudbright.



Heavy traffic on Old Polhill earlier this century.

SIR SETON STEUART CRICHTON MITCHELL

by Mike Short — GS1

Sir Steuart Mitchell who died in March this year aged 87, served at Fort Halstead in the period 1945-1951, firstly as a Commander RN and later as a well respected Superintendent of Armament Design Department (ADE). To these appointments he brought a wealth of user experience together with an excellent technical knowledge of armaments and guns in particular.

His earlier Service career was spent at sea serving in a number of ships between the wars. He qualified as a gunnery specialist in 1929 and subsequently was appointed gunnery officer on HMS Comus and HMS Frobisher. The start of the second world war saw him as Admiralty Inspecting Officer at the Oerlikon works in Zurich. After many deliberations, the Navy had decided to purchase the 20mm Oerlikon

cannon as a light anti aircraft weapon. However when France had fallen in June 1940, only 100 guns had been supplied out of a total order for 1500.

The situation was saved by Cdr Mitchell who gathered up all drawings and available gun parts and made his way to England via the Middle East. This enabled the gun to be manufactured under licence and it continued to be used by the Navy until it was superseded by more sophisticated cannon only in the last few years.

On leaving ADE, Cdr Mitchell became Controller Guided Weapons and then Controller ROFs moving in 1959 to the Ministry of Aviation before retiring from public service in 1962. Cdr Mitchell was appointed KBE in 1954. In later life he served as chairman or board member in a number of organisations and was a director of Parkinson Cowan and Plessey Numerical Controls Ltd.



Sir Steuart Mitchell.

RARDE POLICY BOARD



DD(V), Secretary, DD(A), Director and Chief Engineer.

1. CHAIRMAN — Dr Roger Warren, Director.

2. Mr Colin Oxlee, Deputy Director (Armament) based at Fort Halstead and responsible largely for operations at the Fort and Waltham Abbey.

3. Mr Julian Walker, Deputy Director (Vehicles) based at Chertsey and responsible largely for operations at Chertsey, Christchurch and Kirkcudbright.

4. Mr Brian Thompson, Chief Engineer based at Fort Halstead and

responsible for the provision of engineering and all other technical support services at all RARDE sites.

5. Mr David Packer, Establishment Secretary based at Fort Halstead and responsible, in the main for Finance and General Administration, including Personnel for the whole of RARDE.

6. Dr Geoffrey Burrell, Head of Electronic, Optical and Chemical Techniques Group. Special appointment to the RPB to mastermind the RARDE Business Plans for the DRA, (not pictured).

PUS VISITS RARDE

by Nigel Eves

Sir Michael Quinlan, Permanent Under Secretary for the Ministry of Defence, arrived at Fort Halstead on June 15 and was welcomed to RARDE by Dr Warren. The Fort Halstead members of the RARDE Management Board then joined the visitors for an informal discussion, then it was off to EC Group and the Forensic Labs to see the extensive range of facilities and work undertaken in this area.

Departing the Fort at midday, the visitors and Dr Warren arrived at Barrowhills Mess, Chertsey for lunch and an opportunity to chat to the Chertsey Members of the RMB and RARDE's Senior Military Staff. A tour of Chertsey's test track facility and their unique Robotic and Climatic labs then followed.

Concluding his visit at 5 o'clock, Sir Michael thanked Dr Warren and his staff for a most fascinating and informative day and wished RARDE every success for its future in the forthcoming DRA.

FOX CUB

by Steve Fuller — GS2



'Rusty' the fox cub.

During early April, a fox cub appeared from the woods adjoining the R32 range area. As GS2 are unable to recruit new staff at the moment, the cub was escorted back to the woods. Undeterred, the cub repeatedly returned and before long was dining on milk and catfood. There was no sign of the mother but the cub appeared to be happy to disappear for days at a time and rarely looked underfed.

After a week or two 'Rusty' moved into a spacious cable duct outside the range instrumentation room. From here he would poke out his nose and survey the area before attacking a pile of food

QUIZ

The following questions from Alan Bowley, GS2, require a number as an answer. Added up the numbers reveal a date significant in RARDE history.

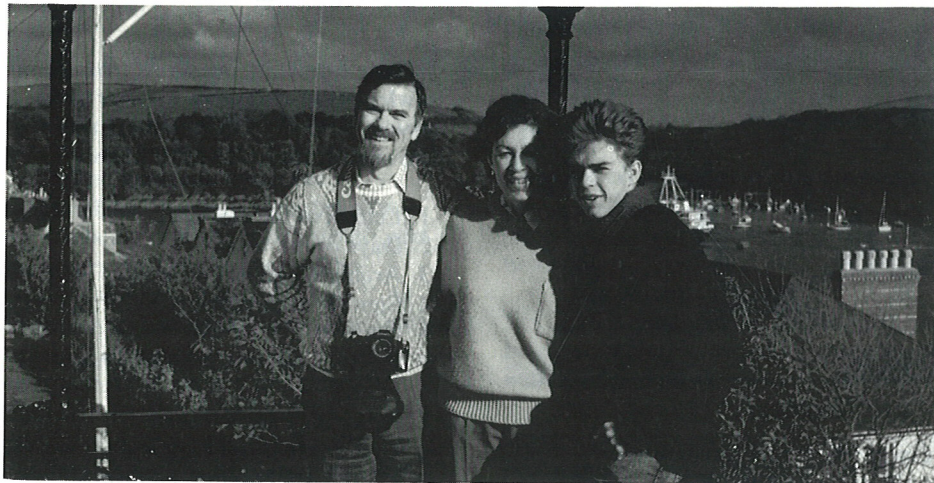
- Letters of the alphabet.
- Days of the week
- Arabian Nights.
- Signs of the Zodiac.
- Cards in a deck with jokers.
- Degrees fahrenheit at which waters freeze.
- Holes on a Golf Course.
- Degrees in a right angle.
- Pounds for passing 'GO' in monopoly.
- Sides on a fifty pence piece.
- Square root of 81 minus square root of 36.
- Quarts in a Gallon.
- Hours in a day.
- Wheels on a Uni-cycle.
- Heinz varieties.
- Length of a cricket pitch divided by 2.
- Days in February in a leap year.
- Number of Wise Virgins.
- Trombones in the Big Parade.
- Soldiers commanded by a Centurian.
- Degrees on a compass between N.W. and S.E.
- Number of days Jesus spent in the wilderness.
- Inches in 305 millimetres.

Answers on Page 11.

or paddling in a bowl of milk.

During May, a few range staff thought the cub must be suffering from a split personality when one day two cubs were seen together. It was obvious that we had been feeding both cubs for some time without realising our error.

Eventually, one of the cubs, found looking rather poorly, was taken to a sanctuary where he unfortunately died the same night. Although the other cub no longer lives in the cable ducting he has been seen recently strutting through the area and looks to be in a healthy condition.



Colin Oxlee, Robyn and Simon.

Colin Oxlee was born in July 1935 in North Finchley. His parents moved to Ramsgate, Kent in early 1939 and were living close to the famous RAF base, Manston, when World War II was declared. Colin recalls as a young boy the excitement of aerial battles between British and German planes in the area close to his home and on one occasion being in his garden when it was strafed by an enemy aircraft.

In 1954 Colin joined the Appleby-Frodingham Steel Co at Scunthorpe, Lincs as a Senior Technical Apprentice. Whilst in Lincolnshire he played for the Men's County Hockey Team and in the men's doubles tennis team.

In 1956 he went to Nottingham University, reading Metallurgy and gaining his Bachelor's and Master's Degrees in 1954 and 1961. Whilst at university he continued playing hockey for the University and Nottinghamshire. He also met his wife Robyn, a secretary in the city and great follower of the University Jazz and Skiffle Group which Colin ran. They married in 1960.

On leaving University, Colin joined RARDE (then ARDE) in March 1961, in M2 Branch (now AA1 Division) as Scientific Officer and stayed in that area making Principal Scientific Officer in 1969. In 1971 he joined Dr Penley, Chief Scientist Army and Deputy Controller, as his Personal Staff Officer. These years also saw the birth of his two children, Sarah in 1966 and Simon in 1970.

March 1974 saw Colin's return to RARDE as Superintendent EM4 (now AA1). Three and a half years later he transferred to ET1 (now GS3), staying until 1980, when he was assigned to a new Grade 6 post as Assistant Director Universal Project (the CHARM project).

1981 saw Colin's second appointment away from RARDE on promotion as Deputy Director Scientific and Technical Intelligence and in 1984 he became Director Heavy Weapons Project in the MGO organisation remaining until February 1989, when he returned once more to RARDE as DD(A).

Colin still lives 'locally' in Tunbridge Wells with Robyn and Simon, Sarah having flown the nest. Hobbies include tennis, squash and swimming although a recent back injury has tempered activities in the case of the first two. He has an appreciation of most types of music (through tolerance in the household), particularly trad jazz, with an occasional strum on the guitar and his son's keyboards. When he has time Colin also enjoys D.I.Y.

Deputy Director (Vehicles)

Julian Walker was born near Portsmouth in 1936. Studying Mechanical Engineering at Southampton University he gained his BSc (Mech) Eng. He became interested in old cars at university, owning a 1/2 share in a Rolls Royce. He also met Jimmie, a zoology student, whom he married in 1960, 2 years after they graduated.

Following a Graduate Apprenticeship at Hawker Aircraft, where he worked on the prototype of



Julian Walker and his 1935 Morris 10/4.

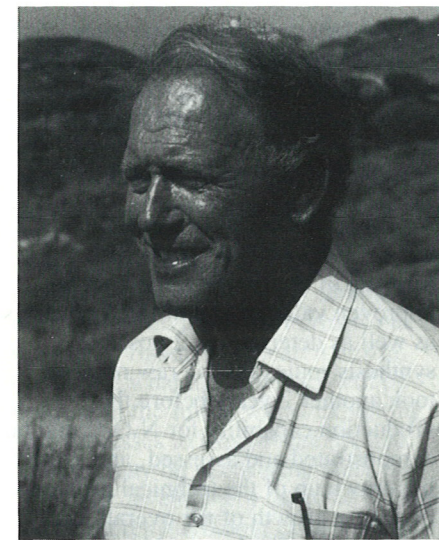
the Harrier jump jet and saw its first flight, Julian came to FVRDE in 1961 as a locally appointed Technical Assistant. Soon after he successfully reapplied as a direct entrant Eng 3 working his way to Grade 5 by 1980.

Julian worked on Chieftain, swimming kits for Saladin and Ferret, a 5 week hot trial in the Trucial States for Big Wheel Ferret, then headed the Logistic vehicles future concept team. 1970 saw him working on the first tank with Chobham Armour, then the abortive Anglo-German collaborative tank project. Briefly working on specialist equipment for N. Ireland, 1974 saw him appointed to lead the project to design and sell tanks to the Shah (Shir I and II). Within 3 months of the Shah signing, 42 development contracts had been let! When the Shah was deposed Julian managed the Shir design conversion to Khalid for Jordan and Challenger for the British Army. In 1980, Head of what is now VS, he had responsibility for all tanks, armoured vehicles and logistic vehicles.

Moving to London in 1984 as D Sci II, which soon became Scientific Adviser (Land), he conducted the independent investigation into the propriety of the procurement of DROPS, a project whose concept he had recommended in the late '60s. Julian moved on to CERN HQ as DER(B) in 1987. Julian Walker returned to RARDE, Chertsey as DD(V) in 1989 and is enjoying the challenge; his previous package management experience is proving invaluable!

Julian and Jimmie's 4 sons — Justin, Tim, Crispin and Hamish — were born between 1962 and 1969. He is an active member of his local church and was Churchwarden for 23 years. Hobbies are design and development of sporting aids for the disabled such as a device called Able Sailer which fits into 17 types of sailing dinghies to aid leg disabled helmsmen; occasional wood turning, metal work and photography; and restoration of the 1935 Morris 10/4 shown in the photograph, which he bought while at University in 1956! He says he doesn't change cars very often.

Chief Engineer



Brian Thompson.

Brian Thompson was born in July 1932 in Sheffield. By 1953 he had gained, by part-time study, an HNC and endorsements in mechanical engineering whilst completing an engineering apprenticeship at Newton Chambers and Co, gas, steel and chemical plant manufacturers.

1950 saw him on National Service with REME on a 14 month electrical engineering course and 5 months in Germany with the 2nd Royal Tanks as Sergeant for maintenance of the Regiment's Centurion tank guns.

Returning to Newton Chambers Brian quickly moved to the National Coal Board as a draughtsman on the refurbishment of coking plants in the NE Division. In 1960 he became an Assistant Design Engineer with the Atomic Energy Authority at Winfrith engaged in research on the heat transfer of PWRs.

Brian entered the Civil Service as an Engineer III through the Open Competition in 1964 at Fort Halstead. He spent 4 years in the Guns Branch helping to develop the swage autofrettage process and to begin the 51mm mortar project, before being promoted into Rocket Systems Branch, working on the research programme which led to the ill-fated RS80 project and later to the successful LAW weapon system.

In 1957 Brian had married Edna, a keen ballroom dancer like himself. Ian was born in 1961 and twins Rachel and Paul in 1971. Brian was elected a Fellow of the Institution of Mechanical Engineers in 1981. He is an active member of the Institution at all levels and in the regional affairs of the Engineering Council. He gained an

Open University honours degree in maths in his spare time.

Promoted to PPTO in 1974 in the Pyrotechnic Branch at Langhurst, he next went on a 6 month course at the NATO Defense College in Rome to study international relations and the politics, economics and military aspects of NATO affairs. The best part of this course, he says, was the 6 weeks tour of NATO countries to see their facilities.

Brian returned to the Pyrotechnics Branch at the Fort for a short time, Langhurst having been closed, before becoming Deputy Development Project Officer for 155mm gun systems. 1979 saw promotion to the Defence Quality Assurance Board Executive in London. In 1983 he transferred to QAD (Ord) Woolwich.

Returning to RARDE in 1986 on promotion, Brian became the first Chief Engineer of the pan RARDE organisation.

Still living in Tunbridge Wells Brian, a keen DIY fan, has designed and built significant additions to the houses and gardens they have owned. He is a keen photographer which fits well with Edna's interest in travel. They both enjoy light classical music, walking and gardening.

Secretary



David Packer, Dorothy, Richard and Graham.

David Packer was born in June 1937 at Gillingham in Kent. He spent 2 years on National Service with the Intelligence Corps, 18 months in Germany near the border at Brunswick.

As a direct entrant EO into the Civil Service, David first worked for the Admiralty at Chatham Dockyard. He met his wife Dorothy through their enjoyment of dancing and married in 1960.

Promoted to HEO in London, David continued working for the Navy in several personnel roles. 4 years later saw him in the embryonic Defence Sales helping create policy and write the rule book as events happened. These heady days ended when David was offered a place on a 9 month course to gain the Management Studies Diploma.

David was promoted to SEO whilst on this course and was a little unhappy to be pulled out at the end of the first term to become a Staff Inspector for the Navy. Trying to complete his management studies at night school, David was again frustrated in 1969 by being offered a post in Washington as part of the newly developing Sales Office.

Packing Dorothy, Richard (born in 1965) and Graham (born in 1967) in to the QE2, David set off for a stimulating 3 years both at work and socially. He and Dorothy were able to indulge in their passion for amateur dramatics. On his return to Britain, David organised exhibitions of military equipment both here and abroad in, for example, Ecuador, Iran, the Far East and Europe. Whilst in situ both he and his post were upgraded to Principal.

In 1979 David moved into project finance for guided weapons such as Rapier and Blowpipe. Turning down an Attache post in Washington, David next went to DG Underwater Weapons at Portland, again in Finance, on promotion at Grade 6. January 1986

saw David Packer at RARDE for the first time and he is now heavily involved with our transition into the DRA.

David and Dorothy have lived in Pembury since their return from the States. Graham has recently made grandparents of David and Dorothy but this does not stop David enjoying jogging and taking part in fun runs. He also sings bass in the Tonbridge Philharmonic Society and is Chairman of the Choral Society.

WHAT IS DINITROGEN PENTOXIDE, AND WHY?



by Greville Bagg NP4

Some 10 years ago a brilliant polymer chemist by the name of Dr Rick Richards conceived a plan for getting his beloved macro-molecules recognised by his explosive orientated colleagues at Waltham Abbey. He would try and build energetic groups into the molecular chain to produce a thermostat rubbery form of explosive. To do this, he would need to find a source of N_2O_5 which should, because of its nitronium ion, be able to nitrate selective groups on chosen organic compounds without damaging their structure.

In 1982, an item of intelligence on possible N_2O_5 synthesis was obtained and forwarded by our man in the US Embassy, a certain Dr Hooper at that time. This proved to be the tool by which his dream became reality but unfortunately too late for Dr Richards who died in 1986 before the work was completed. We dedicate this work to his enthusiasm and in memory of the happy hours spent exchanging N_2O_5 chemistry on the back of many beer mats.

Dinitrogen pentoxide, or N_2O_5 , is a white crystalline solid that will decompose, given half a chance, into lots of brown nitrogen dioxide fumes or pick up moisture to form a very concentrated nitric acid. Also extremely reactive in solution, it eats its way through gloves, skin, plastics or any other organic material it contacts to give a variety of unexpected nitrates. To the chemist, this novel feature provides an exciting mechanism for creating a new range of more useful chemicals, especially in the defence field of energetic materials. To the chemical engineer however, this aggressive property is a bit of a nuisance to say the least, since it makes it difficult both to manufacture and keep uncontaminated in the right place long enough for it to be of any commercial use.

Therein lies the nub of the problem, a chemist's dream and a chemical engineer's nightmare. Here we have a brand new reagent tool to help put theoretical synthesis into practice but only if it can be demonstrated that the N_2O_5 can be made and handled in bulk

at an economic cost. Well, it has taken us over 7 years to do just that and we are now at the point of being the first establishment in the world to drive N_2O_5 into commercial production for the manufacture of the next generation of energetic defence materials, the first new range of energetic polymer and crystalline explosives for 50 years.

Given a quantity of N_2O_5 , it is possible to do everything you can do with nitric acid plus lots more. Not that it would be necessarily desirable to do so because it will always cost more than nitric acid from which it can be made. It is an easy step to deduce that, although its potential as a nitrating agent is largely unexplored, it could also be used to improve upon known reactions involving concentrated nitric acid or mixed acid systems — provided the price is right.



An interesting analogy can be found with the introduction of the ammonia oxidation process for nitric acid circa 1930 stemming from the need to improve explosives production. The 1950's petroleum boom spurred civil industry to take over and start exploiting its real value. The potential usage of N_2O_5 could account for a significant (albeit small) proportion of the apparent 3000 million tonnes production capability of nitric acid manufacturing plant in the UK alone. A bit of optimism easily converts this possibility into probable patent royalties in the next decade.

Research began in earnest in 1982 and by 1985 we had obtained an estimate of the exciting potential but unproven value of end nitrated products as well as determining 2 possible synthesis routes for the raw reagent. It took another 2 years before the production capability for N_2O_5 could be demonstrated and assessed, and a short list drawn up of the technical problems impeding growth of the overall R&R programme. The key problem turned out to be the perennial one of availability of suitable equipment and materials compatible with the very reactive new reagent. We could certainly make N_2O_5 in quantity at a competitive cost but it still leaked through seals on pumps and valves etc to corrode the exterior of plant equipment every few weeks. Most "acid-proof" pumps and valves appear to be held together with corrodible springs and brass nuts!

We then turned to industry for help in developing and exploiting the processes. We found that the only companies willing to engage in expensive development were those whose businesses centred on marketing plant and processes, who were in a position to exploit any new technology at the earliest opportunity. Potential end users, in both defence and civil sectors, considered the project too speculative and could not support the long lead times before profitability.

It took a further 3 years negotiating with various companies before the overall programme took shape. First signing Confidentiality Agreements which allowed us to control the flow and use of valuable information as well as giving us access to their marketing databases. Finally drawing up License Agreements to cover exploitation. This triggered further work and we have since completed most of our patent jigsaw on all the various stages wherein N_2O_5 could be both produced, refined and used according to a variety of different techniques. One process patent on its own is usually fairly weak since the licensee can add improvements during the course of development. But a collection can be stronger than the sum of components since each extends the power of negotiation as the licensee is drawn along the path of commitment.

Now, some 7 years into the project and 3 years into commercial liaison, the companies concerned have verified our original research and demonstration work and have gone public with their marketing of the technology.

It will probably be the full 10 years before the project shows the start of any financial returns on its investment in 1992, and another 5 years before this reagent begins to find wide commercial usage in the civil sector. Perhaps one of the arts of financing research lies in predicting what the customer will be needing in the future whilst exploiting past successes to support the present. Another may be in ensuring there is sufficient development lag before actual profit, thereby avoiding criticism of undertaking 'near market research' with its all too close a connection with privatisation?

Meanwhile our research has just begun, there are more associated processes to demonstrate before commercial licence and development, and even more defence products to make in quantities sufficient for primary evaluation. And if we don't get there first, someone else will!

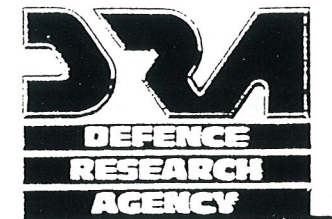
MARGARET NEWTON AWARD

The Margaret Newton Memorial Fund was set up to commemorate the life of a Staff Training Officer who died tragically in the 1974 Paris DC10 air disaster. Money was collected from friends and colleagues in affectionate remembrance of Margaret Newton. The awards are made annually to those RARDE (FH) students pursuing approved courses of study in recognition of academic achievements.

Recipients of the 1990 award of £40 each were Kim Simpson, an ASO in EC3, Jeremy Helm, a SO in EC1 and Neil Cole, a PTO in AA4. These 3 were chosen from a wide field of high academic achievement in 1988/89. All 3 attend college for one day a week.

Kim works in the forensic area involving specialised analytical work; Jeremy works in the detection technology field and Neil works in the tandem warheads area and has contributed to new warhead options.

DRA NEWS



The Personnel Director (DRA) and DUS (CM) have now agreed a package of personnel management flexibilities which have been delegated to CE (Des) and Andrew Ward, his Personnel Director. The Chief Executive now has authority, within certain limits, to deal directly with the Treasury on pay matters (instead of with the MOD); to vary starting pay on entry for new recruits, to undertake local recruitment into the DES/DSG/Executive grades, offering relocation expenses in certain cases; and CE (Des) will now be represented on certain central committees in HM Treasury. CE (Des) also has powers to complement posts up to and including Grade 6.

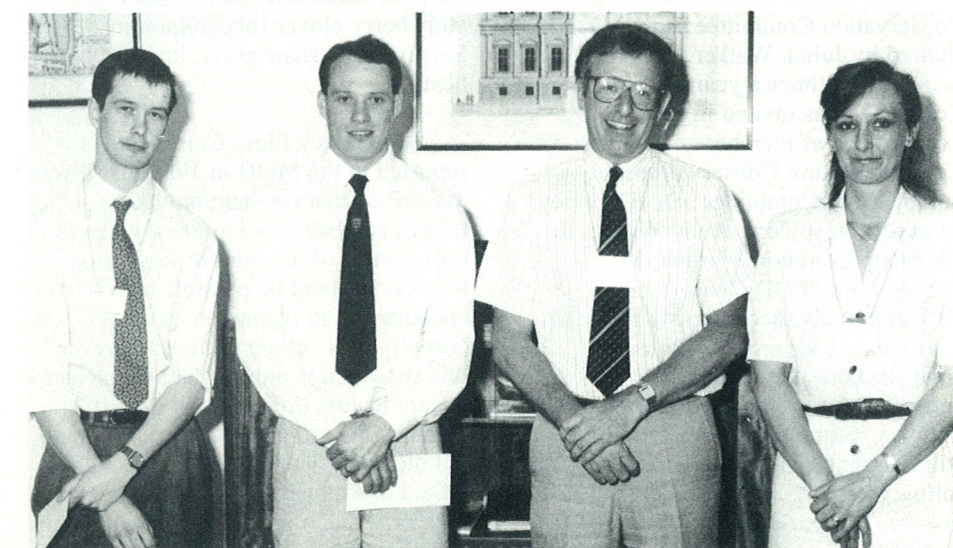
These powers will remain within DRA (HQ) until such time as a suitable structure exists within Research Establishments (RE) to accept them. Work continues to sort out what the structure should look like in each RE. We are hopeful that some delegation to REs will soon be made. The delegations mark the start of the process which will continue over the coming year of handing over to CE the responsibilities for the personnel management of staff which it will be appropriate for the DRA to assume and exercise from April 1991.

A Personnel Working Group has been in existence since last summer examining the implications of the formation of the DRA for RE staff, and trying to ensure that their interests are safeguarded. Working Group 10 (Civilian Personnel Management) has now produced its report, and this is being examined by the DRA's personnel

staff. What is already clear is that the MOD will clearly be relying heavily on DRA establishments to continue to provide staff on loan (particularly Scientists), and they in turn wish to loan staff to DRA for career development purposes. This clearly illustrates the strong links with MOD which will remain after Vesting Day.

As you already know, it is intended to base DRA (HQ) at Pyestock. The building is pleasant and blessed with large numbers of rabbits and squirrels (tamer than RARDE's) who observe the occupants of the building with some curiosity. It is difficult to foresee what they will make of the DRA staff who are supposed to be moving in around the end of August. The author of this particular paragraph — who wishes to remain anonymous for obvious reasons — has considerable doubts whether this will be achieved. The accommodation is in an even worse state than that at St. George's Court. The toilets at the HQ building at Pyestock now contain no pans or sinks, for example!

Much work is also being carried out into establishing what services MOD provides at present and how these should be provided in future. These include things like RAE's aircraft, Air Warrants, forms, Pay Services, Security etc. The full list is mind boggling, and future issues will keep staff informed of progress. All will in future, of course, have to be paid for.



Jeremy Helm, Neil Cole, Roger Warren and Kim Simpson.

WILD LIFE AT CHERTSEY

by Mike Adams — C E Dept.

Serious thoughts on conservation started at Chertsey in May 1983 when the Trade Union side (through the Personnel Manager Mr R James) brought to the notice of PSA their responsibilities under the Wildlife and Countryside Act. This included the necessity to protect the rarer wild flora that we knew of at the Chertsey site, especially the orchids.



Bee Orchid.

From this developed the Conservation Committee, now officially chaired by Julian Walker, which meets two or three times a year. The Committee has invited in several experts such as members of the Surrey Trust for Nature Conservation: the Surrey Flora Committee; Dr E Livesey, an expert on spiders; Andy Wragg, the Chobham Common Warden; Mr Claydon, the MOD Conservation Officer and his successor Mr Baker to advise us (as we are only keen amateurs) on such things as grass cutting where orchids grow. Although they are getting a little better, we are still struggling to educate contractors to follow the correct procedures for instance in clearing the cut grass and cutting back even more on the use of herbicides.



Common Spotted Orchid, Heath Spotted Orchid.

A small part of the Chertsey site is included in the Chobham Common Site of Special Scientific Interest (SSSI). The Common has long been known as an area of outstanding botanical and faunal interest. RARDE's small area clearly reflects this, containing such plants as the Southern Marsh orchid, Bee orchid, Heath Spotted orchid, Broad-leaved Helleborine and the very rare Deptford pink. The Chertsey site has, in addition, a wide range of grasses, sedges and other flora e.g. strawberry clover (uncommon in Surrey), silverhair grass, ling and bell heather.

The Surrey Flora Committee reported to the MOD in 1988 that it was astonished that rare autumn ladies tresses had been able to grow given the coarse state of the present vegetation but that it would be possible to encourage it to regenerate given a correct grass cutting policy. However this specimen is only 4 inches high and we are having difficulty locating it amongst the tall grass, hopefully it has not died out. The report also noted that a field of Ragged Robin had been lost under the site of a new road, fortunately our photographers were able to record it for posterity.



Autumn Ladies Tresses.

Working with Site Services, the Conservation Committee has pushed for the clearance of rubbish from the site and the improvement and creation of wildlife areas. Contractors have planted trees, shrubs and meadow mix grasses. A new wildlife pond has been created off Churchill Road opposite the Sir David Cardwell building. Unfortunately



Ragged Robin.

a stickleback has already appeared which will eat the frogspawn; can I therefore take this opportunity to ask people not to stock it with fish as we wish to encourage the more uncommon frogs and toads.

Fourteen blue tit nesting boxes have been placed in locations around the site and there is an 80% usage each year. Four bat boxes were placed in trees around the balancing pond off Lower Road but they have not yet been used. The pond has had mallards nesting on the man made island in the middle (not shown in the photo) and moorhens have nested and brought up chicks. We regularly see sand martins nesting in the wall that goes under Lower Road, also spotted nesting in the same wall last year was the yellow wagtail.

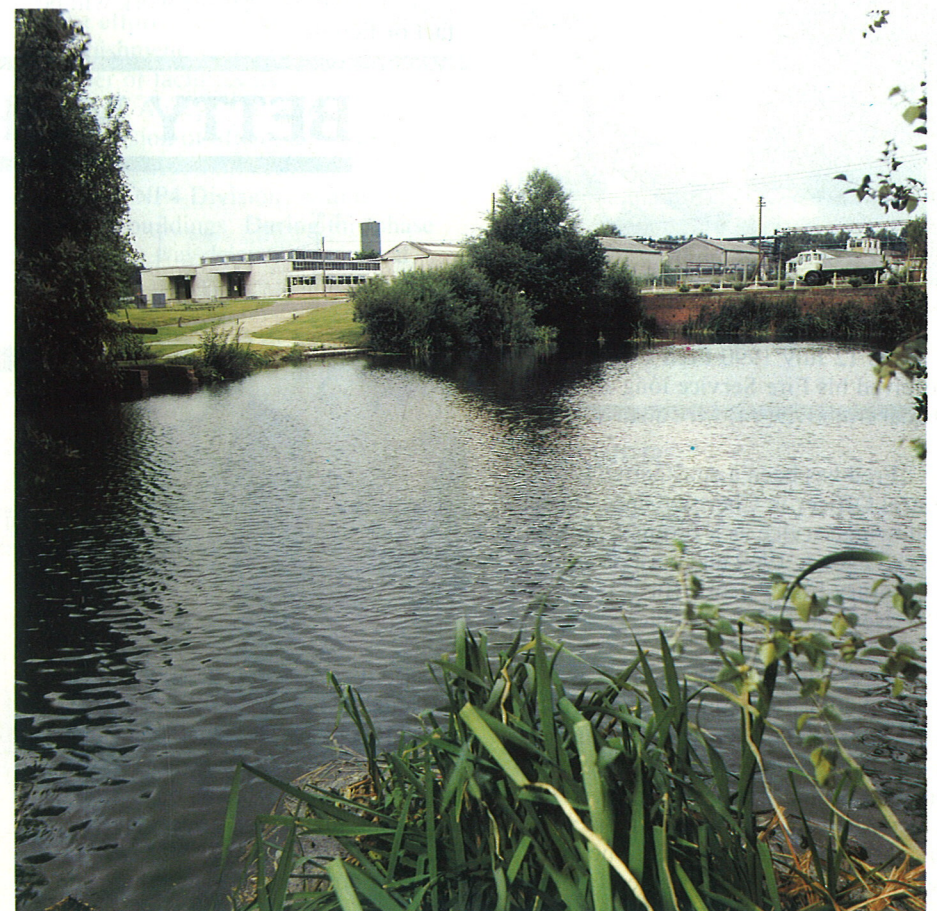
Although the Surrey Committee Report states that the pond is too polluted with oil to contain any life, newts have managed to live there. If we could eliminate the pollution we would see an increase in the pond wildlife, especially the dragon flies which used to be more common at Chertsey.

Other reptiles on site include adders, grass snakes, smooth snakes, common frogs, common toads and the rare sand lizard. A spider count in the autumn of 1988 recorded 20 varieties



Pollution in the Balancing pond.

The Surrey Botanical Report concluded "When one considers that the area is largely roads, office blocks and works and that any open ground remaining has been disturbed there is a surprising amount of botanical interest, consisting of species native to the area, introduced chalk plants and established garden escapees".



Pond with nesting wall at the far end.

MEDALS

by Lesley Shellard



Douglas Smith and Alan Clark, Minister (DP).

Douglas Smith was honoured with the British Empire Medal in May. It was presented by the Minister for Defence Procurement in a ceremony at Admiralty House.



Fred Chaplin and Julian Walker.

On 12 July 1990 Fred Chaplin received his Fire Service long service medal from DD(V), Mr Julian Walker.

Fred has been a substantive Fire Patrol Officer in Chertsey since 1987, following service as a Fireman with us since October 1969 and periods as a temporary Fire Patrol Officer in both Chertsey and P & EE Inchterf.

He is currently also serving as a Local Authority retained Fireman in Crowthorne. This has involved him in many calls to fires over the years, and in 1983 he and a colleague rescued an elderly housebound woman from a fire in which she had been overcome by smoke. The woman recovered from the effects of the smoke and burns and still lives in Crowthorne.

Douglas has worked his way from Messenger at RARDE Langhurst to P&GS 'C' in NP3 at Fort Halstead. His citation states that his reputation for reliability, quality and adherence to timescale is renowned.

Doug has intimated from time to time that he is writing a book on pyrotechnics. However no one has seen any evidence of a manuscript, hence it is not known whether the work will be fact or fiction!

BETTY MORRIS GOES



Betty Morris surrounded by colleagues, friends and presents.

Betty Morris, the Director's Personal Secretary, retired at the end of June. Her career at RARDE spanned over 20 years, 14 of which were spent in the typing pool and amongst the Divisions. In 1986 she became 'Queen Bee' for Director Tom McLean, working next for Chris Baynham and



Leslie and Dawn Bowen.

Leslie Bowen received his Imperial Service Medal from Dr Warren in recognition of some 42 years service. Leslie began his career in the Civil Service as a Fireman and ended it as an Experimental Worker.

He has witnessed many changes at Fort Halstead as it grew to accommodate some 7,000 workers but in the '60s many were moved to Aldermaston. He remembers when A13 was the Medical Centre and the main part of A13 as the two cottages where the Nursing Sisters lived. Leslie has now retired with his wife Dawn and is enjoying gardening, golfing and walking in the country.

lastly Roger Warren. In her time in the Director's outer office, Betty has seen not only Directors but Secretaries of State come and go.

She will now have more time to devote to looking after her parents and dogs and indulging, with her husband, in caravanning abroad, gardening, reading and listening to music.

MOD in the MUD

by Tony Roll – CE Dept.

Work on site commenced soon after with priority being given to the work associated with the transfer of IW4 Division from Westcott. This work involved the complete refurbishment of building N3 to provide offices, laboratories and a computer room. In addition an area on which to position trials equipment, trailers and laboratory vans was required which was constructed to the north of building N3. This element of work was successfully completed in May 1989 and the transfer of plant and equipment followed in June.



Building A10 before . . .

With the completion of the Westcott move efforts were concentrated on the refurbishment work associated with the transfer of facilities from the sites at Waltham Abbey. The work consisted of the provision of office, laboratory and workshop accommodation for NP1, NP2 and NP4 Divisions within 10 separate buildings. During this phase the project was delayed for several months by unforeseen problems, including the discovery of asbestos whilst the re-roofing of building A10 was in progress, and with the need for

There cannot be anyone, staff or visitor, to the site at Fort Halstead who has not been affected by the mud and mayhem created by building contractors who have been apparently hell bent on reshaping the establishment over the last eighteen months.

Their exploits have occasionally deposited mud on roads, torn up footpaths, sealed off car parks and generally made life difficult for permanent staff and visitors alike, but hopefully some overall benefit will accrue to the establishment by the time the contractors have concluded their efforts and normality returns.

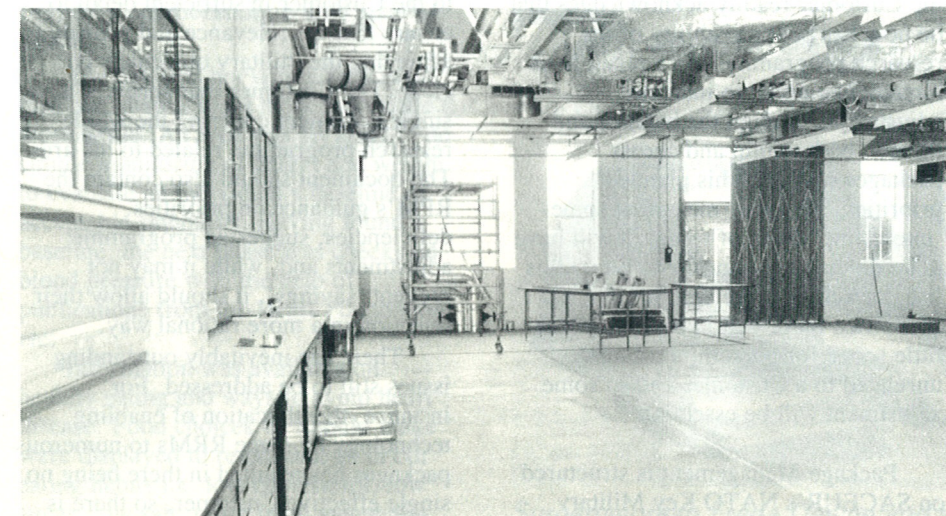
The reasons behind the reshaping of the Fort Halstead site are the joint needs to contain financial expenditure and maximise the efficient use of MOD resources, which has resulted in a project to rationalise some of the units currently under the RARDE banner by assembling them on a suitably reshaped Fort Halstead site, enabling sites at Westcott and Waltham Abbey to be vacated.

It was originally envisaged that all facilities operating on these sites could be relocated to refurbished accommodation at Fort Halstead. However, as proposals were developed, it became clear that in some cases it was impractical to do this due to the limitations inherent in existing structures and so the final design brief contained a combination of both new buildings and refurbishment works for which separate contracts were let.

The initial stage of the project was to vacate existing buildings at Fort Halstead involved in the refurbishment contract, which necessitated a degree of rationalisation within existing groups.

The refurbishment contract comprising work within 11 separate buildings was placed by the Property Services Agency on 7th November 1988 on the local firm R Durnell & Son.

. . . and after.



stringent safety procedures associated with its safe removal. Also some protracted negotiations were undertaken with English Heritage to obtain authorization to proceed with the required refurbishment of the Old Fort, which is listed as an Ancient Monument. Completion of the various buildings was achieved between February and July 1990.

Whilst the refurbishment element of the project was in full swing designs for the new buildings were being finalised and an 80 week Design Development Construct (DDC) contract was let to Alfred McAlpine Construction Ltd. Six new buildings are being constructed at various locations around the site together with a complex of storage magazines adjacent to the West Gate.

The new buildings, on target for scheduled completion in the spring of 1991, will provide accommodation of 5,000 square metres for NP2, NP4 and EC4 (ISRD) Divisions.

The final stage in the project will be the relocation of plant and equipment from Waltham Abbey at which time the staff will transfer to Fort Halstead. It is anticipated that the new facilities provided on the Fort Halstead site will enable RARDE to make an enhanced contribution to future research programmes.

ANSWERS

1.	26	2.	7
3.	1001	4.	12
5.	54	6.	32
7.	18	8.	90
9.	200	10.	7
11.	3	12.	4
13.	24	14.	1
15.	57	16.	11
17.	29	18.	7
19.	76	20.	100
21.	180	22.	40
23.	12		

= 1991 The day RARDE becomes part of the Defence Research Agency.

WHY PACKAGE MANAGEMENT?

by John Filby — S/MS

If Package Management is the answer then it was a very silly question is the polite version of an often expressed opinion. So what was the question? In essence it was how best can the research programme be presented to the Military Customer to maximise its visibility, thus improve his understanding of its importance and hence obtain his support in the annual programme reviews.

Often he resigned en route and passed the problem to a junior officer! This led to comments by RALs that the Customer was inadequately represented at their review. It is hardly surprising that the relevance hence priority of the many facets of the research programme to a particular military capability were not fully appreciated and vigorously defended against shrinking budgets.

Functions. These are closely reflected in the responsibilities of the individual Land Systems Operational Requirements staff who are the principal Customers for the RARDE research programme. The Research Package Customers produce statements of their requirements in terms of military capabilities (research objectives) along with a statement of the rationale behind the requirements and an outline of their equipment procurement plans.

Within the Establishment a Research Package Manager (RPM) has been appointed for each RARDE led package and he has sought, like a Prime Contractor, inputs into his Package from RRM's at non-Nuclear Establishments. The onus has been on the RRM's to determine which Package provides the most appropriate coverage for their research and to seek the relevant RPM's agreement, possibly through other co-ordinating RRM's.

This means that some RARDE resources have bid into Packages led by RPM's on other Establishments. The

Package Management provides the opportunity to improve the situation.

No doubt many believe that they already have the support of their immediate Customer; he visits fairly frequently, listens attentively, agrees with the programme and joins in a pub lunch. However, when 'Savings' are discussed this same Customer fails to protect the programme and endorses an apparently arbitrary selection of cuts.

Unfortunately, while the friendly Customer may support individual pieces of research, their position and priority in the jigsaw of his overall military capability responsibilities is all too often unclear. He therefore has difficulty in giving a considered quantified response to the enthusiastic sales talk or in defending the programme in terms of its military significance within the review process.

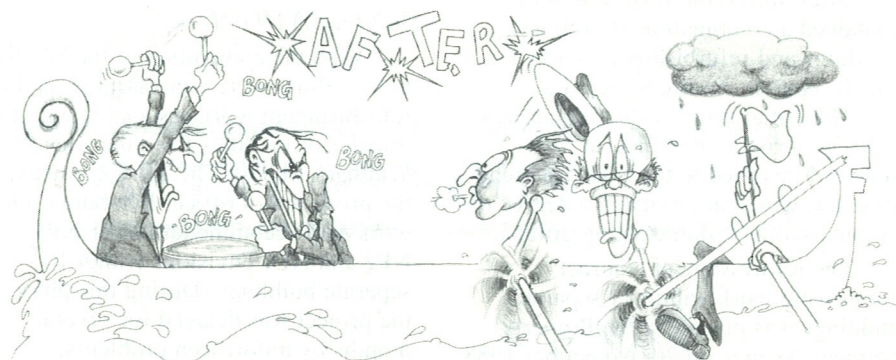
The cartoon serves to highlight the different perspectives of the Establishment Research Resource Manager (RRM) and the Land Systems Headquarters Customer. The Customer would certainly recognise the lower scenario but with the roles reversed. Before Package Management the Customer heard a cacophony of research drumbeats which he had to filter to find those relevant to him. This necessitated scrutiny, at Work Item level, of the Annual Reports of up to 4 Establishments and attendance at as many as 10 Research Area Leader's Reviews (RAL).

In spite of these outstanding issues the Customer readily acknowledges that he now has better visibility of the research programme. As a result he is already beginning to indicate adjustments to align the balance and thrusts, both within and across packages, to match his planned priorities. This may mean that some 'interesting' areas of research will have to be deferred or cancelled. While this is unattractive to the individuals concerned there will in future be very little scope for pursuing research unrelated to a Customer and so some adjustment will be essential.

Package Management is structured on SACEUR's NATO Key Military

RPM has to collate the programme, based on the RRM inputs, and present it to the Customer in sufficient detail to ensure that the relevance and priority to achieving the military objectives is clear. The Customer thus receives a single document covering the whole research programme related to his area. The document should also contain the RPM's guidance on priorities, deficiencies, suggested programme adjustments and, while it may not prevent 'savings', it should allow their selection in a more rational way.

There are inevitably outstanding issues still to be addressed. For instance, the allocation of enabling technology by some RRM's to numerous packages has resulted in there being no single effective Customer, so there is



the risk of no co-ordinated support in any debate on programme priorities. The mechanism for achieving increased support for Technology Demonstration has to be resolved and the interface with and transfer between the strategic research programme, Category 5, and the medium term applied research programme must be established.

The need for Package Management has come into sharper focus by the planned introduction of the DRA and the even tauter Customer-Supplier relationship that this will demand. It is not my purpose here to consider the implications of the DRA but it is obvious that a full understanding by the Customer of the military relevance of the individual thrusts of the research programme will be essential. In return, Package Management will expose the Customer's medium and long-term equipment procurement strategy thus giving the opportunity for the DRA to plan its research programme to coincide more accurately with the Customers' needs. This should reduce the current problem of mature research seeking unplanned support for the follow-on technology demonstration or project application.

Broadly 60% of the RARDE programme is included within Package Management. It is therefore in the best interests of all that we make it a success.

PROTECT YOUR HEART

by Sister Patsy Pyne

The Occupational Health Service at Fort Halstead marked the MOD-wide campaign with an Open Day featuring an exhibition highlighting the 5 main risk factors in causing heart disease. The aim was to make people more aware of their own fitness and thereby prevent a deterioration in their state of health.

The day was hot with a very good turn out, thanks to all those who made it worthwhile. An area was set apart to do simple monitoring of height and weight to evaluate an individual's baseline of acceptable standards. Having found a baseline, the next phase was checks on blood pressure with the help of publications from the Heart Foundation etc.

Information was available on healthy eating and ways to avoid heart disease. Food choices we should make were displayed to re-educate us in our eating habits i.e. low cholesterol, low sugar, low salt, more fresh vegetables

APPRENTICE PRIZE DAY AT FORT HALSTEAD



A sunny day in April saw the apprentices at Fort Halstead receiving their awards and Certificates of Apprenticeship from Nigel Hughes, Chief Executive (Designate) of the DRA.

The following did especially well:
1st Year — 1st prize Mechanical — Gregory Roughley
1st prize Electronic — Yvonne Hatzer
2nd Year —
1st prize Mechanical — Stephen Holden
1st prize Electronic — Gregory Webb
3rd Year —
1st prize Mechanical — Stephen Paull

4th Year — 1st prize Mechanical Technician — Mark Bass
Apprentice of the Year — Julian Brown
Skilled Trade Union Award — Stephen Avis
J S Broughton Trade Lad Award — Gregory Roughley
The Charles Friend Design Technology Award — Sandra Inchley.

Gordon Williams, the Apprentice Supervisor, was given a present from the apprentices as he was moving on to another post.

and fruit, and pulses which are high in fibre.

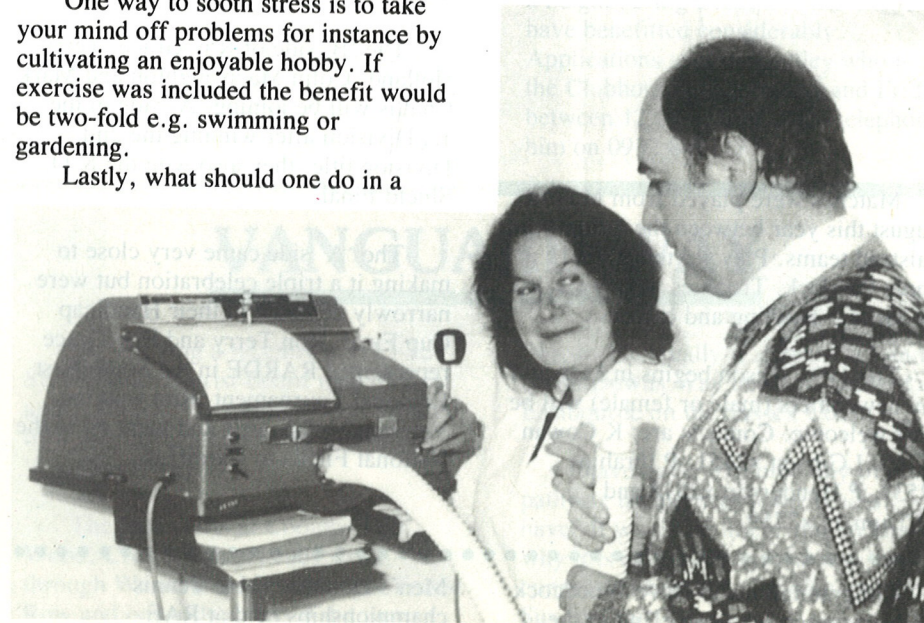
National No Smoking Day was incorporated into the programme and Lung Function tests done as this is a contributory factor in heart disease. Sensible drinking limits were covered to raise awareness (men — 21 units, women — 14 units; 1 unit = e.g. ½ pint of beer).

One way to sooth stress is to take your mind off problems for instance by cultivating an enjoyable hobby. If exercise was included the benefit would be two-fold e.g. swimming or gardening.

Lastly, what should one do in a

cardiac emergency? The very latest video from the Heart Foundation, "Don't Just Stand There", was in good use throughout the day.

As a spin off from the Campaign, we completed health screenings, by appointment, consisting of a questionnaire and simple monitoring to see if there was any cause for referral to the individual's own G.P.



Surgerywoman Freda Devine and victim.

SPORTS AND SOCIAL

24 HOURS NON-STOP SNOOKER

by Lesley Shellard & Dean Clark



Steve Grace, Robert Braddon, Justin Colley, Ian Bateup, John Carman, Dean Clark and Ian Linsdell (Jim Curtis not pictured).

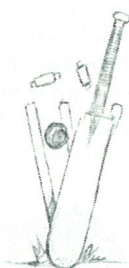
The last days of May saw eight 'volunteers' wandering to N14 Social Club for a few short frames of snooker. What they didn't know was that those 'few short frames' were to last 24 hours!

Starting well, each member was enthusiastic to gain points but as day turned to night the pace slowed as eyelids drooped and legs began to ache. Early morning saw the pain barrier broken and the pace hotting until the

target of 48 frames was completed with 10 minutes to spare.

'Neighbours Offering a Home' and 'Pegasus', the charities benefitting from approximately £500 sponsor money raised, sent people to cheer the team on. Sadly the amount raised is less than the £800 given last year. Thanks to Judith Stapleton and Wendy Brooks for their support and, most importantly, for providing sustenance.

CRICKET CLUB (FH) Evening League



Matches were played from May to August this year between the 4 Fort Halstead teams. Play started at 17.15 at Knole Paddock. Trophies were awarded for batting, bowling and catches.

The 1991 season begins in May and any newcomers (male or female) will be most welcome. Contacts are: K Cowan x2765, I Gibson x2451, P Ibrahim x2537, P Henderson x2818 and I Chapman x2759.

Congratulations to Dave Woodcock at Christchurch who came 2nd in the

TABLE TENNIS (FH) by Roy Grace

The players, past and present, would like to thank Peter Henderson for all his efforts and help in running our club. Peter retires later on this year but will still play in and run our 'C' side. Good luck in your retirement Peter.

The 'B' side of Roy Grace, Terry Holland, Colin MacNaughton and Mark Challis will be joining 'A' side in the 1st Division after winning the 2nd Division title; they also won the K.O. Shield Final.

The 'A' side came very close to making it a triple celebration but were narrowly defeated in their Handicap Cup Final. Ron Terry and Roy Grace represented RARDE in the South East Regional Tournament. Ron won the Veterans singles title and went on to the National Finals in Cardiff.

Men's Doubles Table Tennis championships held at RAE Farnborough in April.

GOLF SOCIETY (FH) by John Sullivan

This year our season began in April with the traditional Maundy Thursday event over 18 holes for the Canadian Club Cup. It was won by Nigel Eves, Chris Higgins and Chris Allman coming 2nd and 3rd. The draws were also made for the John Edwards Match Play Salver and team Knockout competitions. They have run through the summer and should be nearing completion now.

Our second meeting was held at Brombe Park G. C. after the late Bank Holiday. Peter Haskins won the Greenway Scratch Bowl, Dexter Murgatroyd the Handicap Cup and Jim Queay the Novice Cup. The Greensome competition was won by Chris Allman and John Sullivan.

The Hinton Cup Match took place at Dartford between Aquila G.S., Royal Arsenal G.S., Woolwich Garrison G.S. and ourselves and was won by Woolwich.

A new competition was organised in June this year against Barrow Hills Golf Club at Chertsey. Teams of eight competed and the overall score was a draw. Many thanks to all who participated and especially the Chertsey people for their hospitality. We hope to return the compliment this year.

Dates for the future

- 11 September — CSSC SE Team Event.
- 9 October — 3 Iron Team Trophy at Dale Hill.
- 23 October — Civilian v Military at Woodlands.

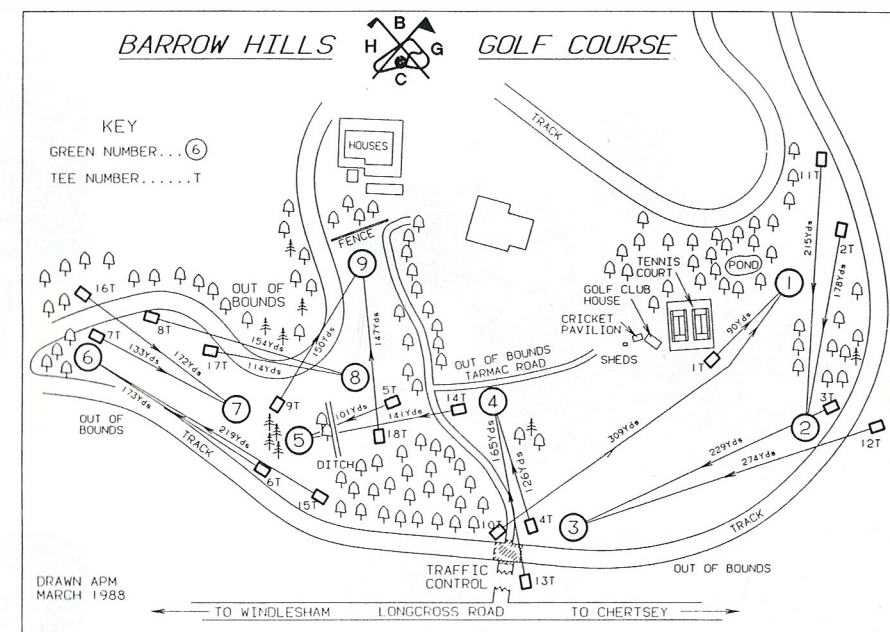


Site Services can handle anything!

Pete Phillips made an arresting sight at his surprise 21st (again) birthday celebration. When approached by a young WPC and requested to remove his car as it was causing an obstruction, he discovered that the strong arm of the law is not always what it seems.

BARROW HILLS GOLF CLUB

by John Emms — DD(V)'s Staff



The Chertsey Golf Club has its own course built within the Longcross Test Track area which forms part of the main Chertsey site. The course has 9 greens but there are 18 tees. Some of the distances from tee to green are significantly different which adds variety and interest for the player. Although the course is small, the scenery is very pleasant and if you are unfortunate enough to hit a ball on to the Test Track you can watch it bouncing along merrily for many hundreds of yards. Regrettably the Test Track and the ground beyond is out of bounds, however some of us (author included) have been known to have luck on our side and have bounced back into play to the accompaniment of scornful remarks of our opponents.

The late Sir David Cardwell, Director in 1969, kindly allowed the sportsfield and adjoining area for the course, provided it would be available to all staff at Chertsey. Building on preliminary work by Major Geoffrey Mason, teams of volunteers began construction of the course. We had very little by way of funds, in fact nothing at all, and so we had to resort to digging our way into it with a little ingenuity to procure extras like sand (is that what it was — more like concrete) which appeared from an Army range.

We opened for business on 30 May 1970; our President made the usual complimentary comments of which the most memorable were that in over 30 years of soldiering he had not seen such co-operation between military and civilians. He also noted that it was the only project that he had known that had been completed on time and within budget. Our membership started at about 70 and this has increased steadily over the years and today stands at more

than 300 civilians and military personnel and their families.

We have just celebrated our 20th anniversary, marking it with a fun day with lots of events for all the family including a barbecue at which a cake iced in green and incorporating the club logo was cut; the birthday cake was prepared by the soldiers of the Catering Corps at Longcross Barracks. The day was rounded off by our Captain Lt Col Peter Morling scoring a 'hole-in-one' at the 4th to resounding cheers and a rush of orders at the bar!

This seems to reflect Peter Morling's progress as Club Captain, only one day after election the team won handsomely against the Arborfield Golfing Society and so far, including a halved match versus Fort Halstead Golfing Society in June, we remain unbeaten this season.

On the competition front we are getting a good response from members for our Club competitions which are held about every other Sunday with an

occasional Saturday game, and our dozen or so matches versus other clubs are always popular.

Our big problem at the moment is lack of rain which has affected all golf courses in the south east and this has led to some marked deterioration in the condition of the course. We are meeting the challenge by improving our sprinkler system but, as I write, it being Ascot week, it is as usual raining.

The first issue of the RARDE News unearthed some new members who had been at Chertsey some little time but were not aware of our existence, if there are any budding golfers out there we are pleased to welcome new members, be they novices or experts. During the summer we hold weekly group lessons with a professional from a neighbouring Club, all who attended have benefitted considerably. Applications to Ron Routley who is at the Clubhouse on Tuesdays and Fridays between 12.00 and 14.00 or telephone him on 0932 848117.

KEEP FIT SOCIETY (FH)



Keep Fit classes are held on Tuesday and Thursday lunchtimes at 12.30 — not as stated in the last edition. Please also note that anyone wishing to use the canteen for any other activities at these times should contact EO/Admin on x2072.

VANGUARD WAY

On studying a recently purchased SE England Tourist Board map of Kent and E Sussex, my curiosity was aroused by a long distance footpath marked as 'Vanguard Way'.

The path starts at Coombe Hill Wood, Croydon then heads south through Westerham, Edenbridge, Forest Row and onwards across Ashdown

Forest. Eventually it appears to join the South Downs Way between Seaford and Eastbourne on the Sussex Coast.

I have never explored any of this pathway but perhaps some readers have? It would be interesting to know why it is called 'Vanguard Way' and its connection between Croydon and the Sussex Coast?

Peter Marshall GS1 x2725

RARDE SPORTS DAY

by Andy Allison



Ministry of Defence Police Dog Display



Display by the Domackwai Judo Club.



Fancy Dress Competition won by Nicola Morris (far left).



Winners of the Cead Cup (Tug of War) were VT.



Puma Helicopter from RAF Odiham, Hants.



Women's sack race won by J Morris.



Pyrotechnics Division representing RARDE at Knockholt Carnival in July, supported by the RARDE Fire brigade.