

HARLEQUIN



ISSUE NO 53 · ONE SHILLING · SUMMER 1966

CARTER BROS.

AERE POST OFFICE STORES

ROW 259

Wide Selection of Groceries
FAST SERVICE

ROW 391

Wines, Spirits, Cyders,
Bottled Beers

At your Service...

AND READY FOR YOUR

Holidays...

CLOTHES TO MAKE

YOU FEEL AT HOME

ANYWHERE...

E. H. BEESLEY

HIGH STREET
TEL..... 33 ABINGDON

LADIES' & GENTLEMEN'S CLOTHIERS

SCHOOLWEAR SPECIALISTS

Bally

of England

joyce

Church's

K
SHOES

Aristoc

Airborne

Shoes by
famous makers
carefully fitted and repaired
by Skilled Staff

BAILEYS

of Abingdon

6 Bath Street, Abingdon
233 Banbury Rd., Oxford
Market Place, Wantage

HARLEQUIN

Vol. XXI

SUMMER 1966

No. 2 (55)

Leisure Magazine of the United Kingdom Atomic Energy Research Group
and Associated Organisations

in this issue

Editor

D. A. TYLER

Sales Manager

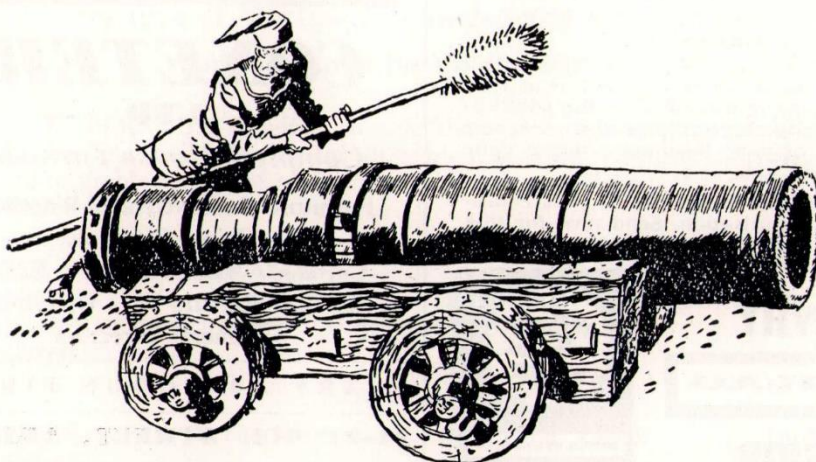
J. DALEY

Treasurer

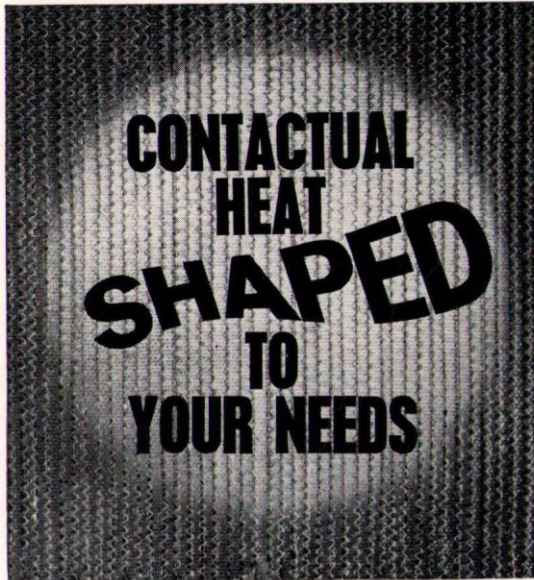
D. A. FRIEND

DR. R. B. JACOBI

Pakistan — Land of Contrasts	-	-	12
A.E.R.E. Photographic Exhibition	-	-	16
Royal Regiment of Artillery	-	-	20
Story of the Harwell Water Tower	-	-	25
View from the Top	-	-	26
Chastleton House	-	-	28
Pub Sign Cricket	-	-	30
Local Industry	-	-	32
Man and Scientist	-	-	34
Over the Top	-	-	45
Twenty Years' Service	-	-	50



The Royal Regiment of Artillery this year celebrates its 250th birthday. Our article of tribute on page 20 describes the bombard, the original wrought iron gun of which a famous example is seen above. This is Mons Meg, now in Edinburgh Castle, and believed to have been forged at Mons in 1461-83. It has a 20in. bore and fired a 330lb. stone shot. According to an old record, Mons Meg discharged with 105 lbs. of powder well rammed in the chamber, and set at an angle of 45°, could project an iron ball 1,408 yards or a stone one 2,876 yards.



STABILAG HEATING EQUIPMENT

Safe, concise, economical. Jacketed electrical contact heat up to 1,000°C. In moulded shapes or tapes. Outdates all other methods for any heating process, distillation or viscous material flow. Simple to install. Utterly reliable with minimal maintenance. Transfer efficiency of 85%.

CAN YOU USE IT?

Stabilag specialise in solving complex heat transfer problems. Stabilag Research is at your disposal. The cost is fractional — the possibilities immense. Stabilag equipment can transfer the economics of your business — bring your plant truly up-to-date.

See why STABILAG is superior . . . the equipment and the organisation, Send now for this informative literature, quoting publication reference Number P.100.

SEE WHY

STABILAG

IS SUPERIOR . . .

Send now for this informative Literature

STABILAG ENGINEERING LIMITED
Mark Road, Hemel Hemstead, Hertfordshire.
Telephone: BOXmoor 4481-2.



L 'TYE'

SCHOOL of MOTORING



MINISTRY OF TRANSPORT APPROVED.
MEMBERS OF THE INSTITUTE OF
ADVANCED MOTORISTS.

79 BROADWAY - DIDCOT
Tel. DIDCOT 2957



COXETERS LTD.

Complete House Furnishers

Furniture Removed and Warehoused
China, Glass, etc.

Curtains Loose Covers & Carpets
Cabinet Repairs Upholsterers
Funeral Directors

TRY ABINGDON FIRST

21-27 OCK STREET, ABINGDON

Telephone: Abingdon 47 & 547

*We are pleased to arrange
Hire Purchase facilities*

Established 1836

CAR HIRE PURCHASE

WITH TAX RELIEF

As a result of our tax relief scheme we are now able to reduce our SPECIAL HIRE PURCHASE TERMS for members of the U.K.A.E.A. by one third.

For full details of deposit, rates, etc., complete and return coupon opposite.

SHAWLANDS SECURITIES LTD.

London House, 3 New London St., London E.C.3.

Tel. Royal 0457/9

Please send me details of H.P. on Motor Vehicles for Members of U.K.A.E.A.

Name

Address

(Block Letters please)

H.

FRIZZELL'S

THE FIRST NAME

you think of for all forms of

LIFE ASSURANCE and HOME LOANS

Public School Fees available for this term or later

Every type of Mortgage arranged and we still have

limited funds for up to 100% Loans

Mr. J. W. BERRY the Reading Branch Manager or his assistant visits site every Wednesday and appointments for discussion of your Mortgage, Savings or Life Assurance problem may be made through the General Admin. Ext. 3224. Or fill in the coupon below.

PLEASE TICK WHERE APPLICABLE

LIFE ASSURANCE DEFERRED HOUSE PURCHASE
 IMMEDIATE HOUSE PURCHASE SAVINGS
 LIFE ANNUITIES

NAME ADDRESS

OFFICE PHONE..... EXTENSION..... PURCHASE PRICE..... DEPOSIT.....

DATE OF BIRTH..... AGES OF CHILDREN..... SALARY £..... RISING TO £.....

NORMAN FRIZZELL (Life & Pensions) LTD.

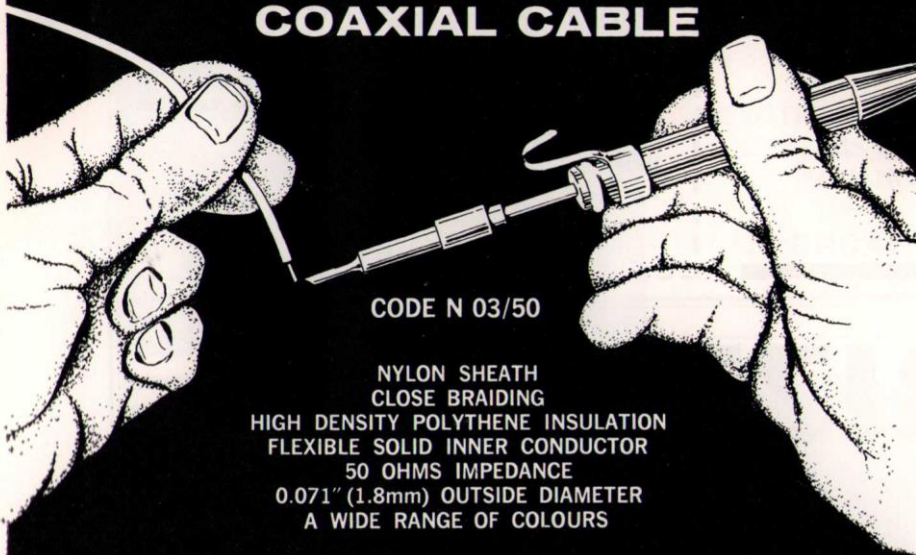
35 STATION ROAD, READING

TELEPHONE READING 53459



TRANSRADIO

FLEXIBLE SUB-MINIATURE COAXIAL CABLE



CODE N 03/50

NYLON SHEATH
CLOSE BRAIDING
HIGH DENSITY POLYTHENE INSULATION
FLEXIBLE SOLID INNER CONDUCTOR
50 OHMS IMPEDANCE
0.071" (1.8mm) OUTSIDE DIAMETER
A WIDE RANGE OF COLOURS



TELEVISION

DELAY LINES

COMPUTERS AND
DATA PROCESSING



RADAR

INSTRUMENTATION



MISSILES AND SATELLITES

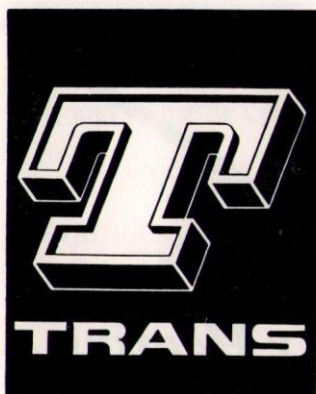
Transradio recommend the use of thin-walled P.T.F.E. Sleeving
for all Transradio Cables with a Polyethylene Dielectric where
soldering presents a problem

Please consult our Technical Service Department
for further information and **FREE SAMPLES**

TRANSRADIO LTD.

183 PARK AVENUE, PARK ROYAL LONDON, N.W.10

ELGar 6281



TRANS RADIO LTD

How to avoid SOLDERING PROBLEMS

Our Sub-Miniature Coaxial Cable N 03/50 and other Transradio Cables with a Polyethylene Dielectric are tough and robust and made from the finest top-grade raw materials.

All Transradio Cables with a Polyethylene Dielectric—in common with other cables of this nature—are vulnerable to excessive temperatures and the minimum heat should be used on soldering operations in order to avoid softening of or damage to the insulation.

Prolonged application of heat during the soldering process tends to soften the Polyethylene Dielectric and can result in a short circuit and we recommend the use of a hot 'Quick' soldering iron, using a small diameter bit.

It has been found that the conventional method of a heat-sink and the use of the most suitable soldering-iron are not effective on particular applications.

Extensive tests have been made by us in order to overcome this soldering problem and we can now recommend the use of Polypenco thin-walled, flexible P.T.F.E. sleeving for applications where prolonged use of heat during soldering cannot be avoided.

This type of P.T.F.E. sleeving has a temperature range of -260°C . to $+260^{\circ}\text{C}$. and is therefore not affected by soldering heat; the sleeving is non-inflammable, non-absorbent and chemically inert to most solvents.

Method Recommended

- (1) Remove outer sheath for a suitable length to expose the braid.
- (2) Push back the braid for a suitable length.
- (3) Thread Polypenco thin-walled, flexible P.T.F.E. sleeving over the Polyethylene Dielectric and under the braid.
- (4) Carry out the required soldering operation.
- (5) Pull the braid over the P.T.F.E. sleeving to complete the screen, taking care that the braid does not short to the inner conductor.





WARMAWALL INSULATIONS LIMITED

- Are your heating costs too high?
- Save at least 20% of your annual Fuel costs by using WARMAWALL cavity wall insulation.
- Suitable for new or existing houses.
- Completed in one day.

Abair Heating

- Individually designed heating systems of all types
- Specialists in Warm Air Systems.

Enquiries and Informative Brochure

**39a OCK STREET
ABINGDON. 1860**



“THE KNOWL”
ABINGDON, BERKS.

The
headquarters of the old-established
INSURANCE BROKING FIRM of
POPE & CO: (Insurance) Ltd.—
a business set in the very heart of
England, with its finger on the pulse
of the London insurance market.

YOU ARE CORDIALLY INVITED TO AVAIL YOURSELF
OF THE FACILITIES PROVIDED
BY OUR LOCAL — AND PERSONAL — INSURANCE SERVICE

Telephone: Abingdon 966 967 & 968 Established 1897

FOR
 JEWELLERY, WATCHES, CLOCKS,
 SILVER, E.P.N.S. and
 STAINLESS STEEL TABLE WARE

Repairs and Engraving Undertaken

FREND & CO. LTD.

NEW SHOPPING PRECINCT
 ABINGDON

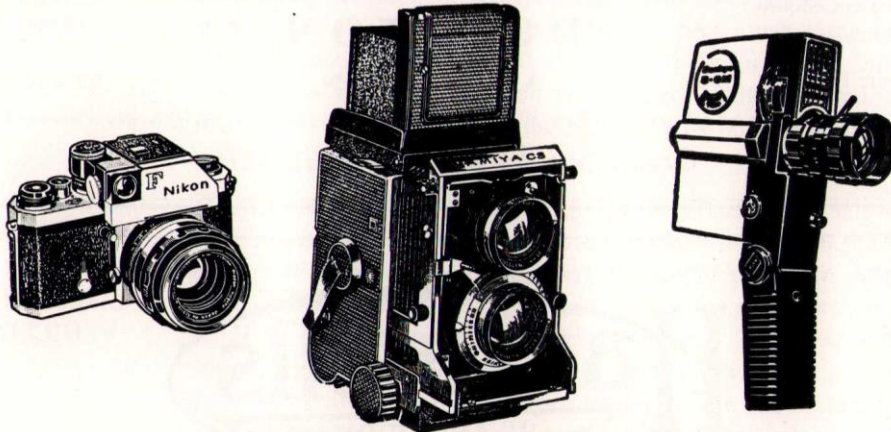
Telephone: Abingdon 3444



It might be thought that Ron Matfield of Research was preparing for an extra wet summer.

A feature on page 45 describes how the one-time life-boat was delivered over the house-top.

The television aerial had been blown down before it arrived. This was providential as the boat would not have passed with it up. Besides, it gave the Matfields two extra channels, so they were not in a hurry to have it replaced!



FOTOKINE

ST. ALDATES

OXFORD

(NEXT TO G.P.O.)

**FOR ALL YOUR PHOTOGRAPHIC NEEDS
 PLUS FRIENDLY, KNOWLEDGEABLE SERVICE**

**THE BEST PLACE
FOR YOUR SAVINGS**

IS THE

TRUSTEE SAVINGS BANK

Interest allowed: Ordinary Department—2½% (Tax Free facilities)
Special Department—5¼%

7 MARKET STREET, OXFORD ★ 1 STERT STREET, ABINGDON
BROADWAY CORNER, DIDCOT

*A Representative of the Bank attends at A.E.R.E. (Social Club) each Friday
between 12.30 and 2 p.m. when Savings Bank facilities are provided.*

Between Harwell and Abingdon on the A.34



D. BURT



MOTOR ENGINEER AND BODY SPECIALIST

Battery Charging
Acetylene Welding
Synthetic & Cellulose
Spraying

Spare Parts

**BARTON GARAGE
DRAYTON**

ABINGDON

Cars Bought
Sold or
Exchanged

Tel. Drayton 364

Holiday Caravans to let at Dawlish Warren, Westward Ho and St. Davids Pembrokeshire

Green Shield Stamps on all sales

CARS

Hartwells
OF ABINGDON LTD

COMMERCIAL
VEHICLES

THE VINEYARD

★
AUSTIN — RILEY — VANDEN PLAS — DEALERS
★

We offer the finest selection of Used Cars,
and endeavour to give personal service in each
one of our departments.

Telephone—Abingdon 1831-2-3

SPARES
DEPT.

PERSONAL
SERVICE



EDITORIAL

The value of leisure was appreciated in early times. Aristotle attributed the growth of mathematical sciences in Egypt to the priestly class being allowed the time to think. In the lives of great scientists we find this awareness of the value of leisure.

The biography of Sir Francis Simon, reviewed in this issue, shows no exception. To his father he owed a belief in the value of holidays and travel. As a boy he travelled more than was customary in most families, with winter holidays at the ski centres and summers abroad from his native Germany in countries overseas, including Britain which was later to become the grateful country of his adoption.

Throughout his life Simon believed in the necessity of holidays of sensible length. These he would take regularly, often when he could ill afford them. To have done otherwise would have been a false economy, for it was in the "idle" moments that his best ideas came to him. He always insisted that if original work was to be produced time must be allowed for thinking and for *re-creation*. This essential climate of creative work he regarded as the right of all who were expected to earn their living by their brains.

British industry Simon saw, on the one hand, as claiming that it could not get the right people and, on the other, as niggardly in the holidays it allowed those who were to supply the brain power. "It is seldom realised in industry", he said, "That the surest way of attracting people is by offering them sufficient leisure. This question has two aspects; the first concerns the scientist himself, who can get more out of life if he is able to enjoy proper holidays, like the university man or the civil servant. The second aspect is of more immediate interest to the firms themselves: while good ideas only come to the prepared mind, they generally come during leisure periods".

We can feel grateful that within our organisation the value of leisure is recognised; yet to have it available is not enough. We must keep free of the feverish cult of leisure in which recourse is taken to having other people amuse and distract us. The difference lies in merely killing time or in putting our leisure to use in the developing of our own resources for the future.



PAKISTAN

P. H. JOHNS, *Personnel Dept.*

My three-month attachment to the Pakistan Atomic Energy Commission had been delayed by the outbreak of hostilities between India and Pakistan, and as I landed at Karachi one November morning I wondered how far conditions had returned to normal. However, except for the captured Indian tank being displayed in the centre of the city, there were few signs of the recent war; I found the chief enemy the heat, from which the only refuge was the swimming pool.

Karachi is not a very interesting city and is not typical of the rest of West Pakistan, from which it is separated by several hundred miles of desert. Fortunately only the headquarters offices of P.A.E.C. are at Karachi, and I was not sorry to depart a few days later by P.I.A. Viscount to the slightly cooler, and much more interesting, city of Lahore.

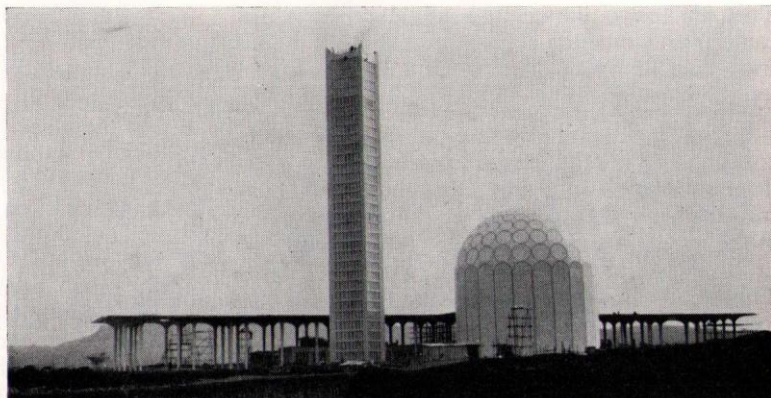
Here the recent war was more evident. Numerous slit trenches had been hastily dug and, as I was unpacking my bag on arrival, the sirens sounded—but it was only a practice blackout. As Indian tanks had approached within 10 miles of the city, the war was the chief topic of conversation and the population were in a revengeful mood.

The Atomic Energy Centre had been operating

four years and I found the staff a friendly lot, keen to show me the city and all aspects of Pakistani culture. The Old City, with its narrow streets and alleyways, is a fascinating place, contrasting with the wide avenues of the modern areas. The traffic is hair-raising in both parts because of the mixture of fast cars, horse tongas not equipped with brakes, and herds of buffaloes. The drivers of the motorised rickshaws seem to have no regard for traffic rules: they weave in and out as small areas of road space become available. The historic buildings of Lahore are very fine, but photography was hazardous due to the state of emergency, and I had one film confiscated, although the only prohibitory notice was in Urdu.

The main recreation is the cinema, and in Lahore these included some fine air-conditioned ones showing American and English films, quite comfortable ones showing Urdu films and less salubrious ones showing Punjabi films. When entering one of the last before the show starts, the noise is deafening from the shouting of the dozen or so sellers of nuts, sweets and the inevitable Coca-Cola. The Punjabi films follow a common pattern and consist of Pakistani songs and dances, impossible fights and comedy scenes, linked together by a slight

A LAND



OF CONTRASTS

1	2
3	

- (1) Food sellers in the old city of Lahore.
- (2) The 5 M.W. Swimming Pool Reactor at Pinstech.
- (3) Wazir Khan Mosque, Lahore.

story. Kissing is not permitted in Punjabi or Urdu films, but American films are shown more or less unabridged and are watched with interest by young girls in purdah.

Although there is some relaxation of purdah amongst the rich and poor, it is still strong amongst the middle classes, and whenever I was invited to a meal at a Pakistani house the womenfolk did not put in an appearance. Stranger still was a Pakistani wedding I attended: the bridegroom was dressed up in all his finery (white suit, embroidered shoes, cap and garlands of flowers) but throughout the day the only glimpse of the womenfolk was

a few heads peeping over the balcony of the bride's house, attempting to get a first glimpse of the bridegroom when he arrived. The bride's father acted for the bride at the actual ceremony and the feast of curried rice was an all-male affair.

After some three weeks at Lahore I moved on to Rawalpindi, a military town which sometimes reminds one of Aldershot. Fifteen miles in one direction, in the shadow of the Murree Hills, the new capital city of Islamabad is rising, and twenty miles in another is PINSTECH (Pakistan Institute of Nuclear Science and Technology) which will be the main centre for atomic research in Pakistan. The latter is still largely in the hands of the contractors, but the 5 MW swimming pool research reactor went critical whilst I was there. The English language newspaper's headline was "Pakistan enters the atomic age", but the Urdu paper announced: "Pakistan can now make an atom bomb"!

The reactor buildings are a clever blend of eastern and modern architecture, but as a contrast earth-moving for building operations is by mule back.

"Pindi" is a good jumping-off place for seeing some of the mountains and I managed to fit in day trips to the Khyber Pass and the nearby hill stations. However, to see something of the more remote areas I decided on a long weekend in Swat, a princely state in the Himalayas. This involved a six-hour journey each way in a local bus. As I was wedged in next to the driver, I saw the near misses with various buffaloes and other livestock at close quarters. After I had held the bus up for fifteen minutes whilst the frontier police checked my entry permit, we ascended the Malakand Pass with its tortuous bends and drops of several thousand feet. I could see the advantage of the driver having three types of horn available to warn all and sundry we were coming, especially when we had to pass through narrow village streets jammed full of people. Swat is a beautiful valley surrounded by snow-capped mountains with a rushing mountain river. The tribesmen all carry rifles, and the roads in the upper valley are really only suitable for jeeps, but each village has a modern school building, and I understand that Swat is the only place in Pakistan where education is free. The return journey to 'Pindi was more adventurous than the outward one as it was made largely in darkness, and tongas and bullock carts carry no lights. The bus advanced at about 60 m.p.h. down the central tarmac strip until a tonga showed up in the headlights. The driver then kept his hand on the horn until the tonga swerved off the tarmac on to the dust strip just in time.

I had to return to Karachi before setting off for Dacca in East Pakistan. Due to the emergency, over-flying of India was banned and the Boeing 720 had therefore to make a six hour flight across the sea, round the tip of India and over Ceylon. East Pakistan is as lush as West Pakistan is arid, and the people are much darker and more Eastern looking and speak a different language, Bengali. Calcutta, the former metropolis of Bengal, went to India at partition and Pakistan is busy expanding the small provincial town of Dacca into a second capital. The Atomic Energy Centre is one of the best modern buildings in the town. The streets are full of cycle rickshaws carrying passengers and pushcarts carrying goods. In fact the general impression was that, whereas

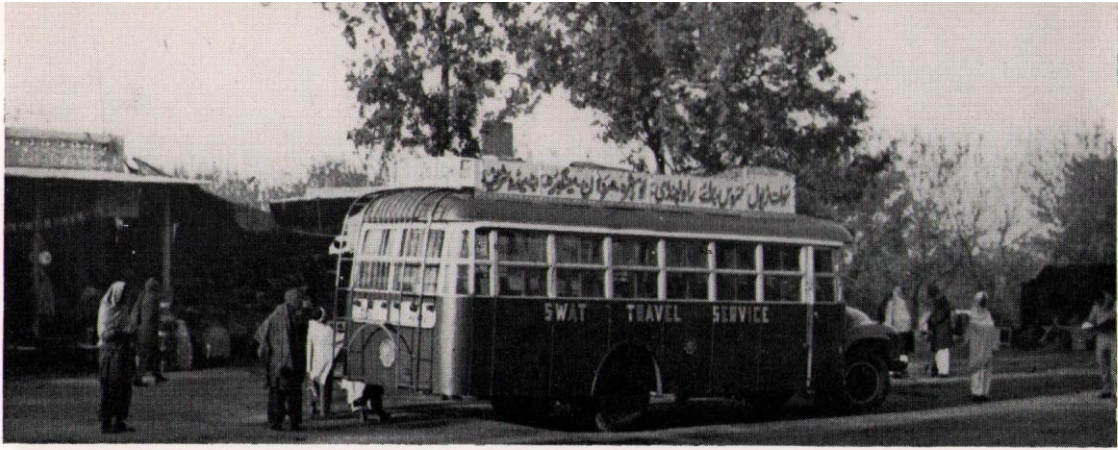
West Pakistan was still largely dependent on animal power, East Pakistan relied still on human muscle.

In my four weeks in Dacca I was determined to use the weekends to see something of East Pakistan. Communications by road are difficult since the many rivers of the Ganges delta have few bridges, but the efficient air services of P.I.A. include many helicopter flights. The low altitude at which these "choppers" fly affords a good view of the country, so I took one to Khulna, some 100 miles away, and returned from there by the "Rocket" steamer. In contrast to the one hour chopper flight, the river steamer took 20 hours, the name *rocket* merely referring to the limitation of ports of call to three. The cabin was comfortable and the food good, and there was plenty to see on the river. Craft ranged from small bamboo-covered boats propelled by oars on the narrower rivers to mighty sailing boats which followed each other down the wider rivers by the dozens. Towards the late afternoon, families could be seen walking along the bank pulling their boats back upstream by means of a rope, sometimes four or five on the line for a larger craft.

I also visited the Chittagong Hill Tracts in the south, near the Burma border. Here at Rangamati is the largest man-made lake in the Indian sub-continent. I was fortunate to meet there a Pakistani holidaymaker who arranged a speed-boat for us on the lake and took me to a Buddhist village, where I sampled their illicit rice wine.

My last trip was to the tea gardens on the Assam border, a ten-hour journey by slow train with the inevitable passengers on the roof: I had to depart from Dacca Station at 5 a.m. and was surprised to find it as busy as Piccadilly Circus. The tea garden managers are 95% Scottish and are very hospitable. The tea estates do the complete job from planting the seed, bringing on the seedlings, pruning and plucking the bushes to processing the leaves in the factory.

So back to Karachi for my last week in Pakistan. Karachi was cooler in February and did not seem such a bad place after all. Time passed quickly writing up my report and saying goodbye to all the friends I had made. Much had changed in the three months I had been in the country. The Tashkent Declaration had been signed and the press had changed its propaganda from war to peace. I hoped they would keep it that way as, if they can, I think the country has a great future.

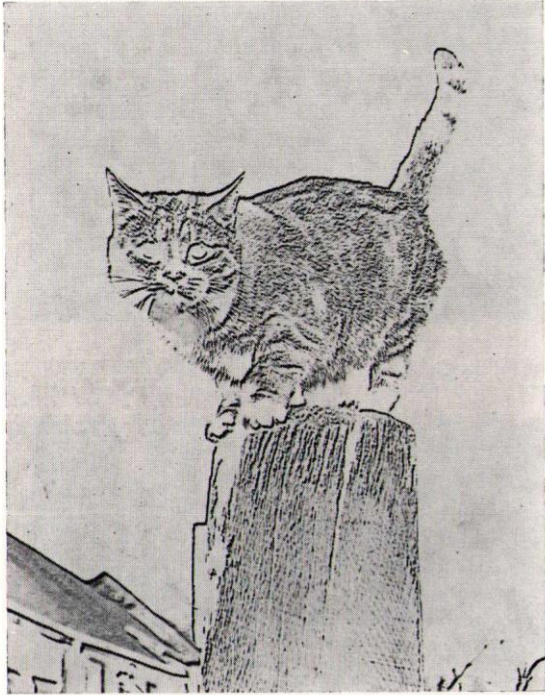


CONTRASTING . . .



. . . MEANS OF TRANSPORT





An entry by P. P. Thomas, *Eng.*

**AERE HARWELL
CAMERA CLUB
8th ANNUAL
PHOTOGRAPHIC
EXHIBITION**

Several well-known names were missing from the 8th Annual Exhibition of A.E.R.E. Camera Club. Although this reduced the number of entries in both black and white and colour sections, it did not detract from the quality which, if anything, was marginally better than in previous years.

The winning entries in the various classes have been dealt with elsewhere and in this note I should like to mention a few of the other prints which, in my opinion, had a great deal to commend them. 'Jill', by C. G. May, the picture of a little girl with the remains of an ice lolly, is a delightful eye-catching print which speaks for itself. Technically it is well executed, and it is rather surprising that it failed to win at least a commendation in the advanced section.

Miss C. A. Fisher usually does well in these competitions, having achieved the hat-trick in the colour section in previous years. Her black and white entries are interesting, particularly the print 'Village in the Valley', which has that well-framed composition so reminiscent of the 'seeing eye'. The print quality is good, and she has obviously made the maximum use of the process to bring out subtleties of light and shade which are essential to this kind of atmosphere subject.



JILL Class A Portrait

C. G. May, *Ceramics.*

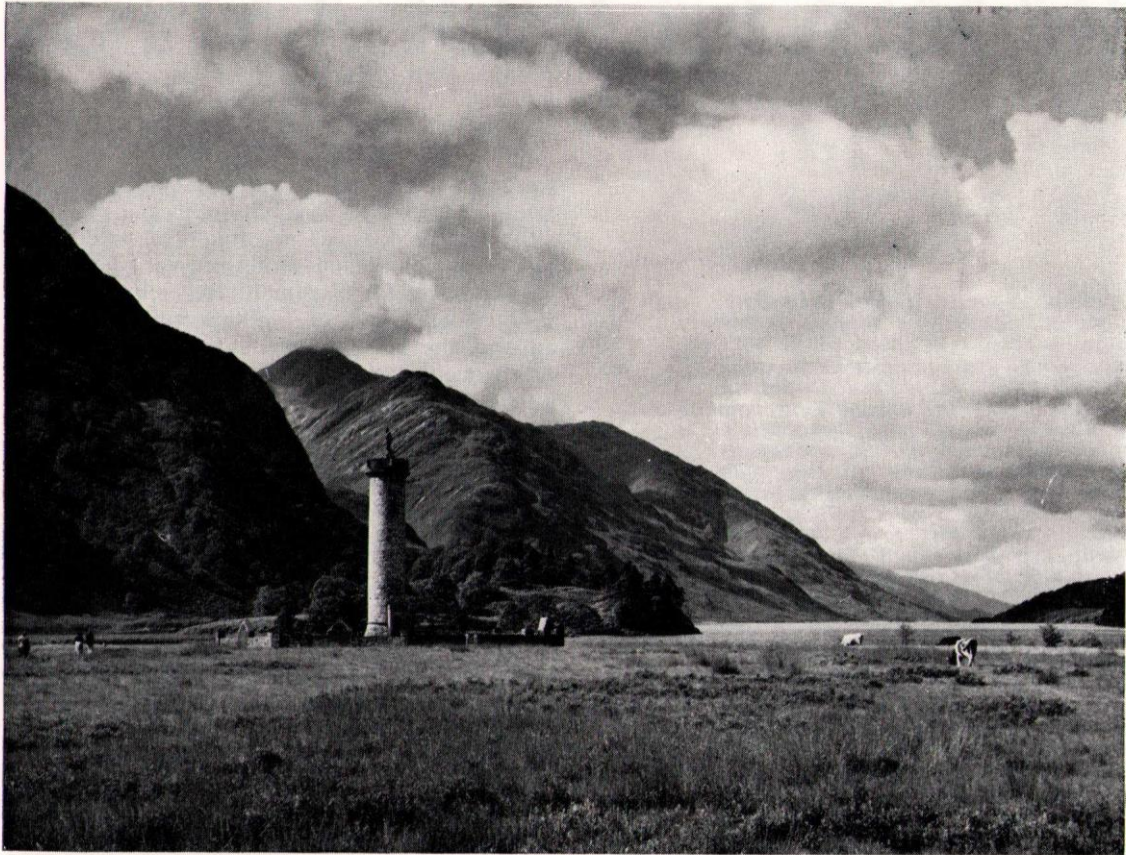


VILLAGE IN A VALLEY

Miss C. A. Fisher, *Risley.*

P. Millward, *Culham Lab*





GLEN FINNAN

H. E. Crooks, *H.P. & M.*

H. E. Crooks, a regular contributor to the exhibition, has this year come up to his usual standard. One of his prints reproduced here is 'Glen Finnan'. This is a spot which I personally know well, so perhaps I am somewhat biased in my choice. Nevertheless, the technical quality is, as usual, of an extremely high order and the composition is classical in its simplicity. Looking at the original print makes one feel the urge to pitch tent for a time and dally in the cool and peaceful stillness of the highland summer.

New ideas and techniques abound for the trying, and P. P. Thomas has clearly been experimenting to find new expression through different media. His attempt to reduce the tonal range to its fundamental black and white is commendable in a subject which I imagine is a mass of middle tones in the original.

Swans are one of my favourite subjects and I can be forgiven for including this print by P. Willward. It is a fine little piece of work of high merit.

In the colour field there is evidence of attempts by several workers to break away from the traditional

approach and find out new techniques which make much more use of a medium in which only the fringe possibilities have been explored. During these experimental periods one is apt to be blinded simply by the conventional end product; the true measure of their success, which should be their intrinsic quality, is often ignored in preference to results that are 'different'.

Symptomatic of this is Miss Fisher's fall from first place after three years of prize taking, but clearly the spark of originality is there and no doubt will crystallize in future entries. N. Wadsworth has produced a fine trio of slides, and 'Boy on the Beach' deserved first place. Among the others which appealed to me were 'Galway Bay' by A. E. Reynolds, 'Water Shapes' by A. C. Fox and 'Deep, Crisp and Even' by D. A. Ogden.

It is a pity that well-known club names like Webb and Boreham are conspicuous by their absence. I shall myself try to have entries in for next year, even if only to avoid the neutrality which results in having to write a report of the exhibition.

ROYAL REGIMENT

ON 26th May, 1716, two companies of the army were formed to specialise in artillery and, although the Royal Regiment of Artillery did not come into being until six years later, the beginnings of the Regiment are reckoned from 1716. It was a logical development; the importance of the gun in warfare had been growing ever since the making of gunpowder in England (attributed to Roger Bacon in 1248). The inventor of the gun is lost in history (the associated name of Berthold Schwarz is certainly legendary), but the earliest representation of a piece of ordnance in this country is in an illuminated ms. (1326) at Christ Church, Oxford. In the drawing, which has no accompanying description, an incendiary arrow is being expelled as a result of a hot iron being applied to the touch-hole.

There is an interesting technical development from this time, through the original wrought iron guns known as bombards (a word derived from bombos, meaning a loud humming noise) to later casting of muzzle-loaded smooth-bore guns firing cast-iron balls. A famous example



A contemporary account of the Battle of Crecy 1346 speaks of the English using bombards "which with fire throw little balls to frighten and destroy horses". There is no doubt that the effect of these guns was purely moral and their destructive power negligible. The illustration above shows a bombard reputed to be one of three used at Crecy.

OF ARTILLERY

BY N. W. WEBSTER

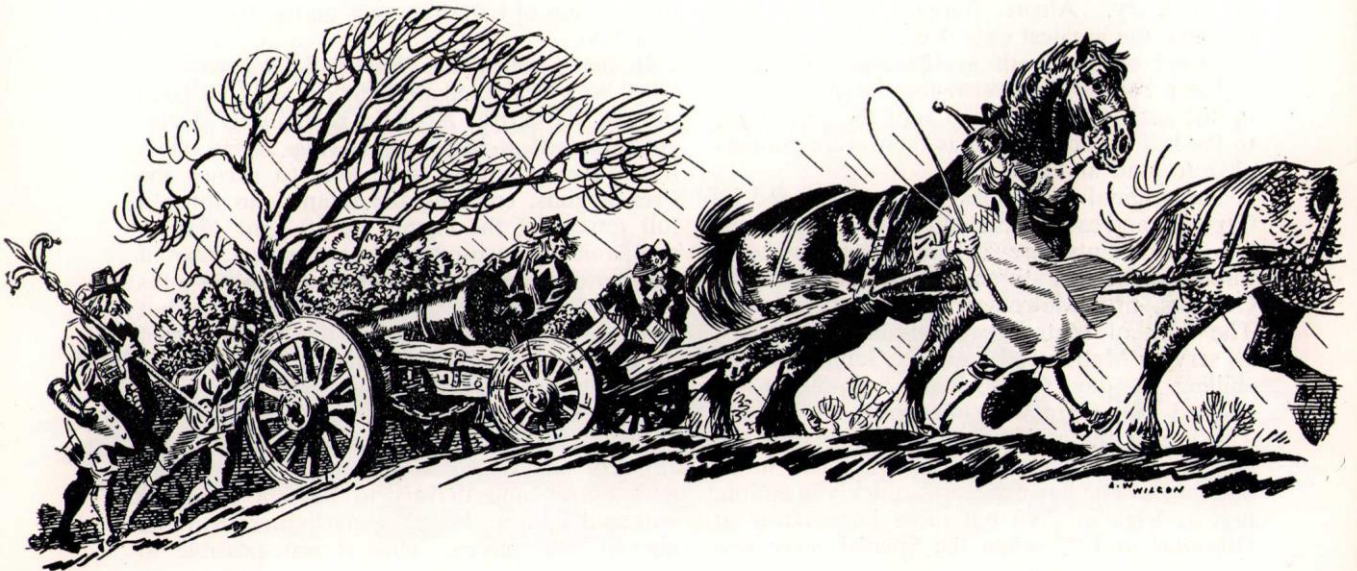
of the bombard is Mons Meg at Edinburgh castle; this piece is believed to have been made at Mons about 1460 and used at the siege of Dumbarton with great effect. With a calibre of $19\frac{1}{2}$ inches it threw a granite ball of 300 lbs. Mons Meg was last fired in 1680 in honour of the Duke of York when she sustained the injury now apparent—a rent which has the advantage of exposing the system of construction. In Tudor times the manufacture of artillery material was carried out at or near the Tower of London. Later the work was transferred to Woolwich Warren, which by 1700 had become of importance as the Royal Arsenal.

In all this time, of course, the effect of artillery was becoming of more importance in battle. Henry V used guns with effect at Harfleur, and they appeared at Crecy as early as 1346. Cromwell early recognised the possibilities of artillery and demonstrated his knowledge at Dunbar (Sept. 1650) where, cooped up by the Scots under Leslie with no line of retreat, the sea at his back and no possibility

*—This year Celebrating its
250th Anniversary*

Artillery as a mobile weapon (illustrated below) was first used by the English in 1704 at the battle of Blenheim—many years after its introduction by Gustavus Adolphus. Late though it was, it might have been delayed still longer had not Marlborough been Master General of Ordnance as well as Captain General at that time. He was never greater than as an artilleryman and took a great personal interest in its affairs. Every gun at Blenheim was laid under his own eye, and his brilliant use of the artillery contributed largely to his success.

“For the other part, the Artillery came out of the war with not less, perhaps with even more, brilliancy than the other corps of the army, and it is likely that no artillery officers ever worked more strenuously and skilfully in the face of enormous difficulties than the devoted men who brought their guns first down to the south side of the Danube and then back across the river to the battlefield of Blenheim.” (Fortescue).





In February 1793 two troops of Horse Artillery were raised. They differed from the field units in that all personnel were mounted. Two more troops were formed in November of that year and were equipped with six 6 pdr. guns, with 45 drivers and 186 horses in the establishment: a self-contained, highly mobile fighting unit of artillery had at last arrived.

The following year the "Driver Corps" was raised to replace civilian drivers and hired horses, but although it was re-christened the "Corps of Royal Artillery Drivers" in 1806, it did not become part of the Royal Artillery until after Waterloo.

of help, he sited his artillery so well that the superior Scottish force was driven out with a slaughter of three thousand and a capture of ten thousand prisoners. A later notable example of skilful war was at Blenheim (1704) when Marlborough was able to achieve devastating effect by movement of cannon; this display of mobility by field artillery was a great advance in tactics, and must have paved the way for the creation of a separate artillery force. The first two companies were grouped with the trains of artillery at Gibraltar and Minorca to form the four companies of the Royal Regiment of Artillery. Albert Borgard was its first Colonel, the greatest expert of the day, who by the time of his death in 1751 had served in eighteen battles and twenty-four sieges; he built up the sense of duty which kept the guns firing to the last round, so long as there were gunners alive to load and fire.

The original companies were commanded by Captains and each consisted of two Lieutenants, two Lieutenants Fireworkers, three Sergeants, three Corporals, three Bombardiers, thirty Gunners, fifty Matrosses and two Drummers. The rank of Matross was abolished in 1783, all serving Matrosses becoming Gunners at one shilling at day. No special armament was allotted and there were no drivers or horses. The job of the regiment was to take over the guns of the defences or field equipment in an operation. The new force was quickly in action, first at Vigo in 1719 but more importantly at Gibraltar in 1727 when the Spanish siege was

broken. More engagements followed as the struggle with the French grew and was carried on in N. America and in India. In 1755 the number of companies was raised from ten to sixteen and in that year a detachment from six artillery companies formed part of General Braddock's expedition to capture Fort Duquesne (now Pittsburgh). The army was caught in thick forest by a force of French, Canadians and Indians who were expert in that kind of warfare, and the guns had to be abandoned. In 1756 the Artillery were granted the right of all Foot on parades, a privilege probably based on the position of battalion guns on the right when in action.

In the Seven Years War, in which we were allied with Prussia against the central European powers, the Royal Artillery particularly distinguished itself at Minden (1st Aug., 1759) when the twelve pounders were able to silence the French guns, enabling the infantry to force a full retreat of the enemy by 10 a.m. Sixteen companies were used in the American War of Independence (1775-83), when the lighter guns (3 pounders) were found to be of most use, but the engagements were not of the magnitude of the European campaigns. When the Napoleonic War began (1793) the experience of Minden had been assimilated and an immense step forward was taken in mobility with the formation of the Royal Horse Artillery, supplied with horses and drivers to form a complete unit and equipped with guns lighter than the normal field pieces. Thus it was possible to

follow the most rapid movements on the battlefield. These developments culminated with Waterloo, when eight horse artillery troops and five brigades of the R.A. were in action.

In the following year, 1816, the Royal Artillery celebrated its hundredth birthday—a century of many and great changes in which the companies of 1716 had evolved into a magnificent force. Even the French General Foy could not forbear his praise—“The English gunners are distinguished from the other soldiers by their excellent spirit. In action their handling is skilful, their aim perfect and their courage supreme”.

The following years showed the reactions following a great war—severe reduction in the Army strength and particularly in the Artillery. The bearing of unit distinctions was abandoned and the Regiment as a whole given its motto UBIQUE (everywhere) followed by QUO FAS ET GLORIA DUCUNT (whither right and glory lead). By the time of the Crimean War (1854–56) the force had been rebuilt and garrison guns and howitzers of up to 13 inches calibre were available. The great struggle culminated in the battles of Alma, Balaclava and Inkerman. In the Indian Mutiny (1857–59) which followed, the artillery was once more heavily involved, and the aftermath saw great changes in organisation and grouping.

The long train of events over subsequent years becomes too detailed for adequate telling. The campaigns of the later Victorian era in India, Afghanistan and Africa brought new

developments. The rifling of barrels which came in about 1860 gave increased range and accuracy, enabling batteries to take up positions well behind the infantry, while the breech-loader gave a quicker rate of fire. The Boer War (1899–1902) and its aftermath speeded the modernisation. Of the Great War, even an outline of the operations is not possible. The battles of the Somme in 1916 and Passchendaele in 1917 took a heavy toll of the Regiment and were noted for the unprecedented intensity of bombardment. The impossibility of frontal attacks, however, gravely affected a force prepared for a mobile campaign. Mobility almost ceased to exist and fire power became the ruling factor. The complications of smoke, gas and high explosive shells had to be taken into account, while the intervention of tanks and aircraft brought more problems. The supply of millions of shells and new guns to replace those destroyed and worn out became essential, and was reflected into the policy and effort at home. In the Second World War, the evacuation at Dunkirk, while it saved an Army, saw the loss of 60% of the nation's stock of guns but nevertheless forced the production of new and superior pieces. In 1941 Churchill considered that “Renown awaits the commander who in this war restores the Artillery to its prime importance upon the battlefield”. This came at El Alamein when the massed use of artillery deployed with great flexibility and mobility gave close support as the battle moved forward.

Below, the R.H.A. are seen bringing their 12 pdrs. into action under heavy fire during the Boer War. It is difficult to imagine what would have happened to our gunners in the early part of the Great War had they lacked the fine experience of this one. Progressive thinking led to a complete change of tactics and before long guns were being sited in concealed positions and new systems of sighting devised.





In the Great War the Regiment expanded to over 2,000 batteries manned by half a million officers and men; in the Second World War the strength at one time was nearly fifty per cent of the Army.

At the time of its two hundredth birthday in 1916 nearly the whole of the Regiment was on active service and the celebrations were confined to a Special Order of the Day by the Commander-in-Chief, Sir Douglas Haig.

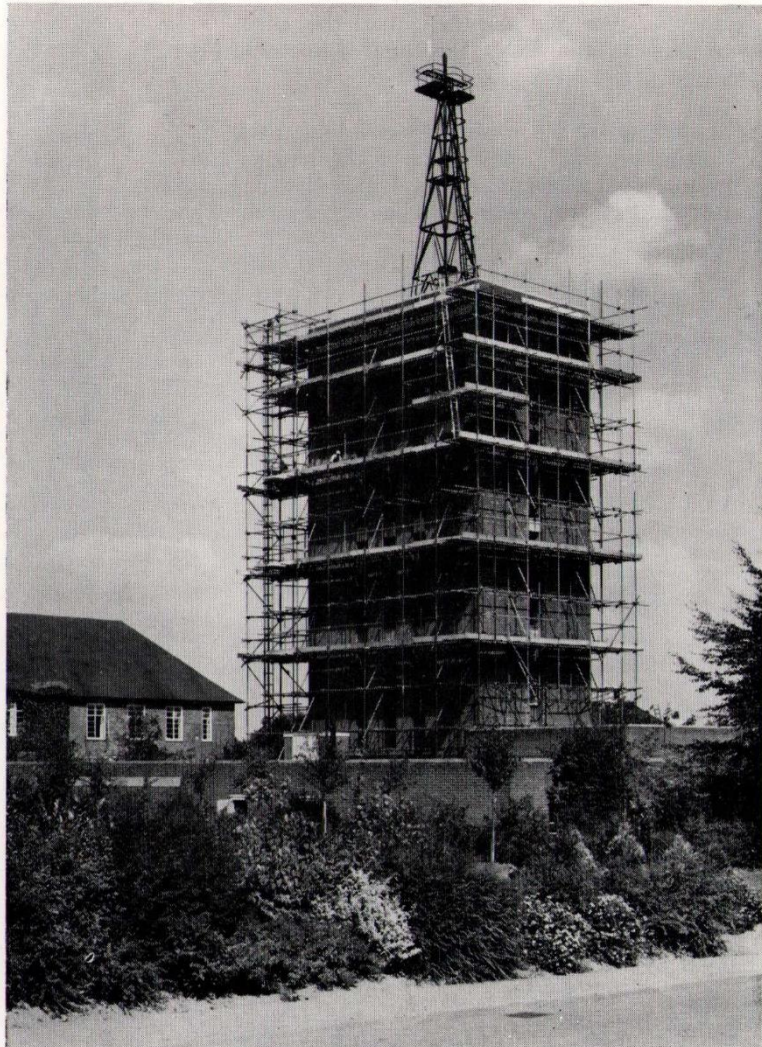
The situation of the Royal Artillery has of course been greatly complicated in recent years by the development of many new weapons and techniques. But it is an interesting thought that in spite of greatly reduced numbers the regiment's striking power is relatively greater than at any time in its history.

Firing an 18 pdr. to the last round was typical of the fine spirit of the R.F.A. in France during the 1914-1918 War. True to its motto "Ubique", batteries fought not only in France and Flanders but in the Dardenelles, Italy, Macedonia, Mesopotamia, Egypt and Palestine, Persia, Arabia, East and West Africa, Russia and on the Indian border.

In the Second World War our first successes were heralded by the crash of hundreds of new guns of all calibres and by the fine work of A.A. and Coast defence gunners in the Battle of Britain. In such actions the quality of the material, however important as a factor in victory, is transcended by the devotion to duty of men; as it will be, always.



STORY
OF THE
**HARWELL
TOWER**



The future of Harwell's weather-worn tower was last year given serious consideration. Today after an extensive face-lift it continues to house 30,000 gallons of water which, in the event of a mains electrical supply failure, will maintain the site until standby diesels can be started. Also, in the early stages of a site emergency it would be important to know wind direction and speed for various heights from the anemometer on its mast.

The tower, built 30 years ago to a Standard Air Ministry Specification, was used during the war as a look-out post to try and give fore-warning of enemy aircraft emerging from the skies to machine-gun and bomb the site.

For several years after its takeover by the boffins, who used its inner chambers as laboratories, the observation hut survived on the top. Because it seemed to serve no useful

purpose the site architect sought its removal. "This is a regular query, which comes every three months", reads a memo in reply. "The answer is always—no, we are not agreeable!"

In 1948 there came the need for a "light-house" to be erected on the top. Fitted with 4 KW of neon tubes, it was to flash at night and warn aircraft in the area. As it was to have a wind-speed indicator and an anemometer,

arguments were put forward that the penthouse was in the way, and final agreement came for it to be taken down.*

Face-lifting of the tower began as far back as November, 1947, when part of the parapet wall was found to be fractured and dangerous—"forthwith to be made safe before another severe frost occurs."

Last year routine maintenance inspection again showed a steady deterioration in the fabric of the tower, so the Structural Engineer set about making a report. It would have been costly to have scaffolding erected to all the points that required investigation; the survey was made by cutting away the brickwork and concrete at strategic points, augmented by binoculars and blown-up photographs supplied by Photographic Section for the more inaccessible places.

The survey showed that the brickwork of the tower had become badly cracked due to "racking" set up by wind forces on the anemometer mast, which is tied down to the roof slab. The concrete was also found to be cracked and displaced due to rust causing expansion of the steel.

When these and other faults were brought to light, the extent of the remedial work and its probable cost became clear. The possibility of demolishing the tower was considered, but it was decided that it was preferable and more economical to go ahead with extensive repairs to the existing tower and installations.

It was estimated that between 10,000 and 12,000 bricks would be required, and 27 tons of concrete. The decision was made, therefore, to scaffold the entire tower and provide an electric hoist for quick and safe moving of materials.

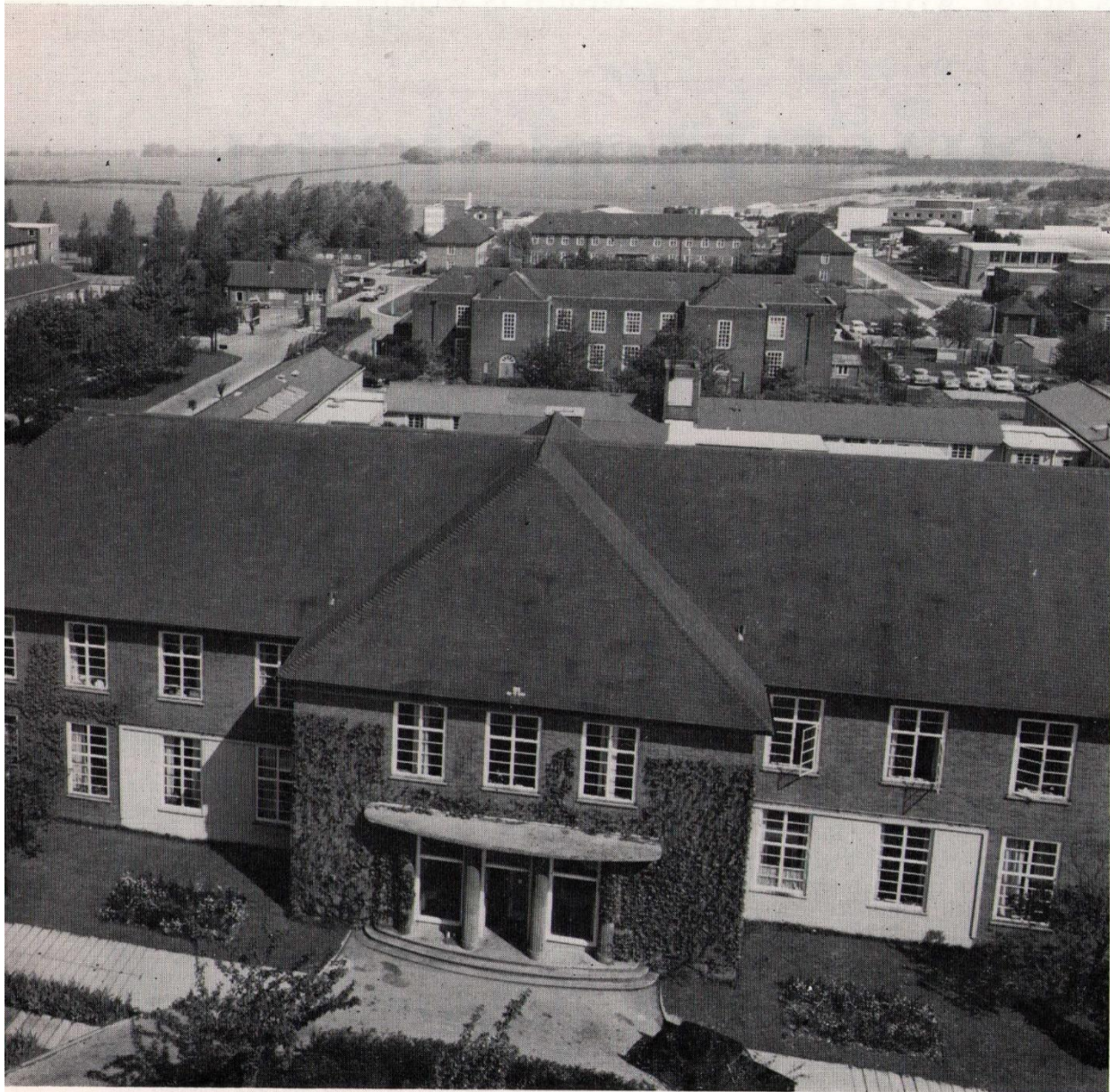
Movement of materials was in both directions, as badly cracked brickwork had to be cut out and removed, together with all inferior or fractured concrete. A comparatively new material, epoxy resin concrete, was used for making good the smaller areas because of its tenacity and resistance to water. For the larger areas epoxy resin was used as a bonding agent between the old concrete and the new. This part of the schedule had to be done first before the colder weather arrived, because the setting of epoxy resin is affected by temperature.

26



In addition to this work on the tower, attention was given to the installations. To prevent damage to the brickwork in the future by "racking" of the anemometer in the wind, twenty-six tons of concrete—the equivalent of some 220 barrow loads—were raised and placed in one day.

Some readers, seeing the board of a contractor displayed in the months while work was



in progress, will have credited the company with more than the erection of the scaffolding. The actual remedial work was done by the direct labour of Engineering Division. Everything possible was done to reduce the frequency and cost of future maintenance.

Today the 80-foot tower, looking younger for its face lift, seems capable of standing as a familiar land-mark far beyond our life-time.

* To avoid speculation about the use of the pent-house that was on the top of the tower: the tower was used by Dr. H. London, not because we were then so short of laboratory space, but because height was needed for producing carbon 13 from a carbon monoxide distillation column; the hut itself was used for storage of toxic nickel carbonyl. Dr. London, who has otherwise been "confined" to Building 33 in all his years at Harwell, admitted to 'Harlequin' that he always had the ambition to make a study out of the hut. As we found for ourselves, the long hard climb up the iron ladder is well rewarded by the quietness and the view at the top, as shown above.

CHASTLETON HOUSE

ALYS GRAHAM

IN THESE DAYS of easy sightseeing the 'stately homes of England' are very much taken for granted; yet the unique atmosphere of each one is part of our heritage.

A mile or two from where the Counties of Gloucestershire, Worcestershire, Oxfordshire and Warwickshire meet, set in leafy undulating country, stands this lovely Jacobean mansion of Cotswold stone.

Its fascination lies not in luxury but in that it retains so much of its past, uninterrupted by the passage of time. An imaginative person can very easily step out of this world and into the lives of those who built it and lived in it.

Walter Jones, a wool merchant of Witney, bought the land from the Catesbys (of gunpowder fame) in 1602 and the building was completed in 1610. He married a maid of honour whose father was Queen Elizabeth's jeweller and whose uncle was the founder of Trinity College.

Approaching through the pleasant walled garden, bordered with shrubs, we come to a circular drive, once a courtyard. From the top of the flights of steps between two jutting bays we enter a small plant-filled loggia. From this we step into a large lofty room, once the common hall. It retains its original oak panelling, now surmounted by family portraits, also the early table once brought in by sections and then assembled. There is a raised dais for family meals.

The main dining room leads off, the long table laid with a white and gold salt-glazed dessert service of 1760. We get a satisfying view from the wide window of the garden at the rear. Small tables are laid with objets d'art, among them an exquisite Chinese coffee service in midnight blue.

Mounting the wide, shallow stairs we pass portraits of the Charles's. Charles II looks startlingly dissipated; the painting is an original. That of Charles I (looking far more ethereal) is a copy.

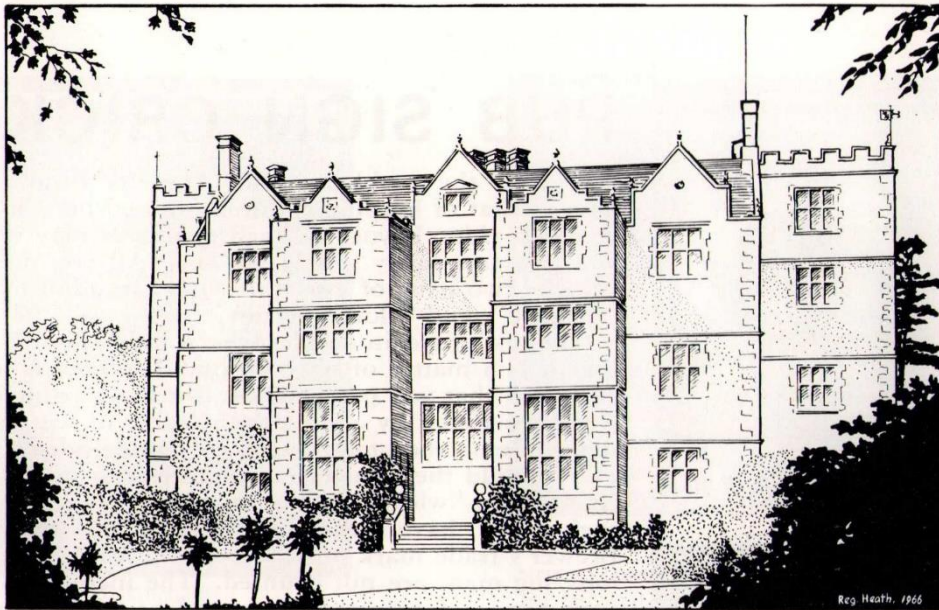
Now we are on the first floor, and enter the State bedroom through a small dressing room. The walls of this little empty room are covered with florentine stitched needlework on hessian, in lovely mellow colours. The walls of the bedroom and the stately four-poster bed are hung with the original tapestry placed there for the wedding of Walter Jones's son Henry to Anne Fettiplace. A Charles II chair stands in the corner. Louis XIV brocade was brought over to cover it, but now it has been stripped down to the original.

Next, we see the dummies standing on the landing and dressed in 19th century clothes, the oldest being a Georgian maid's dress. There are earlier ones in store, but they are much too small for present-day models. The going-away dress of a bride on February 5th, 1895, in wine-red velvet, must have used many yards of material.

This landing leads into the Great Drawing Room. Here one pauses to admire an even better view of the garden at the rear. Early portraits are set at intervals high up on the oak panelling all round the room, and these were built in with the house. A door in the wall leads into a small room containing a lovely collection of Worcester china of the early 19th century, and more Jones portraits.

Now we are in the Library, which is predominantly that of a land-owning gentleman. Besides many books on country matters it contains a fine set of Voltaire and volumes of Alexander Pope's work dated 1717.

Leaving the Library by a small corridor we are now in the Cavalier Room facing the drive. Here for the first time one sees wallpaper, and it is a Victorian flower pattern. The four-poster bed is spread with a masterpiece of white embroidery, the work of Ann Jones, who was a Miss Whitmore from Charlbury and married into the family in 1700. It took her fifteen years to complete, and after that she set to and made pillow covers to match.



Leading from this room is a small room hidden in one of the jutting bays. There is an intriguing story attached to it.

All the Jones were staunch Royalists. Among the fugitives from the Battle of Worcester on September 3rd, 1651, was Arthur Jones, grandson of Walter. After a hard ride he reached his home safely, but his wife, Sara, had scarcely fed him when a thundering on the door proclaimed government troops outside. They were searching for a 'malignant' thought to be Charles Stuart. Arthur fled to the secret room, whose entrance was in those days concealed behind the tapestry—but there was no outlet or window then.

Vainly the soldiers searched the house; but they were still suspicious, because they saw a tired horse in the stables, and they insisted on spending the night in the Cavalier Room, which faced the courtyard. When Mrs. Jones asked them to come down for supper they demanded that it should be sent up. This she did, but she mixed laudanum from her medicine chest into the wine. They ate and drank well, and she listened outside until their snores told her it was safe to enter and release her husband. Taking the leader's horse he escaped, to await happier times.

Making the last ascent we come to the Long Gallery, which runs the entire length of the house. In most old mansions this has been divided up, but here it is almost as it was, with the original lofty domed ceiling and oak panelling. The ceiling was largely restored by local craftsmen in 1903 at the instigation and expense of Miss Whitmore Jones. Her Arms and that of her nephew stand carved in stone on a wide window sill, beneath which rests a

mammoth travelling trunk. There is also a Georgian exercise horse, and numerous family portraits hang on the panelling.

This gallery was used for exercise during bad weather, the roads in those days not being what they are now! There the women walked up and down and the children played. The small room leading from it, a slipper-bath of 1802, is worth noting. There is also a dutch oven: this is made of iron and is portable, standing on three legs. It was placed before the kitchen range and served many purposes. Descending the main staircase we pass with renewed interest a portrait of Ann Jones, the needlewoman, who also laid out the garden: this is entered by a side door, and it is truly 18th century. Quaint figures carved out of privet surround a circular lawn, and in the middle is a slender, graceful sundial.

In 1825 there were no Jones heirs and the estate passed to John Henry Whitmore, a cousin on condition he took the name and Arms of Jones. It was one of his descendants who restored the Long Gallery so perfectly for posterity, and almost everything has remained unchanged.

That, indeed, is the note of all the house. It remains, has remained, unchanged through all the vicissitudes of Church and State. There is no house like it.

Chastleton House is 26 miles from Oxford, which you leave on the A.34 picking up the A.44 near Chipping Norton. Take a turn to the left a mile or so beyond the Cross Hands and follow a single track lane, climbing gently. It is open to visitors every day (except Wednesday) 10 a.m. to 1 p.m.; 2 to 6 p.m. (dusk in winter).

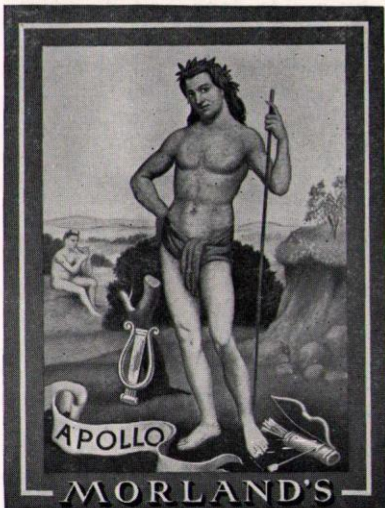
PUB SIGN CRICKET



The Black Swan, Abingdon **ONE RUN**



The Volunteer, Grove **TWO**



The Apollo, Oxford **FOUR**



The Horse and Harrow, West Ilsley **SIX**

One of the problems which parents (and others) have is that of keeping children amused on a long car or coach ride. If you are such a sufferer may we offer you this as a fairly simple answer? All you need is a vehicle, two pairs of eyes (at least), an adult to act as "Umpire", and a long journey.

The toss of a coin decides who is to "bat" first. After that it is a matter of observation. The idea is to scan each pub that you pass and see if it has a painted sign. Runs are scored by adding the number of legs on each sign. (Remember, many signs are double-sided). However, should the sign have a picture with no legs, that counts as a "wicket". The innings continues until ten such signs have been recorded. Signs showing a Brewer's trade mark only, e.g. a hop leaf, cockerel or toby jug man, are not counted. The increasing use of such signs is deprecated by the ardent followers of pub sign cricket, and if, as we hope, the interest in this game develops more pictorial pub signs will be painted. This should bring back one of the attractions of our countryside.

It may be of interest to note that on the return journey from a County Wolf Cub Rally one team scored 96 runs between Bracknell and Reading. The second team could only muster 28 runs between Reading and Didcot! Other examples of high or low scores would be of interest to the author.

*J. B. Honeysett, Personnel Dept.
District Cubmaster, North Berkshire.*

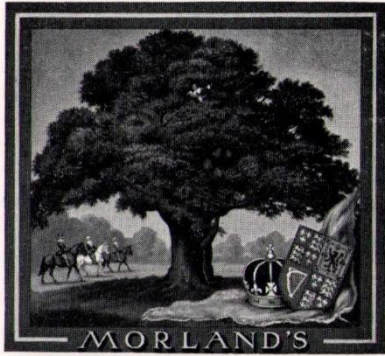
OTHER EXAMPLES OF DIVERSIONS FOR CHILDREN ON CAR JOURNEYS WILL BE WELCOMED BY 'HARLEQUIN'. WE THOUGHT WE MIGHT RECOMMEND AN ADULT VERSION FOR WALKERS ON HOT SUMMER NIGHTS: THE SCORE WOULD BE IN PINTS AND THE WINNER WOULD BE THE ONE WHO, AT CLOSING TIME AT THE LAST PUB, IS ABLE TO FIND HIS OWN LEGS!



The Queen's Head, Wokingham

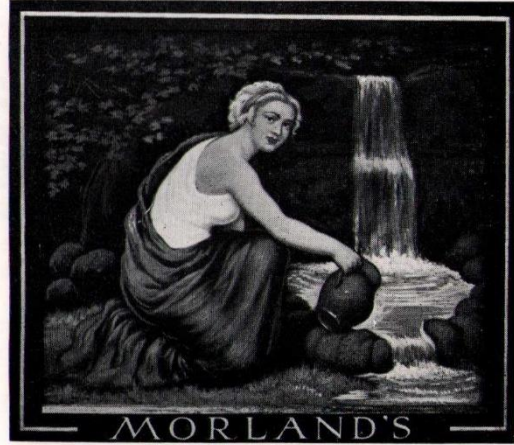
A WICKET

V THIS ONE SEEMS EASY TO COUNT . . .
UNTIL THE LEGS ON THE SHIELD
AND IN THE TREE ARE SEEN



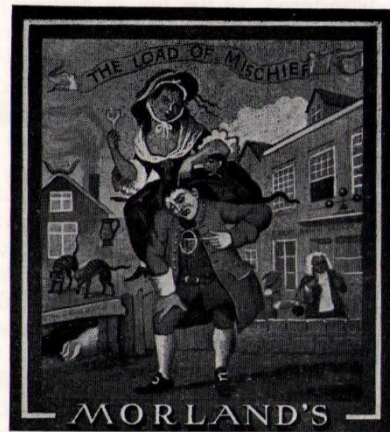
The Royal Oak, Didcot

WE RECOMMEND
A BOUNDARY FOR
SIGNS SUCH AS
THESE

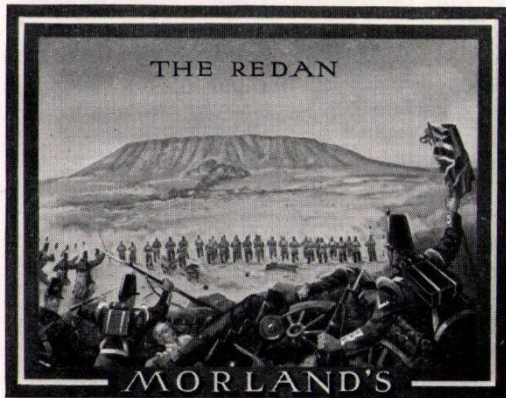


The Flowing Well, Sunningwell, Nr. Abingdon

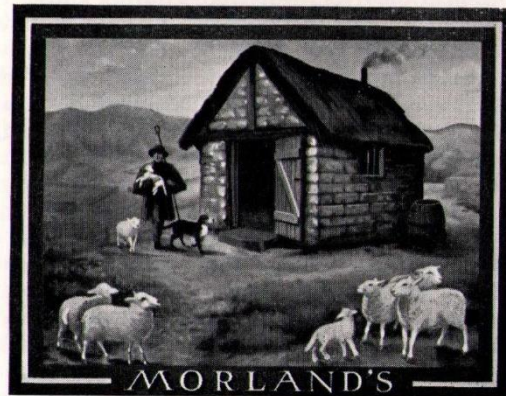
NONE, ONE, TWO, OR MORE ACCORDING
TO DECISION OF UMPIRE!



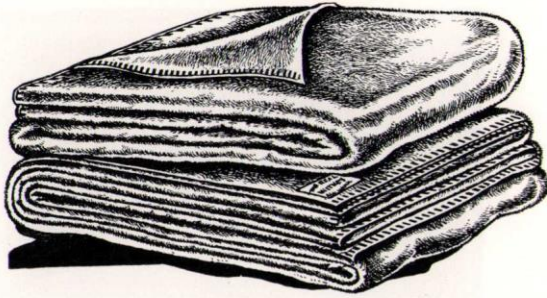
The Load of Mischief, Blewbury



The Redan, Wokingham



The Shepherd's Hut, Ewelme



C. H. Bevis, *Eng. Div.*

Local Industries (2)

Witney's Woollen Industry: How it began

ON A COLD winter's night we might have wondered, as we lay in bed and snuggled into our soft warm blanket, 'How on earth did a blanket industry come to be at Witney?' If we turn the clock back two hundred years we can understand how this has come to be.

Before 1760, woollen cloth was made throughout the country in every village, but about this time the woollen industry had gradually become established in three predominant areas. These were first, the West Country, comprising the counties of Devon, Dorset, Wiltshire, Gloucester and adjacent counties; secondly, the West Riding of Yorkshire and thirdly, that area known as East Anglia.

For a woollen industry to flourish certain conditions must be fulfilled. There had to be a stable source of raw material, all the year round. Fuel was needed, either wood or coal, to heat the dyers' vats and scouring kilns. Then plenty of soft water to do this—swift-flowing streams that did not dry up in summer were essential to turn the old water wheels which drove the spinning wheels. Supplies, either local or that could be easily brought in, of Fuller's earth to degrease the wool, were also necessary.

All three regions had something in common, plenty of wool, water and fuel, and this is why the industry was located in those regions.

In the West Country, the fine cloths and flannels were made, and today their names are household famous: Axminster in Dorset, Wilton in Wiltshire, both associated with carpets, and Witney in Oxford, now famous for blankets. Besides the coarse wool from the hill and moor

sheep, extra supplies of fine quality merino wool were imported from Spain at Exeter, which was quite an important cloth market and port. Coarse wool from Ireland was imported at Bristol, and some at Barnstaple (a woolly name!) and Minehead in Somerset.

The production was organised by travelling clothiers, with packs of horses. The clothiers owned the wool and took it from spinner to weaver to fuller and then to market in Exeter or London. Obviously this system was very haphazard; it was poorly paid and work was unsupervised and very irregular. This led to many arguments, and there was just as much trouble then in the industry as there is today with trade unions. It is impossible to win, with or without unions; employers and employees *will* argue! The clothier was also at the mercy of the spinners and weavers because they would stop work if it suited them. Then, too, there was the danger of attack from highwaymen.

The conditions of work were bad and employed children as young as three years old. In some places, Newbury for instance, labour was organised, and Jack o'Newbury was reputed to have 200 weavers in his house.

The woollen industry in the West Riding of Yorkshire was actually declining at this time; a different state of affairs from that normally associated with Yorkshire. Here the cloths were of the cheaper and poorer quality. The reason is that there was no division of labour or specialization in the manufacture of the cloth. It was all done by the same person. This was the working clothier who bought his own wool each week and sold his cloth the same

week in order to buy more wool to carry on.

He sold it in the local cloth halls (Halifax 1708, Wakefield 1710 and Leeds 1711). The working clothier carried out all the operations himself. Sometimes he would expand, and it has been known that he would have as many as ten assistants.

In contrast to the West Country industry, little capital was needed, and the whole output of cloth per individual was small. It was easier for a man to succeed as a clothier, as the clothier was his own boss and in consequence there was no friction. As often as not the clothier was a farmer with his own sheep to supplement his purchases of wool.

The East Anglia industry was much influenced by large scale immigration of Dutch and Flemish people in the 16th century, and as a result different cloths were being made. These were fine quality worsteds (named after a village of Worstead, twenty miles north of Norwich) and jersey woollen cloth, as well as baizes. The

worsteds were mainly made in northern Anglia and the other two cloths were more concentrated towards Essex, because it was here that most of the Flemish lace workers had settled.

The industry was organised on the West Country pattern where wealthy clothiers bought longhaired fine quality Leicestershire (now a world famous breed of sheep) and Lincoln wool. It was distributed to the spinners and weavers. The majority of the buying and selling was done at the annual Stourbridge Fair, where a clothier could contract to buy a farmer's yearly output of wool; and of course, in London.

It was not long, however, that with the advent of steam power and iron and steel machinery there was a decline of the woollen industry, and it all came to be in the north of England; yet pockets of the old pattern of the woollen industry still survive. One for instance is Witney, where blankets are made.

But this is where we started.

BOOK REVIEW

A Prophet in two Countries

— the life of F. E. Simon — Nancy Arms (Pergamon Press, 12/6)

Sir Francis Simon was a scientist of international distinction whose work embraced low temperature physics, atomic energy and technological education. The author of his biography, who is the wife of H. S. Arms, will also be remembered by many Harwell people.

Simon, whose views were often ahead of his time, became aware of the dangers of the Nazi regime several years before the Reichstag fire; while on a visit to Russia, where people looked over their shoulder to make sure that no one was overhearing them, he saw the implications of political servitude in a totalitarian state.

Later, when he had made his break with Germany and was safe in his Oxford home, his name was included in the Nazi "Black List" of those who would be the first victims of Hitler's vengeance. As his value to the country of his adoption increased, Germany's loss became Britain's gain.

The book goes on to describe his life at the Clarendon Laboratory and his presenting, in 1940, one of the most outstanding reports of all the U.K.'s work on nuclear energy — "Estimate of the Size of an Actual Separation Plant". For his work that followed on the diffusion project he was knighted in the first

New Year's Honours List after the war. Almost certainly he became the only holder of both the German Iron Cross First Class and the British C.B.E.; quite certainly he deserved this seal of his acceptance here.

Much in demand to serve on committees while a Harwell consultant, Simon served on several connected with Capenhurst's diffusion plant. He had great faith in the inventive genius of the British people and in our export of brain power in the form of nuclear power plants.

Simon shared with Lord Cherwell an extreme clarity of thought and an ability to communicate. At the same time he was always approachable, and with his own brand of humour was loved by everyone who worked both with him and for him, each of whom he would call "my collaborator".

We recommend this well-written and well-produced book as one of historical and scientific value, and also as one of great human interest. We are grateful to publisher Robert Maxwell, who himself gave approval for the extracts overleaf to be presented to "Harlequin" readers.

D.A.T.

MAN & SCIENTIST

- SIR FRANCIS SIMON

by NANCY ARMS

One-time member, 'Harlequin' Editorial Board.



— *Abridged from the Chapter of the same title in "A Prophet in Two Countries" (Pergamon Press, 12/6), reviewed on the previous page. The illustrations here are by 'Harlequin' artists.*

SIMON intensely disliked the modern tendency to regard the scientist as a man apart, not supposed to feel or even act like other men, not expected to be interested in politics, in the arts, even in language, which was after all his only means of communication with any audience other than mathematicians. As far as Simon was concerned, a muddled, imprecise exposé of a subject, whether in an arts or science field, was merely a reflection of a muddled, imprecise mind. As he demanded high standards of literacy and general education in a scientist, so he failed to see how the arts man could consider himself educated when he prided himself on knowing no science. Simon believed this to be only a passing phase. Certainly in Plato's day an educated man was expected to be acquainted with the science of his day, and up to the time of Humboldt and Darwin it was taken for granted that he should be familiar with the progress of science. Simon liked to recall the obituary he had read of a man who had been a scientific engineer: "Despite his scientific and technical preoccupation, he was a man of distinct charm and personality."

Perhaps Simon himself attributed too many virtues to science: he need not have been a scientist to acquire what Dr. Bronowski calls the "Old Testament virtues" of truth, loyalty, honesty, sincerity, supposedly engendered by science. A scholar in an arts subject would demand the same integrity. However, Simon saw the trained mind, for example the politician's, using words to conceal a vacuum. The great value of science was that it was always looking ahead, always ready to attempt the

apparently impossible, whatever had not been done before. As in his work so in his life Simon was always asking, "What does it mean? What does he mean? What is he going to do and why? Does what he says agree with what he is doing?" Science was a mental liberator as well as a mental discipline. Since the scientist is perpetually discovering something previously unknown in the world of nature, which is limitless, he recognizes possibilities instead of limitations. Simon would have welcomed the attitude in the engineer, the politician, the philosopher, the administrator, which could say: "I know this has never been done before, but here is a possibility . . ." This independence of mind was, he believed, what made a scientist useful. His own life gave the lie to the conception of the scientist as the man apart.

Simon's forward thinking meant that he was steps in advance of the general outlook of his day. He was not always right. England did not become fascist; a new generation in Germany is taking its responsibilities seriously. But in many matters his predictions have been justified—the rapid scientific advance of Russia, the serious teething troubles which have slowed down the development of nuclear power. In many others something has been or is being done along the lines he advocated. Industry is becoming more research-minded; suggestions are being made to curb the flow of scientists and technologists to the States; university-type technological institutes are proposed; England has had, briefly, a Minister for Science, and will undoubtedly have one again, possibly with some knowledge of the subject for which he is

CASH

for

IDEAS

Nearly **300** awards were made last year for

SUGGESTIONS

on

SAFETY & PRODUCTIVITY

Send **YOURS** to:

Secretary, Suggestions Schemes, Room G.105, Building 329

responsible; and central heating is becoming respectable. In very much the same way that Simon's early doubts about the validity of some low temperature research led scientists to be particularly careful in their measurements of specific heats, so later his unconventional suggestions about giving away closed stoves led some, at least, to reassess the inefficiencies of the open fire.

The prophet is not generally popular, and Simon aroused some violent opposition to his theories, as can be seen in the irate correspondence produced by a number of his newspaper articles. He liked to shock, he loved the arresting phrase, and most people dislike being aroused from their lethargy. Those who enjoyed his realistic, stimulating approach found in the pages of *The Neglect of Science* (Basil Blackwell Ltd., 1951), a collection of some of the articles he wrote for *The Financial Times*, examples of the less prophetic side of his character. He could not for long suppress his insatiable interest in people. His curiosity was not satisfied by the laboratories he visited; he had a keen eye for the passing scene as viewed through the columns of the press or depicted in chance encounters. No one at the Clarendon, where he was known, was surprised when, on his return from a visit to the States, he lectured not on physics but on MacCarthyism. In "America Revisited", reprinted in *The Neglect of Science*, he recorded some of his general impressions of the States after five years' absence. Within the scientific world he noticed a salutary revolt against extreme measures of security and against the preponderant influence of the army. He welcomed concern with the colour problem and the consternation felt by many at the proceedings of the congressional committee investigating "un-American" activities. He was thankful for the conscience pangs of a small group of scientists who had been connected with the atomic bomb, and quoted a remark by one of the leaders of the atomic energy project: "In some sort of crude sense, which no vulgarity, no humour, no overstatement can quite extinguish, the physicists have known sin; and this is a knowledge that they cannot lose."

On the lighter side, he saw no lessening of the general interest in sporting events, the exploits of the "Giants" and the "Red Sox" being ousted from newspaper headlines only briefly by the Russian atomic bomb. He found Americans still contented with the mental diet provided by "tabloids" and magazines and the

comic-strip sections of newspapers. "That comic-strip addicts should be able to determine the future must certainly appear disquieting. . . . However, the most general preoccupation, though perhaps not at its wartime high, is still with the more primitive aspects of the female form and the contraptions designed to keep them under proper control. The art of advertising suffers particularly from this. The favourite method of attracting attention to a particular product, whether washing machine, beer or patent medicine, is still to adorn the advertisement with a blonde, the salient features (of the girl) being put in proper relief."

He gave his love of satire full rein in an article, not sufficiently dignified for *The Financial Times*, which won the approval of *Harlequin*, the magazine of the Atomic Energy Research Establishment at Harwell. In this brain child, which he called "In Retrospect", he imagined survivors of an atomic catastrophe trying to reconstruct the history of the civilization that preceded it. Their only sources for investigation were some copies of a popular newspaper. These they had some difficulty in deciphering, since "the deciphering of an unknown language can only be undertaken on the assumption that what is written down makes sense, and from their point of view their find was not a very lucky one." They saw a picture of a woman shouting "Four times more lather!" and did not realize "that this meant four times more lather than from an undisclosed substance, the only characteristic of which was that it produced four times less lather. Incidentally the stuff was also kinder to her hands, 2·7 times)."

Patent medicines, criminal and divorce proceedings, Hollywood, all run the gamut of his satire. The final verdict of the historians was that the "people inhabiting the earth some 500 years earlier . . . had been intolerably stupid. The details of the mechanism which had triggered the catastrophe did not really matter very much. A civilization at the state of technical development which had obviously been reached could simply not have been in a stable state if the great majority of people had been at such low intellectual level".

Underlying the whimsy was one of Simon's most strongly held beliefs. Science had progressed too fast; philosophy and religion had not kept pace with it. They were still thinking in terms of past ages. On one side were the imagination and courage that split the atom, discovered penicillin, developed anaesthetics; on the other was the mental and moral apathy



Don't forget to pack Lloyds Bank

Even if you don't have an account with Lloyds Bank you can always take Lloyds travellers cheques with you. They are the easiest, safest way to take money abroad. You change them into foreign currency as you need it - and cash any left over when you get back.



In addition to travellers cheques you'll need some foreign money in your pocket when you arrive. All currencies can be obtained at short notice through your local branch of Lloyds Bank, and on demand at many branches. Please bring your passport with you.

Let Lloyds Bank help you to plan

which refused to accept the high adventure of outlawing war or eradicating differences of creed, class and nationality, even of living a decent life.

Simon loved language; he enjoyed puns, the different shades of meaning, the telling sentence, the whole art of communication. His early years in England, when he was unable to convey his meaning in the way he wanted, must have been a sore frustration for a man who was by nature so articulate. And yet his vivacity and enthusiasm, even in those days when he had difficulty with the English language, forced his meaning across. A member of one of the industrial firms remarked on this during the war. "Peierls gets up and says what he has to say in almost impeccable English, with an almost faultless accent, and when he sits down no one has the faintest idea of what he's been getting at. Simon gets up, passionately keen on what he wants to get across. His accent is execrable, his grammar is doubtful, he hardly ever finishes a sentence, and yet at the end everybody knows precisely what he meant."

Simon never lost his German accent; he had not the ear or the patience to make the necessary effort. He enjoyed making fun of his linguistic weakness and used to call himself "Vice-President of the Broken English Union." He never failed to complain when he found others incomprehensible, but then it was characteristic of him to censure his own faults in other people. He did not drive a car well and was yet the most persistent back-seat driver when he was not at the wheel. During the war he engaged a fairly recently arrived Austrian physicist, whom he sent to work at Birmingham. There he would be working under an American—"I do not understand a word he says. Now I want you to make quite clear to me what they mean."

He once concluded a book review with the remark: "The book, which is written in English, contains a number of slight eccentricities of style and grammar, about which, however, this particular reviewer has no right to complain." In fact he was much less casual about the written than the spoken word. He was ready to work with intensity to convey his precise meaning when facial expression and gesture were not available to conceal linguistic inadequacies. He demanded stringent and constructive criticism of his writing from those he esteemed competent to make it. Words were as much a hobby as gadgets and photography and could be enjoyed every day. He hated

imprecision and ambiguity, unless the latter were intentional and amusing. He loved the verbal frivolities that enlivened workaday correspondence. Even at his busiest during the war he was ready to spend time chasing the right Latin tag to cap one with which Akers had concluded a letter to him. To the end of his life he had occasional lapses in grammar and idiom—he always said "the news are . . ." and never mastered the use of "already"—but he welcomed correction, and refused to be fobbed off with any slick explanation of his mistake. Helping Simon with his English was as much fun, and as exacting, as working with him in the laboratory, and, in its way, equally rewarding.

His adventures in writing were one of the many delights of Simon's last years, which, in spite of his anxieties about international affairs and his disapproval of the government's approach to post-war problems, were the most serene of his life. He saw in the activities of the overflowing Clarendon the fulfilment of his dreams for an efficient, productive physics laboratory at Oxford. He saw himself recognized, not only as the doyen of low temperature physics, but as a public figure contributing to the advancement of his country. He found himself surrounded with friends, not only in England, but in the many countries where he was a welcome visitor. His personality had changed very little over the years. New honours did not change his love of informality or evoke the desire for favoured treatment. His sense of humour became no more malicious as he grew older; he had always enjoyed the slightly malicious remark, though he was completely unmalicious himself. He still loved to make fun of people and to be made fun of. His sensitivity to temperature variations and the sartorial means he took to combat them were the subject of a poster produced by his students at the last Christmas party he attended at the Clarendon. Labelled "Sir Francis's Thermodynamic Scale", it displayed a huge thermometer with three markings—"70°—Cap Point: 68°—Muffler Point: 65°—Going Home Point."

In 1956 Lord Cherwell retired from his position as Dr. Lee's Professor of Experimental Philosophy and head of the Clarendon Laboratory. Nothing could have been more appropriate than that Simon should step into his shoes. Together they shared in the transformation of physics at Oxford; together they had made the reputation of the Clarendon. Simon's appointment was the culmination of all he had striven for. He was as excited as a

Summer

Autumn

FISHING TACKLE
PAINTS DISTEMPERS

Whatever the season you will find all you need
at

BEADLES
Ock Street, Abingdon

TEL. ABINGDON 70

DO-IT-YOURSELF EQUIPMENT
HEATING APPLIANCES

FREE DELIVERY

TRY US FIRST AND SAVE TIME

Spring

Winter

HIGH SUMMER and LOW PRESSURE
often result in high pressure gardening,
just keeping up with the weeds.

TOTAL WEED KILLERS

can lighten the work

SODIUM CHLORATE 1/6 per lb.
Effective 6 months some tendency to
spread. Soluble. For paths and drives

WEEDOX (Fisons) from 2/3 per pack
Simazine base. Effective 12 months.
Insoluble and static. For paths, pav-
ing and drives.

WEEDOL (I.C.I.) from 5/6 per pack
Paraquat based. Non persistent for
borders, kitchen gardens, Perennial
weeds regenerate.

Get them from

LANGFORD'S
Gardener's Centre

STERT STREET, ABINGDON

Advice on your weed problems willingly given

ROWSTOCK CORNER GARAGE

TEL. ROWSTOCK 336

IS YOUR LOCAL GARAGE

AUSTIN SALES & SERVICE

SPECIALISTS IN GUARANTEED USED CARS

- * CRYPTON ENGINE TUNING
- * EXPERTS IN REPAIRS - LARGE OR SMALL
- * OFFICIALLY APPOINTED M.O.T. TESTERS
- * LARGE STOCK OF TYRES. H.P. TERMS

AA

24 HOUR EMERGENCY SERVICE

RAC

Faulkner and Son of Oxford

MOTORCYCLES SCOOTERS MOPEDS

B.S.A. MOTORCYCLES
TRIUMPH MOTORCYCLES
NORTON MOTORCYCLES
JAMES MOTORCYCLES
TRIUMPH AUTOMATIC SCOOTERS
RALEIGH MOPEDS

**SALES SERVICE SPARES
CARDIGAN ST. OXFORD**

Established 1910

Phone 57279

ALDEN MOTORS LIMITED

LAKE STREET, OXFORD

(OFF ABINGDON ROAD)

Tel. 48829

Where good cars cost

less - much less -

a lot less

READ & PARTNERS LTD.

**ELECTRICAL ENGINEERS
and
CONTRACTORS**

*At A.E.R.E., Harwell
continuously since 1946*

**READELEC HOUSE,
59 BERMONDSEY STREET,
LONDON S. E. 1.**

Telephone: Hop 5332-3-4

Site Office

A.E.R.E., HARWELL, BERKS

Telephone: Rowstock 357

Chandler's

of

WANTAGE

TRANSPORT SERVICES

- Luxury Coaches for all occasions
- Hire Car Service

Grove Street Garage, Wantage

Phone 3123

child, full of enthusiasm and brimming over with plans for the future of the laboratory. The garden party in the Fellows' Garden at Christ Church which he and Lady Simon gave in celebration of his appointment was a happy reunion of the many friends who wished him well in the new opportunities now opening out for him. He took up his position on October 1st, and enjoyed it for less than a month. He had been making steady progress after a thrombosis of the eye when he had a sudden relapse and died on October 31st, 1956. He died at the height of his success, with none of his powers diminished; his family and friends were spared the memory of a brilliant intellect, a vital personality, in any way impaired.

Lord Cherwell, writing of Simon after his death, said that he was the greatest low temperature physicist of his generation. "Not only was he supreme in experimental research; he had a clearer and more fundamental understanding of the basis of thermodynamics with statistical mechanics than any man since Einstein." He was the last of the great explorers in low temperature physics; others will fill in the gaps in the new territory he opened up. The volume of his work had been made possible by his ingenuity in devising helium and hydrogen liquefiers of a size and simplicity suitable for their use in small, non-specialized laboratories, in a day when money was not available for expensive equipment. He was lucky in that early in life he had been attracted by a comparatively simple idea—Nernst's Heat Theorem—which led him into the type of work in which low temperatures were used for a greater understanding of thermodynamics. Many of the properties of thermodynamics, which are of both theoretical and practical interest, can be determined only if one knows what happens to a substance in the entire range from absolute zero to the one at which work is being carried out. Many interesting properties of matter can be examined only in the absence of the disturbing effects produced by heat; consequently the techniques of low temperature provided the opportunity for examining these properties. Simon was one of the first to turn the absolute temperature scale into experimental reality.

It has been said of Simon that he was frequently wrong in details, almost invariably right in large ideas. His strength lay in his grasp of fundamentals. This is clearly illustrated in his use of mathematics; he was versed in the basic mathematics of what he was doing, but the mathematics was always subservient to the

physical understanding of a problem. For example, the mathematical theory of the diffusion plant was a complicated one. Simon worried over the mathematics and worried the mathematicians until he understood thoroughly the basic physics which the mathematics illustrated. Once this was done, he set down in very simple forms the dozen or so physical relationships which governed the parts of the diffusion plant in which he was interested. He studied these simple formulae and their relations one with another until he knew almost instinctively the quantitative connections between them. This meant that any further discussions that involved powers, pressures, weights, sizes, could be calculated quickly, on the back of an envelope, to give an answer accurate to within 15 or 20 per cent. If this had been done by standard mathematical techniques, it might have been correct to 1 or 2 per cent, but it would have taken anything from days to months to calculate.

Simon was not a scientist of the eminence of Rutherford or Bohr; his name will never be familiar to the man in the street, but it will live forever where low temperature physics is practised. The influence of his teaching will be felt, however unconsciously, in the long succession of his students and of their students. It was impossible to be in contact with him without being infected by his clarity of thought, his insistence on the importance of fundamentals, and his common sense. His vitality, his capacity for hard work, his concern for people were an inspiration.

He was uncommonly shrewd; he was not lightly fobbed off by assurances about the impossibility of some course of action. He acquired what Professor Bridgman described in his memorial lecture as a "know-how, not without an element of cynicism, for dealing effectively with officialdom." Bridgman had witnessed Simon's tactics in evading the difficulties experienced by foreign scientists in obtaining American visas in 1954: "These tactics can only be described as masterly." In the memoir which Kurti wrote for the Royal Society in 1958 he recalls Simon's behaviour at a meeting at which the chairman asked the members to agree that a certain machine should be run at 10 per cent less than the design value. When Simon objected that design value should mean what it said, he was told that they were talking not about science but about engineering, which was an art. Simon persisted: "What would happen if the machine were run at full power?" "It might get too hot." "But, Mr.

DONALD MACINTOSH (*Insurance*) LIMITED

attend every **FRIDAY** in Building 303 A.E.R.E.
Harwell (Main Gate) Ext. 2100 from 10.0 a.m. to 3.0p.m.

*... to assist and give personal attention
to all your enquiries for every type of Insurance.
Our motor premiums are still the most competitive;
immediate cover arranged both for new Insurances
and alterations under existing policies.*

HEAD OFFICE
265 HIGH STREET, ORPINGTON, KENT
Telephone: Orpington 31641-2

MOTORISTS!

SAVE MONEY AT SWANTAX



JET PETROL 4/11½ per gallon.

ANTIFREEZE 2/6 per pint; 18/6 per gallon.

30-40 OILS 1/6 per pint, 2/11 per quart,

10/- per gallon



It pays to call at

SWANTAX GARAGE

STATION ROAD, DIDCOT

Telephone Didcot 2204

SWANTAX



RADIO CONTROLLED
CARS



MINICABS



Phone: DIDCOT 2204



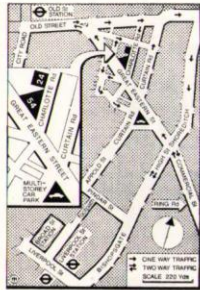
Chairman," asked Simon, "Can't artists use thermometers?"

Simon was over-anxious about England as he was about his family. As a foreigner he was able to see her faults more clearly than a native of the country, and these faults hurt him in the same way as a father is hurt by the failings of a much-loved child. He respected German thoroughness and determination, but he loathed authoritarianism and pomposity. His own sense of humour leavened his intensity of approach even to serious subjects, and he appreciated the refreshingly light touch of the English, particularly in academic life. In England he believed that a man could think for himself, and his great concern was that she might lose this outstanding quality if she continued to muddle along in her insularity and blindness. In his limited sphere of influence he was at least able to voice his opinions, and in his more direct field, the Clarendon and Oxford, he was able to play a constructive part in developing the scientific background he considered so essential to a country that must advance technologically or perish economically. Apart from his unique contributions to the Clarendon, he has left his mark on Oxford. He was responsible for the foundation of the first chair in metallurgy and for the election of a number of scientific fellows in various colleges. Oxford is no longer without a "scientific atmosphere", as he and the other scientific refugees had felt when they first went there, and he was outstanding among those who brought about the change.

His outspoken views, his pertinacity, the

esoteric nature of his specialized subject, the very success he had made in re-establishing himself with honour in a new country at the age of forty, might have led anyone who did not know him to expect a somewhat formidable figure. Nothing was further from the truth. He was kindly, mischievous, witty, friendly, interested in the trivial everyday happenings of home and laboratory. He was so strong and reliable about the important things of life and so defenceless when confronted by the minor discomforts that he inspired confidence and needed protection. He never failed to make an impression, even if it was only by button-holing an acquaintance at a cocktail party and boring him with his latest enthusiasm. None who loved him will ever lose the vivid pictures of their memories. For some these will be of the professor in the laboratory, stripping off his coat and getting down to work on the recalcitrant apparatus of some bewildered student; another will see him with his omniscient notebook, pushing up his glasses to chase some elusive entry or to decipher his illegible script. For all who knew him best the most affectionate memories will be those in relaxation, elbows on chair arms, slender fingers lightly touching, only the eyes belying the seriousness of the occasion, while he planned a knitting machine to eliminate the horror of clicking needles, or inveighed with all the passion of an erstwhile addict against the evils of smoking. Some owed him their lives, many owed him their jobs, more owed him the gift of his friendship. He was a great scientist and a great man.

YOU KNOW WHERE YOU ARE WITH OUR MAP and when dealing with us for all furniture and furnishings at special price concessions.



Our terms of trade and long tradition of good service to Members of the Association are clear and straightforward—like our new map.

Send for a large free copy and come to see us.

Griffiths Hackney Cabinet

Company Limited

54 GREAT EASTERN STREET, LONDON E.C.2
Telephone—Shoreditch. 4431

Open to 7.30 Thursdays; 12.45 Saturdays and
5.30 other weekdays.

FILMS

We keep a good range of Ilford Films. Black and White and Colour.

DEVELOPING & PRINTING

A Good Service given with excellent results.

ORDNANCE SURVEY MAPS

We can obtain any of these, if not already in stock.

(Paper Maps 6/6)

DAVID MALLOWS

and Co. Ltd.

The Shopping Centre - A.E.R.E.

CONTINENTAL COACH CRUISES

We are pleased to introduce for the first time extended Coach Tours direct from Didcot, Abingdon and Oxford to France, Belgium, Holland, Luxembourg, Switzerland and Italy (Spain, Austria and Germany in 1967).

3, 5, 7, 14 Day Tours £13.10.0 to £49.10.0

You no longer need to travel to London to join a Continental Tour, start right here on your own doorstep. For a Luxury Holiday Tour with no overnight travel contact:

RELIABLE LUXURY COACHES

LOWER BROADWAY, DIDCOT. Tel: 2357

(We still have seats available on some Tours this season and will be pleased to forward illustrated Brochure on request).

11 — 52 Seat Coaches for Private Hire



OVER THE TOP

Ron Matfield of Research Reactors originally wanted a 24ft. boat for conversion into a river launch, but accepted one "about 28ft. long" to be delivered to him on the A.E.R.E. Rush Common Estate, Abingdon. What arrived was a 34ft. lifeboat designed to hold 60 people.

It had been intended to have the boat lifted over a small shed into the garden, but its unexpected length required that it be swung over the house-top. This was the first job for a new mobile crane with 100ft. jib, and at one stage the boat became wedged alongside the chimney. Doubt was expressed by the crane crew whether it would go over. Finally, the driver managed to lift it a few more inches and—before a crowd of A.E.R.E. neighbours and their children—the boat scraped past the chimney, leaving behind a few inches of paint.

Our photograph on page 9 shows the boat some time after it had been lowered safely into the back garden, when work had started on an estimated two-year refit. "Harlequin" will be reporting later on the progress of this, and on the hoisting of an even heavier 5-berth motor launch back over the house-top.



WHAT'S NEW IN INORGANIC SCINTILLATORS ?



16-inch Diameter NaI (TI) Spectrometer Crystals

Now available, providing improved anti-coincidence annuli, and "live" shielding against external radiation.

Improved Energy Resolution:

Crystal-photomultiplier assemblies now incorporate a new range of high quantum efficiency EMI P.M. tubes, giving significantly improved energy resolution.

CsI(Na) Scintillation Crystals

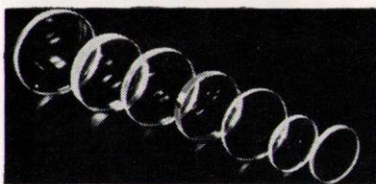
Available for the first time commercially, this new highly efficient and stable scintillator offers many advantages over CsI(Tl). Diameters up to 10 inches.

PROPERTIES OF CsI (Na)	
LIGHT OUTPUT RELATIVE TO CsI (TI)	2.0 *
DECAY CONSTANT, Microseconds	0.65 *
DENSITY g/cm ³ at 25°C	4.5
MOLECULAR WEIGHT	259.81
VAPOUR PRESSURE: Millimeters Hg at 738°C	1
SOLUBILITY, Grams per 100 Grams H ₂ O	160.0
THERMAL EXPANSION, per °C	47.0 x 10 ⁻⁶
THERMAL CONDUCTIVITY Cal/sec. cm ² °C at 0°C	500 x 10 ⁻⁴
INDEX OF REFRACTION SODIUM D LINE (589.3)μu EMISSION MAXIMUM 420 μu	1.787 1.838
MELTING POINT °C	621

* P. Brinckmann, Physics Letters, Vol. 15, No. 4, 305, April, 1965.

"Log-type" Crystals:

For 1 metre arc whole body monitoring, using "inert" light pipes of pure NaI to shield against activity in the photomultipliers.



Full details of these new developments and of standard NaI(Tl), CsI(Tl) and LiI(Eu) crystals and Crystal-photomultiplier assemblies on request.

New Low Background

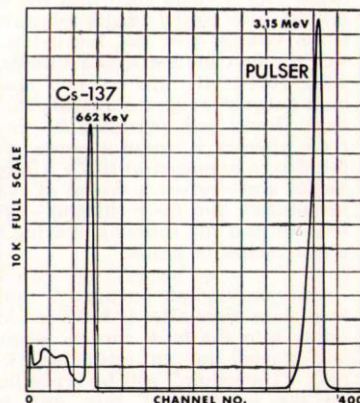
Glass Scintillators:

These have background alpha activities of less than 20 d.p.m. per 100g of glass compared with 100 to 200 d.p.m. per 100g of the standard glass scintillators. They are ideal for neutron spectrometry, time-of-flight work and other applications requiring very low backgrounds. NE 912 contains 8% lithium enriched to 95% in Li⁶, and NE 913 contains 8.5% lithium depleted to 99.99% in Li⁷.

CaF₂(Eu) Crystals: For efficient X-ray or beta particle detection featuring large light output, low beta particle backscatter, low gamma-ray sensitivity, and low refractive index. They can be placed in direct contact with solvents and are stable in high vacuum systems.

PROPERTIES OF CaF ₂ (Eu)	
LIGHT OUTPUT RELATIVE TO NaI(Tl)	30-50 %
DECAY CONSTANT, Microseconds	1.0
DENSITY g/cm ³ at 25°C	3.165
SOLUBILITY	Essentially insoluble in most aqueous solutions, and other liquids.
INDEX OF REFRACTION EMISSION MAXIMUM 420 to 490 μu	1.470

Am²⁴¹ Activated NaI(Tl) Crystals: For use as integral light pulsers in gain stabilisation techniques. A small NaI(Tl) crystal doped with Americium-241 is optically coupled to the primary scintillation crystal and both are sealed into the one container. The pulses from decay of the Americium alpha particles appear between 3-4 MeV on the gamma spectrum. The graph shows the position of the pulser peak relative to Caesium-137.



NUCLEAR ENTERPRISES (G.B.) LTD

Sighthill, EDINBURGH 11, Scotland. Tel: CRAiglockhart 4060. Cables: 'Nuclear Edinburgh'

Canadian Associate: Nuclear Enterprises Ltd., 550 Berry Street, Winnipeg 21.





the

high fidelity

and

components specialists

Ampex, Armstrong, A.K.G., B & O, Cossor,
Decca, Ferrograph, Garrard, Goldring,
Goodmans, Grampian, Grundig, Leak,
Ortofon, Phillips, Quad, Radford, Record
Housing, Reslo, Revox Rogers, Stella,
S.M.E., Thorens, Truvox, W.B. - etc. - etc.

WESTWOODS

46 GEORGE STREET,
Phone OXFORD 47783

**Q.V.F. glass plant & pipeline
is resistant to more chemicals
than any other material.**



Q.V.F. LIMITED DUKE STREET . FENTON . STOKE-ON-TRENT . STAFFS

Telephone: Stoke-on-Trent 32104/8. Grams: Q.V.F. Stoke-on-Trent Telex. Telex: 36120



MORE NEW PRODUCTS

Genevac's policy of continuous expansion now extends the standard product range to include the following:—

- ★ GRS1.—1 c.f.m. SINGLE STAGE ROTARY PUMP
- ★ GRD1.—1 c.f.m. DOUBLE STAGE ROTARY PUMP
- ★ ODPI.—1" AIR OR WATER COOLED DIFFUSION PUMP
- ★ PL44.—1" COMBINED PUMPING UNIT
- ★ TCG. 5 & 6—MAINS OR BATTERY OPERATED THERMOCOUPLE GAUGE
- ★ PRV.—AIR OPERATED RIGHT-ANGLE VALVE
- ★ HVG.—HIGH VOLTAGE GENERATOR & PROBE
- ★ SV20 — $\frac{1}{2}$ " AIR ADMITTANCE VALVE
- ★ SV15.— $\frac{1}{4}$ " MAGNETIC ISOLATION VALVE



THE QUEEN'S AWARD
TO INDUSTRY

FOR ADVANCED INFORMATION SHEETS
ON THESE NEW ITEMS CONTACT—



GENEVAC LTD.

Subsidiary of General Engineering Co. (Radcliffe) Ltd.

PIONEER MILL · RADCLIFFE · MANCHESTER
Tel: RADCLIFFE 3041-2

LONDON OFFICE: 5th Floor, 6 Lambeth Road, London, S.E.1.

MIDLAND OFFICE: 283 Stratford Road, Shirley, Solihull, Warwickshire.

SCOTTISH OFFICE: 15 Moray Place, Edinburgh, 3.

MANCHESTER OFFICE: Heap & Ptrs. Ltd, Royal London House, 196 Deansgate, Manchester, 3.

LIVERPOOL OFFICE: Heap & Ptrs. Ltd, Empire Buildings, Fazakerley Street, Liverpool, 3.

Tel: WATERLOO 2248

Tel: SHIRLEY 4508

Tel: CALEDONIAN 5597

Tel: BLACKFRIARS 0185

Tel: CENTRAL 9532/3

Reynolds & Johnstone Ltd.

17, ST. MARY STREET
WALLINGFORD

Wine and Spirit Merchants

Telephone Wallingford 2035

**WE OFFER A
WIDE SELECTION OF WINES
SPIRITS Etc.**

Case lots available at trade prices

WEDDINGS & PARTIES

*Goods on sale or return
Glasses on Loan free of charge*

DELIVERIES

*Throughout the district weekly
Wine lists & Order forms available
on request*

We shall be pleased to see
Personal Shoppers

Come and browse round

R. G. Bradley and Son

WATCHMAKERS AND JEWELLERS

See our selection of Watches

ROLEX - TISSOT - MARVIN
AVIA - ROAMER - SERVICES
INGERSOLL & HAMILTON

Free Insurance for Rings and Watches
over £10.

208 THE BROADWAY, DIDCOT
Telephone 3113

Established 1857



OVERSEAS REMOVALS

**LOCAL AND LONG DISTANCE
REMOVALS**

**EXTENSIVE, SPECIALLY BUILT
WAREHOUSES for the STORAGE
of FURNITURE**

ESTIMATES FREE

Archer, Cowley & Co. Ltd.

36-39 PARK END STREET, OXFORD

Telephone: Oxford 41061/2

Telegrams: "Removers. Oxford"



TWENTY YEARS' SERVICE

No. 2 MEMBERS OF CONTRACT AND STORES DEPARTMENT, 1966

Back row: left to right

L. Castle — F. W. Broderick — J. L. B. Aldred — J. Catterall.*

Centre row: left to right

C. H. Vincent — J. W. Andrews — L. G. Franks — R. F. Clutterbuck.

Front row: left to right

D. E. Fernback — D. K. Butcher — R. C. H. Raisbeck — R. Hill.

*retired in March, but readily returned to complete the picture.

In coming issues of 'Harlequin' we shall be featuring all who complete twenty years in the Research Group.

If this applies to you, see 'A.E.R.E. News', 8th September for details of photographs, to be taken on Friday, 9th September, of Engineering Division members and of all others on Harwell site, not already photographed for their 20 years' service. Please send your name and Division to the address below.

"HARLEQUIN", G.159, BLD. 77, A.E.R.E., HARWELL, BERKS.

Abingdon Travel Agency Limited

21 MARKET PLACE, ABINGDON
Tel. 138



AFFILIATED
MEMBER

- ★ World-wide Air-Rail-Sea Travel
- ★ Agent for all Coach Travel and Tours
- ★ Have you insured your holiday or travel arrangements ?
- ★ Contact us immediately for your policy
- ★ Booking Office for Abingdon School of Motoring

*For advice and
understanding on all
kinds of Insurance*

*call in the
Man from the
Prudential*



FIRE!

THEFT!

HOLIDAYS!

MOTOR!

LIFE!

RETIREMENT!

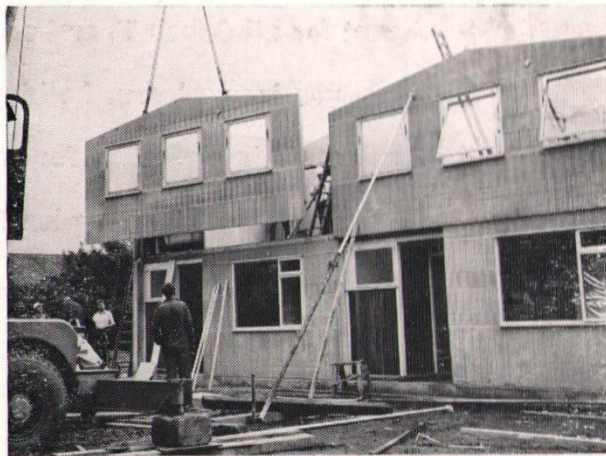
Modus

**top quality
houses . . .
quickly!**

from this..



**to this in
one day ..**



**to a new house
in three weeks!**

Modus, NBA approved system of building,
is available in 2, 3 or 4 bedroom type
houses, bungalows or flats



THE AMEY CHIVERS HOUSING COMPANY LTD 26a OCK STREET, ABINGDON, BERKS. ABINGDON 3868

The Abbey Press, Abingdon, Berks.