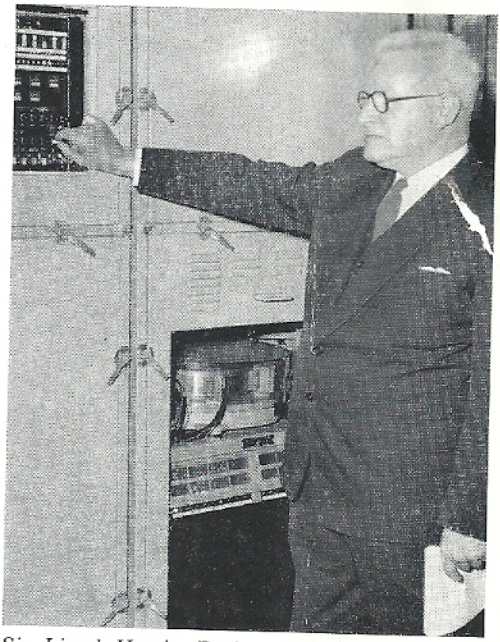
TONE

SPRING 1958 · 3d

The Magazine of AUTOMATIC TELEPHONE & ELECTRIC CO LTD

First call on the new equipment was made by Sir Thomas Eades to Mr. E. Marples, Postmaster-General



Sir Lionel Harris, Engineer-in-Chief of the Post Office, brings the Magnetic Drum Director into service

History made at

LEE GREEN

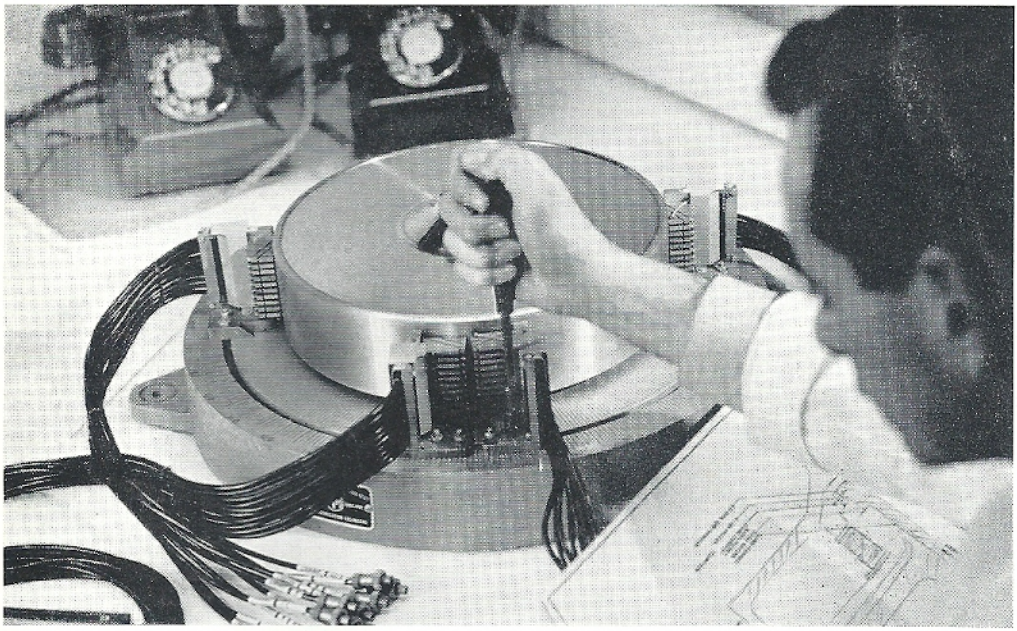
NEW ELECTRONIC EQUIPMENT, which when working at full capacity will be capable of routing over a hundred telephone calls to different destinations simultaneously and is expected to make an important contribution to the Post Office's plans for the widespread introduction of automation, has gone into operation at the Lee Green (London S.E.13) automatic exchange.

The equipment, which was inaugurated by Sir Lionel H. Harris, K.B.E., T.D., M.Sc., M.I.E.E. (engineer-in-chief of the Post Office), is the first of its kind to go into service in this country, and employs a 'magnetic drum' storage device similar to those used in the latest types of computers.

The drum—a bronze cylinder three inches deep and twelve inches in diameter—has a capacity for "remembering" numbers and translating them into routing instructions far greater than the combined efforts of several of the most skilled manual switchboard operators. The drum can make connections more efficiently than its human counterpart, and in order that the rare mistake should not go undetected, supervisory circuits flash alarms whenever something is amiss.

Known officially as the Magnetic Drum Director, this electronic telephone controlling equipment has been developed by Automatic Telephone & Electric Company Ltd and is a noteworthy technical improvement on the existing electro-mechanical equipment in use in London and other large cities throughout the world. Its functions are, however, basically the same—it must "store" the dialled numbers, translate them into routing directions, and ensure that calls are put through in the shortest possible time.

Some 700 different instructions can be stored on the magnetic drum, and from these it is capable of translating any demand for a call into routing data in only one-tenth of a second. This high operating speed gives it many outstanding ad-



The magnetic drum storage device, manufactured by A.T.E., seen in close-up. The drum 'remembers' numbers and translates them into routing instructions with lightning rapidity

vantages over any equipment previously available.

The new equipment will for some time be undergoing extensive field trials, during which its performance in handling public telephone traffic under normal operating conditions will be closely studied.

In his speech at the inauguration, Sir Lionel said: "It is likely that, in general, the various systems of automatic telephone switching providing service to most of the world's 110 million telephone subscribers have now reached a state as near perfection as is permitted by the electro-mechanical methods which they employ.

"Even before the war telecommunications engineers began to see the possibilities of switching without the use of relays and similar mechanisms and, now, with a host of new static devices and techniques at their disposal, the prospects are very real; so real that even though a dated outcome is not clear, neither the Post Office nor industry can afford to neglect their potential".

Sir Thomas Eades referred to the history of telephone development and recalled that, forty years ago, the public were loath to believe that electro-mechanical switches could receive impulses from a dial switch and effect a connection to a called subscriber, entirely without the intervention of a human telephone operator. Now we stood on the threshold of another epoch-making development—the all electronic telephone exchange in which there will be no moving parts but complete silence and lightning rapidity.

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TONE

THE QUARTERLY MAGAZINE OF
AUTOMATIC TELEPHONE & ELECTRIC CO LTD

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Gordon Eadie of Department 683 in the cockpit of a Tiger Moth at Liverpool Airport, Speke

Flying for fun!

Flying club instructor Harry Knight, an ex-fighter pilot, briefs Gordon before a training flight

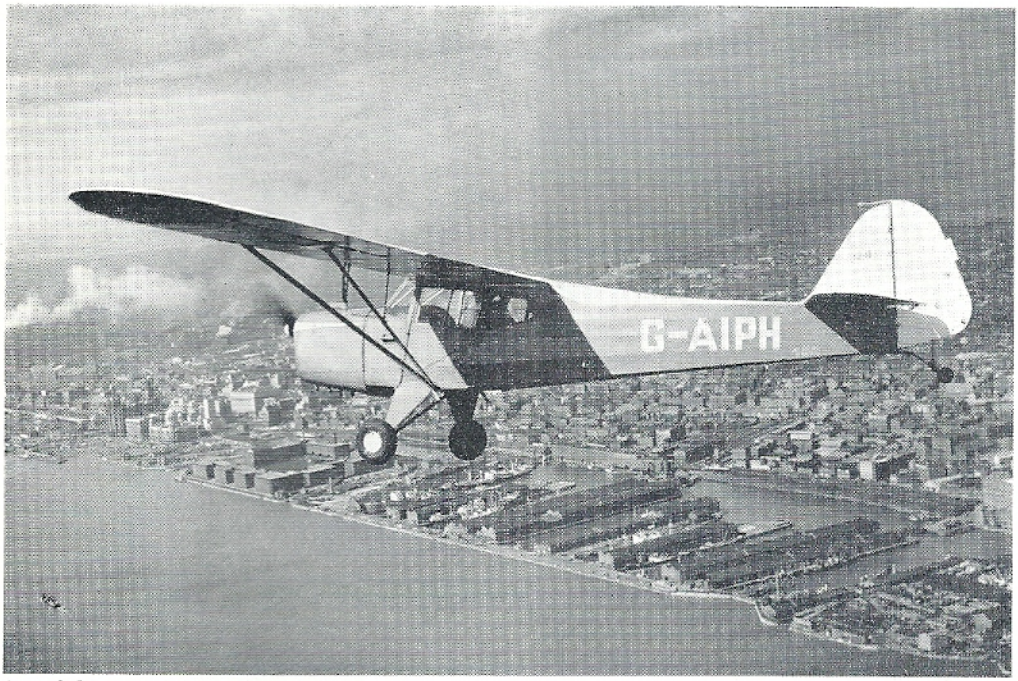
FLYING is no longer a rich man's sport. With suitable aircraft available at less than the price of a lightweight motor-cycle and weekly expert tuition costing the equivalent of a packet of cigarettes per day, the sky is literally the limit. Gordon Eadie's only regret is that he didn't start earlier.

Gordon, a physicist in Department 683 (Laboratory), Strowger Works, Liverpool, reckons he's a pretty average sort. He works a five-day week, studies hard and hopes for advancement like everybody else. A married man, he has a home in Crosby and runs a small car. He smokes, but doesn't drink. A native of Glasgow, he attended both the University College of Cardiff and Glasgow University and served as a captain with the 5th Royal Gurkha Rifles in South-East Asia from 1942 to 1947.

Travelling in a military aircraft on artillery observation duties, Gordon found a new and attractive world, a world of rainbow tints and candy floss clouds, a clean, free, satisfying world, into which only flyers are privileged to venture. Subsequent trips in other Service machines strengthened this interest in aviation. By the end of the war, however, his physique was impaired by dysentery and his nerves to use his own expression—were "pretty badly shot". Flying cured him.

After a spell in insurance, he joined the A.T.E. group, and, in 1956, enrolled as a member of the Merseyside and North Wales Flying Club, whose headquarters are at Liverpool Airport, Speke. Two brothers, Jack and Herbert Green, both keen flyers, run this flourishing organisation. Included on their books are clerks, draughtsmen, engineers, a teacher, a typist and a bus conductor—a typical cross-section of the community. Instructors are Ron Irving and Harry Knight, two ex-fighter pilots. One of their star pupils is a girl.

Few members of the 160-strong club can afford to buy their own aircraft—even when these are to be had as cheaply as £120—and the school maintains its own single-engined machines in which flying instruction is given at, roughly, seventy shillings an hour. Gordon manages to put in about half-an-hour nearly every Sunday, and that's a fair amount of time in the air when you consider that a trip to Blackpool takes only twenty minutes. Gordon estimates his expenditure at one shilling and threepence a minute, and it will cost him about £150 for a private pilot's licence.



One of the aircraft belonging to the Merseyside and North Wales Flying Club pictured against a background of the River Mersey and the Liverpool waterfront and city centre

Ground tuition in navigation, wireless, air control and other allied subjects are included in the club's two-guinea membership fee. Gordon spends most Tuesday nights at airport lectures, film shows and helping in the control tower. He often goes along to Speke in his lunch hours just to see the aeroplanes and "natter flying" with friends.

The friends you make in a club can be very useful, too. If, for instance, a member with his own aircraft is planning a flight to Le Touquet, you may be lucky enough to be invited to go along with him as ballast and, thus, enjoy a cheap Continental weekend. A four-seater machine will provide any amount of nationwide touring at a couple of pounds per hour. All one does is to notify air control of the destinations, Brighton and Bournemouth perhaps, step into the aeroplane, take off and radio instructions are given all the way. It's less complicated, less dangerous, more enjoyable and quicker than any other means of transport . . . and a five-bob aircraft licence lasts for two years.

Is flying difficult? Well, youngsters with no previous experience have been known to take off and fly long distances without damage either to themselves or the aircraft. This sort of thing is freakish and dangerous, naturally. Flying instructors insist, quite rightly, on the highest possible standards before, during and after flights. One mistake in the long, rigorous test for a private licence and you fail.

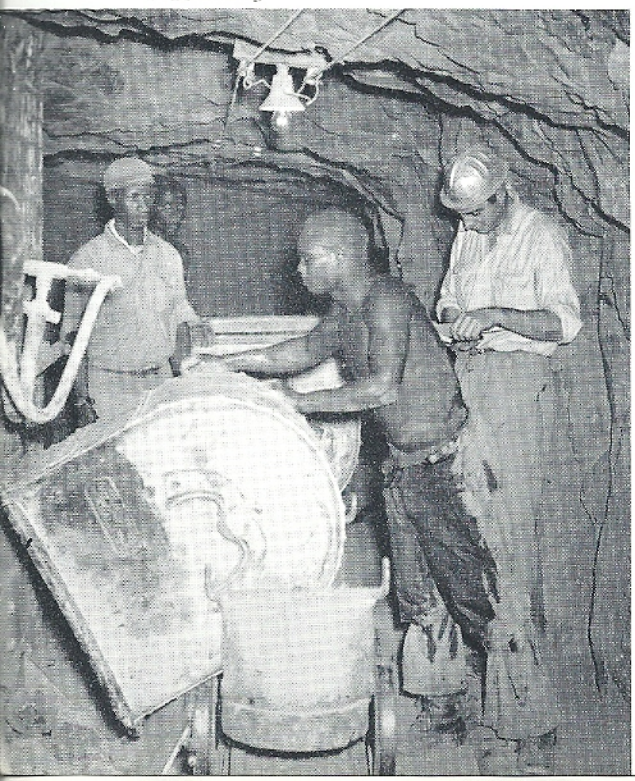
Still, any reasonably intelligent person in good physical condition (spectacles are no drawback) is a candidate for the air. Age is no hindrance either, although you learn faster while you're young.

Forty hours is the present minimum before a person can obtain a private pilot's licence. Many students solo in less than ten hours, although the average is around fifteen. Gordon Eadie believes in doing "a little often" and takes his flying very seriously. For nearly eighteen months he has been building up experience at the controls of Tiger Moths and Auster aircraft and, by the time these words appear, he may decide he is ready to sit for his licence.

"Everything depends on myself, my finances and the weather", he says.

These are the tiny mineral pieces that helped to bring wealth and prosperity to South Africa

An underground scene in the fabulous diamond mines at Kimberley



Golden past-glittering future

SOUTH AFRICA is a country with a long, prehistoric past. So old that many believe it to be the cradle of the human race. Yet only within the past hundred years did two discoveries set the course of the Union's political, racial and economic history—the wealthiest diamond deposits in the world at Kimberley and the great goldfields of the Witwatersrand. As soon as the permanence of these mineral deposits had been established, men and capital began to flow into the country.

Mankind seems still to think of South Africa almost as Stanley wrote of it nearly seventy years ago—interminable forest shutting out the sky, cannibals and adventures with beasts of prey amid the primeval mud of fallen empires—but, today, this vast land mass has one of the most exciting futures in the world. Colossal sums of money and industrial and commercial efforts are being poured into the nation's development.

The Union's thirteen million population includes every colour from the pinky-white of the latest European settler to the ebony black of ancient Bantu tribesmen and cultures that vary from the most highly evolved to the primitive habits of the bush. Cape carts and Cadillacs use the same roads, aircraft frighten antelopes and modern skyscrapers are only a few miles from mud huts in a land of contrasts and contradictions. In an equatorial climate, ice-tipped volcanoes vie in natural beauty with lushly-decorated lakes in which some European countries would be but islands.

Communications are playing an ever-increasing part in the exploitation of South Africa, and the Union has been the A.T.E. group's biggest overseas customer in post-war years. The Union has more than 600,000 telephones and there are more than 70,000 applications for telephones. On the Witwatersrand alone, the automatic system serves about 170,000 lines.

Automatic Telephone & Electric Company have been supplying equipment, through the Union authorities, for the past 25 years, and a fresh landmark in our associations with the country was

reached in December, 1956, when a new factory of Automatic Telephones (South Africa) Limited—a subsidiary company—was opened at Wadeville, Germiston. Sir Thomas Eades, our Chairman, went to South Africa for the ceremony.

The first contract the plant received was for a substantial part of the new City Exchange for Johannesburg, the City of Gold and the great distributing centre for the entire Union. Over 2,000 miles of wire will be used to fulfil this contract. Special components comprising exchange switching apparatus made in Liverpool were assembled on to shelves and racks fabricated from South African steel.

Tool and testing equipment of a specialised nature have been supplied by the parent company, but the greater part of the tools and special handling gear used in South Africa are of local manufacture. Training was given by specialists sent out by A.T.E. from England.

The main building at Wadeville has an area of more than 12,000 square feet and there is a separate spray paint building and a well-appointed canteen. Work has been going on for some time on the wiring of racks and director switches of a new type for the Post Office.

Sir Thomas Eades said that Wadeville was the first factory of its kind in the Union. It was the forerunner of much larger developments which would be of great value to the Government, bringing additional craftsmen and a new technique to the Union.

The objective of this factory was to produce complete automatic exchanges, but, recently, an agreement was jointly concluded between the South African Government and Automatic Telephones (South Africa) Ltd and Siemens Brothers (South Africa) to operate a joint factory. Buildings and land have been purchased in the Springs area, and a new joint factory will commence operations in August or September of this year. All operations previously carried out at Wadeville will be transferred to Springs.

Johannesburg offices of Automatic Telephones (South Africa) Ltd are at Strowger House, 52 Stiemens Street, Braamonfontein, and they have branch offices in Capetown, Durban and Port Elizabeth. Mr. W. O. Passmore, a former member of the Liverpool Engineering Department, is managing director. Associated distributing company is Communication Systems of South Africa (Pty) Ltd, also situated at Strowger House.

Johannesburg, City of Gold, boasts many modern buildings. Above is a skyscraper in Jeppe Street

In sharp contrast to the city's modern architecture, are scenes like the one below—Toby Street

With her dog by her side, this blind girl confidently sets out from her home. No white stick for her.

Mrs. Eileen Rafferty collecting silver foil at our branch factory at Stopgate Lane, Liverpool

INDEPENDENCE RECOVERED

They see again *through the eyes of their friends*

Silver foil helps to buy guide dogs for blind

DO YOU COLLECT silver foil tops from milk bottles? Perhaps not, but many hundreds of people throughout the British Isles hoard these apparently useless items for month after month. Then what do they do with them? Well, if they are charitably disposed, they put the foil in sacks and send the sacks to an address in Yorkshire and the money realised from mass sales helps to buy guide dogs for the blind.

It takes about five and a quarter tons of foil to raise the cost of a guide dog—approximately £260. Five tons of foil represents some *twenty-two million* bottle tops, which, if placed edge to edge, would form a ribbon some 520 miles long—farther than the distance from London to Aberdeen. Sounds an awful lot, doesn't it? But a blind man who lives at Welling in Kent collected nearly twenty tons of foil, the sale of which raised £450. He performed this formidable task out of sheer gratitude for the benefits he has derived from having his own seeing-eye dog, Sandy.

Girl Guides and Scout groups, cinema clubs, women's institutes and large industrial concerns, such as our own, are among the many voluntary collecting centres which are helping to provide greater freedom for the sightless. Our Stopgate Lane branch factory in Liverpool, for instance, has been playing a valuable part in the scheme for more than two years. Here, Mrs. Eileen Rafferty, an assembly group leader, collects parcels of foil and silver paper from many parts of Britain. Parcels are sent to her from people at Strowger Works. Mrs. Rafferty's donations are sent to the Guide Dogs for the Blind Association through their local organiser, Mr. R. P. Jones, of Park Road, Wallasey. Mr. Jones told *Tone* that Stopgate

Lane is one of the most enthusiastic industrial groups in the scheme. "We are very grateful for their efforts on behalf of blind people", he says.

If you were blind, would you think a few hundred pounds an excessive price for a new pair of eyes? There is no figure—in pounds, shillings and pence—that can measure the value of a guide dog to a blind man or woman, and no blind person is asked to pay more than a nominal sum for the dog.

Before any dog can safely be trusted with the care of a blind person, it needs careful and skilled training. Principal breeds used are alsatians, collies, retrievers, labradors and boxers. Any dog which is large enough can be trained, provided it has the right temperament and willingness for the work. It is taught the meaning of four basic commands—forward, sit, right and left—but it must learn also to disregard these orders if traffic or obstructions are in the way. It learns to sit at all kerbs and always to cross roads at right angles. Dogs are colour blind and they have to be taught to recognise the meaning of road traffic signals by the *position* of the illuminated lanterns, not the colour.

The Guide Dogs for the Blind Association, which receives the support of bodies such as St. Dunstan's and the Royal National Institute for the Blind, is the only organisation in Britain carrying out the skilled work of training. The organisation started locally, in Wallasey, in 1934, and now has training centres at Leamington Spa and Exwick, but the supply of animals has not yet caught up with the demand. Today there are about 250 blind people on the waiting list. Dogs must also be trained as replacements for those which die or grow too old.

Not all blind people, unfortunately, can learn to work with dogs. Old folk and those under 18 are not suitable trainees. But there are still hundreds, probably thousands, of blind people who could find new independence through these dogs. It takes three or four months to train each "unit" of dog and owner. The owner must be taught how to hold the handle and how to interpret the movements of the dog.

And what are the feelings of a blind person who is fortunate enough to enjoy the freedom which a well-trained dog can bestow? A Liverpool woman, whose job is a masseuse, has been blind since she was four years old. After "seeing" through the eyes of an animal for more than six years, she declares: "A guide dog is the most wonderful treasure a blind person can possess. My dog, Bess, does her job more thoroughly and with more pleasure than any human I know. She takes me out shopping, to the homes of patients and for long walks.

Dog and owner work together with perfect understanding even in the busiest city streets
Photographs from "Illustrated"

"As we pass swiftly along I frequently hear arguments as to whether or not I am blind. Children stop me to ask if I am. Guide dogs bring that for which most blind persons crave . . . independence.

"My dog is the most precious thing in my life".

April Showers Girl

"April Showers" girl pictured on the front cover of this issue is twenty-two-year-old Miss Sheila Laird, who has been with A.T.E. for nearly two years. Sheila works on wiring in Department 67, City Factory, Liverpool.

Arthur Breeze, an apprentice draughtsman at Strowger Works, was invited to play in the trombone section of the National Youth Orchestra during their recent performances in Birmingham

PICK OF THE TALENT

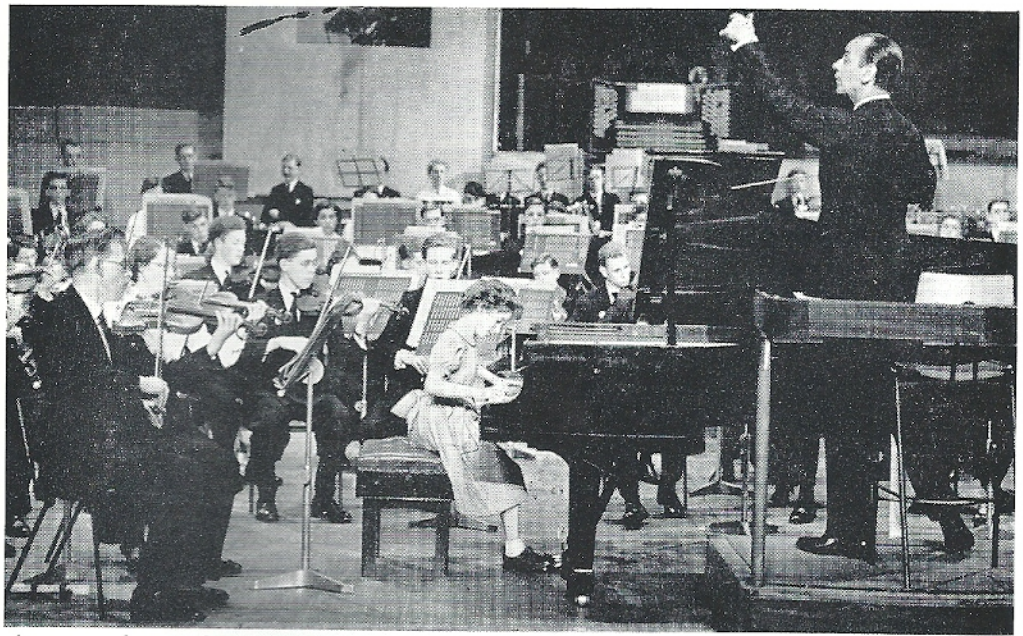
The story of the National Youth Orchestra

THE NATIONAL YOUTH ORCHESTRA of Great Britain was founded in 1947 to further the musical education of the most talented and promising young musicians in the British Isles. Musicians of from 13 to 18 years are given the opportunity of working together as a full symphony orchestra under the direction of distinguished conductors. They are able to study individually, and in sections, under well-known teachers, so that they may achieve a really high standard. Moreover, they can attend classes in rudiments, harmony, composition and conducting and hear recitals given by some of the finest instrumentalists in the country.

Selections for inclusion in this 140-strong orchestra are on the results of auditions held in candidates' home towns. It is a tribute to the skill of eighteen-year-old Arthur Breeze, an apprentice draughtsman at Strowger Works, Liverpool, that he was invited to play in the trombone section when the orchestra met in Birmingham, recently. Arthur spent a week rehearsing in the Midlands with the pick of the nation's young musical talent and played with the orchestra during two big public concerts (pieces that figured in the programme were televised). He also played during a recording session for the British Broadcasting Corporation. The experience has certainly been one of the most exciting chapters in his young life.

Arthur is softly-spoken and of a studious temperament and makes light of his ability as a musician. He has been with A.T.E. since leaving Sefton Park Secondary Modern School, Liverpool, at the age of 15. He has trained, so far, in Department 44 (Test Sets), Department 651D (Main Drawing Office) and Department O6 (Power Equipment). He attends day school with the object of gaining his National Certificate in Engineering and puts in one night a week studying English language at an evening institute. The remainder of his free time is devoted exclusively to music.

Arthur claims no family tradition of music-making (although there is at least one link, a younger brother who plays the cornet in a brass band) and he took up the trombone quite casually



A young and very talented concert pianist rehearses with the orchestra under the guidance of Sir Malcolm Sargent, one of many famous conductors who assist youthful musicians [B.B.C. official photograph

while still at school. Liverpool Education Committee provided the school instruments and Arthur, encouraged by his music teacher, progressed rapidly. He took a city studentship and won three years' free tuition, being given Mr. J. Sephton, of the Bluecoat School, as his mentor. He takes a practical lesson and a lesson in theory every week.

He is now a member of the Merseyside Youth Orchestra and also a member of the Matthay Orchestra. He practised for a time with the A.T.M. Works Band and is currently playing with Edge Hill (British Railways) Brass Band. Brass bands and orchestras may seem a rather strange mixture, but Arthur Breeze enjoys both. His other free-time engagements include rehearsals at the Philharmonic Hall with the Merseyside Youth Orchestra under the conductorship of Mr. William Jenkins; and music lessons from Mr. F. Cook, trombonist in the Royal Liverpool Philharmonic Orchestra.

Arthur received word that he had qualified for the National Youth Orchestra in October last year. Two years ago, he was a reserve. The orchestra's Easter Course will be held in Ireland, and will include concerts in Cork, Dublin and Belfast. In 1959, it will go to Germany to undertake a tour which had to be cancelled last year.

The orchestra enjoys the patronage of Queen Elizabeth, the Queen Mother, and is under the presidency of Sir Malcolm Sargent, with Sir John Barbirolli, Sir Arthur Bliss, Dr. Reginald Jacques and Mr. Walter Susskind as vice-presidents. Miss Ruth Railton is honorary musical director and the conductor at Birmingham was Mr. Malcolm Arnold. There are no full-time music students in this orchestra and a British work is included in every programme. Contemporary composers have honoured it by writing works especially for it: Mr. Malcolm Arnold on two occasions, at the Bath Assembly in 1948, and for the visit to Paris in 1950; Mr. Benjamin Frankel in 1952 and for the Edinburgh Festival in 1956 and Mr. Richard Arnell in 1953.

Several past members of the National Youth Orchestra have been fortunate enough to gain posts in symphony orchestras without training at one of the recognised schools of music, but Arthur Breeze has no delusions and no ambitions in this respect. He just *enjoys* music.

Mr. A. F. Bennett, a Director of the company, making the inaugural address to the newly-formed A.T.E. Telecommunications Society at Strowger House, London, recently

Seventy-three years reviewed

THE STORY of the growth of Automatic Telephone & Electric Company, from its earliest days in 1884 until its present position as one of the leading suppliers of telecommunications equipment throughout the world, was the subject of the inaugural address given to the A.T.E. Telecommunications Society by Mr. A. F. Bennett, C.B.E., M.I.E.E., at Strowger House, London, recently.

Mr. Bennett, a director (and former General Manager), has had thirty-seven years' service with the organisation, and, in the words of Sir Alexander Roger, he is one of the great names in the telephone industry. His unique store of personal experiences, technical and commercial information and keen interest in the personalities and events of our branch of science attracted a large audience that included representatives from every part of the group.

The A.T.E. Telecommunications Society is intended only for staffs of companies within the A.T.E. group in London, but this first paper proved so popular and informative that requests have been received for Mr. Bennett's address to be repeated for the benefit of other areas. Mr. F. O. Morrell (Director, Engineering) and the society's chairman, introduced Mr. Bennett, and said that the tremendous interest in the subject was demonstrated by the numbers attending that evening.

Mr. Bennett carried out his personal review of seventy-three years of telecommunications history by highlighting selected events, achievements and negotiations (in chronological order) involving the group. He emphasised at the outset that the real history had been written by the men who had worked for the organisation. Throughout the address, he recalled many of the names of those who had helped—and those who still do help—to make it flourish.

He began by sketching the character and atmosphere of the old Telegraph Manufacturing Company at Helsby, the establishment of an

instrument-making branch in Liverpool city centre in 1897, and the eventual move to Milton Road, Edge Lane, in 1903. After pointing out the part played by Dane Sinclair, formerly chief engineer of the National Telephone Company, in introducing the manufacture of telephone equipment, Mr. Bennett then showed how "Liverpool began to go abroad" with installations in both China and Australia as early as 1909.

The year 1912 saw the formation of Automatic Telephone Manufacturing Company, with Dane Sinclair as managing director, and the purchase of the Strowger patent rights from Chicago. It was in this year, too, that Sir Thomas Eades, now Chairman, joined the company.

Mr. Bennett outlined industrial resources in the years before the first World War, the wartime contribution and the period of readjustment immediately following. He then went on to describe, in some detail, the important negotiations, agreements and personalities involved in introducing the Director System in the early 1920s.

No man within the organisation speaks with more authority on this particular aspect of company business. It was Mr. Bennett himself who conceived the combination of register/translator with standard Strowger equipment, and it was he who was largely instrumental in securing the adoption of the Director System by the Post Office. He helped iron out many of the national and international problems relating to our equipment.

The A.T.M. gained immense prestige by the Post Office's eventual acceptance of Director equipment in London. Mr. Bennett praised the courage and foresight of Sir William Noble, who was engineer-in-chief of the B.P.O. during the critical period from November, 1921—when the idea of the Director was conceived—to 31st May, 1922. The Director System for London was adopted by the B.P.O. in August, 1923, and deliveries began in 1925. American interests in the Liverpool organisation ended in 1935 when shares they held were sold and A.T.E. became wholly British.

It was in this year that the Post Office adopted the Strowger 32A two-motion switch mechanism (re-naming it later the Type 2000), and Mr. Bennett emphasised the effects which this and the Director had on sales abroad. Moving lightly over the period of the Second World War, he then touched on post-war experiments with crossbar

Mr. Bennett pictured during a Home Guard inspection at Liverpool in 1941

systems, development of motor-uniselectors and our interest in electronics at Liverpool, Taplow, Hivac and Bridgnorth.

He also mentioned Company interest over the years in mine-signalling, electrical appliances, wireless receivers, train signalling, fire alarms, loading coils, remote control and ripple control, carrier, totalisators and traffic signals, then reviewed the size and scope of the group as a whole.

He gave figures showing how the organisation has grown from a few hundred employees and a few thousand square feet of manufacturing space in 1903 to an undertaking with more than fifteen thousand on its payroll and nearly one and a half million square feet at its disposal.

A vote of thanks to Mr. Bennett was proposed by Sir Alexander Roger and seconded by Mr. C. O. Boyse, Managing Director. Replying, Mr. Bennett said that during his long association with the company he had always been warmed and encouraged by the men who had worked with him. These men had inspired in him a real sense of "belonging".

We'd like you to meet . . .

Using call sign G3 MCN, **Harry James,** a bank wireman in Department 24 at Strowger Works, has contacted most parts of the world in six years as an amateur radio enthusiast. He has even spoken to Antarctica. **R. G. Yearwood,** Contracts Department, Bridgnorth (G3 KGY) is another of the many enthusiastic radio amateurs within the A.T.E. group.

* * *

A silver medallist of London College of Music and winner of a musical studentship, **Betty Totten,** comptometer operator, Accounts Department, Strowger Works, has been awarded the London Academy of Music and Dramatic Art's gold medal for acting. Her test piece: portraying Queen Elizabeth. She is a member of Liverpool Playgoers' Club.

* * *

John Hawkins, foreman, 21 Raw Material Stores, is one of 30 tricyclists on Merseyside, of whom at least five are A.T.E. employees. A member of Liverpool Century Road Club and the Tricycle Association, he has competed in time trials and other events and has toured all over Britain on three wheels.

* * *

A former variety artiste who has topped theatrical bills and appeared in films, once shared greasepaint with people like Tommy Handley, Ted Ray and Ben Lyon. He is **Frank Valerio,** Plant Department, Strowger Works. Frank's act used to precede that of Gracie Fields when she appeared at the London Palladium.

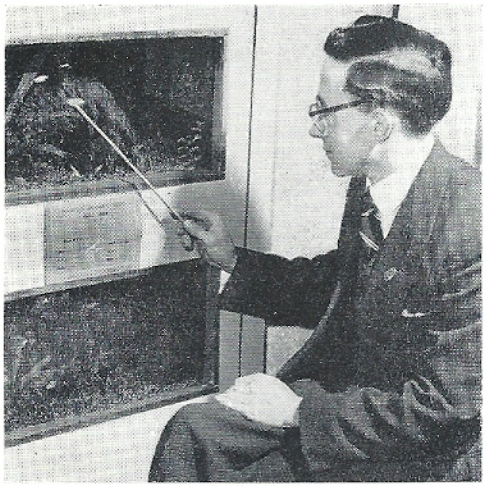
* * *

A racing motor-cycle mechanic, duck hunter and coarse fisherman is **Eric Turner,** sheet-metal worker at A.T. & E. (Wigan) Ltd. His best fishing story? Hooking a two-pound pike and seeing a forty-pound specimen snatch away his prize and line.

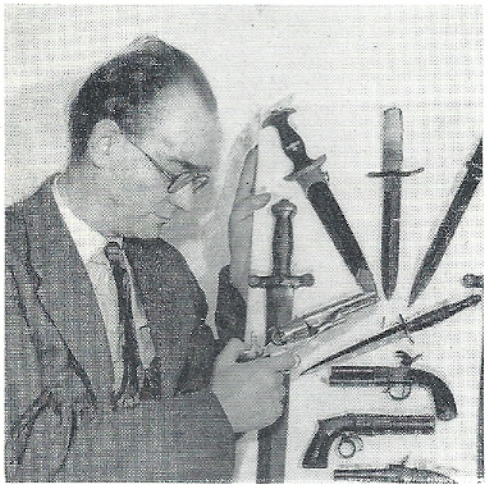
Harry James—radio amateur

Betty Totten—amateur actress

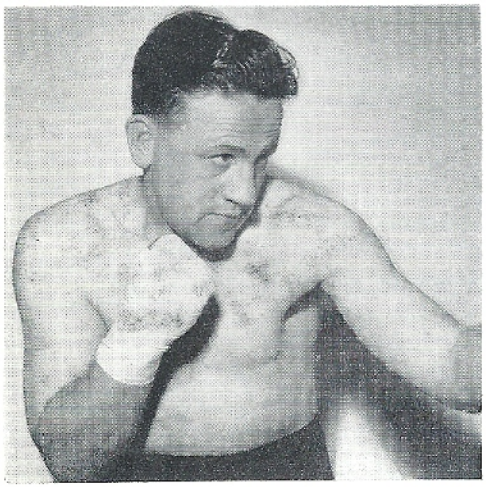
John Hawkins—tricyclist



Eric Birchall—fish breeder



Glen Douglas—ancient pistols



Jimmy Brown—boxing star

A Strowger Works electrician, **Eric Birchall,** had been breeding tropical fish for only six months when he took first prize at a Liverpool show for exhibiting a red swordtail. As a member of Merseyside Aquarists' Society, he regularly attends their meetings.

* * *

Glen Douglas, fitter, Plant Department, Strowger Works, collects ancient swords, bayonets and daggers. One of his show pieces is an early Colt revolver of the type used by the U.S. Army in the Indian wars.

* * *

Norbert Morgalla and **Geoff Forshaw,** Electronic Switching Development, Exchange Laboratories, work side by side, yet rarely talk about the war years when they carried on widely differing activities. Mr. Morgalla was a member of the Polish underground movement working in direct radio link with London—right under the noses of the Germans—while Mr. Forshaw, an Arizona-trained pilot took part in several bombing missions over Germany.

* * *

Harold Taberner, Assembly, Wigan factory, is known to a wide circle of music lovers as a member of an amateur string quartet which delights audiences in Wigan, Warrington and Manchester. He trained at Manchester School of Music and plays on a treasured 200-year-old Italian violin.

* * *

Eric Bentley, Inspection, Department 24, is resident vocalist at the Tower Ballroom, New Brighton, and has made ten broadcasts, and a television appearance in "Holiday Town." He is also an accomplished master baker.

* * *

Bob Gibson, wireman, Department 44, is an accomplished sketcher and painter of Japanese murals. He took up this craft seriously following nearly five years in three Japanese prison camps after being torpedoed from H.M.S. *Exeter* in the Java Sea. He also writes stories.

* * *

Jimmy Brown, Test Sets Department, Strowger Works, once defeated the Burmese flyweight boxing champion in two rounds. Jimmy, a former R.A.F. instructor, is now vice-chairman of the Professional Boxing Association (northern area) and he annually represents the Boxers versus Wrestlers at Stanley Stadium, Liverpool.

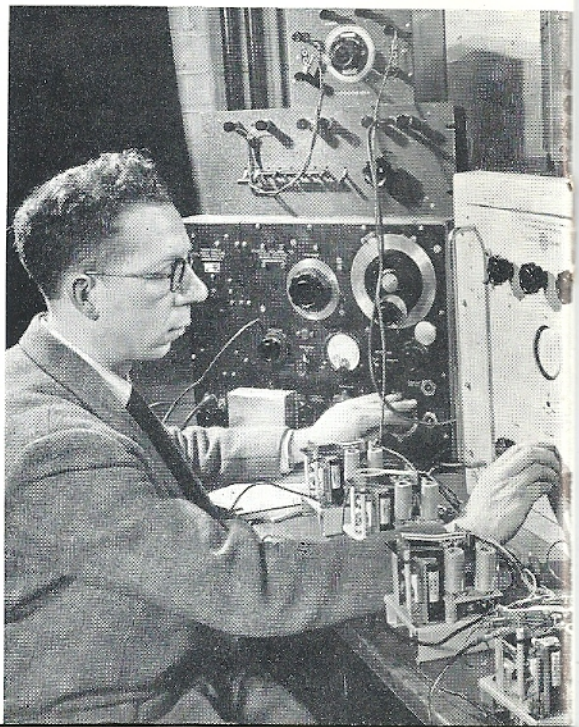
Number nine in a series

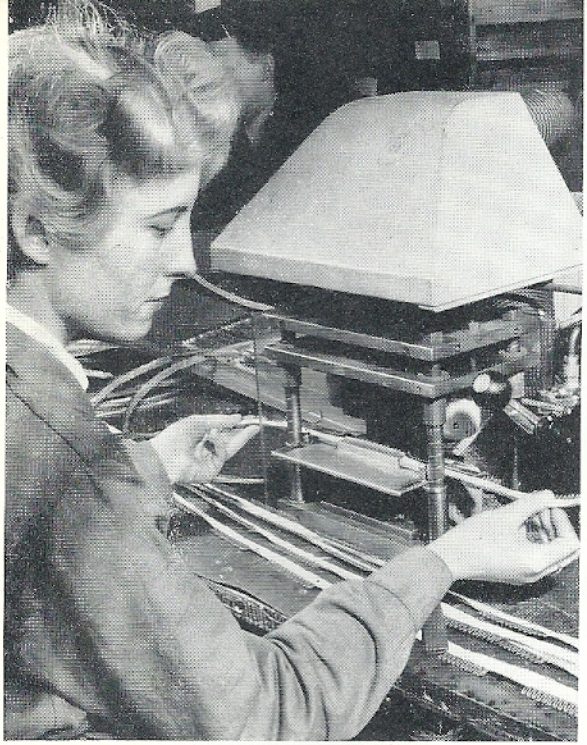
Portraits of an Industry

Father and son were talking to a friend on a bus one morning. "I'm on my way to work," explained the father, "and I'm taking along my boy. He's going for an interview for his first job". "Work in the Auto don't you?" the friend inquired. "That's right. Been there all my working life," answered the father. The son then revealed that he was keen to secure 'a job with a future' and was quite confident in accepting his father's recommendation. A simple little episode really, but there is an encouraging moral to it. Our organisation is, and always has been, proud of its traditions of long service, family associations and opportunities for advancement. We believe that a man can pay no higher compliment to his employers than advising a youth to follow a similar occupation. The telecommunications industry recognises this implied trust and endeavours to provide every facility for technical and professional advancement so that ambitious young people may find what they so earnestly seek—jobs with futures.

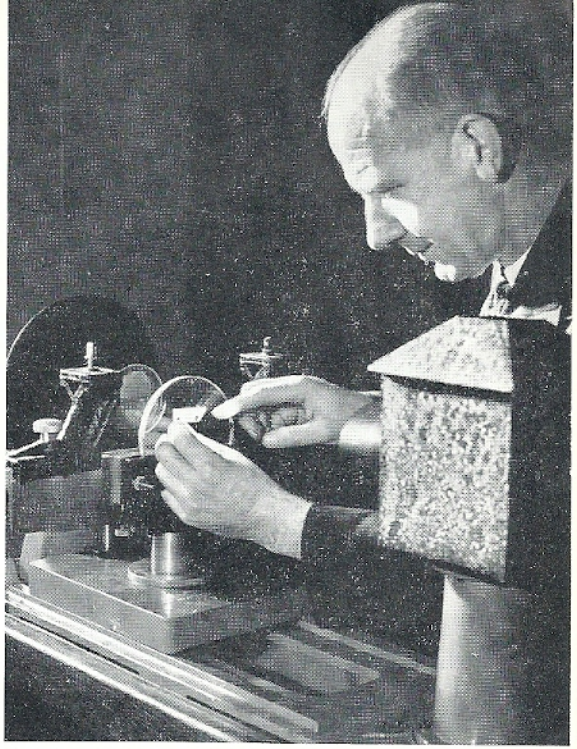
A stage in checking dial repeaters

Amplifier testing in Transmission Division



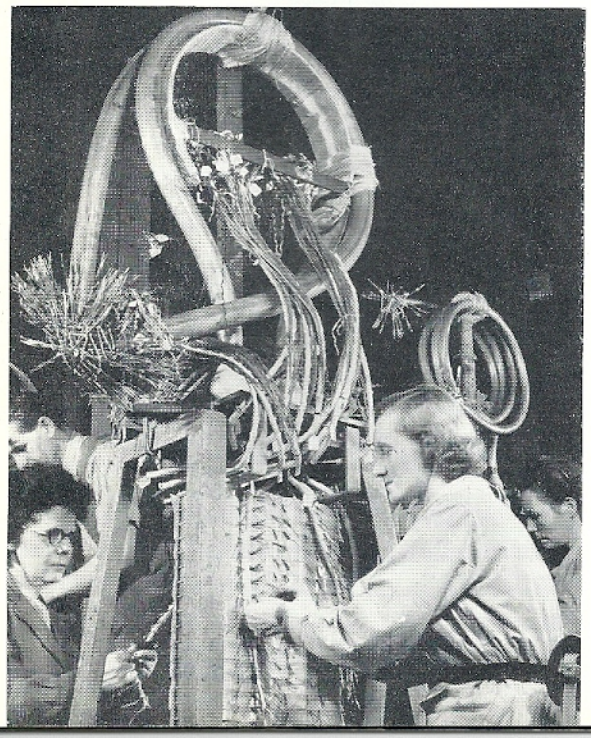


Machine stripping of PVC insulation

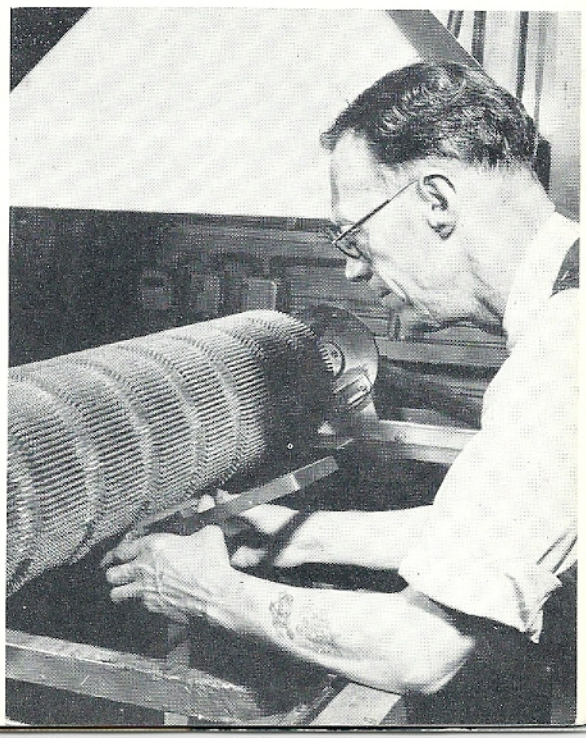


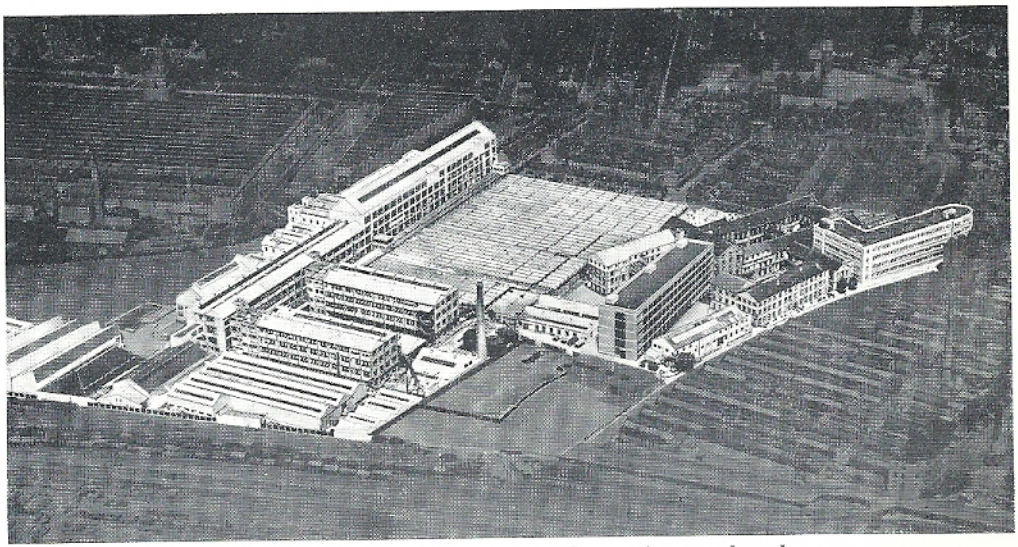
Profile inspection in the Gauge Room

Part of the manufacture of loading coils



Mass soldering of motor uniselector contact banks





All employees at Strowger Works should be able to answer the questions posed on these two pages

Telecommunications Quiz

How well do you know your industry?

HOW MUCH DO YOU KNOW about your industry, your firm, your firm's history, its personalities and its products? How observant are you? How good are you at both estimation and deduction? Well, here's your chance to find out. . . . See how many of the following questions you can answer correctly.

All have some connection with telecommunications. Place a tick or a cross against your choice of answer to each question, then turn to page 22 and check your results. It is appreciated that employees of the A.T.E. group of companies working *outside* Liverpool may not be familiar with Strowger Works, on which we have based some questions. They'll just have to guess! Many questions have been based on information published in earlier editions of this magazine.

Ratings are:	All correct	... *Brilliant.*
	Above 15	... *Very Good.*
	Above 10	... *Good.*
	Above 5	... *Fair.*

1. Who is officially credited with the invention of the telephone?

(a) Thomas A. Edison. ☐
(b) Alexander G. Bell. ☐
(c) Almon B. Strowger. ☐

2. Approximately how many telephone exchanges are there in Great Britain and Northern Ireland?

(a) 300. ☐
(b) 3,000. ☐
(c) 6,000. ☐

3. The British Post Office ordered its first automatic exchange from us in which year?

(a) 1908. ☐
(b) 1912. ☐
(c) 1927. ☐

4. Every gate at Strowger Works is numbered as an aid to fire-fighting. What is the colour scheme used for these numbers?

(a) Red on white squares. ☐
(b) White on red squares. ☐
(c) Black on white squares. ☐

5. Desk telephone instruments made and used by A.T.E. stand on non-skid rubber legs. How many legs are there on each instrument?

(a) Four. ☐
(b) Five. ☐
(c) Six. ☐

6. What is your estimate of the insurance value of publications held by A.T.E.'s Technical Library at Strowger Works last year?

(a) £7,000. ☐
(b) £17,000. ☐
(c) £27,000. ☐

7. The operating speed of automatic telephone dials is measured in "impulses per second". Our equipment is designed to operate at any speed in which of the following ranges?

(a) Seven to 13 impulses per second. ☐
(b) Ten to 17 impulses per second. ☐
(c) 400 to 500 impulses per second. ☐

8. What is the telephone number of Strowger Works?

(a) STOneycroft 4830. ☐
(b) STOneycroft 4380. ☐
(c) STOneycroft 4803. ☐

9. What is the production cost per copy of this threepenny house journal?

(a) Twopence-three-farthings. ☐
(b) Tenpence. ☐
(c) 1s. 7½d. ☐

10. Our automatic desk telephones are six inches in height, nine inches wide and seven and three-quarter inches deep. What is the weight?

(a) 4 lbs. ☐
(b) 5¾ lbs. ☐
(c) 6 kilograms. ☐

11. All but two of the letters of the alphabet are to be found on the dials of modern automatic telephones in G.P.O. booths. Which are two letters missing?

(a) Q and X. ☐
(b) X and Z. ☐
(c) Q and Z. ☐

12. Comedian Ted Ray is only one of the now famous entertainers who used to work for A.T.E. Which of these British film stars, who uses his correct name, is a former member of Department 15 at Strowger Works?

(a) John Mills. ☐
(b) John Gregson. ☐
(c) Jack Hawkins. ☐

13. Bridgnorth, Shropshire, is the home of one of the companies in the A.T.E. group. The town is proud of its special description. What is that description?

(a) Little England. ☐
(b) Queen of the Severn Towns. ☐
(c) The Gateway to Beauty. ☐

14. The County Borough of Wigan, home of another member of the A.T.E. group, has a coat of arms which includes two lions guarding a castle and crown. What is the motto under the crest?

(a) Ancient and Loyal. ☐
(b) Industria Ditat. ☐
(c) Strength and Ability. ☐

15. During the Second World War, this company produced a great deal of equipment for the armed services. How many shell fuze caps do you think we produced during the FIRST World War?

(a) One million. ☐
(b) Two million. ☐
(c) Three million. ☐

16. Every large industrial organisation, such as our own, is required by law to employ a certain percentage of registered disabled people. What is that percentage?

(a) Three per cent. ☐
(b) Two per cent. ☐
(c) 0·5 per cent. ☐

17. Who have been our biggest overseas customers since the war?

(a) South Africa. ☐
(b) Australia. ☐
(c) India. ☐

18. How many gallons of oil a month do you estimate are reclaimed from metal shavings from the various machines at Strowger Works and the Liverpool branch factories?

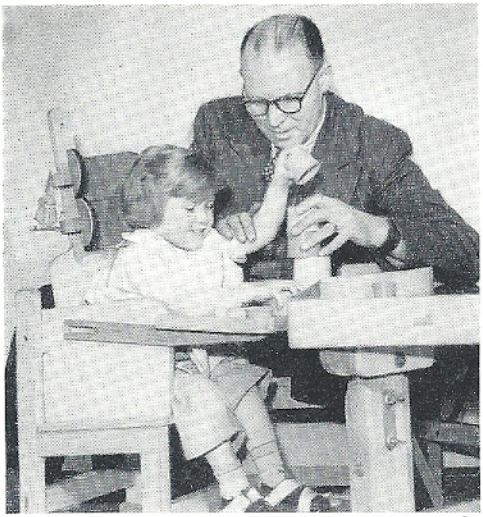
(a) 175 gallons. ☐
(b) 800 gallons. ☐
(c) 2,000 gallons. ☐

19. "Whitfield" is the headquarters of A.T.M. Sports and Social Organisation. How big is this estate in Roby Road, Roby?

(a) Six and a half acres. ☐
(b) Sixteen acres. ☐
(c) Sixty acres. ☐

20. In the visitors' book at Strowger Works appears the name of one of the following:

(a) Caruso. ☐
(b) King George VI. ☐
(c) Sir Winston Churchill. ☐



Stan Oliver pictured with one of the youngsters who use Spastic chairs at Alder Hey Hospital, Liverpool

The Good Samaritans

AMIDST ALL THE PUBLICITY surrounding the opening of Liverpool's first centre for Spastic children in 1957, one brief paragraph in the centre's annual report might have been overlooked.

A member of the hospital staff teaches a boy to walk with the aid of parallel bars apparatus

It referred to the gift of eight Spastic chairs from a group of Edge Hill men.

One of these men, Stan Oliver, a painter in Department 24, Strowger Works, Liverpool, was a founder member of the group which regularly provides large cash sums, medical equipment and "extras"—the latest is Easter eggs—for some 80 Merseyside children attached to the centre.

To understand Stan's interest in Spastic children it is necessary to go back almost three years to a cosy Edge Hill bar parlour. Stan and his brother-in-law, Eric Baker, are joking with a 'teen-age youth who is taking around a collecting box for the Spastics' national organisation. The boy and his collecting box are a familiar sight to the two men, but on this particular occasion it strikes them that it is a painfully slow way of raising money for such a worthy cause. More effort seemed to be called for. Stan and Eric talked over the matter privately before calling together interested people. The enthusiasm shown at that meeting proved no mere flash in the pan. Today, nearly three years later, interest is still at a peak and meetings are held every Sunday.

Stan explains: "We felt that our activities must be centred on local Spastic children, of whom there are at least 180 on Merseyside. If we could see them occasionally, provide a party at Christmas and little gifts at Easter and medical equipment to help them overcome their disability, we felt that donations would be more freely given than if money was sent direct to a national fund".

The term Spastic is applied to people who suffer from cerebral palsy of varying degrees of severity. Sometimes it is hardly noticeable and a young patient is able to attend a normal school. The worst sufferers have difficulty with speech and cannot walk or use their limbs.

On Merseyside there are two officially-sponsored centres for Spastic children, one at Clatterbridge, Wirral, and one at Alder Hey Children's Hospital, Liverpool. The latter was opened in June, 1957, at a cost of £2,500. It is fully-equipped to meet the educational and recreational needs of the children and is staffed by a team of specialists. On the day it was opened, the Edge Hill men made a magnificent gesture by donating eight Spastic chairs to the new centre. The large, bright room of the centre, with its pastel colour scheme, its frieze of colourful pictures and cut-outs, and toddlers' push-along toys, looks like part of a well-equipped nursery. But a glimpse of a physio-

Stan Oliver and his friends are regular visitors to the local Spastics centre where they provide many extras, such as Easter eggs and Christmas gifts, for the handicapped children

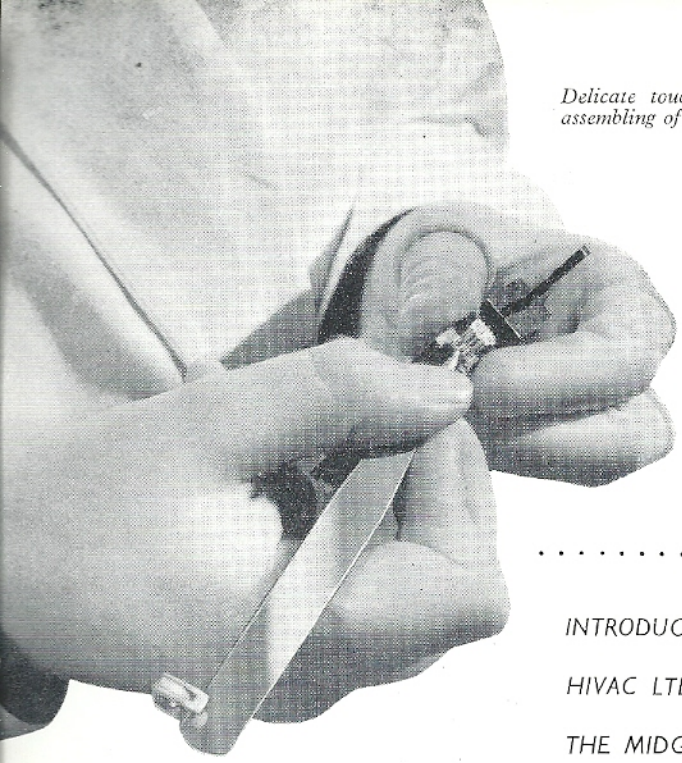
therapist manipulating a child's limbs in front of a posture mirror or an occupational therapist showing a youngster in a wheelchair the rudiments of weaving, quickly dispels first impressions.

Here, in this room are the Spastic chairs. Five-year-old Susan is a typical user. Before the Spastic centre was opened and special chairs became available for her and others, Susan could only lay flat on her back. Now, well supported by the chair, she is able to sit up and can play with toys and take a lively interest in what is going on around her, thus aiding her mental development.

Hospitals—like people—are often short of money to provide "extras". First-rate medical staff and the most up-to-date equipment is supplied by the State, but whose responsibility is it, do you think, to alleviate the anxiety of a mother whose Spastic child has reached a stage where he can grasp a special bar in his own home and learn to walk—if that bar is available ? It is not the hospital's responsibility to provide one, and the mother, in this particular case, could not afford the cost. A small sum of extra money was available—thanks to the Spastic Children's Fund—for this and other hardship cases, and the bar is being fitted.

It is knowledge of cases like this that gives added impetus to Stan Oliver's spare-time efforts on behalf of the children. He helps organise collections, raffles, donations and socials. The work takes up most of his leisure hours. Once, he took an interest in photography, but now you'll find him more engrossed in another pursuit. He knows many of the children attached to the Alder Hey centre personally, and the older ones often write him notes thanking him for gifts, such as occupational toys.

Stan's own colleagues in Department 24, one of Strowger Works' largest departments, are among his most generous subscribers. In the past eighteen months, they have helped swell the total of cheques paid over to the secretary of the Hospital Management Committee to £235. In many other departments throughout the A.T.E. group of companies, employees contribute towards and work for this very deserving cause. They also realise that no effort or expense is too great if, somewhere, a handicapped child can be taught to live a full, normal and healthy life.



Delicate touch is essential in the assembling of miniature valves

GIANTS

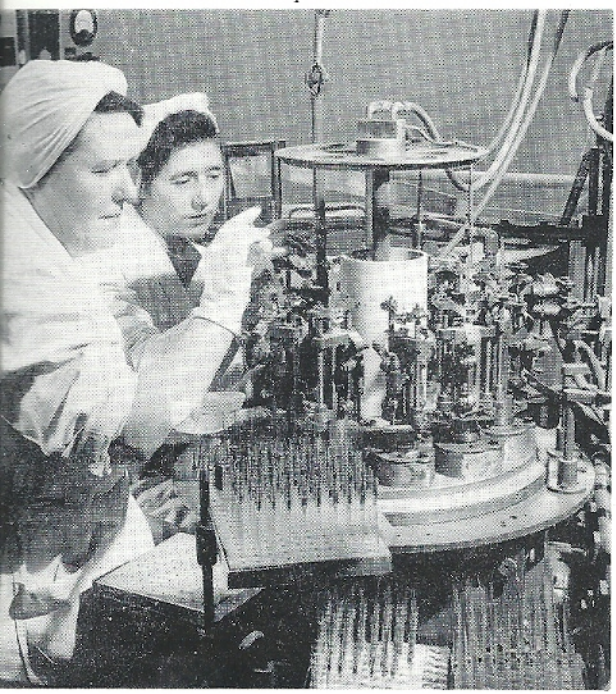
in miniature

INTRODUCING

HIVAC LTD PIONEERS OF

THE MIDGET VALVE

Below: Evacuation process at Hivac Ltd.



WITH THE GROWING USES of electronics in industry and their many other applications, demands upon British manufacturers to supply components of an ever-increasing accuracy and reliability are becoming greater year by year. Among key products in this Electronic Age, are valves and associated components such as transistors and cold cathode tubes.

From its inception, Hivac Ltd., a member of the A.T.E. group, has pioneered the manufacture of miniature and sub-miniature valves. The company was, in fact, the first to design and manufacture types small enough for use in earliest portable radios and hearing aids.

Hivac's premises include a new factory at South Ruislip, Middlesex, which incorporates revolutionary features, and is the most advanced of its kind in the world. Here, cleanliness is the watchword.

Producing the very small, but highly efficient components, involves such extreme mechanical control and absolute chemical cleanliness that every possible precaution has to be taken to maintain spotless working conditions. Atmospheric pressure throughout the air-conditioned assembly shop is kept above normal to ensure that no dust

can enter, and girl assemblers are provided with nylon headscarves and white overalls. As a precaution against a girl's temptation to use her powder compact, handbags are banned from the working area. They have to be deposited in special individual lockers before work begins.

Polished wood-block floors are another factor in the war against dust. To dispense with dirt-collecting stanchions and roof-girders, the barrel-vault type of roof construction has been adopted. Electricity, gas, water and other essential supplies are fed into the main assembly section from a specially-constructed basement level.

An inspection of the minute components that go to make up a modern sub-miniature valve is sufficient to convince the most sceptical that rigorous precautions are necessary. The fine tungsten filaments—thinner than a human hair—grids and other components must be handled with deft-fingered skill at all stages of assembly. Although every precaution is taken to keep the assembly area at the highest degree of cleanliness, so stringent have standards become that a special "inner sanctum" has now been devised within the main workshop.

In this partitioned area, specially-selected girls work at individually pressurised benches assembling the latest types of valves made to tolerances measured in tenths of a thousandth of an inch. This project has been named "Operation New Pin".

Glass screens prevent moisture from the girls' breath condensing on components during assembly, and any dust particles which may have strayed into the super-clean atmosphere are prevented from reaching the work bench by air pressure. Finding the right type of girls for the delicate job of assembling the tiny components used, presents difficulties. Temperament, good eyesight and manual dexterity all play their part. To fully train an assembler takes from three to six months.

Backing up Hivac's manufacturing organisation are teams of laboratory research workers. Ruislip factory is equipped with some of the most advanced laboratories, but the major programme of development work is still carried out at Hivac's premises in Harrow. Hivac's export orders last year achieved a new record and overseas customers include the United States and Germany, two of the most competitive markets in the field of

An interior scene at the South Ruislip factory. Note the barrel-vault roof construction

A picture which gives some idea of the size of equipment manufactured by this company

Girls working on valves with the aid of glass-fronted, individually pressurised work-benches

electronics. Whether it is destined for a hearing aid, a computer, a telephone exchange or a modern weapon of war, the company's products will do their job with the maximum of efficiency.

Hivac derives its name from the High Vacuum Valve Company Ltd., from which it was formed in 1939. In addition to radio broadcast valves, the company specialised in cathode ray tubes in the earliest days of television, and it produced the world's first midget valve suitable for hearing aids in 1932.

Early experiments carried out with equipment incorporating the company's midget valves included what was then regarded as a revolutionary method of combating crime. Portable radio receivers—at that time the world's smallest—were designed to fit into policemen's helmets, so that the man on the beat could be quickly directed to a trouble spot.

During the war years, great advances were made in the manufacture and applications of subminiature valves. A new valve factory was built at Chesham (Bucks.) and additional premises were acquired at Harrow and Northwood for the production of lamps for telephone switchboards, as well as a wide variety of other types. As soon as restrictions were eased, a start was made on the building of the new premises at Ruislip and these are again being extended at the present time.

Hivac have allied large-scale production facilities to more than twenty years' specialised experience in the field of valve miniaturisation and provide a standard of cleanliness and conditions of technical control far in advance of anything previously attained in this country, or in any other part of the world.

How well *did* you know your industry?

ANSWERS FROM PAGES 16 and 17

1. Alexander G. Bell.
2. 6,000.
3. 1912.
4. Red on white squares.
5. Four.
6. £17,000.
7. Seven to 13 impulses per second.
8. STOneycroft 4830.
9. 1s. 7½d.
10. 5¾ lbs.
11. Q and Z.
12. John Gregson.
13. Queen of the Severn Towns.
14. Ancient and Loyal.
15. Three million.
16. Three per cent.
17. South Africa.
18. 2,000 gallons.
19. Six and a half acres.
20. King George VI.

What is an Engineer?

THE AMERICANS, with their peculiar fondness for statistics and self-analyses, are acknowledged experts in the field of industrial surveys. Some time ago, the Engineers and Scientists of America, a very enterprising organisation, reported on the results of a test given to mechanical engineers to find out what they think, do, know, like and dislike.

The test was confined to some 250 engineers in one plant, considered to be representative. Some people would say that the American experts' findings apply equally well to the many engineers employed throughout the A.T.E. group of companies. Judge for yourself. Here are some of the conclusions reached:

Engineers have risen to a higher vocational level than their fathers.

Less than four per cent of engineers fall below the mean of the population in general ability and aptitude, while only ten per cent of the general population reach the mean of the engineers.

Engineers are definitely superior to the general population in verbal intelligence, which is a fact borne out by World War II Army statistics, which show engineers to be one of the most intelligent occupational groups.

On vocabulary, only eight per cent of engineers fall below the average of the general population.

Engineers are superior in abstract reasoning and in arithmetic reasoning, but in the latter only 20 per cent obtained perfect scores.

Only two per cent made perfect scores in mechanical comprehension and less than five per cent fell below the norm for applicants for mechanical work.

Contrary to expectations, engineers are no more superior on engineering aptitude tests than they are on tests of general intellectual ability.

In general, engineers are social conformists in both belief and practice. They are more interested in things than in people. Few have so-called cultural or aesthetic interests. They adhere to cold facts and designated steps in performance.

Most of them do not like mathematics *per se*, and they are not attracted by its theorising content.

They do not seem to enjoy work where personal relationships are paramount. Thus, they stay away from selling, advertising, public relations or routine office work.

Their language is terse and to the point, for they dislike unnecessary conversation.

Few show interest in the humanities in education.

In reading, engineers avoid the so-called "high-brow" magazines, but do not interest themselves in "low-brow" publications either.

Engineers are usually straightforward, direct and self-sufficient, matter-of-fact and unimaginative.

They are frequently tactless. Soft, polite, diplomatic or oblique conciliatory moves are foreign to their nature.

In a word, the engineer, to use one of his own favourite terms, is consistent. He follows a pattern, and he likes life to be a pattern that is symmetrical, logical, visible and vital. For him, this is a practical, not a personal world.

"... *their language is terse and to the point*"

Members of the A.T.M. Players Society discuss the script of a new production with producer Arthur D. Hughes during rehearsal on the stage of the main canteen at Strowger Works

On stage, please!

WHAT makes a play producer happy? We put this question to Arthur D. Hughes, producer of A.T.M. Players Society. Was it, we asked, a record-breaking audience, appreciative Press comments or a perfect cast? All, or any of these things contribute towards making a happy producer, but Arthur's particular ideal is none of these things.

A perfectionist, he aims to overcome semi-technical problems connected with the Players' twice-yearly productions. Take, for instance, the next play—Noel Coward's "Blithe Spirit" at Crane Theatre, Liverpool, on March 31, April 1 and 2. The audience will probably take for granted —an audience's prerogative—the eerie, flickering blue lights in Act I. But unusual lighting effects are a major hurdle to overcome and not a little ingenuity had to be put into practice so that the lights will "cue in" with the rest of the play. Solving difficult finer details of play production like this reflect Arthur Hughes' 30 years connection with Merseyside amateur dramatic circles, nine of which have been spent producing A.T.M. plays.

The Players Society is one of the oldest sections of the Sports and Social Organisation, having been formed in 1927. One of the founders, Eva G. Campbell, is still a member, and another Company pensioner, Philip Hayes Johnson—for 50 years a semi-professional artiste—became interested in the Players Society after his retirement and has now appeared in three plays.

The 30 members who take part in or assist with the twice-yearly productions are independently considered to be one of the finest industrial groups on Merseyside. And, remember, this is an area which has 300 amateur dramatic societies, probably the highest concentration in the country. A.T.M. Players Society often act before audiences numbering a thousand.

The usual type of play chosen is light comedies and recent audiences responded with pleasure to choices like "Love's a Luxury" and "The Love Match". For 26 years—plays were not produced during the war period—this formula has proved a sure success with audiences. Deep down, though, Arthur Hughes has a hankering to produce sheer drama. The play "The Little Foxes" appeals

to him particularly. One drawback he has not yet overcome is the prospect of having—with only limited financial resources—a grand ancestral hall type of staircase, so necessary to the climax of the drama. But he continues to hope. . . .

With a fair range of dramatic skill for the producer to call upon, actors and actresses need have no fear of being "typed." There are usually up to a dozen players actually acting in a production and the rest of the company take it in turns to assist with back-stage production, such as scene-shifting and prompting. Four times in recent years has an A.T.M. player been selected by a local newspaper dramatic critic as "Performer of the Week"—a really high honour.

These amateurs act for the sheer love of the art. Many of them belong to other theatre groups. Bill Duggan, for instance, has for 40 years been associated with leading Liverpool groups; Doris Bennett has done remarkably fine work in Shakespearean productions with the David Lewis New Theatre Group and Arthur Hughes has connections with Unity Theatre, Calderstones Open Air Theatre and the Rainhill Garrick Society and has acted in plays by Shakespeare, Moliere and Shaw. So, naturally, A.T.M. Players can, and do, spend a lot of their spare time widening their outlook by visiting theatres and giving friendly criticism and advice to a colleague who may, for three crowded nights, be portraying characters as varied as Hamlet, a Cockney parlourmaid, Queen Victoria or a French dandy.

Rehearsals for productions are held in the Works Canteen, Strowger Works, on Mondays and Wednesdays from 6 p.m. onwards. Newcomers get advice on stage make-up, deportment and voice production.

As a good producer, Arthur Hughes aims to break down the invisible curtain between the audience and the cast and to create a feeling of "oneness." Nothing pleases him better than that the audience should feel genuine hate for the villain of the piece—it shows that the actor has got "under the skin" of the part.

The Players Society is probably the only section of the Sports and Social Organisation which has decided to scrap subscription fees, so, theoretically, all S. & S.O. subscribers are members. If you are an amateur theatre enthusiast, they'll welcome you.

Officials to contact are: Eva G. Campbell, chairman; H. O. Nunley, secretary and treasurer; and Arthur D. Hughes, producer.

Phil Hayes Johnson, a company pensioner and semi-professional, helps with the stage lighting

Arthur Hughes and Doris Bennett iron out dialogue over the footlights during a rehearsal

BUSY LINES

★

PEOPLE · PLACES · EVENTS

EMPLOYEES and friends of Automatic Telephone & Electric group of companies, both at home and overseas, were pleased to learn that Mr. J. A. Mason, Director (Production) had been awarded the C.B.E. in the New Year Honours List.

Mr. Mason has been with the organisation for 47 years. During the first World War, he won the Military Medal at Passchendaele. He started his career in the Drawing Office and became a telecommunications engineer in 1921, chief equipment engineer in 1934 and assistant works manager in 1939. From 1945 to 1946 he visited Canada, the United States, Brazil and Poland as overseas technical representative. In 1946, he became manager and, in 1950, was made a director.

Mr. Mason, who was born in Liverpool, has lived in Wallasey since 1928, and has a wife and one daughter.

* * *

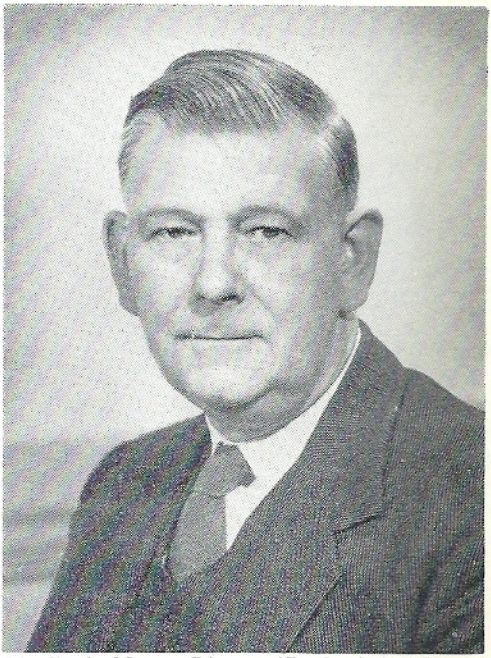
The city of Glasgow is one of the leading British users of Electro-matic vehicle-actuated traffic signal equipment made by A.T.E. The municipality is the first in the British Isles to attain a hundred intersections.

* * *

While on the subject of traffic signals, the Ghana *Daily Graphic* recently published an odd item. An Accra municipal official is reported as saying that special traffic signals had been supplied in the national colours of Ghana—red, amber and green.

* * *

At a dinner held in Liverpool recently to mark the retirement of Mr. G. R. Maitland, the company's London public relations officer, those present—ten in number—shared no fewer than 360 years' service with the organisation. Mr. Maitland is succeeded at Strowger House, London, by Mr. A. E. Bugle, formerly public relations officer at Strowger Works, Liverpool.



Mr. J. A. Mason, Director (Production), who was awarded the C.B.E. in the New Year Honours List

The new Knightsbridge, London, headquarters of the giant Bowater Paper Corporation, has a Liverpool-built 700-line P.A.B.X.

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An order from the National Coal Board to manufacture an automatic 24-volt 25-line exchange has been gained. All the latest safety devices essential for underground communications are incorporated in the exchange. Circuits were designed jointly by N.C.B. and A.T.E. engineers.

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The first all-relay Type 54 Electro-matic traffic controller went into operation last January at the junction of Prescot Road, Derby Lane and St. Oswald Street, Old Swan, Liverpool, not far from Strowger Works.

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According to a recent publication, the London automatic telephone network serves some 1·35 million exchange lines. There are about 2·25 million telephone instruments connected to 235 automatic and 56 manual exchanges by nearly 2·5 million miles of pairs of paper-insulated copper wire in the lead-sheathed underground cables. About 35 million dialled telephone calls are made every week. *That's* busy lines!

Photographic Contest

RESULTS AND CRITICISMS BY THE JUDGES

TOTAL NUMBER OF ENTRIES received for the photographic contest announced in our previous issue amounted to 325. This breaks down into 194 entries in the black and white section and 131 in the colour section. Pictures were received from as far away as Trinidad and as close as City Factory.

Standard of entries in both sections was good, but contestants, in general, showed lack of originality and imagination, which were the very qualities requested. There was a surprisingly large number of "holiday atmosphere" and scenic photographs, and children and animals were popular subjects, too. Another general criticism made by the judges was that few competitors managed to infuse "action" into their pictures—a quality which helps to capture the eye.

A selection of the best pictures received is presented. We regret that printing arrangements prohibit us from showing winning entries in the colour section, and limitations on space preclude reproduction of many more first-rate black and white illustrations. *Tone* takes this opportunity of thanking you all for the interest you have shown in the competition, which attracted pictures from employees in nearly every company within the A.T.E. group.

PRIZEWINNERS IN THE BLACK AND WHITE SECTION WERE:

1st (£10): Ron Hill, 2 Morfe Road, The Grove, Bridgnorth (Drawing Office, A.T. & E. (Bridgnorth) Ltd.). Entry entitled "Can't I Come?"

2nd (£5): N. Bailey, 8 Ryedale Avenue, Leeds 12 (Department 328, Strowger Works, Installer). "Dinner Is Served."

3rd (£2 10s.): J. E. Longden, 4 Leafield Road, Speke, Liverpool (Department O8, Laboratory, Strowger Works). "Lunch Break."

SUCCESSFUL CONTESTANTS IN THE COLOUR SECTION WERE:

1st (£10): H. Harris, 165 Boaler Street, Liverpool 6 (Clock No. 242, Department 24), who submitted a simple, but effective, close-up of a boy wearing a beach hat.

2nd (£5): A. J. Hatton, 22 Solway Street, Liverpool 8 (Department 65, Strowger Works), for a dramatic shot of Liverpool's Lime Street at night.

3rd (£2 10s.): N. W. Williams, 28 Montgomery Road, Aintree (Department 891, Commercial Engineering), for his close-up of a flower, "Bermuda Easter Lily."

THE FOLLOWING WERE VERY HIGHLY COMMENDED:

Black and White Section: Eric M. K. Kirk, A.T. & E. (Bridgnorth) Ltd.; J. H. Phillips, British Telecommunications Research, Ltd.; Taplow; B. Hooper, Department O1, Strowger Works; Mrs. Mary Owen, Department 34 (Inspection), Strowger Works; J. Wilberforce, Department 14, Strowger Works; A. J. Crosby, Department 132, Strowger Works; H. Evison, Department 454-65, Strowger Works; R. J. Jackson, Department 676, City Factory, and Miss D. R. Wheatley, Strowger House, London.

Colour Section: C. A. Hill, A.T. & E. (Bridgnorth) Ltd.; D. Whitfield, Department O1, Strowger Works; H. Millar, Department 674, Strowger Works, and J. R. Huxley, Home Sales, London.

Three of the winning entries

SECOND PRIZE: "Dinner is served"

THIRD PRIZE: "Lunch Break" **RIGHT, FIRST PRIZE: "Can't I come?"**

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