

BELL PUNCH  
*news and views*



VOL. I. PART II. SPRING 1949

I WAS away in Australia on the Company's business when the first issue of "News and Views" was created and published, and I congratulate the writers of all articles for the conciseness and informative contents of their contributions.

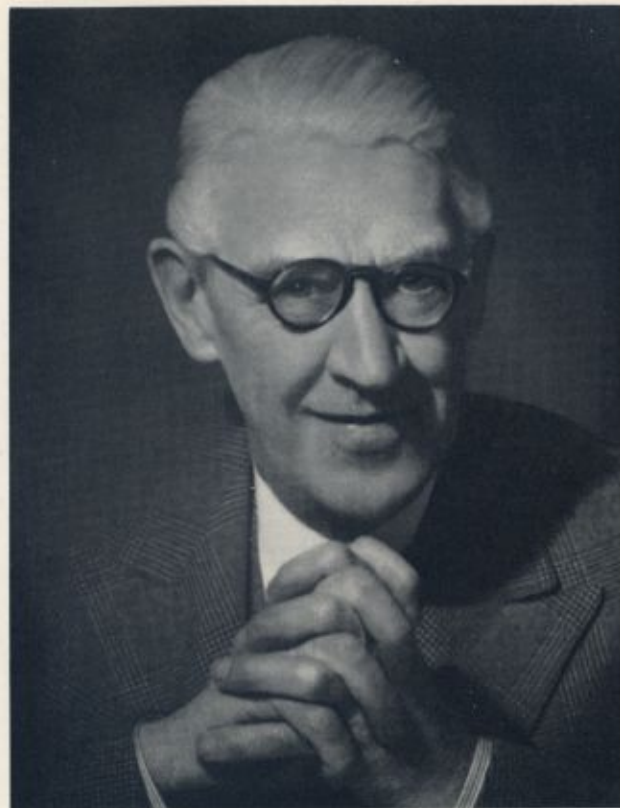
The object of the new journal was succinctly expressed in the Chairman's Foreword, but I should like to add that Bell Punch "News and Views" in no manner supplants the Journal of the Bell Punch Social and Sports Club which has been regularly published, except for a break in the war years, since the middle of the 1920's.

Well, the Company has now entered upon the eighth decade of its existence, and it is true to say that never once during the past seventy years has the Company experienced any material recession.

I was reminded only the other week of a statement I made in one of my past addresses to employees to the effect that no industrial concern can stand still and be content to rest upon past achievement, that the only alternative to progress is a gradual—or rapid sliding backwards. It may be twenty years ago since I made those remarks, but they are just as true today as they were then.

I was saying farewell to Mr. George Kimpton, the Works Blacksmith, who was retiring on pension, at his own request, after 34 years' service with the Company; reminiscing away back in the past he stated he had never forgotten those particular remarks of mine and recalled them.

Progress, in itself, does not necessarily imply adding to the number of the Company's products. It embraces improvements in manufacturing facilities and production methods, and the finding of new fields for outlet. It is in this latter connection that our Overseas distributors can be of material assistance.



*Armedmund Slack*  
Managing Director.

# NEWS

The Managing Director returned to England from his visit to Australia, arriving on 1st January at Southampton on the S.S. Orion. Mr. Black was present at the opening of our new Totalisator Equipment installed at Wentworth Park Racecourse, New South Wales, which is operating with complete success.

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Colonel C. W. Gourlay, a member of the Board of Control Systems Ltd., was in South Africa during the last two months. He called on our representatives in Johannesburg, Durban and Cape Town and saw many of our installations including the Model 'H' in the Native Beer Halls.

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Mr. W. B. S. Sheldon has further increased his aggregate of air travel hours with two flying visits to New York in October last and February this year and to Brussels in January.

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Many helpful comments were received on the first issue of Volume I of this publication; criticisms and suggestions are most readily welcomed. It is not our policy to restrict "News and Views" to items of domestic interest only. Included this time are some articles of general interest, and contributions of a like nature are invited for future issues; they should be addressed to the Editor, Bell Punch Co. Ltd., 39 St. James's Street, London, S.W.1.

It is hoped to publish "News and Views" three times a year; the Spring number in March, the Summer number in August and the Christmas number in December.

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Automaticket Ltd. successfully exhibited their Canteen Cash Collection Systems at the Hotel and Catering Exhibition at Manchester from 9th to 19th February. This was the first occasion on which the Model 'P' or Automacheckit was publicly shown in its non-traffic role.

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We have recently had several changes in premises. Bell Punch Taximeters Ltd. is now accommodated in works and offices in the Paddington railway terminus area, their former location near Kings Cross having been requisitioned by the local Council for housing purposes. The London Service Department has moved from Dean Street, where it was housed for some twelve years, to more spacious and improved premises in Clerkenwell Road where the Automaticket London Ticket Store from Wardour Street is also located.

The same address in Clerkenwell Road now finds the London Sales Branch of London Computator Limited, with the London Sunlock School and Rest Room for pupils.

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We have been very pleased to welcome in London the following visitors from overseas so far during 1949: Mr. S. M. Smith of Ceylon Printers Ltd., our Ticket Issuing Machine Distributors there, engaged in an inten-

sive period of 2/3 weeks study on both servicing and selling; Mr. Montes of Auto-Bazar, Canary Islands, received tuition during the same month in the operation of Sumlock and Plus Machines and in sales technique. We were glad to see Mr. and Mrs. J. O'Leary of J. A. Miller and Son of Dublin, our Sumlock Distributors, for a very short time in January; Mr. R. Weiss, Managing Director of Controles Automatiques, Ticket Issuing Machine Distributors in France, visited us from Paris in February, and finally, Mr. Schou, from the United States, was with us very recently.

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The most recent appointments of Distributors overseas include: Luar S. A., Havana, Cuba—Sumlock and Plus; Casa Claveria, Barranquilla, Colombia—Sumlock and Plus; Auto-Bazar, Las Palmas, Canary Islands—Sumlock and Plus; Argente Santos & Ca. Lda., Luanda, Angola—Plus.

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Our Distributors in Holland, Messrs. Procento, have widened their activities by establishing an associated company for Sumlock and Plus in Batavia. We congratulate them on this effort and also Mr. D. W. Davids, who is doing such strenuous work there to ensure the success of this venture.

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Our Distributors for Sumlock and Plus in India and Pakistan have maintained their organisation in an active state throughout the trying circumstances of the past two years. We congratulate them on their efforts, which are now resulting in encouraging developments within that territory.

We are very glad to say that Mulford Bros., our Distributors for Sumlock and Plus in Palestine, have, after a period of very great difficulty, been able to re-open their offices in Jerusalem and Haifa.

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It sometimes happens that the patience of our Distributors in waiting for Import Licences has to be shared by their customers. Recently, in Denmark, our Distributors, Dansk Formulartryk, sold the whole of a consignment of Sumlock and Plus Machines before the shipment had arrived in their country and even before the necessary permits had been granted.

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Some of the more interesting installations of Bell Punch products abroad recently, which give an idea of their world-wide use, include 200 Bellgraphic Model 'P,' with which Mr. Kreissler, the Ticket Issuing Machine Distributor in Colombia, has equipped the National Colombian Railways; the Anglo-Iranian Company at Abadan in Iran will shortly be using Model 'H' and the Bellgraphic Model 'P' Ticket Issuing Machines for their canteens and restaurants; the Suez Canal Company are now users of the Sumlock Adding/Calculating Machine through the good auspices of Mr. Baganis, our Distributor in Cairo; Bell Punch A/sia., Ltd., have introduced the Model 'H' Ticket Issuing Machine to the Australian Jockey Club, where large numbers are used at the entrances and, finally, a Plus Rapid Adder has found its way into the Dominca Convent in Oberpfalz, Germany, after purchase in London by Sister Assumpta.

# **DEVELOPMENT OF BELL PUNCH COMPANY**

*(Extracts from an article in "Modern Transport" of June, 1948)*

The original Bell Punch Co., Limited, was incorporated on July 5, 1878, with an authorised capital of £30,000. It was established to acquire the patent rights of an American hand registering ticket punch which had already been adopted by a few tramway companies in this country. Prior to the introduction of this system the general tariff system upon tramways involved either a universal fare or else the route was divided into zones with a flat fare charged and collected in each zone. The check was usually by means of tickets issued from a roll. The punch, used in conjunction with a series of varying priced preprinted tickets, enabled tickets to be issued for any length of journey, and for the first time made it possible for overlapping fare stages to be introduced, thus granting the passengers full value in the form of distance to be travelled for the fare paid.

In 1884 Mr. John Melton Black joined the board as managing director and soon afterwards began to develop a small rotary ticket printing machine designed to bring about very considerable economy in the printing of tickets. In 1889 the company was reconstructed as the Bell Punch and Printing Co. Ltd., with a nominal capital of £100,000. This was to provide capital for the building of these small rotaries, the acquisition of a suitable factory for this new ticket business together with the establishment of an engineering shop for the building of the company's

machines and the manufacture of bell punches which had originally been imported from America.

## **Improved Punch Introduced**

About this time Mr. J. M. Black improved the design of the punch and introduced what is known as the box or breast punch which gained rapid favour over the hand punch in that it left the conductor's hands free. The building of a factory to the company's requirements was undertaken on a site situated behind a row of cottages in Tabernacle Street, in the City of London.

In 1891 the company succeeded in making arrangements with the London General Omnibus Co., Limited, for a trial of the new system over two or three of its bus routes provided that Bell Punch would itself operate the trial and provide all the necessary equipment and operating staff. It proved a great success and one route after another was added to the trial. Eventually L.G.O.C. took over the operation, entering into a contract to extend the system over the whole of its routes.

## **London Bus Tickets**

It is interesting at this stage to note that from 1891 right up to the present day Bell Punch has supplied tickets to London buses without a single break, beginning with the

L.G.O.C. and other transport organisations now embodied in the London Transport Executive.

In 1894 the company suffered from a disastrous fire which started in a bedstead manufacturing concern—Angus and Company—some 40 yards down the street. The intervening premises were occupied by the furniture manufacturing firm of Lebus and Company. The fire spread rapidly and resulted in one of the largest fires in London during the last century—many acres of buildings in the neighbourhood being completely gutted with the company's recently-built factory in the middle of the area.

#### **Recovery from Disastrous Fire**

Temporary premises were taken in Charterhouse Square while the site of the gutted works was cleared and plans prepared for the construction of an enlarged factory which was completed and occupied at the end of 1895.

Rapid expansion of the company's business took place in the early 1900's when many of the company-owned tramways operating in the provinces were taken over by the municipalities under powers granted to them by Act of Parliament, and it was then that the extensive electrification of tramway systems in the country took place. In 1909 Mr. J. M. Black retired and his son, Mr. H. Drummond Black, who had already acted as secretary for some years, was appointed managing director in his stead.

#### **Seeking to Expand**

It had become obvious by 1912 that if the business was further to expand it would be necessary to seek additional

accommodation. Mr. Drummond Black favoured the acquisition of a site in the country and eventually found the site known as the Upper Colham Mill at Uxbridge, then occupied by Bell and Croydon. This property was acquired and building started in 1919, the move-in being completed in 1922.

#### **Extension of Interests**

In 1924 Bell Punch acquired Automaticket Limited, a small organisation which had been formed for the purpose of importing from America ticket issuing machines primarily for use in cinema box offices, and this started the company's research and development of ticket issuing machines in all fields. It soon developed mechanisms of its own which, in the course of a short time, obviated the necessity of importing from America.

In 1929 the Racecourse Betting Control Board was established and the company succeeded in obtaining a contract for the manufacture of 1,000 totalisator ticket issuing machines which became the standard used by the Racecourse Betting Control Board. The success of the machine in this country was recognised in America and the Bell Punch Totalisator Ticket Issuing Machine has become standard equipment employed by the American Totalisator Company.

#### **Taximeters and Calculating Machines**

Up to about 1930 there had been no company in this country involved in the manufacture of a taximeter and the trade was entirely dependent upon meters imported

from abroad. A small concern with little capital called the Waddington Tamper-proof Taximeter Co., Limited, did start but made little headway. The manufacture of taximeters fitted in with the Bell Punch Company's scheme of cash control mechanisms and the concern was acquired with a resulting embarkation upon the manufacture of taximeters in reasonable quantities. Today it is the only manufacturer of taximeters in this country.

As an adjunct to one of its ticket control systems the company required a small adding mechanism, and in the search for a tried mechanism instead of devising one of its own from scratch, it became acquainted with a small adding Machine that was being developed by Petters Limited, of Yeovil. It was not a difficult matter to acquire the rights in this mechanism from Petters and thus it was that the company embarked upon the manufacture of a small adding machine to which it gave the name Plus. Some tens of thousands of the machines have been sold both at home and abroad.

It was but a stage to enlarge upon the capacity of this adding machine in the development of a full keyboard calculating machine which was eventually developed over the few years before the recent war and, under the name Sumlock, it was launched upon the market in 1940. For the purpose of more efficient exploitation of the Plus and Sumlock machine market London Computator Limited was incorporated to deal with the sales side of these activities in the United Kingdom.

### **Purchase of Paper Mill**

The consumption of paper for conversion into tickets is obviously great since Bell Punch claims to be the largest ticket printer in the world and in order to avoid dependence upon outside supplies the company acquired its own paper mill—Isaac Warwick and Co., Limited, of Wraybury, on the River Colne, near Staines. It was a mill that had been supplying the company with ticket middles since about 1896.

In July, 1927, Control Systems Limited was incorporated, for the purpose of acquiring and consolidating the direction of the growing diverse activities of Bell Punch Co. Limited, (so renamed in 1932) with an authorised capital originally of £300,000, later increased to £450,000 in November, 1936. As designed, this company is purely a holding company and quotation on the Stock Exchange was sought, and granted, in 1936. The capital was subsequently increased to £600,000.

### **Notable War Production**

The company's contribution in the provision of war equipment was important and, in collaboration with technicians from the Admiralty and the Royal Aircraft Establishment at Farnborough, it designed, developed and manufactured many highly technical instruments. The design and development of all these high precision instruments were, in the main, accomplished by Mr. C. F. Webb, the company's chief designer, who was granted the M.B.E. in recognition of his services.

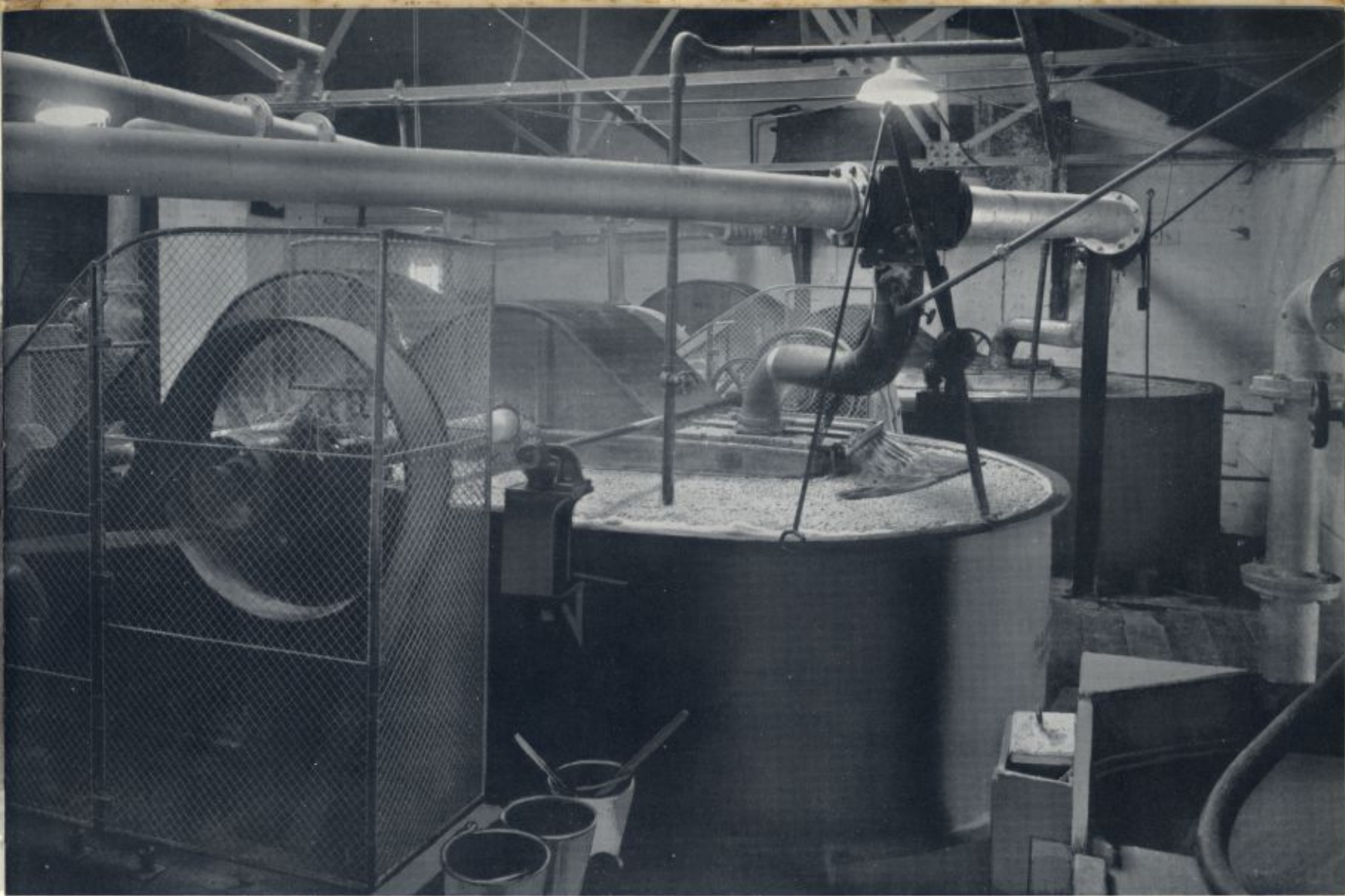
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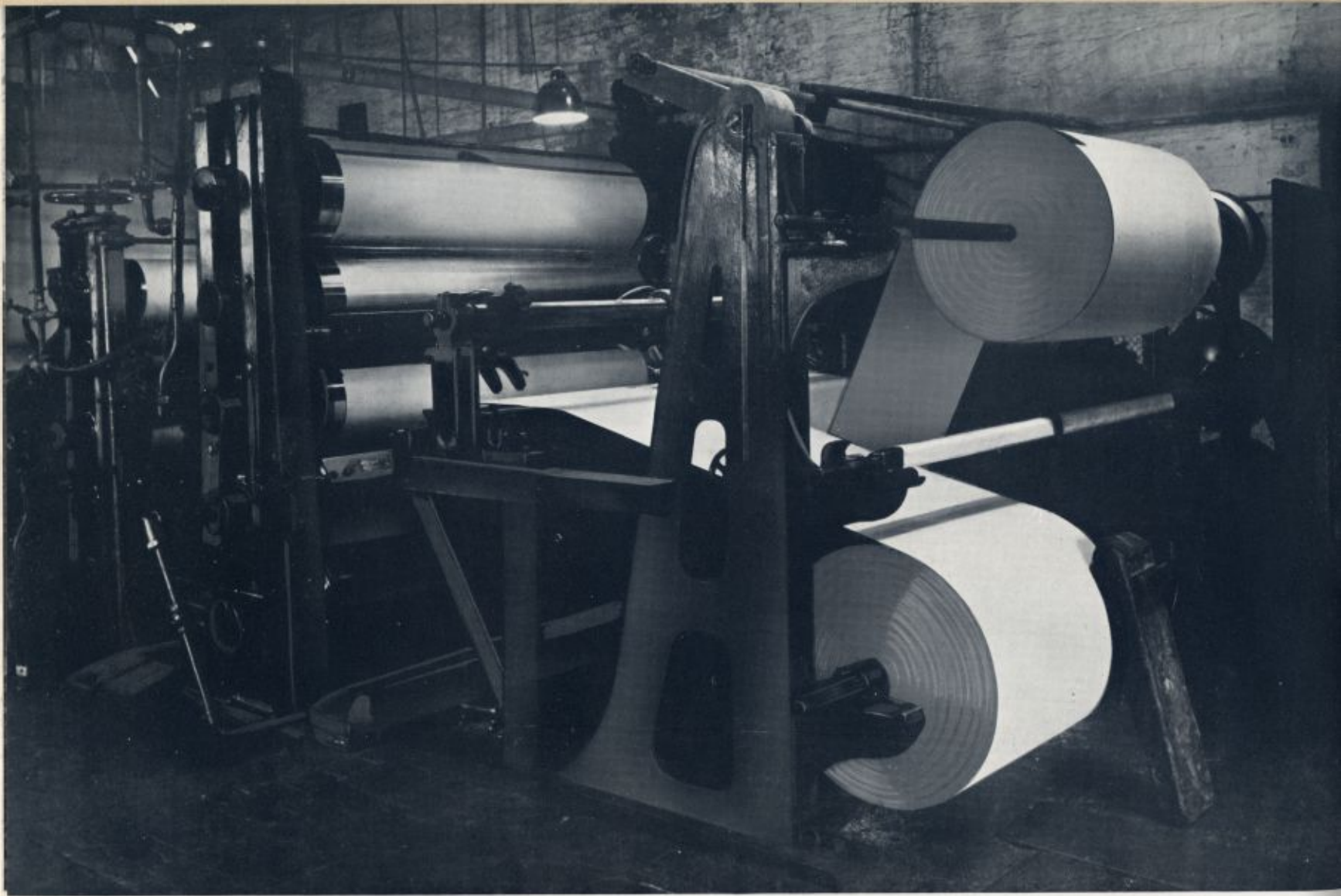




WRAYSBURY MILL ON THE RIVER COLNE



PULP IN PREPARATION, WRAYSBURY MILL



REELING PAPER, WRAYSBURY MILL



REEL STORES, WRAYSBURY MILL



SUMLOCK SERVICE, LONDON



AUTOMATIC TICKET SERVICE, LONDON



SUMLOCK SCHOOL, LONDON



SUMLOCK SCHOOL, LONDON



# ULTIMATE SHOP, UXBRIDGE



*Top left—General view of  
final assembling.*

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*Top right—Inspection  
in final assembly line.*

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*Bottom left—Sub-assembling.*

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*Bottom right—Bench  
Testing and final inspection.*

# TICKETS, PLEASE—HERE, WHAT THE HECK'S THIS?

(With acknowledgements to "The Sunday Post," Glasgow—31st October, 1948)

"Tomorrow the latest type of tram ticket will be issued on several routes operated by Glasgow Corporation Transport Department from Newlands depot.

It has the same familiar value colour as the one you get on a Glasgow Corporation bus, but is much smaller—about the size of a return half of a railway ticket. The New Look in reverse, as this illustration (actual size) shows:—



The Ultimate ticket issuing machine is a streamlined job. Silent in action, it is deadly efficient, firing off anything up to 500 rounds of ha'penny specials, penny halves, tuppenny ones, or what you like in next to no time. A touch of a button, a flick of the hand, and there you are—it's in the bag!

This speeding up of issue will facilitate the work of the conductor in collecting fares, especially at rush hours.

The Transport Department aims to equip all depots and garages throughout the service with the Ultimate machine as soon as supplies are available from the manufacturers. The work of the ticket inspector should be facilitated. He can see the essential particulars at a glance—number, value, stage boarded, and whether adult (ORD.) or half-fare (CHILD). He doesn't require to turn the ticket over, for there is only one printed side.

Yet it's such a tiny thing, this new ticket! You know what some people are!

Still, the ticket is an excellent example of what can be done in cutting down to a minimum! It is one way of getting round the paper shortage. Contrast it with the earlier book-mark ticket, five inches long.

One thing is certain. It'll stand wear and tear better than the flimsy paper tickets which have been in use on the cars since 1936."

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Another



# "HOLLAND, THEY SAY YOU ARE SO VERY SMALL!"

by H. Meulenbelt

(Managing Director of PROCENTO N.V., Distributors for Sumlock and Plus in Holland)

It is true indeed, this first line of a well-known Dutch song, but it is true too that the same country is great in things in which it can be great.

In 1945 Holland was smaller than it had been for many, many years. The eternal enemy and friend of Holland, the water, was flowing over large areas of fruitful earth, earth so bitterly needed for the recovery of an emaciated people. Factories were destroyed, towns flattened, hundreds of thousands of people killed, no coal, no textiles, no food. But one thing had not disappeared—the spirit of the Dutch men and women. The spirit, the resoluteness to return Holland to the place it deserves amongst other nations.

And so it started, right from the beginning. Slow but sure. The big industrial leaders, together with the workmen tried to make the best of it. And in spite of their different points of view they worked together in a close co-operation; there were no major strikes to cause bottlenecks that could be fatal for a quick recovery. And with the assistance of foreign countries, and in spite of bureaucracy, enormous taxes, small-mindedness, they succeeded in building something up, because everybody knows that this small country is worthwhile working for to live in.

And now more of our textiles than ever are exported throughout the world, more planes than ever before are

landing at Schiphol, the aerodrome that was completely wiped out in wartime.

The war-destroyed factories of Philips are making more products than ever before; the decimated merchant-fleet earned again in 1948 more than 370 millions of guilders in foreign currency; the Netherlands State Railways, completely disorganized and ruined, now give you a half-hourly service between Amsterdam and Rotterdam, and more railroads are electrified than before the war.

Of course, there are still bottlenecks; the housing problem is enormous; the lack of foreign exchange is still disquieting; it is not only the poor people who find it very difficult to make ends meet; small firms do not know how to pay their taxes. These are but a few of our problems.

But you cannot expect a Government to satisfy everybody, and probably in every country mistakes are made. However exaggerated it may sound, Bell Punch Company has assisted in some small measure to the Dutch recovery. High production, so essential to the country's commerce, must be backed up by a modern and efficient administration, and to the latter the use of the Sumlock and Plus machines have certainly contributed. We are proud to have been able to install these office equipment machines into some of the leading industrial offices in Holland.

## *“THE ISLAND”*

*by W. S. Bell*

Situated at the extreme western border of Middlesex and encompassed on one side by the River Colne and on the other by the Millstream, lies “The Island,” a green and pleasant spot and the site of Bell Punch Company’s factory.

Formerly known as “Upper Colham Mill Estate,” the Island has an area of approximately nineteen acres, but the Estate includes a further three acres of ground on the eastern side of the Millstream.

Of the buildings existing in early 1919 when the work of clearing began, only a few remain today, and of these the Mill building is a worthy monument of the activities of some of the former occupants of the Island. This building was indeed a Flour Mill and derived its source of power from an undershot paddle water wheel driven by the Millstream, and one of the first items of reconstruction was the replacement of this water wheel by two modern hydro-turbines, coupled to a generator to supply electric power to the Factory.

The first building programme provided a Power House, a Printing Factory with a floor space of one acre and a three-storey building for Engineering and the manufacture of Bell Punches. These buildings were erected on the Island proper, and an office building was constructed on the mainland side of the Millstream.

Work was commenced in 1919, and completed in time

for the whole Factory to be removed from London and installed in working order by June, 1923. The task was accomplished under the Company’s supervision with the employment of direct labour, and in consequence of the extreme shortage of building bricks at that time all buildings had to be constructed with concrete blocks which were manufactured on site by women.

Considerable thought was given to preserving the rural aspect of the site. The office building, as the Frontispiece, was designed to blend in with its surroundings, the Factory buildings were partly concealed from the main road by an existing line of trees, and the lawns, flower beds and fruit trees presented a very welcome change from the drabness and grime of the Factory’s previous situation in Central London.

The formation of a Sports Club was an early step to develop amenities for Employees, and in 1924 a Pavilion was erected and a sports field provided for Cricket, Football and Tennis.

The Factory’s expansion has been continuous, in stages too numerous to mention separately, until today there are over seven acres of ground under development, and the whole presents a modern, well-equipped Industrial Establishment, in healthy and pleasant surroundings, providing for its employees an excellent Social Centre and Canteen and the facilities for Sports and Recreation.

# THE ROMANCE OF PIPES

by Peter Smith

(Director of Dorset Clay Products Ltd.)

Throughout the ages clay has played a vital and fascinating part in the development of civilisation, and it is no exaggeration to say that many pages of history have been compiled through the study of pottery relics of all descriptions, from the rare and beautiful wares of the East, down to the humble drain pipe.

Most of us are in some degree indebted to the latter article, and it might be of interest to have some idea of the modern methods used in its manufacture.

Earthenware pipes are made in several parts of this country, and the process differs according to the type of clay available. Where the clay is fairly plastic it can be dug by mechanical excavator and taken direct into the pipe factory for use almost immediately.

Once in the factory the clay undergoes a series of mechanical processes which speedily break it up, mix it with pre-ground burnt clay and water, and it is then nearly ready for making into pipes. When it is thoroughly mixed, the clay is extruded from the pugmill, cut into regular sized lumps by an automatic cutting device, and then conveyed and stored close to the pipe-making machines into which it is eventually fed at regular intervals, the size of the pipe being controlled by an appropriate die fixed in the machine. Women operate these machines in many factories, and also carry the pipes away as they are produced.

Pipes from 3 to 24 inches in diameter are made on these machines, as well as various bends used in the trade, and in all there are about 600 articles of different shapes turned out in a modern pipe factory. Some of these have to be moulded by hand, and they are made by pressing the clay, which in this case has been softened by adding more water, into plaster of paris moulds.

When the ware is completed in the green, or soft state, it is placed on slatted floors in sheds heated by waste heat taken by air ducts from kilns which are cooling down, and left until thoroughly hard and dry, after which it is stacked into large circular coal-fired intermittent kilns and fired to a temperature of approximately 1150° Centigrade.

After firing, the pipes emerge in the glazed state in varying shades of brown, according to the composition of the clay and the type of coal used in the firing. The glazing is caused by the addition of common salt to the fires, when hydrochloric acid gas is produced and forms a glaze on coming into contact with the heated pipes.

Only three weeks may elapse from the digging of the clay to the emergence of the finished product, and it will be realized that this is an important factor in the building world today, where speed combined with reliability are the essential ingredients in the production of this as well as countless other items in the clay trade.

# CANTEEN CASH CONTROL

by S. D. Roper

The pulse of London's film centre, Wardour Street, is beating fast. Television! Film quotas! High entertainment tax! and numerous other difficulties face the exhibitor and film renter. In the midst of all this activity, Automaticket Ltd., whilst quietly surveying with the right eye her greatest and oldest friend, the Film Industry, looks eagerly with the left towards newer markets: ticket machines for Swimming Pools, Ballrooms, Restaurants, Canteens, Snack Bars, Ice Cream Parlours, Fun Fairs, Golf Courses, Putting Greens, and even for production control in factories, by the issue of a ticket for use as a packing slip.

Of these markets, canteens have become vitally important to Automaticket Ltd., who now claim over 2,000 machine installations in this field alone. Proper feeding of the factory worker is a necessary step to maximum efficiency, and the factory canteen now plays an essential part in our daily life. In stopping to consider this canteen cash control problem, it must be remembered that speed is of primary importance, due to the limited time available for meals. It is hardly necessary, therefore, to emphasize that if payment is made across the food counters, the delay caused in handling cash and giving change will have serious consequences. In addition, cash handled by the serving staff offers temptation and should be avoided.

To overcome all these difficulties, a Model "H" Machine to issue and record tickets in the minimum of time is installed in a cash desk near the entrance to the canteen. The tariff is prominently displayed so that employees can purchase a ticket, or tickets, to cover the food they choose. By this means all money is securely collected away from the serving counters, and the serial numbers on the tickets and the mechanical numerators in the machine provide the necessary cross check.

Six different denominations of tickets are usually sufficient to control the majority of canteens, some of which use a price range, whilst others prefer special tickets printed "Luncheon," "Sweet," "Tea," or as required, in order to obtain a separate record of each meal served. Without any waste of time employees approach the serving counters, knowing exactly what they require and hand the correct value of tickets to any of the serving staff in exchange for food. The ticket, in full view of the purchaser, is placed on a spiked file or dropped into a locked slotted box ready for the management's collection, check, and ultimate destruction.

Other unexplored markets are around the corner, which reminds us of the man arguing with St. Peter at the gates: "It must be legal tender—it has an Automaticket imprint, and came from one of their infernal machines."

# THE MIND AND NERVOUS SYSTEM IN RELATION TO NUTRITION AND WORK

by Professor Oertel

(formerly Professor of Pathology at McGill University, Montreal, Canada)

The human body is occasionally referred to as a machine in which the body organs and tissues represent the machine and the food the fuel to furnish the energy for work. This comparison is, however, incorrect inasmuch as the human body is a living organism whose activities depend moreover upon a highly complex nervous system which initiates and constantly maintains all body functions and its outside activities. It is, in fact, not too much to say that our whole body is suspended from two nervous centres—the spinal cord and the brain—by an astonishing extensive network of nerves. These are attached to all organs and tissues and control their activities. That means that every body activity in the normal intact body is set in motion by the nervous system. Moreover, it applies with equal force to normal or abnormal, diseased functions.

Now consider for a moment the question of nutrition in this light. Nutrition of the body depends upon three inter-related processes: digestion, resorption, assimilation. In all of these, the nervous system and the attitude of mind are of first importance. In the healthy man,

digestion is ushered in by the attractiveness and palatability of the food. These are conveyed to us by our senses: sight, smell, taste. Even to hear of them makes our "mouth water." What does that mean? Our senses convey stimuli, even by memory, to the emotional centre at the base of the brain, whence they are transmitted by nervous impulse to the whole of the digestive tract. These impulses augment the blood supply of the digestive tube throughout and thus stimulate the secretory glands to activity. Thus, when the ingested food reaches the stomach and intestines, their chemical components are broken up to simple chemical compounds which readily pass through the resorbing membranes of the gut and are poured into the rich blood and lymph circulation to be carried principally to the liver, where they are reconstructed to body substances for use in the body economy. In order to carry out these movements in the intestinal tube and in the circulation properly there occur rhythmic movements called peristalsis, equally under nervous control.

The final end products of this completed digestive process

are then carried by the circulation through the body, to be deposited in various tissues and organs, for functional use.

This is, briefly sketched, the normal course of events. But it will readily be seen that it is open to all sorts of interferences or interruptions. For the delicate nervous mechanism which from start to finish controls all these activities is easily disturbed and unhitched.

It will be seen from the foregoing how important the integrating action of the nervous system is in relation to digestion, resorption and assimilation of food, and that, quite apart from the chemical composition of the food, the sensitiveness of the nervous system integrated with our senses, circulation and circulatory movements, secretory activity and tissue and organ functions, plays an essential part in nutrition. Thus the body use of foodstuffs depends upon the nervous system. Indeed, it is well known and an almost daily experience that, in certain persons, the nervous system is so over-sensitive even to chemically highly nutritious food, such as shell fish, eggs, milk, strawberries, that in spite of their high chemical value as foodstuff these persons are made ill by them, resulting in asthmatic attacks, skin rashes, diarrhoea. It can, therefore, hardly be overstated that the food value not only depends upon the proper food but on how this is utilized by the body. The attitude of mind and nervous regulation are here of first importance.

A few words with regard to work and the nervous system. I understand here by "work" wilful actions which find

their expressions in co-ordinated muscular activity, be it by using a pen or creating a piece of art or swinging a sledge hammer. How do functions of such a variety arise? The will to do something is an impulse to those centres known as the motor area, situated in certain definite convolutions on the brain surface. Here the impulse is translated into transmitting stimuli which travel by definite tracts of nerve fibres to a group of muscles. These are thus set in motion in such a way that the wilful act is brought into execution.

This whole process takes a certain amount of time and can be experimentally measured by delicate precision instruments. It is open to all sorts of experimental tests and reveals what is known as reaction time. It shows individual variations and can be shortened and made more accurate by training and a ready and interested attitude of mind; it is lengthened by fatigue, lack of attention or disinterestedness.

Here then, we see again the mind and nervous system as a fundamental requisite to start the chain of related events.

Nutrition and work are two closely related subjects. Both of them depend for their healthy function upon a chain of events which is set in motion by the nervous system. Man, therefore, is not a machine. He is a highly organized living being. Even his most elementary functions of nutrition and motion (muscular activity) are subject to his emotions and controlled either directly or indirectly by his nervous system.



BELL PUNCH COMPANY LTD., 39 ST. JAMES'S STREET, LONDON, S.W 1

CABLES: BELPUNCH, PICCY, LONDON

Made and Printed in England

