THE MONOTYPE RECORDER

JANUARY-FEBRUARY

1932

NO. 243

VOL. XXXI

THE

MONOTYPE RECORDER

A JOURNAL

FOR USERS AND PROSPECTIVE USERS OF THE "MONOTYPE" TYPE COMPOSING AND CASTING MACHINE AND ITS SUPPLIES

No. 243 Vol. XXXI

CONTENTS

THE "MONOTYPE"

FROM INFANCY TO MATURITY

by

R. C. Elliott

LONDON

THE MONOTYPE CORPORATION LIMITED 43 Fetter Lane, London, E.C.4

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THE MONOTYPE RECORDER



THE MONOTYPE RECORDER.

In introducing the first number of this little paraphlet to our readers we will frankly admit that it is an advertisement, but it is by no means a mere puff of the "Monetype." It aims at giving the printers of the United Kingdom a ready means of estimating the progress made by the most highly perfected mechanical composer on the market, and of deading whether it has come within the range at "practical polities" from their point of view or not.

With this object a note of all items of interest referring to the capability of the machine of the success achieved by the Companies exploiting it will be found from month to month.

A page of composition of more or less difficulty showing the diverse uses in which the composer may be put will appear regularly, and in addition, as the Linston biomotype Corporation are always at work cutting new faces, the latest product added to the stock and ready for delivery will be shown on the third page.

The RECORDER will help to keep users of the "Monotype" in touch with the Corporation and will contain hints as to the solution of those small difficulties which inevitably orop up from time to time in the case of all machines recently introduced to a new office, where the operators must necessarily be more at less strange to their work.

Opportunities will be made for assisting the over growing number of chose enterprising printers who have already adopted the Monotype by suggesting methods of raising the efficiency of their installations and increasing the production obtained from them.

In fine, the RECORDER will be made as useful to its readers as the space stronged by the columns will parmit, but these columns will be regorously kept within their present bunds so that the printer's valuable time will not be unfully ensurabled upon. The Monotype has "cone to stey" and the interests of the Corporation owning the rights in this invaluable invention (or, more properly speaking, inventions) will be pushed in a "statightforward manner. The Corporation has something to sell which the printer only needs to see in practical work to appreciate. The Corporation asks nothing more than to have the capabilities of the machine tested, and, if round to be superlative, that the machine should be adopted. All they desire is that the Monotype shall have " a fair field and no favor," and that printers will reture to be beguiltud, by temporarily cheap often of rivals, into doing their quota rowards keeping a better machine permanently off the market.

As this is the first issue of this *brochure* it may be perulssible to give a slight sketch of the history of the Lanston Monotype—to give the machine its full name.

The Monotype came from that ever prolific birthplace of investive genius and its product, the United States, in 1809. The primaval stage goes back to the earlier "Eightes," and has now become buried in the "misty past;" out in 1609, on its arrival here, it might be called in its mediaval state. The keyboard was a mechanical one with but 132 keys, and the caster which was built by "hand" (i.e., without jigs, templates, or other standard tools) was only capable of manipulating the same number of crustrices.

Since that period three great changes have taken place itrs/by, the jount was raised from 132 to 225 matrices, involving changes on both caster and setter; secondly, the mechanical hoard was superseted by a vasily superior pneumatic board, giving wider measure, greater speed, and less liability to derongement; and thirdly, the caster was improved not only in the details of design of some of the important working parts, mainly directed towards increasing the life of the machine and securing greater perfection.

Campaness and Cast on the Monotype.

of product, but also in being built on absolutely interchangeable lines. This practically means that it, after years of use, the working parts give signs of wear, they can be renewed and the machine completely rehabilitated at an insignificant cost and without leaving the printers' premises

The "Perfected Monotype" comprises the Pneumatia Keyboard and the New Caster, both being equally interchangeable or "Standardized."

The comprehensive fount covering five alphabets besides figures, fractions, and all the usual commercial " sorts," constitutes in itself a demand for recognition at the hands of the trade, and experience already shows it will get it.

In conclusion, we ask these who may receive copies of the RECORDER to take the trouble to read them-if one number contains nothing of interest, the next may do,

THE DRURY LANE KEYBOARD AND CASTING SCHOOLS.

THE School for the training of Compositors in the use of the Monotype Keyboard, which is held nightly from Monday to Friday inclusive, is making considerable progress. During the past month the attendances numbered 332, and Such a good number of number verticatives infinitest gravitational and require nothing but practical work to make them thoroughly efficient. No less than fifty applicants for tuition have not yet received eards owing to there hoing no vacancies.

The Caster Attendant Training School has only been open about two months, but it is already giving good results. The average attendance during the month was ten nightly. The classes are held on Tuesdays and about ten nightly. Thursdays.

PROGRESS OF THE MONOTYPE IN THE UNITED KINGDOM.

THE Perfected Monotype has been on the market for harsly an months, but already the following districts have been invaded and installations have been erected in representative houses.

London.	Dunstable.
Liverpool.	Ashford.
Manchester.	Aylesbury.
Leeds.	Ulverston.
Birmingham.	Edinburgh.
Bristol.	Dublin.
Stockport.	Belfast.
Treasure	

Four installations have already resulted in increases in the plant laid down, a fact which considering the short time which has transpired speaks volumes for the efficiency of the machine.

The capacity of the Corporation for rifecting deliveries is of course limited by the number of machines which can be built, but three casters and a competent number of key-boards are now being completial weekly, and an increase in the production to at least six weekly is anticipated at an carly date.

Books from the lowest to the highest quality, Magazines, Weekly Newspapers, Medical Dictionaria, Serials, Voters' and Fating Tists, Weather and other Charts, Trade and Exhibition Catalogues, and all classes of jobbing work are

now being composed and cast on the machine. The Hansard Par inmentary Debates have been set on the older type machine for more than a year past.

A Jobbing Board, containing upper and lower case and small caps Roman, upper and lower case Antique, two sets of figures and all the usual " sorts," has already been introduced, and is new in commercial operation, being used for

In and sole is now in contraction operation, doing treat no the pointing of Seedenan's Catalogues. A becture giving a full general and technical description of the machine was given recently to a well-attended meet-ing of the Punjers' Managers and Overspers Association of London, and the greatest interest was evinced.

PROGRESS OF THE MONOTYPE IN THE UNITED STATES.

THE Inland Printer of Chicago states :-

The New York Sine has a battery of lorty Monotypes. The Telegraph of the same city recently installed eighteen

New York Typographical Union has denided to open a school for instruction on the Lanston Monotype Machine. The Union will contribute 315 per week to: three months towards expenses, and the Lanston Company a similar

amount. The Iniand Prints learns from the Secretary of the Lanston Monotype Machine Company, of Washington, D.C., that in Chicago four Monotypes are new in use in the office of Guntaoup and Warren; three at the Winship Printing Company's plant: two at the Faithern Printing Company, and two at Barnani and Miller's. While the West is not as well represented as the Rast in number of machines in use, from present indications it will not be far behind the East before very long.

Recent mail advices state that there are now over 120 Monotypes in operation in New York City alone.

ONE OF MANY I

THE First Annual Dinner of the employees of the Corporation was held at the Southampton Restaurant. Chan-cery Lane, W.C., on the evening of Doccaber 14th last, and was well attended.

The meeting was in every way a successful one, the dinner being followed by a smoking concert. Confidence in the future career of the Corporation was the dominant keynote of all the speeches made during the evening.

HINTS TO MONOTYPE USERS.

 $Dnv^{\dagger}\tau$ expect any modulue to work without costation—Give even the Monotype Casting Machine a faily rest.

The child that is dirty is not always and appy, but the Monotype , is all the better for a wash and brush up in the morning.

" Take care of the pence and the pounds will take gare of them-wes," Take care of small details in the care of the Musuuppe selves." and the machine like the brook will go on for ever.

 $^{\circ}$ Do not sool the ship for a halporth of tar." An ourse of good oil on the mould is work, a gallon at the oilshop.

A good worknam takes care of his tooks, so a good Konotype operator will over op his mathines at night and avoid as much dust as possible.

If you want good type you must use good metal. Here the Israelites could not make bridge without straw.

Make it worth the while of your employees to keep their machines in good working order, and they will make it worth your while.

Compound and Cast on the Monetupe.

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SPECIMEN OF NEW FACE JUST PRODUCED BY THE CORPORATION.

BREVIER LATIN.

BREVIRE LATIN. Designation C -s. Soven operations belong by rights to type-setting by hand. The compositor must, first, desipher his copy, accordly, strend to its orthography and punctuation, according to the mile of the outper-tuns from proof read sheet, sevenithly, distribute his assembled types after they have served heir use, thirdly, conver-tions from proof read sheet, sevenithly, distribute his assembled types after they have served heir use, either in printing to the destrolyping and the ensembled, types and spaces, and they have served heir use, either in printing or the destrolyping and the assembled types and spaces, and they have served heir use, there in printing or the destrolyping and the assembled types and spaces and their additional distribution, his task on the with provide complexing. Neither in their enlinety do they map out the machine problem. If the inventor does not after the source of the destrolyping of the types and spaces and their additional distribution, his task on the with provide a painting ourface of lettopyres, in which he makes his own types or substitutes therefore, his destrolend havend the domain of the compositor's art into that of the typefounder's. These are esthed and mathematical considerations here to be dealer with. A plece of there-class letterpress has three attributes, his presence of which considerations here to be which shall neither require compensating for at the press by excessive make-ready nor manipulation of another blick use is not negative models letterpress and the pression requires a final recently in provide a final the of the typeformeter. The second here a painting from the mathematical in printing from foundary. The second requirements of good printing to performeters of final creation in parts of the type of the destrolender.

The second requirement of good printing is perfectness of face, or unbroken continuity of line and curve over the entire surface which is to contact with the paper. This needs no amplification. The blird generalization is accuracy of alignment, the least departure from which fatally condemns a bit of printing as the fault of the workman who locks up the composed rypes into the printing-form, or else us the fault of the types themselves. In a work due to its is either that of the stone-hand or of the material. This attribute of good printing requires the most accurate proportion and squareness of angles in the hody of each letter that is used. If not an approximate extent a perfect rectangle, the individual types computing a line will not fit with the motion closeness needed in a tight line. If not rectangular throughout their entire length of body they will " wabble " and rock. The same may be said of the foot of the types. They must be a perfect level, as far as practical perfections extends, and compt a plane that is exactly at right angles with the plane of their entire due of extends will a preliminary functioning by intelligence be dispensed with in machine-work. There will always have to be operatives—at least as long as there is copy to be interpreted, bad grammar to be dealt with, and the captions of writers for publication to compli-tion complete. cate original manuscript.

cate original manascript. Generally speaking, therefore, the task set the inventor in the field thus far traversel is to produce a machine which will translate copy into properly spaced lines, pages or galleys of lines of types. Each of the broad classes of machine substitute with which printers are at present Lamilarized has approached the question from opposite standpoints. Broadly considered, these machines fall into two classes, viz., machines which handle foundry-type, and machines which not only compose the printing surface, but go further and make the types of which, whether singly or in lines, such surface is made up.

ABCDEFGHIJKLMNOPORSTUVWXYZ& abcdefgbijkimnoporstuvwyz

SPECIMEN OF DIFFICULT COMPOSITION SET STRAIGHT ACROSS AND CAST ON THE MONOTYPE.

NONPAREIL MODERN.

Designation B-6.

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THE MONOTYPE RECORDER.





THE "MONOTYPE" COMPOSITION CASTING MACHINE OF TODAY Showing casting to a measure of 60 ems pica

NOTE

AS, with this number, THE MONOTYPE RECORDER, originally a four-page leaflet, first issued in January, 1902, commences its thirtieth year, it may be of interest to our oldest and youngest readers alike if we attempt a brief history of the machine which has revolutionized composing room practice. The task is not a simple one, and the writer feels that the technical aspects of the progress of the "Monotype" may be of wider interest than the romance of its commercial development, remarkable as this has been. First class commercial utility rather than anything else has brought the "Monotype" to the position in which it stands today, after thirty years' experiment and experience in a highly technical and competitive field.

THE types used in the composition of the following pages are "Monotype" Bembo, 36, 30, 24, 16, 14, 12 and 10 point.



THE "D" PATTERN "MONOTYPE" KEYBOARD AS IN USE TODAY Fitted with Tabular Composition Attachment

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THE "MONOTYPE" FROM INFANCY TO MATURITY

By R. C. Elliott

GENESIS

The United States Patent Office records contain the following entry under date of June 7th, 1887, referring to patent specification number 364,521.

Claim 1. "Producing Justified lines of type, Tolbert Lanston, assignor by direct and mesne assignments to the Lanston Type Machine Company, Washington. (Original application September 30th, 1885. Divided July 3rd, 1886). No model.

"An improvement in the art of producing justified lines of type, which consists in ascertaining the space in a line required to be filled by justification if types of a normal or standard size were used, and then making in succession the types of the proposed line, the bodies of the desired number of said types being varied from normal as to width an amount equal in the aggregate to the ascertained space required to be filled by justification, whereby each line is formed by a continuous process from beginning to end of a succession of types specially made for it which just fill it out and which require no manipulation or disturbance whatever to effect the justification of the line."

Another specification (364,525) of the same date contains:

Claim 1. "In a type-forming machine the combination with a series of dies of a plunger for depressing any one of the said dies when brought beneath it, die-centering mechanism for centering the dies beneath the said plunger, and a type-compression box or matrix of which the centered and depressed die forms a part."

Claim 5. "... for feeding a strip of metal or other material to the compression box, and a plunger operating to cut off a portion of the said strip, and to compress it in the said box."

Claim 6. "... a series of dies arranged in a type carrier, two independent sliding frames, for adjusting the die carrier in planes at right angles to each other ... a series of setting pins ... and two record strips, one for each series of setting pins for causing the projection of one or the other of the pins of each series ... which will bring the desired die to the centering points."

Here we have the claims regarding the salient points of the original conceptions of Mr. Tolbert Lanston as outlined in a specification dated September 30th, 1885, which, for the purposes of the United States patent laws, was divided into two sections on July 3rd, 1886, and amended according to the foregoing main claims on June 7th, 1887.

Shorn of its legal phraseology Lanston's original scheme consisted of a machine for perforating two paper ribbons for the purpose of using these ribbons for controlling a second machine. This second machine carried a roll of type-high lead, which was sheared into strips of the required type widths and passed into a compression box. In the meantime one of a series of dies was selected, according to the positions of the perforations in the paper ribbons, and the die was forced upon the top of the metal strip to convert it into a type, and finally accurately to shape it to required dimensions by compression in the box. It was a machine for composing justified lines of types made from cold strips of lead and arranged in order on a galley. The widths of all the type bodies were designed to be increased by an equal amount for each type so that all completed lines should measure the required width. Later this incrementation of the type bodies to secure even line lengths was confined to the space bodies only, as in present "Monotype" composition.

MR. TOLBERT LANSTON

The inventor of the "Monotype" was born at Troy, in the State of Ohio, U.S.A., on February 3rd, 1844. After leaving school, at the age of fifteen, he volunteered for service in the American Civil War (1861-65), at the termination of which he took up employment in the American Government Pension Bureau. In the meantime he studied law, and practised as a lawyer, but all the while possessed a strong leaning towards invention in general.

During the period of Mr. Lanston's employment at the Government Bureau of Pensions he became acquainted with a Colonel Seaton, whose father did much Government printing before the present U.S.A. National Printing Office was established. Through this acquaintanceship Mr. Lanston obtained his original knowledge of the art of printing. Colonel Seaton became head of the Census Bureau at a time when tabulating machines controlled by perforated cards were first being tried to classify statistics, and which today are so successfully used in many branches of industry.

Mr. Lanston was intensely interested in these machines, and conceived the idea of applying the principle of the perforated ribbon to control a type-composing machine.

Competition in invention of type-composing machinery was then at its zenith, but the direction in which development was to move was not yet definitely indicated.

He had very little financial means beyond his salary at the Bureau of Pensions, but he was fortunate enough to receive a modicum of financial help and a great deal of encouragement from Colonel Seaton in putting his idea of a type-composing machine into practice. This financial support was later taken over entirely by Mr.J. Maury Dove, who ran a very profitable coal business in Washington, in addition to being the principal owner of several high-class hotels and apartment houses.

Not a great deal of reliable information is available concerning Mr. Lanston or his methods, but it is known that Mr. J. Maury Dove supported the scheme over a trying period of thirteen years, the experiments being exceedingly costly and not always encouraging.

His son, Mr. Aubrey Lanston, has written of his father:

"He had a very poor and unhappy boyhood. He has often told me that, as a boy, he had to run in the cold winters in Ohio, where he was born, to keep warm, as he never had an overcoat until he could buy himself one. At the close of the Civil War (1861-65), which left him mustered out as a sergeant of Federal infantry, he went to Washington, where he secured a clerkship in the 'Pension Office'. When he left the Pension Office to work upon the 'Monotype' idea, he was Chief Clerk and Chief of the Board of Re-reviewed, which he had himself formed for the better control of pension claims.

"It seems to me that the most remarkable thing in his development of the 'Monotype' is now entirely forgotten: that Tolbert Lanston, with no mechanical education whatever, with not even at that time a scholastic education, and without any practical knowledge of mechanical matters, should have been able to visualize and create, step by step, this invention. And what seems to me even more remarkable is that this minor, governmental official, so handicapped, without any model and with inadequate drawings, should have escaped being dismissed as a 'crank' when he sought to enlist capital in the development, step by step, through many and vast trials, of the machine. But confidence never waned in him, and indeed he seemed to inspire it, and the capital needed was always to be had.

"My father was strong in his personal convictions and could seldom be won over by opposing logic, so sure was he of the correctness of his own judgment, but he seldom failed to yield to the plea of tenderness and affection. Of a most serene nature, he was not subject to exalted enthusiasms nor to any mood of depression. At the moment when the affairs of the American Company seemed close to the commercial goal, a midnight fire completely destroyed the works, then located in an upper floor of the Capitol Power House (Street Train Power) at Washington, which occurred, I think, in 1897. Despite this staggering blow—for machinery, drawings, everything were lost—my father appeared the following morning quite as though nothing had happened. He simply went



MR. TOLBERT LANSTON Inventor of the "Monotype"

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quietly to work to repair the loss without the slightest sign of grief, depression or discouragement.

"My father was of that type of solid, substantial manhood of the former generation, and I am able to say, with entire conviction, that I am sure he never harboured an unworthy thought, while a dishonourable deed was impossible to him.

Mr. Tolbert Lanston passed away on the 18th February, 1913.

EXPERIMENTING

The success of the "Monotype" was by way of a long and tortuous path, and the marvel is that Mr. J. Maury Dove did not abandon his support in utter despair.

The first keyboard was mechanically operated; that is, by the depression of a key the operator's finger-strength moved the mechanism for causing the punches to perforate the paper ribbons; at the same time a weight-operated driving gear advanced the paper ribbons, registered the thickness of the letters operated, and advanced a scale pointer to indicate how much of the line had been composed and how much remained unfinished. At the end of each line the operator raised the weights by pulling a lever, and this action simultaneously returned the line indicator to its starting point. Each time a space key was struck an indicator moved up an arm, and this indicated the number of spaces used. At a certain distance from the end of a complete line this arm moved radially over a segment of a disc, finally indicating by means of figures the amount of justification required to complete the line length when such line was later composed in type on a separate machine.

The first type-making machine (as the claims of the specification referred to indicate), carried a set of 196 letter-forming dies, used for impressing upon the top of a strip of lead the character required. The leaden strip was held firmly in a shaping box, which compressed the type body true to size and length. The stops for selecting the required matrix, and causing it to be brought to operating position, were operated electrically. Although keyboard and type-forming machine both functioned according to plan, it was apparent that neither was designed in such a manner as to operate reliably under ordinary printing office conditions.

The number of characters included in the composition was increased to 210.

A seemingly endless series of experiments was made in connection with the typemaking machines, but eventually type casting was adopted and mechanism controlled by compressed air was applied for bringing the required matrix to the type-casting position. As the casting and cooling methods adopted were in the first machines too



THE FIRST "MONOTYPE" KEYBOARD

To reverse the line indicator the operator pulled a lever after finishing each line. This action raised weights, which acted as motive power for advancing the ribbon spool, em scale pointer, and justifying scale pointer



THE FIRST "MONOTYPE" TYPEMAKING MACHINE

This machine automatically cut off a strip from a type-bigh roll of lead, compressed it to exact width and perfect shape, and impressed a character upon its upper end from a series of dies. There were two paper ribbons, and the stops for positioning the dies were controlled electrically slow in action, experiments were made with a machine in which were employed three separate moulds. Although this was not a success, a machine with four moulds, four record strips, and four galleys was made and exhibited at Chicago at the World's Fair in 1893.

In spite of all his failures Mr. Lanston was encouraged to continue his experiments, and received all the financial help he needed. From the testimony of people personally acquainted with him (including that of his own son) it may reasonably be assumed that a certain natural obstinacy and a disinclination to take advice from experts upon mechanical details were the principal reasons why his experiments were so unsatisfactory and the cost so burdensome. The deductions from Mr. Lanston's personal experiments were: It was possible to compose perforation symbols into a single paper ribbon to represent justified lines of type; that compressed air was a desirable medium to actuate the mechanism in order to obviate fatigue in operating; that perfect justification was possible based upon incrementing the thickness of the type bodies composed in a line; that a casting machine could be devised in which any one of a set of matrices could be brought to a definite casting position; that a new type could be cast for every letter desired; and that completely composed lines could be carried to a galley and arranged in proper column form.

These facts being established, the time arrived when it was deemed necessary to relieve Mr. Lanston of the responsibilities of experimentation, and to engage qualified engineers to do this work.

Messrs. Sellers & Co. of Philadelphia had been engaged upon the construction of some of these early machines, and a member of this firm, Mr. John Sellers Bancroft, was invited to take complete charge of all experimentation. To begin with, he reverted to the principles of the original mechanically operated keyboard, and made radical alterations in the casting mechanism.

Mr. Lanston's final matrices were made of steel bodies, at the end of which there was an inset of copper into which the character was punched. These were contained in a frame, and the desired matrix was partly pushed out from the rest to form a seating on the mould. Mr. Bancroft retained this form of matrix construction, but suspended them in a frame by wires running through a hole in the centre of the matrix body. He introduced a dimensioning wedge to regulate the mould blade movement, and for justification he limited incrementation of the type bodies to the spaces only. Many other new features were incorporated, such as automatic stoppage of the machine in the case of long and short lines.

Mr. Bancroft in his first independent effort made two important errors of judgment; the first was in going back to the mechanical keyboard without introducing any important improvement over Mr. Lanston's earlier designs, and the second in limiting the scope of the matrix-case to 132 characters. These, however, were completely overshadowed by the fact that he produced a marketable machine, based upon reliable mechanical principles.

This 1897 caster had a matrix-case containing 12 rows of 11 matrices per row, controlled by stop pins arranged in two blocks at right angles to each other. The stop pins were raised by compressed air, and, as a jaw advanced carrying with it the matrix-case, a projection struck the raised pin and caused a pawl to swerve into a rack tooth, and thus bring the matrix-case to rest. The matrix-case returned to zero during each cycle of the machine. The sizing wedge was at the rear of the machine, and was moved in unison with the matrix-case, and its connecting rod was provided with a micro-meter adjusting nut. The metal pot rested on a pair of rails, enabling it to be moved away from the mould. The complete pot containing the metal was rocked upon a shaft for every character cast, and the nozzle protruded some distance from the pot to the mould. The driving cams were positioned in two groups on two sides of the machine, geared at right angles to each other. The maximum measure of line was about 27 picas. Such, briefly, was the first marketable "Monotype," the direct forerunner of the present model.

In 1899 Mr. Bancroft produced an improved machine very much in the form we know it today, and decided to abandon the idea of using a completely mechanicallyoperated keyboard, and had designed by the Taft-Peirce Manufacturing Company (an engineering firm of high repute) a keyboard pneumatically controlled. In this keyboard the act of depressing a key liberated compressed air, which did the work of perforating and paper advancing, and other movements of mechanism necessary in composing a line.

Messrs. Sellers & Co. were entrusted with the manufacture and development of the caster, which was to embody Mr. Bancroft's new ideas.

In the improved casting machine the mechanism was driven by a single set of male and female cams arranged in a straight line at the reat of the machine. The capacity of the matrix-case was increased to 225 characters and spaces, arranged in 15 rows of 15 matrices in each row. The matrix-case and sizing wedge moved direct from one position to the next with the minimum of movement, as they were not returned to zero before taking up their next positions. An independent micrometer wedge adjustment was introduced for the purpose of adjusting the type sizes by microscopic



THE FIRST "MONOTYPE" TO CAST SINGLE TYPES

Mr. Lanston first applied for a patent in 1890 for casting type by his composing machine; the patent was granted in 1896. He followed this by an application in 1894 for a patent for controlling the caster by a single paper ribbon; this was granted in 1897



THE THIRD MODEL "MONOTYPE" TO CAST SINGLE TYPES Produced in 1893

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differences. The metal pot was designed to be lowered and swung clear of the mould, and the supply of molten metal to the nozzle was conducted through a channel separated from the metal pot, but resting in it, so that there was no need to raise the complete pot each time a cast was made. In principle, as distinct from constructional detail, the machine was that which is in use today.

Thus Mr. Bancroft completed the machine conceived by Mr. Lanston fourteen years carlier, and made it obvious to Mr. J. Maury Dove and the other financiers, who had supported the scheme through a long and trying period, that their faith was likely to be justified.

THE KEYBOARDS

From the foregoing it will have been gathered that the type-forming machine required and received much the greater share of attention on the part of the experimentalists, but when this machine reached its final form it was apparent that the keyboard mechanism had not reached finality as far as its form of construction and general arrangement was concerned.

Mr. Lanston's first keyboard was completely mechanically operated. When Mr. Bancroft took charge of the work he continued with the mechanically-operated board, and constructed his first keyboard on these lines. He found, however, that he had to resort to a pneumatic board which was designed and eventually perfected by Messrs. Taft-Peirce & Company. To show the care and thoroughness of these original inventors it may be stated that both Mr. Lanston and Mr. Bancroft devoted months of observation concerning tests as to the reliability of different forms of construction and operation, such as, for example, the best angle to position the valves of the keybank of what was known as the "A" keyboard, as it was thought the operator would strike the keys with a push away from his body, in which case there would be abnormal wear upon the key and its bushing. This particular test proved that operators depressed the keys by a downward movement at right angles to their palms, and that consequently a vertical key was preferable to an angled one.

The unit-counting mechanism of the early mechanical board was too delicately constructed to be reliable for any reasonable period, and, as it was completely encased, it was impossible for the operator quickly to locate a derangement.

In the first marketable keyboard of 1899 this mechanism was considerably improved, but left much room for greater reliability to be attained. The later "C" pattern as produced by the Taft-Peirce Company was a very reliable mechanism, with the exception that the most frequently used keys and their bushings became worn with use, with the result that the escaping air when a key was depressed produced a weakness in the operation of the punching and registering mechanism. This defect was at once remedied by inserting new valves and bushings.

These early commercial keyboards, however, had one inherent disadvantage, and that was the necessity of arranging the keys in the order of the matrices in the matrixcase of the caster. The buttons were therefore arranged with the thinnest characters (such as i, l, comma, full point, etc.) on the extreme left, and the rows increased in character thickness until on the extreme right the thickest characters were reached (such as W, em dash, and so on).

Although Mr. Bancroft was compelled to use compressed air for the keyboard, he never took kindly to it, and when the "Monotype" became firmly established he proceeded to develop some of the principles of the earlier mechanical board, and the present ("D" pattern) keyboard was the result.

In producing the present keyboard Mr. Bancroft discarded the valvular keybank and substituted "combination" hars, operated direct by the fingers, for opening two compressed air valves for every key struck. Whereas there were 255 compressed air valves on the original keybanks, these were reduced to 33 in the present arrangement. Further, instead of being restricted to arranging the rows of keys in the order of character-thickness, from thinnest to thickest, it is now possible to adopt a typewriter arrangement of keys, and any alteration in the positions of the matrices in the matrix-case could be provided for by changing the combination of the bars beneath the keys. The rest of the mechanism remains the same in principle as on the pneumatic keyboards, but is more reliably constructed.

EARLY "MONOTYPE" FOUNTS

Mr. Lanston's early conception of a machine-composed fount was that of characters being designed to some definite thickness, multiples of a thinnest unit dimension. This was essential; as be had, by means of his proposed mechanism, to register the unitthickness of every character composed, so that all complete lines should contain the same total number of "units". That principle stands good today, and, where a line is short of the required number of units, the justification system extends the width equally of all the spaces in such line, so that the shortage is made good, and the line is of the correct length.

The first problem was to decide the relative thicknesses of the various characters of the alphabet, and, after most exhaustive countings and measurements, it was decided



THE FIRST "MONOTYPE" KEYBOARD MARKETED IN ENGLAND WITH THE 1899 PATTERN OF CASTING MACHINE

This keyboard was completely mechanically operated by the action of weights raised by the operator at the end of each completed line

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THE FIRST "MONOTYPE" CASTING MACHINE SENT TO ENGLAND IN 1897 It was known as the "limited fount" machine, as it carried only 132 matrices that the lower case i, l, full point, etc., could be commonly allotted a thickness of five units, the figures and average letter-thickness nine units, and the capital W, em dash, and em quad eighteen units, no matter what the thickness of the fount unit might be. It was therefore decided to imagine a "one-point" fount, with the em of that fount divided into 18 equal parts. Thus was established the unit and em of a one-point "Monotype" fount, and the unit of all larger sizes was to be a multiple of the unit of the one-point fount. The unit and em of an 8-point fount is therefore eight times the thickness of the unit and em respectively of a one-point (if such could be made).

The adoption of this principle was a distinct departure from the old typefounders' method of making the em of all sizes perfectly square in section, and all figures exactly half-ems, irrespective of whether a fount was "lean" or "fat". In "Monotype" practice the figures and ems of a "lean" fount are narrow, and those of "fat" founts are wide, and this is without question a logical departure.

FINANCE

It is almost needless to remark that as soon as the perfect "Monotype" was ready for the market those financiers who had so steadfastly supported Mr. Lanston and his successor, Mr. Bancroft, were compelled to look for capital, not only to recoup their losses but to make the special jigs and tools for manufacturing purposes, apart from the usual expenses attendant upon organising and advertising a new industry. To obtain this capital it was necessary for the financiers of the scheme, headed by Mr. J. Maury Dove, to dispose of their foreign rights, and they were fortunate in securing the interest of the Earl of Dunraven. In 1897 a preliminary Company was formed, and one of Mr. Bancroft's first groups of machines (those with the fount limited to 132 characters) was installed in an office in Leadenhall Street, London, for the sole purpose of enlisting the interest of the investing British public. The outcome of the negotiations was that the sum of $f_{250,000}$, two-thirds of which was in cash and one-third in ordinary shares, was paid to the American Company for the British and Colonial rights, excepting Canada. (At that time this was one of the largest sums ever paid for the rights of an invention). Further negotiations resulted in the British company obtaining possession of the world rights excepting The United States of America, South America, and Canada.

Whilst this British capital was welcomed by the American Company, all was not well with the English concern. Their own resources were quickly absorbed by the costs of preliminary organisation, which included a ruinous delay due to the American company having decided to produce a machine with a larger fount capacity. The comparatively idle period between 1897 and 1899, when the present model was produced, saw much money being expended without any return, so that when the re-designed machine was ready for marketing the capital of the English company was almost exhausted.

The first supply of machines added to the difficulties of the English company instead of acting as a relief. The improved and enlarged machines had naturally been constructed under hurried conditions, and were despatched from the American factory without having undergone adequate tests, so that it was not known which parts were liable to give way during use. Further, no skilled labour was available. Parts of the mechanism naturally broke, but there were no spares to replace them, and many of the machines became idle. Nobody understood the adjustments, and reasoning in regard to them had to give way to sheer speculation. Small wonder, then, that firms who had installed these early "Monotypes" were anxious to cancel their contracts. This resulted in still further financial embarrassment, and the shareholders and investing public refused to subscribe further additional capital, no matter in what form it was applied for. The Earl of Dunraven, who became chairman of the English concern, and who time after time had pledged his credit on behalf of the shareholders, showed his faith in the business by taking up additional shares from his own private resources.

EMERGING THROUGH THE SHADOWS

Long after a severe illness, or after a period of severe physical or financial strain, although the memory remains perfectly clear concerning the tribulation, it is difficult to understand how one's strength withstood the strain.

Can any present-day "Monotype" shareholder realise to any appreciable extent the difficulties attendant upon placing upon the market a machine similar to the "Mono-type"? Realise that the "Monotype" was to revolutionise the practices of the composing room, and that as a consequence every compositor was certain to become a potential antagonist, not by reason of any wilful spirit, but because he felt that his future livelihood was certain to be jeopardised. He knew the past had certainly provided him with a measure of employment; was this machine to render that employment insecure? His sympathies naturally leaned to the side of certainty, as demonstrated by his employment in the past, and a certain shyness of and antagonism to the "Monotype" was only to be expected. Today the hand compositor is thankful to the "Monotype" for having relieved him of the drudgery of uninteresting composition and scarcity of sorts.



THE "C" PATTERN "MONOTYPE" KEYBOARD

The "A" and "B" patterns were similar in design to the "C" pattern and succeeded the 1809 "mechanical" boards. The "A" "B" and "C" patterns were worked entirely by compressed air



THE FIRST "FULL FOUNT" "MONOTYPE" CASTER Produced in 1899, providing for composition from 225 matrices

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THE EARLY DEVELOPMENT OF "MONOTYPE" JUSTIFICATION

I do not wish to leave out an important branch of this subject. It is a danger from which princes are with difficulty preserved, unless they are very careful and discriminating. It is that of flatterers, of whom courts are full, because men are so self-complacent in their own affairs, and in a way so deceived in them, that they are preserved with difficulty from this pest, and if they wish to defend themselves they run the danger of falling into contempt. Because there is no other way of guarding oneself from flatterers except letting men understand that

to tell you the truth does not offend you; but when every one may tell you the truth, respect for you abates. Therefore a wise prince ought to hold a third course by choosing the wise men in his state, and giving to them only the liberty of speaking the truth to him, and then only of those things of which he inquires, and of none others; but he ought to question them upon everything, and listen to their opinions, and afterwards form his own conclusions. With these councillors, separately and collectively, he ought to carry himself in such a way that each of them should know that, the more

Mr. Lanston's original scheme for justification was to increase the thickness of the bodies of all the types and spaces in an incomplete line. He contended that the slight increase of body thicknesses would not be noticeable to the eye. All the lines of the above paragraphs are justified in this nummer, which is known as letter-spacing.

I do not wish to leave out an important branch of this subject. It is a danger from which princes are with difficulty preserved, unless they are very careful and discriminating. It is that of flatterers, of whom courts are full, because men are so self-complacent in their own affairs, and in a way so deceived in them, that they are preserved with difficulty from this pest, and if they wish to defend themselves they run the danger of falling into contempt. Because there is no other way of guarding oneself from flatterers except letting men understand that

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It early became obvious that the enlargement of the type bodies should be confined to spaces only. A comparison of these will show how Mr. Lanston was mistaken in surmising that increasing type body thickness would not be noticeable, for in short measures this method of line justification is instantly obvious. Amongst the users of print, such as publishers and book printers, opposition was also strong; this went even to the length of criticising the composition for appearing too uniformly excellent and the spacing monotonously accurate!

These were external troubles; the internal difficulties were even more distressing. As already stated, the first machines were far from being reliably constructed, nor was their mechanism perfectly comprehended by the members of the Monotype Corporation staff. The system of line justification was not understood and the mysteries of the justifying scale figures seemed incapable of solution.

Punch-cutting and matrix-making were industries in their infancy, and men had to be trained in these arts. Engineers at that period looked upon a micrometer as an instrument to be associated with a silk-lined case rather than to be used against cold iron or steel. Points, sets, type beights, alignments—these terms were so much jargon to the raw staff hands; a new craftmanship had to be acquired by them.

The offices in Leadenball Street were vacated at the end of 1897 and premises taken at 42 Drury Lane. In the early part of 1899 a factory was established at Redhill, in the country fields of Surrey. The offices in Drury Lane soon became inadequate for the business and in 1904 larger premises were taken at 43 Fetter Lane, within the City of London.

Prejudice and scepticism on the part of printers and compositions gave way to satisfaction and appreciation, the "Monotype" became established, and today we feel that it is a well founded institution of the printing industry.

DEVELOPMENT

Early experiments in producing the "Monotype" composing machine were directed towards producing a machine for composing straightforward composition up to a limit in body size of twelve points, and it was thought that the use of the machine would be limited to the composition of newspapers and books. Although Mr. Lanston had aimed at producing a machine capable of handling 225 different characters and spaces, Mr. Bancroft later considered that an equipment of 132 different characters and spaces would be ample.

When the batch of machines produced upon Mr. Bancroft's first designs was placed on the market, it became apparent that he had committed an error of judgment, and that the scope of future machines would have to be increased. The machine as finally designed provided for an accommodation of 225 matrices. Today there is an insistent demand for the provision of even more than this number of different characters.

"MONOTYPE" TABULAR COMPOSITION

Stone Quarrying and Mining Slate Quarrying and Mining

Manufacturer of Tin Plates Brass Ware Makers Iron Ore and Ironstone Mining, etc. Iron and Steel Tube Making Pig Iron and Steel Coke Ovens and By-Product Works Carpet Manufacture Artificial Stone and Concrete Works Other Textile Work Construction and Repair of Motors Other Brass Industries, etc. Glass Bottle Making Hand Drills, Cutlery, Saw, File Making Boot, Shoe and Clog Trades Electric Wiring, ctc. Saddlery, Harness and other Goods

etc. Glass Bottle Making Hand Drills, Cutlery, Saw, File Making Other Brass Industries,

Manufacturer of Tin Plates Brass Ware Makers Iron Ore and Ironstone Mining, etc. Iron and Steel Tube Making Pig Iron and Steel Coke Ovens and By-Product Works Stone Quarrying and Mining Carpet Manufacture Artificial Stone and Concrete Works Slate Quarrying and Mining Other Textile Work Construction and Repair of Motors Other Brass Industries, etc. Glass Bottle Making Hand Drills, Cutlery, Saw, File Making Boot, Shoe and Clog Trades Electric Wiring, etc. Saddlery, Harness and other Goods

The upper six lines show three columns of different widths composed and cast right across as ordinary lines. The centre diagram shows the different thicknesses of spaces in one complete line. The lower six lines show what the result would be if spaces of equal thickness were used throughout each line.