The Typograph and the Monoline Machines*

BY HENRY LEWIS BULLEN

THE typograph and the monoline composing machines, though invented in the United States by Americans, have had to find their market abroad, because each of them infringed upon patents owned by the Mergenthaler Linotype Company. Nevertheless each has had an interesting history. The typograph continues to be made in Germany, while the manufacture of the monoline has but recently ceased. The Rogers typograph was the first slugcasting machine to attempt to compete with the linotype machine. It is the invention of John Raphael Rogers, now consulting engineer with the Mergenthaler Linotype Company. He was born in Roseville, Illinois, on December 11, 1856. At the age of nineteen, in 1875, he graduated from Oberlin College, and adopted the teaching profession. At one time he was superintendent of schools in Lorain, Ohio. It was in Lorain in 1880 that Rogers began experiments toward a type-composing machine. In 1888 he applied for patents on a workable machine. "During these eight years," writes Mr. Rogers, "I knew nothing of the efforts of Mergenthaler and of Schuckers until patents began interference."

JOHN RAPHAEL ROGERS
Inventor of the typograph composing machine.

WILBER STEPHEN SCUDDER
Inventor of the monoline composing machine.

FRANK HINMAN PIERPONT
Who developed the typograph in Germany.

The first typographs were built in Cleveland, but before they could be marketed the United States Courts upheld the patents of the Mergenthaler Linotype Company, thus preventing the use of the typograph within the jurisdiction. Simultaneously with its action against the typograph, the Linotype company was defending an action against it by J. W. Schuckers for infringing his justifying wedge space patent. This wedge device was vital to the success of the linotype machine. Rogers and his associates very shrewdly bought the Schuckers patent and continued the suit in its defense. The Courts sustained the Schuckers patent, and the Linotype company was compelled to negotiate for its purchase. It had become the sole valuable asset of the Typograph company in the United States, but was valueless to it in that jurisdiction because the owners had no machine to which the wedge might be applied. Negotiations resulted in the acquisition by the Linotype company of the Schuckers wedge patent and the rights within the United States of the Typograph company for $416,000.

However, not all the linotype patents were effective in Canada or in Europe. In Canada a company styled Typograph Limited was organized, and began the manufacture of typographs in 1890 in Windsor, Ontario. It continued with moderate success, owing to the limited Canadian market, until the expiration of certain linotype patents opened the United States market to the typograph, whereupon the place of manufacture was moved to Detroit, Michigan, in 1907, and the name of the company changed to American Typograph Company. The price of the typograph was about half that of the linotype, and it had a fair sale among the publishers of weekly and daily newspapers in small cities. To meet this competition the Linotype company itself revived the manufacture of Rogers' invention in a revised design, called the Junior Mergenthaler, which was far from being as effective as the original. This machine soon vanished and not long after the American Typograph Company ceased to exist.

It was about 1893 that the manufacture of the typograph began in Germany. It is still made there. The Ludwig Loewe Company had bought an option on the European patents for the European market. Frederick Bright, of the Canadian Typograph Company, was sent over to demonstrate the practicability of the invention, to be determined by the holders of the option after the machines had been made in Germany. It was not until 1896 that the Ludwig Loewe option was exercised, largely through the efforts of Frank Hinman Pierpont, an American, who became managing director of a company known as the Typograph Aktiengesellschaft, in which the Loewe company had the controlling interest. Thousands of typographs of German manufacture have been sold. Pierpont resigned as managing director in 1899, in which year he went to England, where he was appointed manufacturing manager of the Lanston Monotype Corporation, which position he continues. Pierpont was born in New Haven, Connecticut, on September 24, 1861, of a family a member of which was one of the founders of New Haven. In 1880 he was employed

* This is the fourth article in the series setting forth the transition from hand-set to machine-set composition.

by the Pratt & Whitney Company, of Hartford, as an apprentice. At the end of the second year Pierpont was assigned to the designing room and remained there until the expiration of his apprenticeship. In 1885 he associated himself with a patent lawyer. Among his employments was the making of

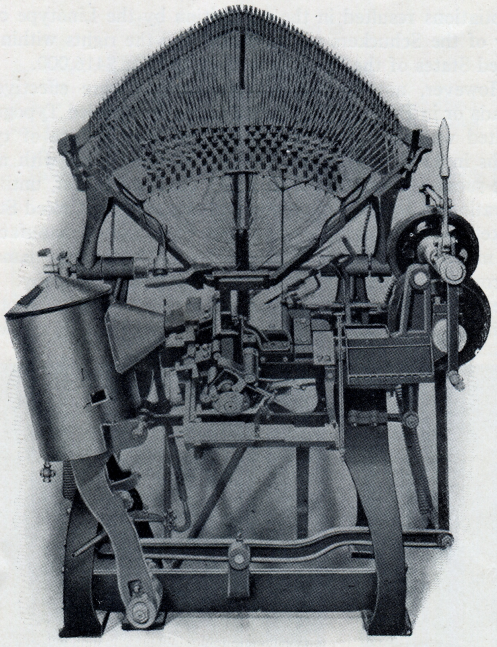

FIG. 1.—The Rogers typograph composing machine as it was made in Detroit in 1907.

drawings for the Patent Office of parts of the Paige typesetting machine. In 1894 he went to Berlin with reference to German patents on a bevel gear generating machine, which had been sold to the Ludwig Loewe Company. It was thus that Pierpont became interested in the typograph, which he improved and for which he created a successful market. The works of the Lanston Monotype Corporation, at Horley, about fourteen miles from the center of London, are in a high state of efficiency, especially in the matrix-making department. To improve the efficiency of the monotype machine, as made in England, and to economize in production costs, Pierpont has made numerous successful inventions.

Fig. 1 shows the latest style of typograph made in America. It was a slugcasting machine, and cast excellent slugs. The matrices were held in position at the top of the arched frame by escapements, each connected with and operated by a wire track, which in turn was controlled by the key of the corresponding character on the keyboard. On touching a key the required matrix was released and slid downward on the wire track, to which it was attached, to its position in the line being assembled in front of the casting mold. The spacers were disks, beveled in front, which also had a wedge-shaped projection, while in the rear it had a square opening. As the spacer was released it engaged on a square rod placed behind the composed matrices and the projection on the spacer took a position between each two words. When the line of matrices was composed the operator — if it was a hand machine, and most of them were — turned a crank three times, which set cams in operation, which first gave a half turn to the square rod, thus causing the beveled disks to expand and justify the line, which then moved to the mold, whereupon the plunger in the metal pot forced the metal into the mold, after which the line was released, trimmed and deposited on the galley. The operator worked in a standing position. When a slug was cast, the operator distributed all the matrices and spacers instantaneously by tilting the arched frame forward, whereupon each matrix slipped back on its wire track to its position behind the escapements under the top of the arched frame. When power was applied the cams were set in motion by pulling a lever; the power was cut off automatically when the casting operation was completed. The machine produced three thousand ems an hour; it cast any size of book types; as made in America 630 matrices were furnished, but with German machines a greater number were supplied. The typograph of 1888 weighed 300 pounds; that of 1907 weighed 1,000 pounds. Though limited in scope, so far as it was developed, the typograph was an ingenious and satisfactory machine, and entitles Rogers to a place among eminent inventors who ushered in the era of machine composition.

THE SCUDDER MONOLINE COMPOSING MACHINE

In 1893 a second competitor to Mergenthaler's invention appeared: a line-casting composing machine called the monoline, shown in Fig. 2. This was the invention of Wilber Stephen Scudder, now supervising engineer of the Intertype Corporation. He designed the intertype machine and at the outset superintended its manufacture. Scudder was born in Galesburg, Michigan, on January 19, 1859. He learned the toolmaking trade and gained expertness in factories making sewing machines, watches and typewriters. He became successively, in 1886 and 1887, foreman and superintendent of the factory of the Crandall Typewriter Company, of Croton, New York, now the Corona Typewriter Company. In 1887 he was engaged by Ottmar Mergenthaler to assist him in developing the linotype machine in the Baltimore factory. When the linotype factory was established in Brooklyn, late in 1888, Scudder became part of its organization, and was made superintendent in a few months, holding that position until he resigned in June, 1892.

Scudder resigned to develop his invention, the monoline machine, backed by a company of which L. G. Hine and the executors of the estate of Oswald Ottendorfer, founder of the *Staats Zeitung*, of New York, held a controlling interest. Herman Ridder was manager of the Ottendorfer estate. Hine only a year before had been president and general manager of the Mergenthaler company, and still held a substantial interest in it. He was well acquainted with Scudder's inventive and mechanical ability. Scudder's association with Ridder was a new one, but in later years it led to the founding of the present Intertype Corporation.

When the first monoline machine was completed in 1893 it was viewed with alarm by the directors of the Linotype company. They offered a large sum for the Scudder patents, but not so much as the promoters of the monoline machine demanded. Failing to purchase, the Mergenthaler company put its patents to the test in the United States courts, and Scudder's patents were held to be infringements upon Mergenthaler's invention, as no doubt they were. The monoline, therefore, could not be made or sold in the United States. A factory was established in 1894 in Montreal, operated by the Canadian Composing Company, Limited, where machines were made and sold — about twelve hundred of them — between 1894 and 1905, in which year the Canadian and United States patent rights and other assets of the company were sold to the Mergenthaler company for $1,250,000. The monoline continued to be made by the Mergenthaler company for a few years after the purchase. Simultaneously with the operations in Canada, with sales also in Australasia, South America and South Africa, rights to manufacture and sell were disposed of to companies in Rotterdam, Steyr (Austria) and Berlin. These European companies were discontinued shortly after the close of the Great War. In 1911 Scudder interested Herman Ridder and others in the manufacture of the intertype

machine, many important patents issued to Mergenthaler having expired or been found to have been imperfectly protected. The Intertype Corporation was organized and has achieved a merited success.

The monoline (Fig. 2) as finally made in Canada used a justifying wedge or spaceband which would have infringed the Schuckers patent if used in the United States. But in the original monoline, intended to be made in the United States, Scudder used an expansible wedge with curved walls which seemed to evade infringement, though not so effective as the Schuckers. The Canadian monoline spaceband was a long steel wedge sliding between two shorter steel wedges, presenting parallel outside surfaces while being expanded as the longer control wedge was pushed upward. The monoline did not use single matrices. It used matrix bands or strips in much the same way that Mergenthaler did in his earlier machines, but so improved that while Mergenthaler's did not work satisfactorily Scudder's did. Scudder grouped his alphabets in a limited number of widths, following Benton's self-spacing type patent in this respect. Each matrix strip, made of brass, with a series of twelve stops on its back, contained characters, usually twelve, which were to be cast on bodies of equal width. Thus one strip contained capitals Z, P, L, T, O, D, E, B, S, C, J and Q, one of each. There were, of course, several of each strip in the magazine. At touch of a key a strip containing the required character was released and dropped into an assembler, each key setting a stop which arrested the required matrix in a position in line with the other matrices on other strips forming the line. When the line was

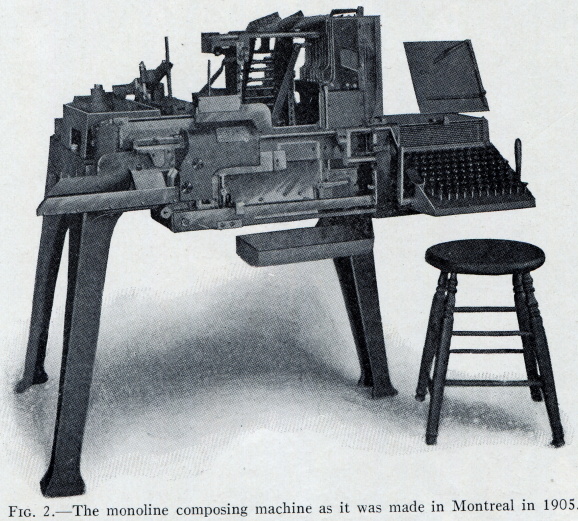

FIG. 2.—The monoline composing machine as it was made in Montreal in 1905.

completed, the matrix strips were justified and moved automatically to the casting mold. Each machine was provided with about four hundred and fifty matrix characters. It cast lines up to 21 picas in length and from agate to 10 points in body. The output was stated to be 3,000 ems an hour. The monoline did not have as wide a range of utility as is given by machines based more closely upon Mergenthaler's invention, but it cost less to make, was sold at a lower price, did excellent work and was admirably designed in every part. As to its merits, we may accept the judgment of the directors of the Mergenthaler Linotype Company, who paid a great price to prevent it from coming into a wider market as opposing patents expired. For his services in connection with the development of type-composing machines Scudder has amply earned a place among the galaxy of talent that has made machine composition possible, the chiefs of which are Mergenthaler, Lanston and Benton.

But what of the host of those who year by year stood side by side with the greater men, working out their ideas — expert mechanics, whose suggestions and expertness have gone to swell the fame of their chiefs? May we not offer a tribute to these men, whose names will never be known beyond the walls of the workrooms in which they were employed? Perhaps some day when Peace shall have her victories more renowned than those of War, monuments will be erected to the

UNKNOWN INVENTOR.

HELP WANTED—OR THE LAY OF THE LOST COPYHOLDER

BY GEORGE O. JAGER

Now there's been all kinds of writin'. In prehistoric date
Man scrawled on a stone with an ape's shinbone or scratched with a bit of slate
Heteroglyphic hieroglyphics on the rocks or cliffs o'erhead
Or pebbles paleolithic, from an antediluvian bed.
Later they used the stalk of plants, wood-pulp or bark of a tree,
The stylus and papyrus, pressed clay or ivory.
While the mid-age monks, on sheepskin stiff, with pen of a goose's quill
Tossed off the so-called "classics," which schoolboys ponder still.

And there's been all styles o' writin'—the Jap and the heathen Chinee
Wrote from bottom to top — as you see on a box of tea!
The Persian wrote from right to left, and the Babylonian bold
From left to right — the exact reverse — that is, so I've been told.
Others again employed both styles, and wrote from right to left,
And then from left to right again — a cross-cut saw effect,
Swaying alternately back and forth, in a manner based upon
The famous system practiced by the ancient boustrophedon!

But of all the weirdest writin' that ever is or was
Some of these want-ad. fellers break all of chirography's laws;
By holdin' the paper upside down or at obtuse angular slant,
You may decipher something — but most of the time — you can't!
A signature often resembles a snake, yet hardly that, forsooth!
For you can't make head or tail of it, and to tell the simple truth,
If you can't do that, then it ain't a snake, for may I rot in jail
If there's anything else to a bloomin' snake outside of a head and tail.

O Gutenberg, O Coster, or whoever the devil it was
That invented the art of printin' and improved typography's laws,
Three towns contended for your name, Mainz, Frankfort and Harlem, too,
But which of the three deserved it I'm hanged if I know, do you?
And thou, O industrious Mentel, thou too wert a mighty name
And a tablet hung at Strassburg duly records your fame —
But O great trio of typos, what boots all your learned skill
When wretched mortals practice the art of longhand still!

Oh, there's been some great names in printin', there's Jensen, whose characters rare
To our modern architypographers prove both a pride and a deep despair.
And Laurent St. Vincent Alopa, who embellished now out-of-date
Editions of "Lascaris" with his capitals ornate.
Then there was the mighty Aldus, who from Gothic drew apart,
And with svelte and graceful *italics* invented another art.
Oh, I dream of these ancient artists and I feel a proper thrill —
Then I think of these "longhand" scribblers, and I want to rise up and kill!

Boy, page Ignatius Donnelly, send a tracer for Sam Lloyd,
Bring me the Urim and Thummim that Joseph Smith employed!
Like the learned Taylor and others who studied the alphabet's plan,
I scrutinize strange symbols, weird signs and characters scan!
Oh, soon I will go crazy, and in a padded cell
Cut out little paper dollies, or leap and wildly yell.
O Isis and Osiris, Oh, what a mess all this is!
Osiris and O Isis, this writin' is a crisis!