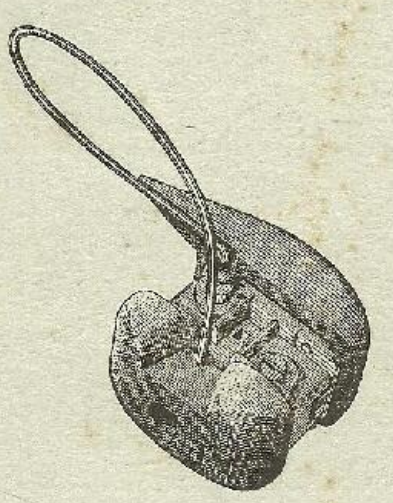
THE MONOTYPE RECORDER

VOLUME XLI SUMMER 1957 NUMBER 1

THE TYPECASTERS

by Ellic Howe



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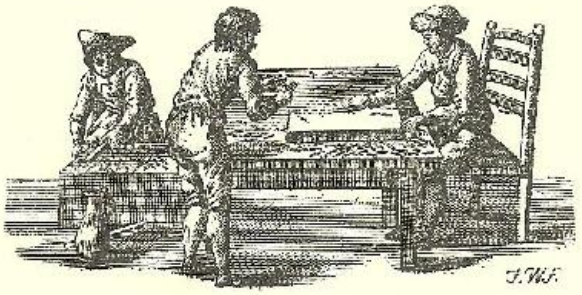


ELLIC HOWE

THE MONOTYPE CORPORATION LIMITED · LONDON

Schriftgießerey | *Typocheum.*

From Christian Täubel's *Wörterbuch der Buchdruckerkunst und Schriftgießerei* (Vienna, 1805)

Denen Schrifft-Gießern ist man großes Lob schuldig, denn wann sie nicht wären,
hätte man keine Buchstaben, wo keine Buchstaben, wären auch keine Bücher.

The typecaster's trade is worthy of praise, for if it did not exist we would have no types,
and if there were no types, there would not be any books.
ABRAHAM A SANCTA CLARA, *Etwas für Alle*, 1699

IF JOHANNES GUTENBERG was, in truth, the "inventor" of letterpress printing, then he was also the first to work out a method of producing movable types in quantity and to certain standards of precision. In spite of the vastness of the Gutenberg literature, we know little enough about him either as a personality or as a printer, and hardly anything tangible about his typecasting experiments in the 1440's and later. Thus references in this paper to his "invention" are necessarily based upon the opinions of a host of other writers, and not upon contemporary documentary evidence. What little there is of the latter has provided successive generations of scholars, most of them German, with material for endless argument, some of it choleric. Within the limits of this essay, so far as Gutenberg is concerned, one can do no more than advance a few hypotheses which may not be unreasonable.

Assuming that he was born between 1394 and 1399, Gutenberg would have been in his middle forties at the time when he was experimenting with printing at Mainz, and over fifty when he was supervising the production of the 42-line Bible. For the purpose of anniversary celebrations the date of Gutenberg's "invention" is conventionally taken to be 1440.

It is important to remember that before Gutenberg ever experimented with the manufacture of type he was already trained as a master craftsman in the metal-working trades. Members of his family were among the managers of the mint at Mainz, and he himself was a technically qualified goldsmith. Like other members of his craft, he knew how to cut a punch, engrave a seal, cast in metal from a mould. He no doubt knew as much about metals and their behaviour as any other competent craftsman in the district.

In those days Mainz was renowned for the skill of her goldsmiths. (In Birmingham I imagine that these men would today be known as manufacturing jewellers—men adept at small-scale metal work.) In 1475, a few years after Gutenberg's death, as many as twenty-nine of them were working in the city. Nuremberg, a far wealthier town, and with three times as many inhabitants, could only find employment for nineteen.

That part of fourteenth-century Germany which might now be roughly described as Northern Bohemia, on the borders of E. Germany, SW. Poland, and N. Czechoslovakia, was

the centre of the European metal-mining industry. The spread of printing was to bring in its train increased consumption of lead, tin, and other metals.

The essence of Gutenberg's invention was not contained in the technique of punch-cutting, nor in that of striking matrices, nor in the construction of the actual printing press. The arts of punch-cutting and matrix-(mould) making were not discovered by Gutenberg. Presses made of wood and incorporating a primitive screw device were also known and used for domestic and agricultural purposes. What he apparently did work out was a system whereby an unlimited quantity of printing types, each one of them with the same height-to-paper, and with their printing surfaces accurately positioned on the type bodies, could be expeditiously and cheaply cast from matrices contained in a hand-mould. Furthermore, since different letters of the alphabet vary in set-width, he must have devised a method of adjusting the mould to cast types according to the width required. He had, too, to learn how to justify his matrices to ensure consistent alignment and neither too much nor too little space between individual letters when composed. It was also necessary for him to contrive a type metal suitable for his purpose.

It would be tedious to re-examine the controversial theories that have been discussed, almost *ad nauseam*, concerning the kind of matrix and mould designed by Gutenberg. The subject has occupied the attention of many learned and sometimes intransigent Germans. With few exceptions their writings have not been translated into English, and it may not be convenient to refer to works not generally available to readers of this essay.

During the 1920's there was much discussion of a sand-casting technique alleged to have been used by Gutenberg. Its principal protagonists were Gustav Mori, a practical typefounder, and Gottfried Zedler, an *Akademiker*. Dr. Aloys Ruppel, for many years the curator of the Gutenberg Museum at Mainz, and the author of by far the most readable and comprehensive biography of Gutenberg, does not subscribe to the sand-casting theory. In his opinion Gutenberg devised the traditional form of typefounder's hand-mould, or something very much like it. And that hand-mould, he suggests, is the key to the real meaning of the invention. Professor Otto W. Fuhrmann, an American scholar, and one of the few non-Germans with a comprehensive knowledge of the Gutenberg literature, is apparently of the same opinion.

Professor Fuhrmann contributed an interesting article, "A Note on Gutenberg's Type Metal", to the *Gutenberg Jahrbuch* for 1950. What metal suitable for typecasting, he asked, would have suggested itself to Gutenberg? A series of deductions were set forth: a metal

with a low melting-point, not too expensive, and readily available, was the first essential. Lead met these requirements, but if used alone would be too sluggish to penetrate the finer lines in a matrix. Nor would lead types be sufficiently hard to stand up to many impressions. If tin were to be added in a given proportion the metal would flow more freely and the casting of the actual printing surface would be more accurate, but the type bodies themselves would tend to shrink in an irregular fashion. That defect would necessitate a great deal of laborious "dressing" before a fount could be ready for use by a compositor. The problem, then, was to find an additional ingredient which would prevent shrinkage; indeed, a metal which would expand when in the process of solidifying. Two metals, antimony and bismuth, fulfil this requirement.

Professor Fuhrmann wondered how Gutenberg came to learn of the peculiar properties of bismuth and antimony which, he suggested, were then rare and hardly known except to alchemists. But Gutenberg must have been in touch with many men with a knowledge of the properties of metals. The kind of tip which he required need not have come from an alchemist. The answer, if we could but discover it, is probably banal indeed.

It is likely that the alloy in its correct proportions was found empirically by hundreds of experiments. It is interesting to note that in 1436, when living and working in Strasbourg, he had paid the goldsmith Hans Dünne 100 guilders for "material pertaining to printing". This large sum of money might well have been spent on a great quantity of metal for experimental purposes. Professor Fuhrmann thought that a goldsmith, in his capacity as a metal worker, might well have been the source of supply. Or possibly Gutenberg employed Dünne to act as an intermediary for the purchase of the metal, hoping to avoid inquiries as to the purpose for which he needed it.

* * *

The story of the development of the printing trade and how printers soon set up in business all over Europe forms no part of this essay. Suffice to say that between 1450 and 1500 printing was carried on in 260 different towns, and that during those fifty years more than a thousand printing offices were opened. It follows, then, that there was work for men who understood the principles of this new craft of typefounding.

There has been a good deal of speculation as to the manner in which the fifteenth-century master printer equipped himself with type. Dr. Konrad Haebler, one of the leading German authorities, contended that the commercial typefoundry, supplying types to the trade at large, was either non-existent or a great rarity in the fifteenth century. His view was

based on the following arguments: the types then cast were so soft that they had frequently to be replaced. Thus the services of a typefounder, i.e. journeyman typecaster, would be permanently required in a printing office. Furthermore, in his opinion, the master printer in the incunable period would himself understand and be capable of working at all trades proper to the craft—punch-cutting, typecasting, composing, printing, etc.—and would not require outside assistance.

Haebler's conclusions were attacked with some violence by Dr. Ernst Consentius in his book *Die Typen der Inkunabelzeit* (Printing Types in the Incunable Period), 1929. He sought to prove that there were many instances where men had set up in business as master printers without knowing anything about punch-cutting and typefounding. Much of his material was derived from an intensive examination of the Basle archives for the period 1480–1500. Now Basle was already an important printing centre at that time, and there is little doubt that there was a lively traffic in matrices and types. Consentius described many interesting transactions in which type equipment played a part.

What did he prove? Not that there was a firm or several firms of typefounders, supplying the local trade as a whole, but that a great many different people, and in widely differing circumstances, were involved in transactions in which typefounding material played a part. In one instance a journeyman proposing to go into business for himself as a master printer acquired some unjustified matrices. A friend of his who had previously worked as, or for, a goldsmith contracted to justify the matrices, and then "botched" the job. There was a lawsuit. The result of the litigation is unimportant to us, but the evidence shows that at that time a man could decide to set up as a printer without necessarily possessing a knowledge of type-cutting and founding.

In 1500 one Peter Kreyss, described in the Basle archives as a *Geschrifftschnider zu Basel*, i.e. type-cutter at Basle, purchased a house. The fact seems to indicate that it was not his intention to work as an itinerant craftsman. He might have been an employee of one of the local printing offices, but it seems unlikely that one firm could give whole-time employment to a punch-cutter; there would be a limit to the number of founts required. Kreyss may have been a typefounder (typecaster) as well. His output would have averaged anything between 2,000 and 4,000 sorts per day. Supposing that he cast types for, say, five out of six working days and averaged 3,000 casts per day. His yearly output would have been nearly 800,000 letters, which is no doubt far more than a printer of those times could economically use. In any case, the capital cost of the metal would have been a burden.

Consentius remarked that it had been estimated that a typecaster would require one month in which to supply sufficient material to keep four presses going. Thus no firm could keep a specialist typefounder at work for month after month unless, indeed, the metal was so soft that re-casting was a daily necessity.

Although there may not have been any independent typefoundries, it is probable that there were a number of specialist craftsmen who made the rounds from firm to firm, and that a few of the larger printing houses also supplied matrices struck from punches in their possession to smaller firms both near and far. It is likely, too, that they would also have sold complete founts.

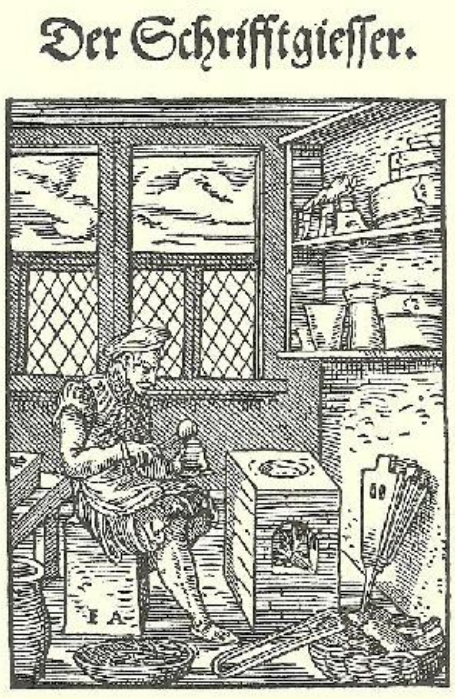
The Basle printer Michael Wenssler is known to have been a shareholder in the Bohemian metal mines. Whence this interest in the source of supply of metals useful to the printing trade? He was not, surely, merely intent upon securing supplies for his own use. If he combined printing and "trade" typefounding, a finger in the metal business would have been useful to him.

Leonhard Thurneysser (*b.* 1530 at Basle, *d.* 1590 at Cologne) was another printer-typefounder with metallurgical connections. He had, indeed, much practical mining experience. Thurneysser was one of the most extraordinary characters ever to work in the printing trade, and it is a pity that there is apparently no full-scale biographical study of him.

It has been said that Claude Garamond (*d.* 1561) was the first man to establish a commercial typefoundry. This may be true, although the reverse seems likely. In the Lyons archives Nicolas Wolfe, a native of the German Duchy of Brunswick, was listed in 1493 as a *fondeur de lettres*. He later set up as a master printer and the first known product of his press is dated 1498. It is possible to identify the types he used in the possession of at least half a dozen other printers in the town. He appears to have been a typefounder supplying the printing trade before ever he went into business on his own account.

Between 1500 and 1550, according to Baudrier (*Bibliographie Lyonnaise*, 12 volumes, 1895–1921), there were eighteen typefounders (masters or journeymen) working in Lyons, of whom only one, Cornille de Seranges, is known to have been a punch-cutter. For the years 1550–1600 there were twenty, with Robert Granjon as the only punch-cutter. The point is that a man does not have to know how to cut punches in order to cast type. It is clear that a man would be able to set up as a commercial founder if he could obtain a supply of matrices. There is no evidence to suggest that they were ever difficult to obtain.

The "Garamond legend" may derive from the fact that he was the first practitioner of his



Ich geuß die Schrifft zu der Druckrey
Gemacht auß Wißmat/Zin vnd Bley/
Die kan ich auch gerecht juſtiern/
Die Buchſtaben zuſammn ordnierrt
Lateiniſch vnd Teutſcher Geſchrifft
Was auch die Griechiſch Sprach antrifft
Mit Verſalen/ Puncten vnd Zügn
Daß ſie zu der Truckrey ſich fügen.

* I cast the types which the printers employ
Made of a tin, lead, and bismuth alloy.
The letters I justify and dress
That they range neatly in the press.
Whether they roman or Gothic be,
Or even Greek, is the same to me;
And capitals, rules, and other signs
Are adjusted to tally with the lines.

From Jost Amman's
Eygentliche Beschreibung aller Stände
(Frankfurt-am-Main, 1568)

art ever to achieve a substantial reputation outside a closely confined professional circle. During the period 1541–50 he was busy cutting Greek types, the famous *Grecs du Roi*, commissioned by Francis I of France, a monarch well versed in classical studies. Garamond was an outstandingly accomplished punch-cutter, and in touch with all the "right people" in Paris at a time when there was a lively interest in ambitious book-production and publishing projects. During the hundred years that had passed since Gutenberg's time many printers had achieved fame, but this was perhaps the first time that a punch-cutter and his work were in the public eye. Garamond no doubt also supplied founts of type to the trade—his will mentions moulds—but he would have employed journeymen for this work.

The first known pictorial representation of a typecaster at work may be seen in an engraving published in a book printed at Ghent in 1545 by Jost Lamprecht. Three years later the identical block had reached Ipswich, where it was used by A. Scoloker in *The Ordenarye for all faythfull Christians*. The typecaster is seen seated at his furnace, and in the act of pouring metal into the mould by means of a ladle.

Some twenty years later a far clearer engraving of the same kind was included in the *Eygentliche Beschreibung aller Stände* (Frankfurt-am-Main, 1568), a collection of woodcuts by Jost Amman illustrating all manner of trades and professions, with doggerel verses by the popular Nuremberg poet Hans Sachs. The typefounder is surrounded

by the implements of his trade: on the floor there is a basket full of type, seemingly with the jets still attached to them; matrices ready for use are on the table beside him. Note, too, the bellows, the basket of metal ingots, and the tongs for placing them in the hot-metal pot. Additional moulds, etc., are lying on the shelf.

John Day, from Dr. Peter Mirtir's *Commentaries on the Epistle of St. Paul to the Romans* (1568)

Early literary references to typefounding are rare. Lionardo Fioravanti, in his *Dello specchio di scientia universale* (Venice, 1567), stated that types were cast from an alloy of *stagno, piombo negro, antimonio, marcasita, rame & ferro* (tin, black lead, antimony, iron pyrites, copper, and iron). Loys le Roy's *De la vicissitude ou variété des choses en l'univers* (Paris, 1579) was translated into English by Robert Ashley in 1594. A passage reads: "Then they do iustify their matrices on moulds of yron, and in the white thereof make their castings, with lead, tinglasse [bismuth], antimony, and other mixed maters." Possibly the first reference to the use of antimony by typefounders is in G. Agricola's *De Natura Fossilium* (Leipzig, 1546): "If when smelted a certain proportion be added to tin, a printer's alloy is produced from which the type is made that is used by those who print books on paper."

There is little positive that can be written about the early history of the typefounding trade in England. Caxton learned the elements of printing at Cologne in 1471–2 and later printed in Bruges. He returned to England and set up his press within the precincts of Westminster Abbey in 1476. Since there was no trained labour in England, he must have brought craftsmen as well as equipment from the Continent. For instance, Wynkyn de Worde, his foreman and successor, came from Worth in Alsace. For the next seventy-five years or so the majority of the men who opened printing offices in London were foreigners, from France and the Low Countries in particular. Typefounding must have been carried on, but nothing is known of the circumstances in which it was done. In his *English Printers' Types of the Sixteenth Century* (1936), Colonel Frank Isaac gives dozens of instances of types originating from continental sources, from France, Germany, the Low Countries, and Basle. It is unlikely that the London typefounding trade amounted to much during the first half of the sixteenth century.

John Day (1522–84), English born, was not only an accomplished printer, but knew how to engrave a punch. He also conducted a typefoundry, but many of his matrices came from abroad. Between 1550 and the end of the century at least half a dozen foreigners, Huguenot refugees from France or Protestants from the Low Countries, exercised the trade of typefounding in London, but it is not known whether they worked on their own account or as employees of printer-founders.

The first historical record of typefounding as a distinct and recognized trade in this country may be found in an entry in the Court Book of the Stationers' Company made on 1 August 1597, when Benjamin Sympson, founder, entered into a £40 bond not to cast or deliver types without first telling the Master and Wardens of the Company the name of his customer.

The State, through the medium of the Company, was to continue to keep a watchful eye on the printing trade, and hence also upon the trade's sources of supply of types. The Star Chamber decrees of 1586 ordained that no more printing offices were to be opened in London. There were then twenty-two firms. In 1615 the Stationers' Company reaffirmed the regulation. The notorious Star Chamber decrees of 1617 were intended to supplement and reinforce those of 1586 and 1615. The number of printing offices was limited to twenty, and the number of typefounders to four. For most of the seventeenth century the London typefounding trade was under some form of official control or restraint.

During that century the technical and æsthetic standards of London printing, which had in the past seldom equalled the best prevailing abroad, were in the doldrums. The few typefounders certainly made little or no contribution to the well-being of the trade. These men, all of them in a small way of business, and seemingly unaware of traditions of craftsmanship as exemplified by the work of the great French founders of the past, contrived their poor best.

Considering the technical and æsthetic limitations of the London typefounding trade in the seventeenth century and, I infer, the lack of informed interest in typographical matters* it is surprising that the first comprehensive description of all aspects of typefounding (punch-cutting, mould- and matrix-making, casting, etc.) ever to be written was published in London in 1683. Its author, Joseph Moxon, F.R.S. (1627–90 *c.*), was a man of parts; his principal speciality was the publication and sale of books of a scientific nature: works on

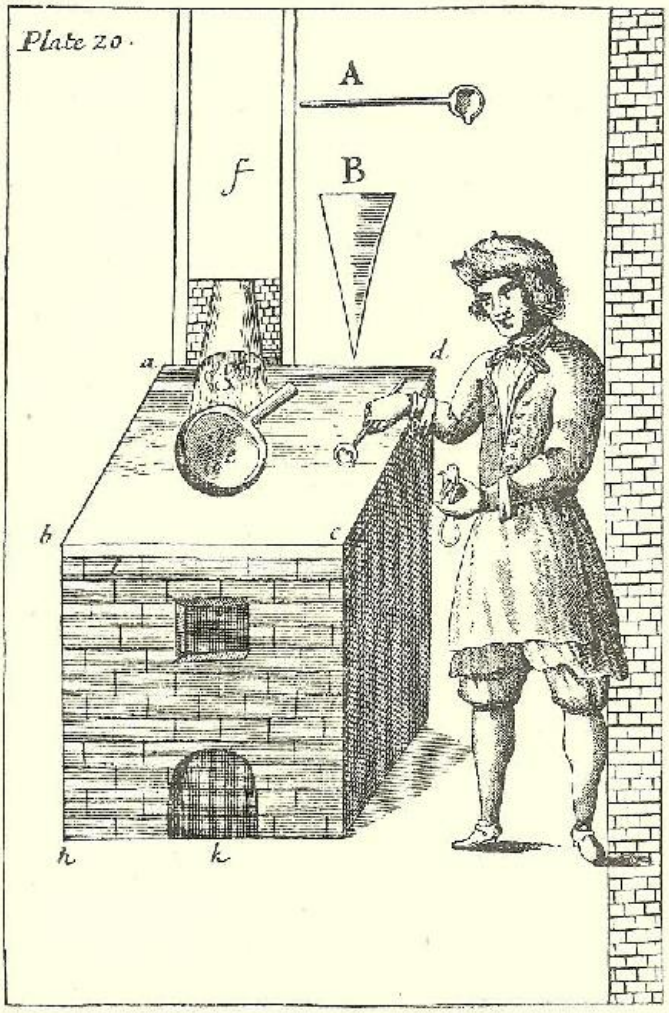
* This sweeping statement could not, of course, apply to Dr. Fell, Vice-Chancellor of the University of Oxford from 1666 to 1669, who did so much to equip the University Press at Oxford with typographical material.

astronomy, surveying, geography, and the like. He did some printing, operated a typefoundry for a while, and was in touch with the leading British scientists. His *Mechanick Exercises . . . applied to the Art of Printing* (1683–6) was originally issued in twenty-four serial parts. This was the first "Printer's Manual", and besides the punch-cutting and typefounding sections contained detailed information on all other aspects of the letterpress printer's trade.

That part of the book which would today be called "Teach Yourself Typefounding" is not easy reading. It would be interesting to know whether anyone has recently attempted to follow Moxon's instructions, and how they succeeded.

"Having justified the mold and matrice," he wrote, "we come now to the casting of letters: but we have neither furnace, mettal, or ladle. Wherefore it is the founder's care, first to provide these." He described the construction of the furnace and then turned to the making of metal. The principal constituent was lead, which was thought to be hardened with iron. For the latter stubnails were thought best, as they melted easily. To make the iron run he recommended the addition of an equal weight of antimony, pounded into small pieces. The proportion of iron (presumably the iron-antimony compound) was to be 3 lb. to every 25 lb. of lead. Nothing was said about tin or copper.

Until quite recently liquated antimony sulphide has been called "crude antimony". Is it possible that Moxon was actually describing the extraction of antimony by heating the sulphide in the presence of iron? (The iron reacts with the molten sulphide to form a slag of iron sulphide which melts below 1200° C.) The impure antimony was



From Moxon's *Mechanick Exercises* (1683–6)

refined by re-melting with common salt but as extracted could contain approximately 7 per cent iron in the form of an iron-antimony compound melting at 728° C, and this could be incorporated in the lead.

It was necessary to prepare the iron-antimony alloy in the open air. The antimony, when heated, gave off poisonous fumes, and since a fierce heat was required it was desirable to erect the furnace at a distance from buildings, owing to the risk of conflagration. The furnace was fuelled by charcoal, and if there was a moderate wind to provide a draught, the fire would be sufficiently heated after an hour or so. In those days there were no instruments to measure heat accurately, and the best way in which to judge whether the melting was going according to plan was for the men to "lay their ears to the ground and listen to hear a bubbling in the pots; and they do this so often till they do hear it. When they hear this bubbling, they conclude the iron is melted."

At the same time another furnace was prepared to melt the lead, which had to be heated until it was red-hot. "Hitherto a man (nay, a boy) might officiate all this work, but now comes a labour would make Hercules sweat." A ladle with a handle 6 ft. long, its cup heated red-hot to prevent the metal chilling, was used to transfer melted lead to the pot close by containing the iron-antimony alloy. An assistant with a long iron stirrer then agitated the compound until he was sure that all the metals were adequately mixed. And then came the refreshment: "Now, (according to custom) is half a pint of sack mingled with sallad oyl, provided for each workman to drink; intended for an antidote against the poysonous fumes of the antimony, and to restore the spirits that so violent a fire and hard labour may have exhausted."

From Christoph Weigel's *Abbildung der Gemeinnützlichen Hauptstände* (Regensburg, 1698)

When the metal was cool, it was presumably broken up into small lumps of convenient size, and was then ready to take indoors to the casting room.

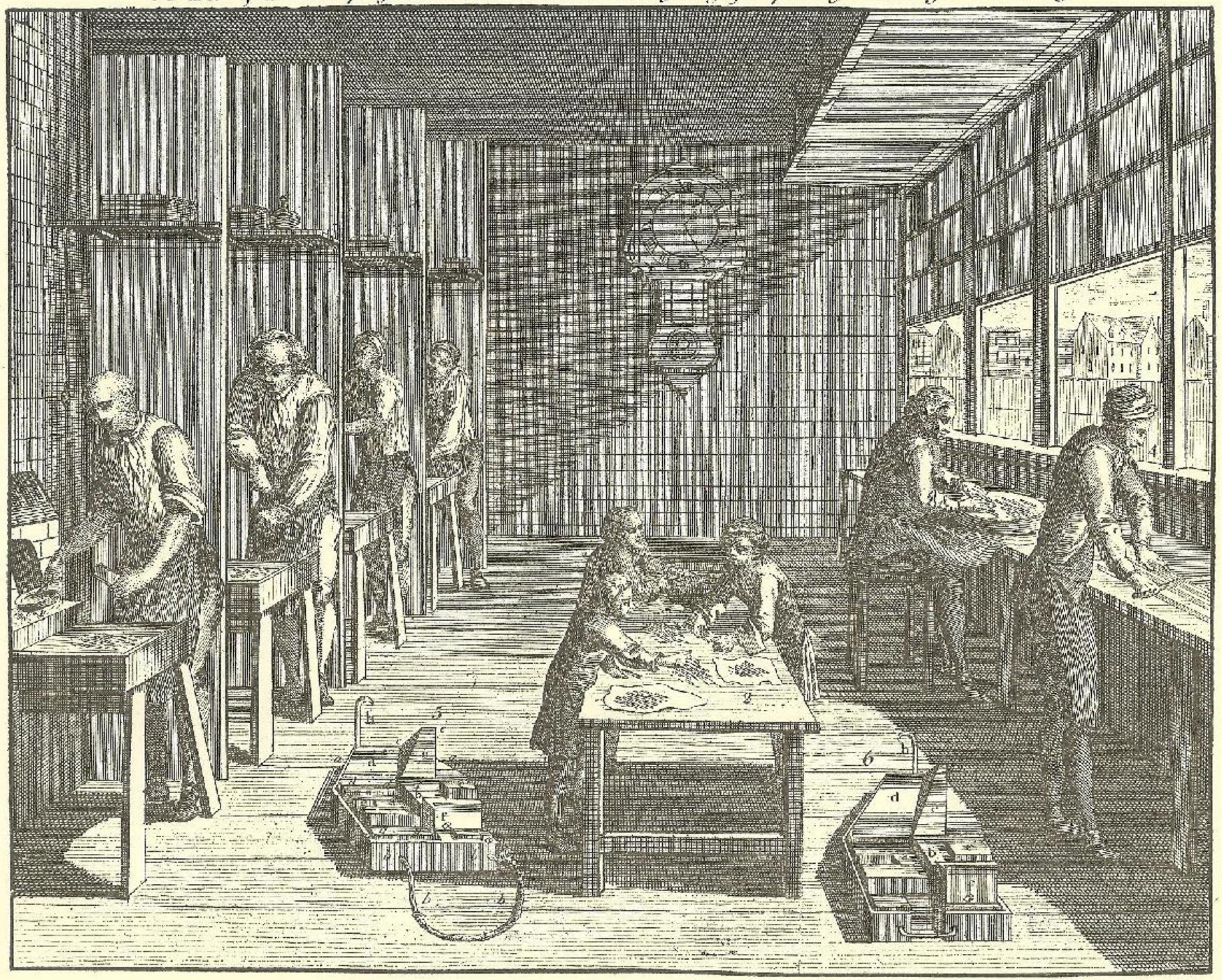
The section on "casting, breaking, rubbing, kerning, and setting up of letters" might well have been written by a student of time and motion study. Every movement belonging to the casting process was minutely described, not forgetting the twist of the left side of the body away from the furnace at the moment of pouring the metal into the mould, the latter being given a strong "shake" to ensure that the metal penetrated the face of the matrix. Somewhere in the literature of the history of printing there is a reference to typefounders in the act of casting apparently gesticulating like monkeys.

It is clear that the founder's work required both application and skill, not only during the casting process but in the subsequent ones concerned with the preparation of the type for the printer. The jets (superfluous metal) had to be separated from the bodies. This work was done by boy labour. Then the sides of the types had to be rubbed smooth, kerned letters adjusted so as to make composition easy, and each individual letter inspected for imperfections.

The technique of typefounding as described by Moxon probably varied little from the practice of the earlier founders, and was to remain unchanged until late in the nineteenth century, when mechanical casting machines finally replaced the manual method. P. S. Fournier *le jeune*'s account of all aspects of the craft in his *Manuel Typographique* (Paris, 2 vols., 1764–6) is clearer than Moxon's, but in essence he wrote about the same procedures.

Nearly a century after the first publication of the *Mechanick Exercises*, Moxon's text was used to accompany the plate showing the interior of the Caslon foundry which appeared in *The Universal Magazine* for June 1750. Minor technical improvements in the ancient method of manufacturing types were no doubt instituted before and after Moxon's time, but there was to be no revolutionary change in casting technique until the middle of the nineteenth century. The mechanisation of type manufacture kept pace with the mechanisation of printing. Until such time as typefounders began to work on an industrial scale, their trade was a small-scale one. Comparatively few firms sufficed to service the printing trade in this country, and the majority of them in the eighteenth century employed few workmen. The Caslon foundry, instituted in 1720, was probably the largest in 1800.

In the St. Bride collection there is a copy of the house rules in force at Robert Thorne's foundry in London in 1806. Casting, rubbing, and kerning were done by the piece. The "dressers" were paid 25*s*. per week, "abiding by the old custom of leaving work at four



View of the Caslon Foundry, from *The Universal Magazine* (June 1750)

o'clock on Mondays". The hours of work were from 6 a.m. to 8 p.m. in summer, and from 7 a.m. to 8 p.m. in winter. Casters and rubbers had to take their turn in carrying in metal. Although the London compositors and pressmen were then organized in trade societies for the protection of their interests, the journeymen typefounders, who were few in number, do not appear to have been in a position to negotiate "union" agreements with the employers covering wages and conditions of work generally.

The London master typefounders, on the other hand, had formed an Association in 1793. This was in an effort to protect themselves from price-cutting at the hands of their Scottish competitors. In 1796 the Association was dissolved, only to be re-formed in the following year. It had an on-and-off existence until 1820. During the Napoleonic Wars the masters were plagued by the constant rise in the price of raw materials. The average selling price of pica founts rose from 1*s.* 1½*d.* per lb. in 1793 to 3*s.* in 1810. In 1816, immediately after the cessation of hostilities, pica fell to 2*s.* per lb. In the same year the price of antimony fell from £400 to £200 per ton. Unfortunately history was not to repeat itself after 1945, and there has been no substantial drop in the price of metal—indeed, the reverse has happened.

In his *History of the Old English Letter Foundries* (1887), T. B. Reed gave a brief summary of patents relating to typefounding during the period 1790 to 1831. It is a pity that he neglected to provide a fuller technological account of nineteenth-century type manufacture (about which he must have known a good deal), but it must be remembered that he was writing for an "antiquarian" audience. Mr. A. F. Johnson does something to remedy this in his new edition of Reed, and readers desiring to study the subject are referred to his book.* Legros and Grant's massive *Typographical Printing Surfaces* (1916) is more concerned with the technology than the history of the manufacture of printing types. When investigating the history of inventions, it is easy to mistake "experiments" for "use in commerce", and their lengthy list of patent specifications may do more to mislead the reader than help him. Early attempts at "mechanising" typecasting were not really "mechanical" inventions, involving the use of power-drive. Since the earliest times the operative engaged in typecasting had to pour the metal into the mould by hand. These experiments early in the nineteenth century sought to replace hand-pouring by a hand-operated pump. There are a number of instances where British typefounders did their best to ensure that such inventions were safely kept in cold-storage. Either they feared labour trouble or the members of the Masters'

* T. B. Reed's *A History of the Old English Letter Foundries*, 1887, revised and enlarged edition by A. F. Johnson, 1952, is the standard work on the history of the trade in Great Britain, and covers the period 1476–1890.

Association had a tacit agreement amongst themselves that they would individually take no step which might lead to lower prices for their product. In any case, theirs was a conservative trade and they were conservative people. As always happens in such cases, somebody outside the ring takes a chance on a new and more productive method of manufacture, is able to undercut his competitors, and his example is soon followed by them.

The first effective mechanical casting machine was invented by David Bruce and patented in the U.S.A. in 1838. By 1850 a few of them were in use in this country, although the old-fashioned hand-casting methods still generally prevailed. It is significant that the Report of the Jurors appointed to review the printing section of the Great Exhibition of 1851 had little to say about mechanical typecasting. About ten years later, however, at least one British typefoundry had a large number of pivotal casters (the Bruce machine) at work. This was the Marr Typefoundry in Edinburgh, which then operated between thirty and forty machines, each of them doing the work of four hand-casters. With the old pivotal casters it was still necessary to remove the jets and dress the types by hand after casting. The first machine to cast ready-dressed types was the Johnson & Atkinson design, patented in 1859. Some were still at work at Messrs. Stevens, Shanks & Sons, successors to the Figgins foundry, in Southwark Bridge Road in 1939.

There is no evidence to suggest that the introduction of mechanical casting led to unemployment in the typefounding trade. Indeed, it is probable that the hey-day of the British typefounding industry was in the second half of the last century. The market for its products was constantly expanding, not only at home but also in the colonies. In London alone the number of printing offices had increased enormously since the end of the eighteenth century. In 1785, when John Pendred published the first printing trade directory, there were 124 printing businesses. In 1855, seventy years later, there were at least 423 firms in London alone, and by the end of the century the number had increased still further. Not only were there more firms, but many of them were far larger than had been common in the past. London and Edinburgh were no longer, as in 1800, the only important printing centres. General printing and newspaper offices, some of them with a great many employees, were thriving in all the main centres of population. Plant and equipment, which in 1800 had differed little from what had been used three centuries previously, was beginning to resemble the machines and apparatus we use today.

A number of independent factors had done much to influence the expansion of the British printing trade during the Victorian era. The introduction of the Penny Post in 1840,

From an engraving by J. Wagner (c. 1760)—source unknown, possibly Swiss

allied to the development of the railway system in the 1840's, gave a great impetus to printing outside London. With the repeal of the Newspaper Stamp Tax of a penny per copy in 1855, daily newspapers, hitherto published only in the metropolis, were speedily founded in all the more important provincial towns. The printing industry grew as rapidly as did, for instance, the radio industry a century later. The master typefounders reaped their harvest and some of them made substantial fortunes. They enjoyed an increasing demand for their products and competition was not excessively severe. It was not easy for newcomers with little capital to enter the trade, as the long-established houses were accustomed to extend long credit, and a good deal of capital was required.

Inventors and printers had been experimenting with typesetting machines since the 1840's. These were "cold metal" machines, incorporating magazines filled with foundry type. The keyboard operator released the types from their respective channels, the letters falling into a stick where justification was effected by hand.

The people most interested in the possibilities of mechanical typesetting were the newspaper proprietors, to whom speedy production of composition was an important matter.

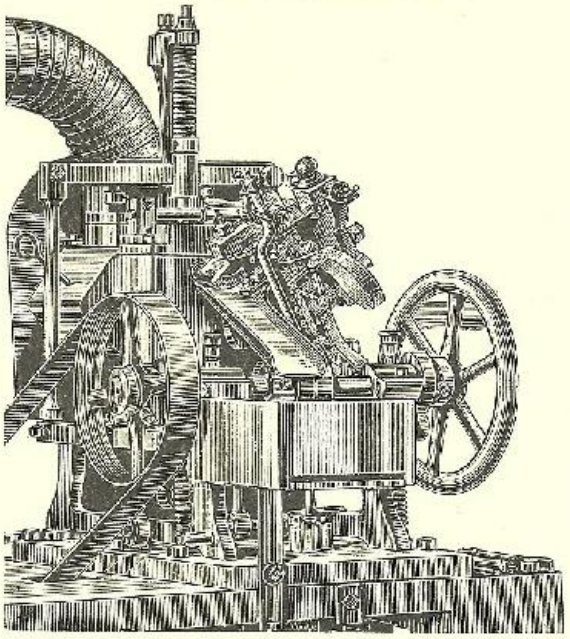
From MacKellar's *American Printer* (1889)

The book and general printers saw no reason why they should hurry to invest in this kind of plant. Time-honoured methods of composition were considered adequate and there was, in any case, no shortage of labour. There were always plenty of unemployed compositors looking for work. After 1860 typesetting machines were used to some extent in the provinces for newspaper production, but hardly at all, except by *The Times*, in London. It seems that they were not an economic proposition unless cheap juvenile labour could be employed to attend to distribution. The News Department of the London Society of Compositors was able to prevent this practice in London. In those days, however, *The Times* was a non-union shop.

When the Linotype was introduced in the 1890's the old "cold-metal" typesetting machines were speedily thrown on the scrap-heap, and it was not long before Linotype was installed in dozens of London and provincial newspaper offices. The newspaper proprietors had been accustomed to buy very large founts from the typefounders, and the latter must have been disturbed by the loss of these orders. It is possible that the typefounders saw the red light, but their trade was as old as printing itself, and the proposition that the average book and general printer might soon have the means to become his own typefounder was inconceivable. When the first Lanston machines arrived from the U.S.A. in 1897, and were written-up in the trade press, master printers were sceptical rather than impressed.

There was no question of 'Monotype' machines getting away to a flying start in this country. Messrs. Wyman & Sons were the first to install them. This was in 1898, and by the end of 1900 only one other firm (Cassell & Co.) was operating a 'Monotype' plant. This was due to the fact that no machines were ready for exportation from the U.S.A. During the next four years, however, the machine was set to work in about 120 British printing businesses. The result was that in time a large tonnage of typefounders' metal found its way

to the melting-pot, and replacement founts were not ordered from the old sources of supply. As yet, however, 'Monotype' machines were casting nothing larger than 12 pt. and printers still went to the typefoundries for their display material. Nor at this time were any firms selling 'Monotype' type by the pound.



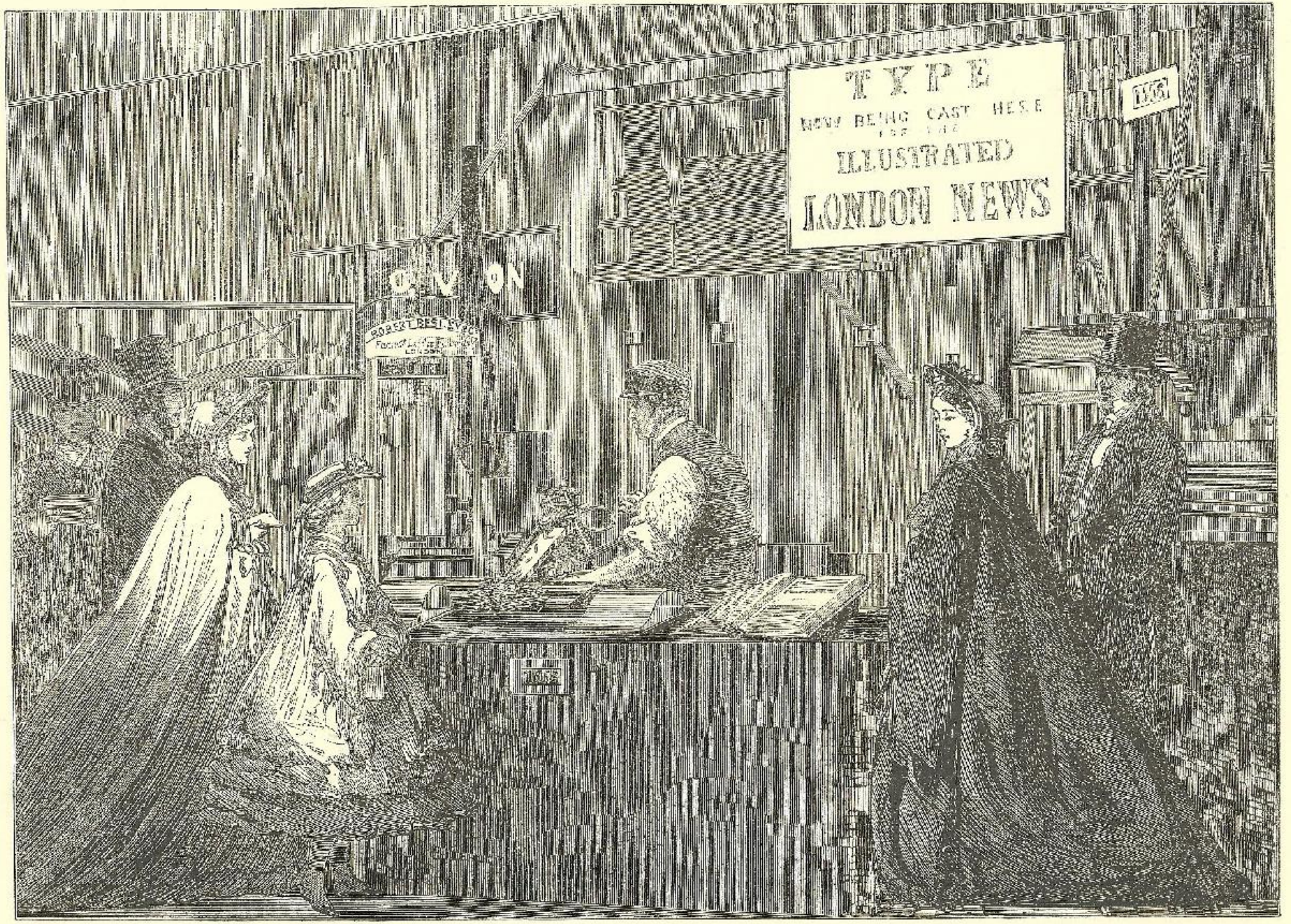
Pivotal Typecaster from Alexander Waldow's *Illustrierte Encyklopädie der Graphischen Kunst* (1884)

By the end of the first decade of the present century, then, the typefounders were facing a gradually shrinking demand for their products. As and when the older men retired from the trade, youngsters were not recruited in the same proportion. A man who completed his indentures as a matrix-maker in the typefounding trade in 1908 told the writer that towards the end of his apprenticeship he was all too often obliged to work short-time. The orders had dried up and there was little for the journeyman and himself to do.

The youth who perforce stood idle is now the esteemed Secretary of the Monotype Casters' and Typefounders' Society. His name is Alex Douglas. Some account of his early experiences in the typefounding trade may be of interest to readers of this essay. His story shows that a state of affairs which brought perplexity and the threat of unhappiness to many skilled craftsmen eventually found its own satisfactory solution. The increasingly wide use of "hot metal" mechanical composition after 1904 represented a serious threat to the livelihood of men in the old typefounding trade. This was at a time when the concept of full employment was unknown, and when the social services were hardly in their infancy. To be out of work was a far more serious matter than it is today.

Alex Douglas was born in 1887. He came of a family of typefounders. An uncle was a typecaster at the Shanks foundry in Red Lion Square. His grandfather also worked for the same firm, and his great-grandfather had also been in the trade. Grandfather Douglas, with whom young Alex boarded, lived at the foundry; he was its caretaker. He was a highly skilled craftsman, and was often employed in casting semi-nonpareil (3 pt.) sorts for the music founts which were one of the firm's specialities.

Thus in 1901 Alex Douglas joined the rest of his family at Shanks's. He was apprenticed



A pivotal typecaster at the London International Exhibition 1862

to learn the trade of a matrix-maker. This was a step higher in the social scale than typecasting, highly skilled work performed according to methods which had been traditional for centuries. He was to learn how to use a hammer to "strike" a steel punch cleanly and accurately into a copper matrix blank, and then justify the matrix to make it ready for the caster. To achieve correct height-to-paper and positioning of the letter on the type body was precision work of a high order. The tools he used were files, a special milling lathe and various gauges for measuring the position of the type face. From time to time, while working on a matrix, he would himself cast trial sorts. For this purpose he used an ordinary hand-mould. He did not have to learn the traditional typecaster's "shake", as a small hand-pump was employed to inject the metal into the mould.

Hand-pouring followed by the distinctive "shake" had practically died out by the time that Douglas came into the business. Casting machines, giving a reasonably high output and a great improvement on the earlier models of the previous century, were in common use. At the Shanks foundry one or two men still cast type by hand, using a ladle instead of a hand-pump, but they were producing very large display sizes, where pouring, as opposed to pumping, gave a better result.

In those days there were a fair number of foundries at work: Caslon, Figgins, Shanks, Reed, and Pavyer & Bullen in London; Stephenson Blake in Sheffield; Miller and Richard in Edinburgh; and a few others. The type business was declining, but there was still a good trade in printing and composing-room equipment for some of them. *The Times* newspaper had been one of Shanks's best customers while Douglas was with the firm, but orders from Printing House Square suddenly dried up, and this was a serious matter. One of Lord Northcliffe's first actions on obtaining control of *The Times* had been to install a battery of 'Monotype' machines.

Alex Douglas's first glimpse of a 'Monotype' machine was at Spottiswoode Ballantyne's in New Street Square. He was still an apprentice matrix-maker, and had arranged a private demonstration for himself. He could, of course, have achieved the same object at the Lanston Monotype Company's school in Drury Lane, where enquiries were welcome. The young men in the typefounding trade, and many of the older ones, were beginning to talk about this fantastic 'Monotype' machine. The [London] Typefounders' Society was also watching it. The Society's part-time Secretary, Mr. George Tomkins, was not without his connections with the school, and had been able to arrange for his members to receive instruction on a 'Monotype' caster in the evenings.

Douglas himself enrolled for a course on the caster. It lasted three months. He had, however, no particular desire to become a caster operator upon the completion of his apprenticeship. As a skilled journeyman matrix-maker he could expect to earn 45*s*. a week. This was quite good pay, since compositors in London were then getting 39*s*., while the typecasters at Shanks's received only 36*s*. But 'Monotype' caster operatives were two a penny at a guinea a week!

In those far-off days it was uphill work for the promoters of Lanston's new machines to sell them. Printers were more sceptical about new inventions than they are today, and it was felt necessary to dangle an economy carrot before a prospective customer's nose. The L.S.C. and the T.A. had never shown much interest in the caster but had made sure that the keyboard was their "property". The keyboard operator, affirmed the Lanston Monotype Company, could produce 6,000 ens an hour and upwards. And that, compared with the output of a hand-compositor, was very good indeed. The caster, it was suggested, could safely be left to the ministrations of a "mechanic", and not a particularly skilled one at that. Hence the guinea a week situation. The Lanston Monotype people employed a large staff of well-trained technicians whose task it was to come to the rescue quickly when something went wrong with one of their machines. A good many years were to pass before both the manufacturers and the users of the machine came round to the idea that to operate a casting machine *efficiently* requires real skill.

In 1913, after he had worked at Shanks's as a journeyman for five years, Douglas handed in his notice. He had found himself another job. His new employers were Messrs. Grant Legros & Co. Ltd. The names of the proprietors of the firm are still remembered as those of the joint authors of that monumental book *Typographical Printing Surfaces,* published in 1916.

L. A. Legros and J. C. Grant were specialists in the technology of type production and were able precision engineers. If Lanston's invention had not emerged when it did, these men might have achieved greater material success. They laid down a plant to manufacture the Davis Typecaster. These they hoped to sell to printers, and on the same scale as sewing machines are sold to ladies. That was how Mr. Douglas expressed it to the writer. It is no use trying to sell typecasting plant if there are no matrices to go with it. Messrs. Grant Legros & Co. had legislated for this. They had designed and built their own pantographic punch-cutting machine. There was no question of producing original type designs. There were plenty of old ones to copy. They began to build up a matrix hire-library. Then two

events happened in fairly rapid succession. There was a serious fire at the Grant Legros factory, and there was the outbreak of the Great War.

With his experience in precision metal work Douglas was soon called to the munitions industry. He remained in the engineering business until 1922. Then he went back to his old trade of matrix-making at Caslon's, who had just celebrated their 200th anniversary. This was the largest typefoundry in London and employed about 200 people. Douglas was interested in trade union affairs and soon became Father of the Chapel.

The [London] Typefounders' Society was neither as large nor as long-established as some of the other important printing unions. It had been founded in 1889, and for many years had about 200 members. When Douglas became F.O.C. at Caslon's in 1924, its membership numbered 866, six fewer than today. Although the number of card holders has not materially altered during the past thirty years, there has been a complete change in the industrial functions of its members.

When Douglas was working at Caslon's, about one-half of the Society's members were employed in the typefounding trade, while the remainder were operating 'Monotype' casters. Many of the latter had come to the new field with foundry training behind them. To their new field of activity these men brought the traditions of craftsmanship learned as members of an ancient trade. They made their own contribution to the progress of a machine which was by degrees becoming more complex.

The story of the 'Monotype' caster operators on the trade union side is not without its complications, and it is not one that can conveniently be discussed in these pages. Suffice to say that it was not until 1920 that the Typefounders' Society was able to make an agreement with the London Master Printers' Association. At last it was recognized that the caster operative's work was worthy of remuneration on a craft basis. The conception that a caster-hand was worth only half a compositor went by the board. It is true that the minimum rate for a caster operative was a little less than that paid to members of the L.S.C., but the gap was not too wide. It may be mentioned in passing that the 'Monotype' caster operative and the hand-compositor in London are now paid the same minimum basic wage.

Mr. Douglas became Secretary of the Typefounders' Society in 1934. By then the number of members working in typefoundries had decreased still further. It was therefore decided in 1937 to alter the name of the union, and it then styled itself the Monotype Casters' and Typefounders' Society. Today all but a dozen or so of its members are working in printing offices equipped with 'Monotype' machines.

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