

## STORIES of New Jersey

into wooden frames the size of the desired sheet. The bottoms of the frames were made of strands of criss-crossed wire like a coarse screen. The layer of pulp was pressed until most of the water was forced out and it had formed a damp sheet, which was taken carefully from the frame and placed between felt pads. Many of these sheets and pads, one on top of the other, were placed in a powerful press that squeezed out all the water and made the sheets very thin and fairly strong. They were then hung like wash to dry.

The quality of the paper depended on the skill of the papermaker. If the pulp were poured into the frames unevenly, the sheet would be too thin in some spots and too thick in others. Because they were so fragile it was an achievement to handle sheets 15 by 25 inches. Books and newspapers were smaller, and good printing was difficult with the uneven paper texture. The modern paper machine, using a pulp made of wood, old paper, rags or even potato peelings, turns out a continuous sheet of paper more than five feet wide and thousands of feet long. The modern printer with sheets of perfectly uniform paper large enough to hold 64 pages can print a book of 256 pages in four printings. Bradford or Franklin would have had to print the 256-page book in 32 printings.

All the good paper was imported from Europe at first, but gradually mills were built here and slowly the quality of their product improved. By 1810 there were 185 mills operating in the United States, producing paper that was comparable to the imported variety.

The lampblack, linseed oil and resin for ink were more plentiful than linen for paper, but the process was delicate and unpleasant. Lamp black is soot such as a burning match deposits. Mixed with varnish, which is composed of linseed oil and resin, it forms black, sticky printer's ink. Linseed oil, extracted by crushing and pounding flax seed, is strained, filtered and boiled until thick. As it boils, powdered resin is added. According to old records the bubbling oil smelled so unpleasant that people never lived near ink mills. The oil had another inconvenient habit--it often exploded, and some ink makers boiled the oil outdoors.

Printers bought varnish and lampblack separately and mixed them together on a mixing block. The wrong amount of resin or too much or too little boiling resulted either in ink that would not dry or ink that would not spread evenly.

### THE PRINTING PRESS

Gutenberg's press consisted of a wooden screw that pressed a sheet of paper against a form of freshly inked type. After each sheet was printed, the screw had to be loosened, the paper removed and the type re-inked. With the relatively weak wooden screw the paper could not always be pressed against all the type evenly, and sometimes parts of the printed matter could scarcely be read. To offset this printers used to dampen the paper to make it more pliable.

A greater defect was the immovability of the bed of type, which made it necessary for the printer to lift the type out of the press to ink it. About 1620, however, Willem Janszoon Blaeu of Amsterdam, Holland, designed a press on which the stone type bed could be shifted to one side after a sheet had been printed. Blaeu also substituted an iron screw for the wooden one and by this improvement was able to print much more evenly because he could put more pressure on the paper.

Using a screw to press the paper against the type was not discarded for many years, but eventually presses were perfected that used a simple, powerful lever instead. The lever quickly and easily brought the type and paper together in a single movement and just as quickly drew them apart for removing the sheet and re-inking the type.