

words only those which have their respective parts connected by a hyphen are compound in the printing-office sense. Unfortunately, the usage applicable to many words is conflicting, dictionary-makers and writers disagreeing, as to whether they should be printed distinctly, or be connected with a hyphen, or be printed as single words. Webster's and Worcester's Dictionaries designate, in each doubtful word, whether it is to be printed with or without a hyphen, but they do not explain on what principles their decisions are founded, and they do not always reach similar conclusions. Goold Brown, in his grammar, undertook to solve this problem by the doctrine that: Permanent compounds are consolidated; as bookseller, schoolmaster: others are formed by the hyphen; as, glass-house, negro-merchant. But Parker in his *Aids to English Composition*, in commenting on this doctrine, says that no better reason can be given for the use or omission of the hyphen than caprice. Wilson, in his *Treatise on Punctuation*, lays down some rules, yet he acknowledges that there are numerous exceptions to most of them, and he laments that the subject under consideration has been sadly neglected. Practically, the only safe course open now for proof-readers and compositors is to consult their favorite dictionary in all doubtful cases.

Condensed.—This general term is applied to various styles of job letter which are narrower than Roman letters of a corresponding size. Some of the English foundries use in a similar sense the word compressed. (See *JOB LETTER*.)

Conner, James, born April 22, 1798, near Hyde Park, Dutchess County, New York, died May 30, 1861, was the founder of the Conner Type Foundry of New York, which, since his death, has been conducted by his sons, under the firm name of James Conner's Sons. After serving an apprenticeship to the printing-business in a New York City newspaper-office, he worked for some years as a journeyman printer, chiefly in book stereotype offices, beginning his labors as a stereotyper in the office of Mr. Watts, who, in conjunction with Mr. Foy, was one of the first, if not the first, to stereotype successfully in the United States. Subsequently he started a stereotype establishment in New York, to which an extensive type-foundry was afterwards added, and he prepared plates of a number of valuable standard works, some of which he sold, while others he published on his own account. Later in life, after an adventurous career, his business attention was concentrated on his type-foundry, and he made strenuous exertions to increase his variety of faces as well as to improve the facilities for manufacturing type. A biographical notice of Mr. Conner, which appeared in *The Printer* of May, 1859, gives the following account of some of his experiments:

Among these, elaborated by the process of chemical precipitation, was the casting of letters from an electrotyped matrix. Previous to Mr. Conner's successful efforts in this direction, Messrs. Mapes and Chilton,

chemists, had experimented to produce a fac-simile of a copper-plate which Mapes wished to use for his magazine. Ascertaining the perfect success of the experiment under other hands, he was anxious to have their battery tried on a copper-plate. It was, to his and Mr. Chilton's joint delight, successful, and a very favorable report was inserted in many of the European scientific periodicals. So gratifying, in fact, were the results of the experiments made in this direction, that improvements were suggested from time to time.

In the course of his experimenting, Conner took a Long Primer Italic capital T, and inserted it through a piece of stereotype plate. This was attached to a copper wire by soldering; some zinc was attached to the other end of the wire; a weak solution of sulphuric acid was made and placed in a vessel; a solution of common blue vitriol in another apartment; then the matrix and the zinc were placed in their respective apartments, and the process of extracting the copper from the sulphate, through galvanic action, commenced, and the copper obtained was thrown on the intended matrix.

Conner and his assistants then took a small cut of a beehive, and, setting this also in the same way, obtained a perfect matrix, which is now in use at Conner's foundry. These successes encouraged him to other experiments on a larger and more valuable scale. Mr. Conner, therefore, ordered a fancy font of type, which he originally had cut on steel, selecting therefrom a perfect alphabet, points, and figures, and then shaved a stereotype plate on both sides. This he lined off into sizes, equal to the matrices he desired to make. He then made the necessary openings through the plate, and inserted the types designed to be precipitated on, which he cut off and soldered on the back. This proved a highly successful experiment, as it gave him a perfect set of matrices at one precipitation. This plate is still to be seen at Mr. Conner's establishment, as originally made, and is regarded as a great curiosity—being supposed to be the first alphabet thus made, in this or any other country.

His next experiment was made on a more extended scale, and, to this end, the apparatus was enlarged so as to admit three fonts of fancy types, which were placed in communication with the precipitated copper at the same operation. Between each letter was inserted a piece of wood, made to the height necessary to separate each matrix from the other as it came out, it being impossible to connect the wood along with the precipitated metal. Thus divided, each matrix would fall apart without the labor of sawing. This experiment, however, was by no means successful. From the circumstance of wood being introduced as dividing lines, and becoming wet, it swelled—such swelling causing the type to spring from the bottom of the trough. In the process of precipitation, only a very thin shell was formed on the face of the type; about the same quantity having found its way to the bottom, in consequence

of the springing of the dividing lines, and the throwing of the types off their feet. All these difficulties have been since overcome, and his establishment has several thousand precipitated matrices that can scarcely be told from those made from a steel punch.

Consecutive Numbering-Machines.—Several machines are made by which tickets, checks, or cards can be numbered consecutively with great facility. They are extensively used in printing railroad tickets and tickets for secured seats in places of public entertainment.

Consonant.—An articulate sound which in utterance is usually combined and sounded with an open sound called a vowel; a member of the spoken alphabet other than a vowel; hence, also, a letter or character representing such a sound. Consonants are divided into various classes, as mutes, spirants, sibilants, nasals, semi-vowels, etc.

Contents.—A summary of the matter treated in a book, which usually follows the preface or introduction, but sometimes precedes it. When a work is divided into chapters, and the contents of each chapter are summarized at its head, these summaries are frequently printed at or near the beginning of the work, as contents; while in works not thus divided, and in which the summary assumes the shape of a minute alphabetical index, such an index is usually printed at the end of the book.

Context.—The parts of a composition which precede or follow a sentence quoted.

Co-operative Associations.—A number of co-operative associations of journeymen printers, formed for the purpose of enabling them to acquire an interest in printing-establishments, without abandoning their situations as journeymen, have been organized in various portions of the United States. The organization is usually effected under a general act authorizing the formation of corporations for manufacturing purposes. In one company, whose articles of association furnish, in some respects, a type of others, the capital stock is fixed at \$5000; the term of the existence of the company is twenty-five years; the number of shares is twenty-five; the business is intrusted to the management of five directors or trustees; a small portion of the sum represented by the par value of each share of stock is paid at the time of the original subscription, and the balance in weekly instalments; members are prohibited from selling stock except to the association; and the members mutually agree that in case of difficulty or dispute they will rely for a settlement upon the honor of the board of directors, and the members of the association generally, instead of appealing to the courts.

Copper.—The immense number of impressions which electrotypes are known to bear without serious injury to their surface, has attracted increased attention to the value of copper as an ingredient of type-metal, and while a process of copper-facing type has been employed to a comparatively limited extent,

many type-founders announce that copper forms an important portion of their alloy.

Copperplate Engraving.—This art is supposed to have been invented by Tommaso Finiguerra, a goldsmith of Florence, about or before 1460. It is said that he chanced to cast, or let fall, a piece of copper, engraved and filled with ink, into melted sulphur; and, observing that the exact impression of his work was left on the sulphur, he repeated the experiment on moistened paper, rolling it gently with a roller. His leading object is supposed to have been to obtain proofs or copies of the fine engravings he executed on gold and silver plates. In engraving copperplates they are cut with a steel instrument called a graver, the design being generally, either in part or entirely, etched upon the metal. This process is based on the chemical action of nitric acid. An etching ground, composed of white wax, burgundy pitch, and asphaltum, is laid upon the surface of the plate. This compound is tied up in a silk bag or roll, and, the plate being warmed, the wax is applied by rubbing over the surface—the heat of the metal causing the etching ground to ooze through the silk, and uniformity of thickness being caused by the application of a dauber. A drawing is made with a needle through this composition, until along all the lines the metal is laid bare. An edging of wax being placed around the plate, a solution of nitric acid is poured over it; this must be sufficiently strong to act readily, but not very intensely, upon the copper; this is technically called biting. The chemical action which ensues is the formation of an oxide of copper, which is rapidly dissolved off in the form of a nitrate of copper, there being at the same time some nitrous acid generated, which is visible in red fumes. When the acid has penetrated to a sufficient depth, its operation is arrested by an application that neutralizes it, and the plate is touched up by the graver. For a long period nearly all the illustrations used in books were copperplate engravings, but in modern times they have been supplanted, to a very large extent, by wood-engravings, mezzotints, and steel-plate engravings.

Copperplate Paper is usually made from the best stock, is unsized, calendered on one side and rough on the other.

Copperplate Press.—Many improvements have been introduced into this machine during the last few years. The copperplate press is employed in taking off prints or impressions from copper or steel plates, engraved, etched, or scraped as in mezzotint. It is a description of rolling press, and consists of two rollers or cylinders supported on a strong frame. These rollers are movable on their axes, one being placed just above the other. The table on which the plate to be printed is laid runs between the two. The upper cylinder is turned round by means of a cross fixed on its axis; the lower one is turned by the action of the upper on its surface. These rollers are so arranged as to admit of a greater or less amount of

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