

carrying on hostilities at all other times. These hostilities are carried on by them to gratify the feeling of avarice—to add to their wealth. They have driven off from New Mexico since 1846 stock to the value of at least \$500,000 (half a million.)

A specimen of their blankets (one of the coarse sort) is at the house of Mr. R. S. Coxe, Esq., F street, between 6th and 7th.

Washington, Jan. 7, 1851.

R. H. WEIGHTMAN.

#### TYPE FOUNDING.

Of contributions by inventors and artizans to the great work of mental development, there are three that have been conspicuous in bringing out the modern outburst of thought. But for them the genius of refinement had never made the progress she has; nor without them could she advance a single step further. Successfully employed in hastening a present, they are securing the future elevation of our race. Preventing retrogression in intelligence, they add daily to the general stock, and are posting it up for the use of our successors. United, they have revealed a potency unknown to the ancients:—They are metallic types, paper and the printing press;—a triad of achievements in mechanical science unrivalled in importance and value. While water, wind, steam, electricity and the gases, serve to animate material mechanisms, these are the elements of a higher and mightier prime mover; one destined to agitate and expand the intellect of the world; to extend and perpetuate the peaceful reign of science and arts over the earth.

*Type Founding in the United States, by GEORGE BRUCE, Esq., of New York.*

Type founding is not a business of great industrial importance, but is valuable as being the fundamental branch of the letterpress printing business, and interesting as the great discovery of the 15th century, by which books, which were before possessed by the rich only, were brought within the reach of people of moderate means, encouraging the learned, and promoting the arts and sciences, through the cheap diffusion of knowledge.

As soon as type founding had been brought to a moderate degree of perfection, by forming copper matrices from steel punches, and a variety of sizes of type had been introduced, it must have been separated from the business of the printing office and made a distinct art; for the same moulds and matrices, with the constant employment of a few workmen, could supply all the type that was required for many printing offices, and thus save the expense of separate moulds and matrices for each one. It would indeed require a demand from many printing offices to furnish the business necessary for a single type foundry and to keep it in activity.

In the year 1683, as Joseph Moxon states in his *Mechanical Exercises*, the number of different bodies of type cast in England was ten: the smallest having 184 lines in a foot, and the largest 17½. Each of these sizes or bodies required about 250 matrices. In 1789 the number of sizes or bodies in the British type foundries, amounted to upwards of twenty, of which the smallest,

called Diamond, had 292 lines in a foot, and the largest, called 12-lines Pica, had six lines. Four foundries at that time furnished all the types used in Great Britain and Ireland, in all their colonies, and in the United States, which had become then independent. It is not probable that these foundries employed more than fifty casters and a hundred other persons, or altogether 150 persons. This must seem a very small number, though probably over-rated. A caster's work is stated at from 3,000 to 4,000 letters in a day. Take the highest number, and supposing it to be of the body called Long Primer, having 90 lines in a foot, it will amount to 10 lbs., and in a week to 60 lbs. Ten such casters would produce 600 lbs. in a week; a quantity quite sufficient to print the largest newspaper published at that time, and to last twenty years, if used only for a weekly issue of 1,000 impressions.

The number of Printing offices in the United States, when independence was declared, could hardly have exceeded fifty, of which 37 published newspapers; and the annual importation of types could be supplied by the work of two casters. This constituted the difficulty of introducing type founding; the demand was necessarily too small for the proper maintenance of one, even if all the printers had united in support of a domestic establishment. Hence every attempt to establish before the revolution, and there were several, failed, as might have been foreseen. In 1790, the number of newspapers was 70, and some of them were published daily. The population and prosperity of the country after the revolution became actively progressive; and in 1796, when the exports of the year amounted to \$60,000,000, the duties on imports were raised to 15 per cent. ad valorem, the inhabitants numbered 4,500,000, and the printing offices had increased to 150, the favorable moment at length arrived.

Type founding, unconnected with any other branch, was then commenced in Philadelphia, by Archibald Binny and James Ronaldson, natives of the city of Edinburg, where Binny had carried on the same business. Their assortment was not extensive, but it embraced the essential fonts, Brevier, Bourgeois, Long Primer, Small Pica, Pica, and Two-line letters. They were obliging and attentive, and in twenty years made a fortune. They improved their foundry according to the increase of printing and the consequent demands of the trade, extending their assortment from Pearl of 180 lines in a foot to 12-line Pica, having six lines. They made an important improvement in the type mould, by which a caster could cast 6,000 letters in a day with as much ease as he before could cast 4,000.

According to Holmes' *American Annals*, about 200 newspapers were printed in the United States, in the year 1801, of which 17 were issued daily, 7 three times a week, 30 twice a week, and 146 weekly. There must also have been at the same time as many as 60 offices engaged in miscellaneous printing. The whole business had increased three-fold in eleven years. Another type foundry was put in successful operation in Baltimore, about 1805, by Samuel Lower & Co. It had in it some moulds and matrices which had been used by Christopher Lower, who printed in Germantown near Philadelphia, and cast his own types, in 1740. He printed with German characters; but now the foundry was revived with excellent Roman and Italic letters, and among other extraordinary things it had the size called Diamond, with a smaller face than had ever been cast before. It was the smallest type in the world.

The demand for type was very brisk till the war of 1812 commenced, and the foundries were generally three or four months in arrears in their execution.

of orders. The names of the newspapers published in the United States, in April, 1810, are given in Thomas's History of Printing, and amount to 359, of which 27 were daily papers; 38 were printed twice, 15 three times, and 279 once in a week. Add those required for general printing, and the whole number of offices could not be less than 500, being an increase of 240 in nine years, and some of them using several thousand pounds of type for book printing.

In 1811, Elihu White established a Type foundry in New York. He had been long engaged, in connection with Mr. Wing, in the manufacture of printing types, at Hartford, Connecticut, upon a plan of their own invention, by which 20 or 30 letters were cast at once, and had brought it to a useful degree of perfection; but now, abandoning the invention, he adopted the old plan of casting, and having a good assortment of faces, and bodies, his removal to New York was a great convenience to its printers, and they gave him a very satisfactory support. But the principal business in type founding still continued for some years to be done in Philadelphia.

In 1813, another type foundry was begun in the city of New York, by D. & G. Bruce, principally to cast types for their own use. They had carried on book printing for seven years, and had now become acquainted with the stereotype art—Mr. David Bruce, having visited England, in 1812, and acquired it by purchase and actual labor. For ordinary printing, it was customary to level off the body of the type at the face end, or shoulder, as it is usually called, which unfitted it for making a strong stereotype plate in the most approved way: hence, the necessity for casting type expressly for stereotype. Their first font was Bourgeois, with which, they cast two sets of plates of the New Testament, the common school Testament, and sold one of these to Matthew Carey, of Philadelphia, retaining the other for their own business. But these were not completed till 1814. In 1815, they cast the plates of the 12mo. School Bible, on Nonpareil type, prepared like the Bourgeois, at their own foundry expressly for stereotyping. They thus gave the first stereotype School Testament and School Bible, to America; but not the first stereotype book. John Watts, of England, also commenced stereotyping in New York, in 1813, and completed the Westminster Catechism that year, a volume of 120 pages, 12mo. David Bruce, invented the planing machine for equalizing the thickness of stereotype plates, which is now used in every stereotype foundry in the United States. The process of stereotyping is, however, entirely different from that of ordinary type founding, and it is, therefore, generally carried on as a separate business, or connected with the composing department of a printing office. Twenty compositors, and two proof-readers, will furnish full employment for one moulder, one caster, and three finishers, who will, among them, complete on an average, 50 pages of octavo per day. There are now sixteen of these stereotype foundries in the city of New York, employing about 400 persons. Probably 600 more may be employed in the stereotype foundries of other cities and towns of the United States. Altogether, 1000 persons are employed in stereotyping, and cast daily, what is equal to 2000 octavo pages, in doing which, in addition to imported antimony and tin, they use up 3,300lbs. of good American lead.

In 1818, or soon after, a type and stereotype foundry was established in Boston, and another in Cincinnati, principally through the enterprise of the late Elihu White, who having the means of multiplying matrices with facility, took this method for the extension of his business. Others followed his example, and type foundries were established in Albany, Buffalo, Pittsburg,

Louisville and St. Louis, with several additional in New York, Boston, Philadelphia and Baltimore. The business in fact was overdone, and failures and suppressions took place, as competition reduced the prices of types.

The mode of type founding has latterly undergone some important changes, which must no doubt be considered improvements. First among them, is the introduction of machine casting, in which a pump forces the fluid metal into the mould and matrix, and gives a sharper outline to the letter than was formerly given by the most violent throw of the caster. The old practice of casting only a single type at a time remains. The first idea of this machine originated with Wm. M. Johnson, who obtained a patent for it in 1828. Elihu White, put it into use in his type foundry, and persevered in using and trying to improve it as long as he lived; but he did not succeed in removing the greatest fault, which was a hollowness in the body of the type cast by it, that inclined them to sink under the pressure of the printing press. Other machines for casting printing types, have been brought forward within the last ten years, and various modifications and improvements have been made in them, which have at last commended them to general use. By their use three times the quantity of type that was cast by Binney & Ronaldson's improved mould, is now cast in a given time, and nearly five times the quantity that was cast by the common hand mould, fifty years ago. This improvement has passed into Europe, and been adopted by some of the German type founders; but in Britain, it has found no favor, and types there, are still cast in the same kind of mould as was used two hundred years ago, or in the earliest known type founding, at the rate of 4000 letters in a day.

The next improvement to be mentioned, is the application of electrotyping to the formation of matrices, by which a great saving of labor is effected. In old fashioned type founding, the original of each character, is formed on a separate steel punch, which being hardened and tempered, is driven into copper a 16th of an inch or more to form the face of the type, called a matrix. This matrix being adjusted to the mould, which is to form the body of the type, is then ready for casting. If the punch with its matrix be of a very plain or simple character, it will have cost two dollars, and have occupied a day of one workman, though generally, the punch and matrix are made by different workmen. If the punch be of a fancy character, with scrolls and figures in it, requiring tedious engraving with much nicety and mathematical accuracy, it may occupy many days to cut it, and may be worth fifty dollars; but more commonly a fancy or ornamental character costs from five to ten dollars. Our type founders generally adhere to the old way of getting matrices for the fonts, commonly used in printing newspapers and books; but stereotyping is resorted to for many of the ornamental fonts and borders. The French have produced a great variety of fancy types within the last fifteen years, and offer to sell matrices of them for fair prices, but even such matrices without the punches come high. They also sell the type, which being brought to this country, are used by our type foundries, to produce electrotyped matrices, from which similar type can be cast, and thus a very great saving of time and money is effected.

It may seem unfair to the moralist, that the works of a laborious artist should be taken in this way without compensation, and used in competition with him in every market to which our manufactures are admitted. In that view it is a hard case, no doubt. But the type founders are not wilful wrongdoers in this matter. They have been accustomed to think, that when they buy an article, they may use it as they please, there being no law restraining

them. They have been educated in this belief, having constantly before them the practice of booksellers, who buy a foreign book, and re-print it in a cheaper style than the original, and then thrust it into every accessible market to the exclusion of the author's sales, and the ruin of his pecuniary prospects. The bookseller, however, while cutting off the author's profits, contributes handsomely to the spread of his fame. This the type founder cannot do; and here, therefore, the parallel ends.

Not foreign articles alone are thus copied by the American type founders. Any article that is saleable, and got up in good taste by one type founder, is instantly electrotyped and cast by others; for there is no law to protect the peculiar property of the original producer, although the art for securing designs, &c. may seem to have a leaning that way. Types cannot have the date of the patent on each one as the law requires for a patented article; and to put the date on the wrapper would only serve to give the notice to the first purchaser. It might seem to be an evasion of the law, and not a fulfilment of its provisions, exposing the patentee to a fine of one hundred dollars upon every complaint, which of course would be made whenever he attempted to assert his patent right.

Perhaps, however, the law was not intended for the protection of printing types, and all this reasoning is useless. But, no doubt, there is a desire to protect every branch of industry, and type founders might be completely protected, by simply permitting them to file an impression of a new article with small expense, as the title page of a book is now filed to secure a copy-right. This is the practice in some parts of Europe, particularly in France and England, where it is called registering.

The demand for printing types in the United States, is continually increasing at a prodigious rate, both for newspaper and miscellaneous printing, and probably the number of printing offices amounts to 4,000. A writer in the New York Tribune, about six months ago, in a sketch of the newspaper press, estimated the whole number published at 2750, of which, nearly 250 were published daily, as follows: New York has 15; Boston, 11; Philadelphia, 8; Cincinnati and Pittsburg, 9; Albany, Nashville and Rochester, each 6; Baltimore, St. Louis, Charleston, Memphis, Buffalo, New Haven, Detroit and Chicago, each 5; Washington, Louisville, Richmond, Norfolk, Troy, Brooklyn, Hartford, Providence, New Bedford and Portland, each 4; Mobile, Savannah, Wheeling, Syracuse, Cleveland and Columbus, each 3; Portsmouth, N. H., Harrisburg, Newark, Oswego, New London, Lowell, Montgomery, Vicksburg, Zanesville, Milwaukie and Wooster, each 2; with some fifty other places which have one each. California is omitted in this enumeration, inadvertently of course, but it had on the 1st of September, at least 13 newspapers, of which 8 were published daily.

The writer in the Tribune estimates, on apparently good information, that the 15 dailies in New York, publish 125,000 papers per diem; the 11 in Boston, 70,000; the 8 in Philadelphia, 75,000; the 5 in Baltimore, 30,000; the 10 in New Orleans, 50,000; and the 201 other dailies, 1200 each. The aggregate makes 590,000 papers for the daily circulation, or 184,080,000 for the annual circulation of the daily papers of the United States. He then assumes that of the 2500 tri-weeklies, semi-weeklies and weeklies, there are 50 which circulate 30,000 each, making 1,500,000 in the aggregate; 50 which circulate 10,000 each, or 500,000 in the aggregate; and the remainder circulate 1000 each, on an average, or 2,400,000 in the aggregate. The whole annual circulation is thus estimated at 2,830,000.

It may be assumed as certain, that with the enlarged size of the present newspapers, each one, on an average, requires 800lbs. of type for its composition, or 2,200,000lbs. for the whole 2750 papers; and if it be also assumed that 1,500,000 impressions are all that can be taken from type on an average of large and small editions, then it will follow that in printing 412,880,000 papers in the year 1850, the type will sustain a wear equal to the destruction of one-tenth of the whole, or 220,000lbs., which may in great part be returned to the foundry, to be re-melted.



There are now four type foundries in Boston, seven in the city of New York, one in Albany, one in Buffalo, three in Philadelphia, one in Baltimore, two in Cincinnati, and one in St. Louis; in all twenty. The seven in New York cast about 2000lbs. of type per day, and employ about 350 persons. The 13 foundries out of the city of New York, are estimated to cast 2400lbs. of type per day, and to employ 450 persons. The aggregate production daily is 4400lbs., by the efforts of 800 persons. The metal used is a mixture of lead, antimony, and tin, in different proportions, suited to the kind of type to be cast, but containing on an average, 75 per cent. of lead. The consumption of lead, therefore, amounts daily to 3300lbs., and yearly to 1,029,600lbs., subject to a deduction for old type returned to the foundries to be re-cast, probably amounting to 20 per cent., or about 205,920lbs., leaving 823,680lbs. for the quantity of new lead consumed per annum.

These foundries not only supply the printers of the United States, but most of the printers in Canada, some in the British West India islands, the Spanish and Danish islands, Mexico and South America. The quality of the American type will bear a favorable comparison with the European, and in cheapness it is unrivalled. The following are the prices at which they have been sold for the last fifty years, given at eight different dates, and naming only the principal and most useful sizes.

Names of Bodies.	1801.	1806.	1811.	1819.	1827.	1831.	1841.	1850.
Pica,	\$0.35	\$0.44	\$0.55	\$0.44	\$0.42	\$0.36	\$0.38	\$0.30
Small Pica,	.40	.48	.58	.48	.46	.38	.40	.32
Long Primer,	.47	.56	.66	.56	.50	.40	.42	.34
Bourgeois,	.56	.66	.76	.66	.58	.46	.46	.37
Brevier,	.67	.76	.86	.76	.70	.56	.54	.42
Minion,		1.03	1.13	1.00	.88	.70	.66	.48
Nonpareil,	1.12	1.40	1.75	1.40	1.20	.90	.84	.58
Agate,					1.44	1.10	1.08	.72
Pearl,					1.75	1.40	1.40	1.08
Diamond,								1.60


I have thus endeavored to furnish an account of the rise, progress, and present state of type founding in the United States, agreeably to my promise; and although it may appear imperfect, I have not relied on my own recollections, which go back to Binny and Ronaldson's commencement; but have drawn some of the facts carefully, from various and well known sources.

**ONE**

**AMERICAN**

**Bank Note**

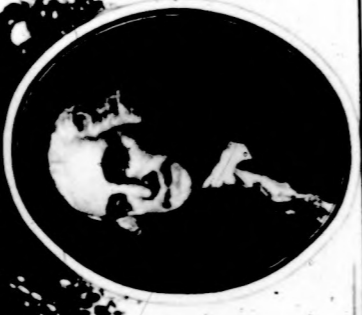



**ENGRAVING**

**Randolph, Wright, Hatch & Edson.**

**NEW-YORK.**

**TWO**

REPORT

*US Patent Office*

OF THE

COMMISSIONER OF PATENTS,

FOR

THE YEAR 1850.

PART I.

ARTS AND MANUFACTURES.

CONTENTS:

- I. FINANCES AND STATISTICS.
- II. INVENTIONS AND CLAIMS.
- III. EXAMINERS' AND MACHINIST'S REPORTS.
- IV. HISTORICAL NOTICES OF INVENTORS AND PATENTEES.
- V. ABORIGINAL ARTS.
- VI. EARLY MACHINERY IN AMERICA.
- VII. COMMUNICATIONS.
- VIII. ABSTRACTS FROM STATE PAPERS.

WASHINGTON:  
OFFICE OF PRINTERS TO HOUSE OF REPS.

1851.

# TABLE OF CONTENTS.

## I.—FINANCIAL AND STATISTICAL.

	PAGE.
Receipts and Expenditures .....	6
Classified List of Expired Patents .....	10
Alphabetical List of persons whose Patents expired in 1850 .....	25
Alphabetical List of Patents granted in 1850 .....	36
Patents re-issued during the year 1850 .....	60
Designs .....	61
Extensions .....	64
Additional Improvements .....	64
Disclaimers .....	65
Renewals .....	65
Alphabetical List of Patentees for the year 1850 .....	66

## II.—INVENTIONS AND CLAIMS

For 1850 .....	99
----------------	----

## III.—EXAMINERS' AND MACHINIST'S REPORTS.

Charles G. Page .....	304
W. P. N. Fitzgerald .....	308
H. B. Renwick .....	324
L. D. Gale .....	336
S. P. Bell .....	352

## IV.—HISTORICAL NOTICES OF INVENTORS AND PATENTEEES.

James Rumsey—Joseph Barnes' reply to Fitch in behalf of Rumsey .....	355
Dr. Thornton on the origin of Steamboats .....	368

## V.—ABORIGINAL ARTS.

Goldsmithing of the Aztecs .....	373
Spinning and Weaving by the Aztecs .....	374
Spinning and Weaving by modern Indians of New Mexico .....	378

## VI.—EARLY MACHINERY IN AMERICA.

Saw Mill .....	387
----------------	-----

## VII.—COMMUNICATIONS.

Dyeing, Spinning and Weaving by Indians .....	392
Type Founding .....	398
Paper Making .....	404
Repairing Cast Iron in China .....	406
Chinese Tile Makers at work .....	409
Pin Making .....	412
San Torina Earth .....	415

## VII.

## COMMUNICATIONS.

1. DYEING, SPINNING AND WEAVING, BY CAMANCHES, NAVAJOES, AND OTHER INDIANS OF NEW MEXICO.
2. TYPE FOUNDING IN THE UNITED STATES.
3. PAPER MAKING IN THE UNITED STATES.
4. REPAIRING CAST IRON VESSELS IN CHINA.
5. CHINESE TILE-MAKERS AT WORK.
6. PIN MAKING IN THE UNITED STATES.
7. SAN TORINA EARTH.

*Dyeing, Spinning and Weaving, by the Camanches, Apaches, Navajoes, &c.—In a letter from Judge Peters, of Santa Fé, N. M.*

THOMAS EW BANK, Esq., *Commissioner of Patents,*

*Dear Sir:*—Fully appreciating the heartiness and zeal, with which you direct your researches into the various branches of inquiry and learning connected with your important bureau, I with great pleasure, but with diffidence, accede to your request, and give you such information with regard to the manufactures of wool and cotton, as I have acquired in my rambles among our western Indians; and more especially, among the Navajoes, Camanches and Apaches of Western Texas and Southern New Mexico. I have not been further west than Paso del Norte, in Texas—nor further north than Sonora, in New Mexico, and the surrounding country.

It is known to every observing traveller in those parts of our country—now no longer remote—that the brilliancy and durability of the various shades of primitive colors, and the few semi-colors that those Indians dye their wool in, are probably not equalled by the learned and scientific chemists of Europe, and our own country—an important fact, that seems not to have excited the curiosity of our otherwise enquiring countrymen. Should I be able, through your instrumentality, to bring to the public notice, such facts as well lead to enquiry and investigation, I should consider myself as having contributed somewhat to our national advancement in one branch of the arts at least, and that one of the most important.

The Camanche, Navajo, and Apache Indians, present the curious spectacle of marauding bands of well mounted men; seemingly always committing predatory incursions upon their civilized neighbors, the Texans and Mexicans, apparently constantly on the alert for evil, and yet, possessing great skill in the more peaceful and benevolent habits of the herdsman and shepherd.

The depredations of the immense number of sheep, almost daily chronicled in our gazettes, are not made to appease hunger only; but to add to the

already immense flocks that overspread, as I have been told by them, the region of country lying west of the Sierra Madre, and east of California—a region as yet totally unexplored and unknown.

In the spring and summer of 1843, in company with an old friend—one of the Creeks who had emigrated west of the Mississippi soon after the treaty with them in 1832—I travelled westward. My guide and companion had acquired a good knowledge of the language and habits of the Camanches, Navajoes and Apaches, and had probably not altogether abstained from joining them occasionally in their irruptions upon the settlements of their timid neighbors of Chihuahua and Sonora. I found him “as one having authority,” and of course, very useful, both in the protection he afforded me, and the information he enabled me to acquire.

Among the first objects of interest to me, next to the matchless feats of horsemanship they perform, and which have so often been written of—was the number and variety of articles wrought by them, both useful and ornamental, and which might well vie with the skill of more civilized artizans. Among these were the beautiful fabrics composed of wool, and a kind of grass cloth, and some few of cotton. The object, however, of greatest interest to me, was the art of imparting to wool, &c. the beautiful colors I had often before admired, and to this I gave most attention. Like other Indians, I found them unwilling to impart knowledge voluntarily, and I had in my previous and long intercourse with the western tribes, early learned not to make inquiries that might excite their special attention to my designs. Our Indians are not disposed to impart to their white brethren, unless their citizens, any thing that might be useful out of their own country, in which particular, they are not unlike the Chinese, so that with the exceptions of their modes of dying and spinning, I will not now attempt to give you any certain account. The information I derived, and minutes made at the time, will now only enable me to give you the modus operandi of extracting their dyes, without being able to give you the names of the ingredients. The specimens I had been enabled to collect have become dried up, and many have been lost by crumbling, and I was not enabled to procure seeds or other means of re-producing the plant, and am not sufficiently a botanist to give you a technical description of them. I can give you the facts only, but these are of sufficient importance to awaken curiosity, and lead to the investigations of secrets by those more intimately connected with the subject treated of, and I think of sufficient importance to have that enquiry efficiently made under governmental auspices.

I may be mistaken, but to my apprehension, if Congress were to appropriate a sum of money sufficient to induce intelligent and competent persons to spend a year or two among the Camanches and Navajoes, and thus enable them to acquire an accurate knowledge of the plants used as dyes—procure seeds and plants—and obtain such practical information in their art of dying as would enable our manufacturers to acquire that art, it would be legitimately advancing the general welfare of our country in a greater degree than it does by applying to many uses the public treasure so often contributed.

The colors most admired by the Camanches and Navajoes are crimson, blue, purple and green; consequently these colors are the most common among them in all their shades; and though in their weavings they blend these with brown, yellow and other colors, with singular judgment and taste, yet it is the brilliancy of those that you most admire.

All their primitive colors are the products of the prairie and mountain flowers, and their semi-colors are composed of these and the inner bark and