We have left but a word to speak of the printing process. This does not differ very widely from other printing processes, except in being done wholly by hand. Two persons operate the press together. The first inks the plate and so prepares it for the press, adjusts it in its place, and by a turn of the wheel applies the pressure; a second cleans the plate off and prepares it for a second printing. This is done, first, by wiping off the remaining ink with a cloth, and then polishing the plate with whiting, rubbed on with the palm of the hand. Long experience has demonstrated that there is no such polisher as the human hand; but it gets fearfully dirty in the operation. In Washington a register, analogous to that attached to an ordinary gas meter, is connected with every machine, which thus registers every impression taken. This register is locked and the key is in the possession of the superintendent, who thus has a means of proving that no money has been abstracted from the printing room. In the printing room at the Treasury Department eighty of these presses are in simultaneous operation; in one of the print rooms of the National Bank Note Company of New York there were one hundred and sixteen. The men are paid by the piece, and work with marvelous rapidity, and the room presents a very striking picture of busy activity. It can hardly be credited, but it is the fact, that the wiping of the plate by the hand sensibly wears away the steel, and the difference in value of different workmen is measured by the skill with which they succeed in polishing the surface with the least wear—producing the greatest cleanliness and the least attrition of the plate.

The money is now substantially ready for the market. It only remains to print upon it the seal of the United States—a red stamp, which is affixed to all bills, whether issued by the United States or the National banks, and is always printed at the Treasury Department—to add the number, which is changed with every printing by an ingenious contrivance, which our space does not permit us to describe but which gives to every note its own number—and finally to divide the notes, which are printed six or eight on a single sheet and must be separated, an operation which is done in Washington by an ordinary bookbinder's cutting machine but which requires the greatest skill in its manipulation, in order not to mutilate any portion of it. The money is then packed in boxes; if printed by a private bank note company, it is sent to Washington to receive the Government stamp; if in the Treasury Department, it is sent down to the Treasurer, where it is stowed away in vaults, ready for use. Just before our visit to the Treasury Department there had been a careful counting of the money in the vaults. It amounted to $1,038,000,000: or, if the reader gets no very clear idea from figures expressed in billions, and we confess we do not, he may get a better conception from the statement that it comprised ten cords of paper money.

There are some of the products of the press room which, however, never get to the Treasurer. These are the mutilated and imperfect bills. Along with these are bonds and bills worn out by long use and sent to the Treasury to be redeemed. These are carried to a furnace room a few rods from the main Treasury building, and there, in the presence of a committee appointed to witness their destruction, they are burned, the smoke being forced through water to prevent any part of the charred paper from being carried off and picked up for future presentation.

The most wonderful thing concerning these operations remains to be told—the accuracy with which they are conducted. A single sentence from the report of Mr. George B. McCartee, chief of the Bureau of Engraving and Printing, sums up the results of this painstaking care: "It affords me great pleasure to state that, in the engraving, printing, and finishing of $890,483,995, notes, bonds, and other securities, and 104,140,286 stamps during the year (1871), not one note or sheet of paper has been lost to the government."

The Cat Show at The Crystal Palace.

There can be very little question as to when the first animal show occurred. According to Archbishop Usher's calculation, it was in the year 2349 B. C., and the place where it was held was Noah's Ark. It lasted for at least nine months, says *Land and Water*, and must have been a hard time for Noah and his family if the antediluvian animals wanted anything like the attention that their descendants get in these days at the Regent's Park. How they fed the *carnivora* at all, and how they stowed away enough green food or hay for the *graminivora*, is an interesting subject of inquiry which I must pass over for to-day. Further on in history there were grand beast shows at Rome. Sulla exhibited 100 lions, Scaurus a hippopotamus and five crocodiles, Pompey 600 lions and twenty elephants, Julius Cæsar several giraffes, Augustus a snake fifty cubits long, Trajan 11,000 animals in all, and Probus 1,000 ostriches, among other live luxuries. In all these cases the enjoyment of the Roman citizens, who were the principal witnesses of the show, was hightened by the death of the curious beasts which had cost their exhibitors so much money and trouble; and the same strange principle was adhered to later in history, when the Smithfield Club, so lately as in 1798, took to exhibiting fat cattle, which were killed by the butcher instead of killing each other. It was not till 1838 that the Royal Agricultural Society hit on the brilliant idea that an animal need not be killed because it had been exhibited, and as soon as mercy prevailed over sacrifice the system became popular.

The fourth cat show, which lately closed its doors, was an improvement, both as to the quality and the number of entries, on any previous. The arrangements were very good and the comfort of the animals so strictly studied that they suffered as little as possible from their confinement, and only lifted up their sweet voices occasionally. But five days in a cage is a great trial for a cat which is used to liberty, and it is no matter of wonder that some of the prisoners were looking very weary before the time came for their release. Perhaps variety of color was the most striking feature of the show. White and black, tabby and tortoiseshell, and their various combinations, are familiar to all of us, but here in addition were mouse color, whity brown, bright reddish yellow, pale grey, pug dog brown, a greenish grey, like a Scotch hare, and other strange shades, causing the visitors to play desperate havoc with the tenth commandment. Cats and kittens all told, and without including certain interlopers in the way of puppies and birds which were in the cages with the cats, there must have been about four hundred animals in the show, the largest and finest being No. 257, a monstrous tabby tallow cask of a cat, with a splendid skin, weighing nearly twenty-two pounds, and superior in all respects to the well known "Museum Street Jack," the heavy weight champion of previous shows, who never quite reached twenty pounds in weight. Perhaps the handsomest cat exhibited was No. 281, a magnificent *bran doré* from Paris, "Fritz" by name, only two years old, and with a face like an eagle owl's, beautiful to the last degree, and capable of looking exquisitely savage on very slight grounds. Most cats are self-satisfied enough, but "Fritz" was absurdedly consequential, and held his dainty little nose in the air with the look of an opera *prima donna* obliged to sing in a barn.

Erratum.

In our article entitled "Scientific and Mechanical Possibilities," on page 329 of the current volume, it is stated that "it is not within the possibility of mechanism to bore 4,000 feet more." It should read: "Is it not," etc.

CROSS BREEDING OF FISHES.—Mr. B. Hanson, of Stavanger, in Norway, has, according to a correspondent of the *London Athenæum*, accomplished a novel feat in pisciculture by producing a new hybrid species, a cross between *Salmo alpinus* and *Salmo eriox*, the former species spawning four weeks before the latter. Mr. Hanson's manner of bringing together the spawning maturity of the two species is ingenious. When *Salmo alpinus* has been spawning for some time, Mr. Hanson secured a female fish in an interesting condition, and imprisoned her in a perfectly dark tank, where he left her alone. In a like manner Mr. Hanson, as soon as possible, secured the sire of the first couple of *Salmo eriox* he found in mature condition for spawning, and put him under a similar arrest, and kept a close watch over both until the time of the sire came. In this manner Mr. Hanson has succeded in rearing, with only a loss of one per cent, in his spawning boxes (supplied from a subterranean well which flows with a uniform temperature of +5½° Réaumur all the year round) a new species, which attains full development in four years, and is remarkable for its exceeding vigor and wildness in water, and its palatableness on the table. Mr. Hanson entertains sanguine hopes of this species becoming self-productive in course of time, contrary to all experience of hybrid fish, because he has already caught in his pond several individuals with roe in them."

DANGEROUS DIETS.—The failure of the potato crop in England is likely, from what we read, to bring about an epidemic of scurvy, unless the public can be better informed of the requirements of an antiscorbutic diet. The fact, therefore, cannot be too widely made known that pease pudding, haricot beans, and boiled rice, which have been suggested in the journals as substitutes for potatoes, will not prevent the occurrence of scurvy. In the absence of the potato, an excellent antiscorbutic, fresh green vegetables or fruits will be requisite, or the health will certainly fail, even though fresh meat be taken. Amongst the vegetable material which may be used, the *Lancet* states, are the various forms of cabbage, lettuce, oranges, lemons, onions, mustard and cress, dandelion, and sorrel. The experience of the crews of vessels on long voyages has shown, over and over again, the uselessness of the pea and bean tribe in preventing scurvy.

VELOCITY OF NINE-POUNDER SHOT.—Experiments have recently been made to determine the velocity of the nine-pounder shot when fired with various charges of powder. From the nine-pounder gun of 8 cwt., with 3½ lbs. of rifle large grain powder, a velocity of about 1,500ft. per second was registered, the gun being quite uninjured. In order to obtain these results on service a stronger carriage is required, and will probably shortly be made. The carriage on which Sir J. Whitworth's new gun was fired on the sands at Southport has endured the strain of the heavy charges exceedingly well.

AIR was compressed by Professor Tyndall, by means of a column of water 260 feet high, to one eighth of its original volume (120 lbs. to the square inch) and then allowed to escape. As it rushed out, it expanded so violently and caused such an intense cold that the moisture in the room was congealed in a shower of snow, while the pipe from which the air issued became bearded with icicles.

SCIENCE is studied by the observation of facts. But observation is not easy. It requires more memory and a further perspective than most men possess. Experiment, too, is necessary, which is a series of questions put to Nature, and no witness can be found more difficult to examine.

MANUFACTURE OF LETTER ENVELOPES.—One establishment in New York city, that we know of, is now turning out nine hundred thousand letter envelopes daily.

DECISIONS BY THE COMMISSIONER OF PATENTS.

Horse Rake Patent.

CALISTA E. COX, EXECUTRIX.—*Extension.*

In the matter of the application of Calista E. Cox, executrix of the estate of Harvey W. Sabin, for extension of patent No. 7,813, for improvement in horse rakes, granted December 3, 1850. Extension granted for seven years from June 8, 1872.

Preserving Hops.

BATES *vs.* SEEGER & BOYD.—*Interference.*

Appeal from the Board of Examiners-in-Chief in the matter of the interference between the application of Benjamin Bates and the patent of Seeger & Boyd for an improvement in preserving hops.

To pack goods of various kinds in bottles or cases made airtight, in order to preserve their contents more effectually, has been common from time immemorial, and cannot be monopolized under a patent.

THACHER, Acting Commissioner:

The patent was granted to Seeger & Boyd, December 12, 1871, application therefor having been filed the 20th of October preceding.

The application of Bates was filed January 13, 1872.

The patent contains two claims. The first is in interference, and is as follows, viz:

As a new article of manufacture and trade, hops ground or pulverized and incased in airtight packages, as and for the purpose set forth.

The gist of the invention is the airtight package. Neither party claims here the article itself, and, in fact, there is proof in the case that it is entirely destitute of novelty.

I can find nothing whatever patentable in what Bates has done. Covered cans and boxes, and corked bottles, are the most common devices in the world for securely keeping solids and liquids of every description. There is no more reason for granting a patent for a bottle or can of ground hops than of ground pepper, ground spice, or any other pulverized substance.

It will undoubtedly be said that objections of this nature apply with equal force to what is called an invention in the patent of Seeger & Boyd. I freely admit it. Why such a patent should ever have been allowed is beyond my comprehension. It has been the practice to hermetically seal cans, bottles, and packages of every description from time immemorial, and for the purpose of preserving their contents in their original condition. The result in this case is precisely what every one would have expected; there is no new discovery whatever. Not even *special skill* is required to practice the wonderful art described; much less is there the least demand for the exercise of *inventive genius*. A mere child can put ground hops into a bottle and cover the cork with sealing wax.

The grant of such patents, for what is utterly unworthy to be called invention, is a fraud upon the public, and is to be condemned in the strongest terms.

Unfortunately, the patent of Seeger & Boyd is beyond the control of the Commissioner, and it therefore becomes necessary to formally pass upon the question of priority.

Judgment on this point must be given in favor of the patentees.

Lead Pencil Eraser.

Appeal from the Board of Examiners-in-Chief in the matter of the interference between the applications of Samuel D. Hovey, Joseph Illfelder, Philip Hufeland, J. Reckendorfer, and T. H. Muller for letters patent for an improvement in eraser attachments to lead pencils.

THACHER, Acting Commissioner:

The inventor of a short paper sleeve, which serves only to connect an India rubber eraser to a pencil, and does not cover the rubber so as to protect it and make it firm, is entitled to a patent for what he has invented only, and not for such a one as would embrace the latter feature.

Notwithstanding the patent thus allowed, a subsequent inventor of a paper sleeve, made long enough to cover and protect the rubber and strengthen the connection, may have a patent for it.

Where there is reason to doubt whether the only invention to which the successful party in an interference is found to be entitled is new, his application should be referred back to the Examiner to investigate the question.

The testimony in interference cases should be so construed as to conform to the preliminary statement of the party producing it; and such as is inconsistent with it should be disregarded.

The date of an invention originated abroad can be carried back no further than the time when specimens embodying it are shown, on satisfactory evidence, to have reached this country.

Judgment in favor of Hufeland.

DECISIONS OF THE COURTS.

United States Circuit Court, District of Connecticut.

RUSSELL AND ERWIN MANUFACTURING COMPANY *vs.* MALLORY *et al.*

A suit in equity, brought by the Russell and Erwin Manufacturing Company against Mallory, Wheeler & Co., under letters patent granted to Rodolphus L. Webb, December 31, 1867, for "improvement in reversible locks and latches."

Before Judges WOODRUFF and SHIPMAN.

DEFENSES NOT SET UP IN THE ANSWER—COMBINATIONS—ABANDONMENT—ESTOPPEL—WEBB'S PATENT FOR REVERSIBLE LOCKS AND LATCHES.

If Webb's reversible latch was new and useful it was patentable, and his patent is not to be held invalid because he only claims the latch *when used in an outer case containing also lock mechanism*—and this even though there be no relation between the latch and the lock.

The statute secures to the inventor an interval of two years in which to test the usefulness and the value of his invention by putting it into use and on sale, without being thereby barred of his patent; and it necessarily follows that, from the mere lapse of the period mentioned, no presumption of abandonment can arise.

When by express enactment an inventor may have two years of trial in the public markets, putting his invention in use and on sale, and yet be entitled to a patent, there is no reason for concluding that he may not also have the like period at least within which to offer his right as an inventor to others—submit the invention to that test of its usefulness and value—and yet be entitled to his patent.

Where it appeared that, during a period of delay in applying for a patent, the first inventor had asserted a continuous claim as such, and a purpose to secure a patent on his invention, and had shown some, though inadequate, appreciation of its value, although another meanwhile had made the same invention and put it on sale: *Held*, that there was no *abandon-*

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