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THE MANUFACTURE OF GOLD PENS AND PENCILS.

The name Faber has been connected with the manufacture of pencils for more than a century. In the year 1761 Caspar Faber (the founder of the house) began the manufacture of Faber's pencils in the little village of Stein, near Nuremberg, Bavaria. In 1784 Anthony William Faber—whose name the firm bears to this day—succeeded his father Caspar Faber. Since the time of A. W. Faber the commercial relations of the house have extended to all commercial countries, and the Faber pencil is a familiar ob-

ject in every household and place of business. In 1851 the late Mr. Eberhard Faber removed to this country, and established in this city the branch house in which is centered the trade of the whole of the United States, Canada, Mexico, South America, and the West Indies. It is not the purpose of this article to give the details of the history of this very successful house, nor to describe the manufacture of lead pencils, but to give an idea of the process of making gold pens and gold pen and pencil cases.

The New York office, which is shown in the upper portion of the engraving, is located at 718 and 720 Broadway,

and different departments of the new factory for the manufacture of gold pens and pencils are shown in the larger of the other views. Some of the recent styles of goods are shown in the small side engravings.

A gold pen seems a very simple thing, but there are many processes in its manufacture, all requiring an amount of skill that can be acquired only by long experience.

The gold used in this establishment is obtained in bricks from the United States Assay Office, and for pens it is [Continued on page 309.]



FABER'S GOLD PEN AND PENCIL FACTORY.

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melted and alloyed to make it 16 carats fine and cast into ingots suitable for rolling; it is then rolled down to a long narrow ribbon, from which the pen blanks are cut out by means of a lever press, as shown in one of the upper views.

The blank is considerably thicker than the finished pen. The nib of the blank, which is now quite blunt, is notched or recessed at the end to receive the iridium forming the exceedingly hard point which all good gold pens possess. The iridium is coated with a cream of borax, ground in water, and laid in the notch formed in the end of the blank. It is then secured by a process of sweating which is nothing more nor less than melting the gold of which the pen is formed, so that it unites with the iridium as solidly as if the whole were a single piece of metal. This operation, as may be imagined, requires the utmost care to prevent the complete fusion of the gold while heating it to a sufficiently high temperature to insure the union of the two metals. The blank, which is now much shorter and thicker than the finished pen, is passed between rollers of peculiar form, to give a gradually diminished thickness from the point backward; the rolls have a small cavity over which the extreme end of the iridium pointed nib is placed, to prevent injury to the iridium. The blank is rolled several times through this machine to give it the proper length and thickness. After rolling, the nib of every pen is stiffened and rendered springy by hammering. This is an important step in the manufacture of the pen, as the elasticity of the nib depends entirely upon this operation.

The pen blank is now somewhat out of shape and requires trimming to give it approximately its final dimensions. This trimming is done by a press something like the one used in cutting out the blanks. After trimming, the name of the manufacturer and the number of the pen are stamped on the blank—which is still flat—by screw presses, several of which are seen near the center of the larger view.

The next operation—that of giving the pen its convex form—is also performed by means of a screw press, the blank being pressed between a concave lower die and a convex upper die. Several blows are required to bring the pen up to the required convexity, and when this operation is completed, two jaws approach the blank and press it upon opposite edges over the sides of the upper die, and give the pen its final shape.

The next step in the manufacture is to cut the iridium into two points, by holding it on the edge of a very thin copper disk, which is charged with fine emery and oil, and revolved at a high speed. The nib is then slit by the machine shown in one of the lower views, and the slit is cleared by means of a fine and very thin circular saw. After slitting, the nibs are brought together by hammering, and the pen is burnished on the inside in a concave form and upon the outside upon a convex form. This gives the pen a uniform surface and increases its elasticity. The nibs are set by the fingers alone.

The grinding lathe shown in one of the upper views has a spindle carrying a thin steel disk and a copper cylinder, both of which are charged with fine emery and oil. The slit is ground by the thin disk, and the sides of the nibs and the points are ground upon the copper cylinder.

During the process of grinding, the points are examined from time to time with a strong magnifying glass, and when the grinding is complete, the pen is polished upon buff wheels, thoroughly cleaned, and then passed over to the inspector, who weighs and tests it.

These various operations are conducted in the department illustrated by the larger view in the engraving. The lower interior view represents the pencil making department, where gold pen and pencil cases or holders are made. One of the modern pencil cases, which is extended by simply pulling one end, is a marvel of compactness. Some seven or eight pieces slide one over the other. The portion drawn out carries a spirally slotted tube which engages a pin projecting from another spirally slotted tube, and revolves the tube so that it moves the lead-carrying portion of the pencil outward. The extreme end of the spiral slot of the inner tube ends in a straight or circumferential slot, which receives the pin projecting from the lead-carrying device, and prevents the latter from moving backward when pressure is exerted on the pencil point.

The various sizes of tubes required in the manufacture of pen and pencil cases are made in the pencil department. The blanks are first cut from the sheet and bent roughly into semicircular form by hammering into a grooved block. They are then drawn through a plate to bring their edges together, when they are ready to be soldered. For the internal brass tubes silver solder is used. It is applied in a finely divided state along the seam together with a little liquid borax. The soldering is accomplished by moving the tube lengthwise in a trough formed of thin firebrick under a huge roaring blowpipe flame, which is directed into the trough. The flame is urged by a blast from a bellows, and the tube becomes hotter and hotter until the particles of silver solder melt and look like little globules of mercury, an instant more and the melted solder runs into the seam, and the operation is complete. Gold soldering is quite similar, the only difference being that the gold is applied in a thin strip instead of a powder, the strip being drawn into the seam in the tube.

After soldering, the tubes are cleaned and drawn down to the required size on a draw bench. Most of the tubes are

drawn upon a mandrel to insure equality in the internal and external diameter of the different tubes of the same nominal size.

The tubes are cut into different lengths for different purposes by a circular saw, having a gauge for regulating the lengths. The spiral slots are formed in the internal tubes of the "magic" pencil by a very ingenious and simple device, which consists simply of a tubular guide placed diagonally across the edge of the saw, the angle formed with the side of the saw corresponding to the pitch of the spiral to be cut. The tube being inserted in the guide and brought in contact with the edge of the saw has a short diagonal slit cut in it, and it is now pushed forward and at the same time allowed to turn, when a slit will be cut, having a true pitch from end to end.

The several operations in pen and pencil case making are carried forward by workmen who have acquired skill by long practice, and who, under the guidance of an able superintendent, make and assemble the parts rapidly. Each workman has a special piece, which he makes carefully and perfectly, so that when all the parts are brought together there is no difficulty. All of the pieces work together smoothly.

The tubes forming the outer case are drawn in plain corrugated dies, and are ornamented by chasing, engraving, or knurling.

It would be futile to attempt to describe in detail the different operations in pen and pencil case making in an article of this character, as the great variety of ways in which they are made would require an entire volume to properly describe them.

While all of the goods manufactured by this house are justly entitled to the reputation they have earned, the gold pens are deserving of especial notice, as they are not only made with the greatest care and of the best materials, but, by the test of use, have proved a very superior article.

THE ABUSE OF LIVE STOCK ON THE WAY TO MARKET.

The American Humane Association—formerly styled the Society for the Prevention of Cruelty to Animals—held its third annual convention in Chicago the second week in October. The attendance was small, but the subjects discussed were of national importance. Chief among them was the treatment of live stock on the railways, and at their halting places between the feeding grounds of the West and the markets of the East. In his opening address, President Brown dwelt particularly upon the cruelty which characterized the treatment of stock by shippers and yard men. While in transit the cattle are kept for days together without food or drink, and multitudes arrive at Chicago dead or nearly dead from the tortures they have undergone. At Chicago, he said, a sifting out process has been inaugurated, the crippled and diseased animals being picked out and sold in that market for food, while the sound survivors are forwarded to New York.

The report of the executive committee, prepared by Mr. Geo. T. Angell, was largely devoted to the same topic. The fullest information, however, was embodied in the report of Mr. Zadok Street, who, during the past six or seven months, had traveled a distance of 18,000 miles over the cattle-carrying roads of the country, for the purpose of observing the condition of animals when shipped from the West, their treatment in transit, and their condition on their arrival in Eastern markets. In the prosecution of these studies, Mr. Street inspected 1,340 local stations where animals are collected for shipment. To a large extent he found the pens unfavorably situated, the ground low and level, and in wet weather very muddy. In many pens he saw cattle and hogs standing in mud from four to eight inches deep, without shelter from the hot sun and exposed to storms, day after day, while waiting to be shipped, their suffering aggravated by an entire lack of arrangements for giving them food or water. He had seen cattle thus confined in Kansas in hot weather three days and nights without food or drink, previous to shipment. And the man in charge said he had been ordered by their owner to ship them to St. Louis without feeding or watering. On their arrival the owner expected to get 100 pounds of water into each of them before they were weighed. He had shipped thousands of cattle, and claimed that such treatment did not hurt them in the least, even in extremely hot weather. No experienced shipper, he said, would allow cattle to be fed or watered within twenty-four hours of their being loaded into cars for a long journey. It is proper to add that wiser and more humane shippers—we trust the majority of shippers, though Mr. Street speaks of them as few—who condemn in strong terms this manner of treating animals in transit, and never allow their stock to be overcrowded or to suffer for lack of food or drink or rest.

In respect to overloading cars, Mr. Street said that it is no uncommon thing to see from eighteen to twenty head of large fat cattle in a car twenty-eight feet long and eight feet wide, and thirty-six to forty-eight of 1 and 2 year old cattle in a car. Also 120 stock hogs in each deck of a double-decked car, and from eighty to ninety large fat hogs in single-deck cars, where there did not appear to be standing room for them.

He had seen 100 large fat sheep forced into each deck of a double-decked car in extremely hot weather; large fat cattle, cows, young calves, and hogs overcrowded in the same car, some of the calves lying down and hogs eating the calves while yet alive! Also, large bulls in the same car

with smaller cattle, the former goring the latter. He had seen hundreds of cars with cattle so overloaded that there was hardly standing room for them, and they would use all their strength to get relief until some became exhausted and fell or lay down. In that condition they were trampled upon by their fellows.

While this subject was under discussion at one of the sessions, Captain Gray, of the Lake Shore Railroad Company, said that the shippers were mostly to blame for the damage to cattle. The cure for the evil of overcrowding cars was to be found in the substitution of weight rates for car rates by the railroad companies. When the charge was for weight there could be no gain in and no excuse for overloading. All the roads leading East from Chicago had adopted the system of weighing, and, as a consequence, the sufferings of cattle on the road had been greatly mitigated. Another source of suffering was cut off by forbidding the shipment of mixed car loads of cattle and sheep or hogs. This the Lake Shore road no longer permitted. Mr. Hoxie, the live stock agent of the same road, pointed out another and the chief source of injury, namely, in loading and unloading. The oftener cattle were loaded and unloaded the more they were punished. They could not be loaded and unloaded without doing themselves much injury, and, after one experience, they fought against reloading, and necessarily bruised one another. The handling of stock at Chicago is now done with much less cruelty than formerly. The iron pointed goad has been done away with; and where ten animals used to be taken out dead, but one is pulled out now, showing a decided improvement in methods of handling.

Dr. George L. Miller, of Omaha, gave an account of the methods still prevailing west of the Mississippi, from which it is evident that the society has much to do in that region. The worst that Mr. Street saw was fully confirmed. The pike is still commonly used there, and the treatment of the cattle "infamous and cruel beyond the power of words to express."

Mr. Street said that cattle could be shipped without injury; he had seen them after a long journey come out as fresh and strong as when first put in; and Mr. Levick, of Philadelphia, gave reports equally gratifying, one firm in that city losing but 8 head of cattle out of 1,800 shipped, the rest coming out in as good condition as when they left home. On the other hand, Dr. Miller had seen cattle driven to mania by their sufferings, so that they had to be shot. Between these extremes a terrible amount of needless suffering is possible, suffering which the entire community is injured by, bodily as well as sympathetically, for tortured animals cannot furnish wholesome meat. In taking up this subject, and in their efforts to mitigate the vast amount of misery the cattle traffic now involves, the Humane Association is doing a work likely to be as beneficial as it is noble.

The Brain of an Anthropologist.

M. Asseline, aged forty-nine, belonged to a "society for mutual autopsy," and the examination of his brain was made by his bereaved *cosociétaires*, who were prepared to find in it all the commonly received external indications of a highly refined and intellectual nature. He had been a republican and a materialist; possessed enormous capacity for work, great faculty of mental assimilation, and an extraordinarily retentive memory; had a gentle, kindly disposition, keen susceptibilities, refined taste, and subtle wit. As a writer he had always displayed great learning, unusual force of style, and elegance of diction; and in his intercourse with others he had been unassuming, sensitive, and even timid. But "the autopsy showed," says *Nature*, "such coarseness and thickness of the convolutions that M. Broca presumed them to be characteristic of an inferior brain. The fossæ or depressions regarded by Gratiolet as of a simian character and as a sign of cerebral inferiority, which are often found in women, and in some men of undoubted intellectual inferiority, were very much marked, especially on the left parieto-occipital. But the cranial bones were at some points so thin as to be translucent; the cerebral depressions were deeply marked, the frontal suture was not wholly ossified, a decided degree of asymmetry was manifested in the greater prominence of the right frontal, while, moreover, the brain weighed 1,468 grammes—i. e., about sixty grains above the average given by M. Broca for M. Asseline's age." The report was made by M. Thulié to the Paris Anthropological Society, of which the deceased M. Asseline was a member.

The Speed of Ice Yachts.

We take pleasure in recording the fact that President Barnard and Professor Loomis have both written to the *Post* retracting their assertions as to the inability of ice yachts to outspeed the wind that drives them. They find on examination, as every one must, that such a result is not only a mechanical possibility, but has been practically demonstrated scores of times by Hudson River yachtsmen whose testimony cannot be gainsaid.

The moral of controversies of this nature was happily expressed by the Yankee poet, long ago: "Don't never prophesy unless you know!"

The Belcher mine of the Comstock lode, Virginia City, Nevada, has now reached the great and remarkable depth of 2,920 feet.