Miscellaneous.

The Manufacture of Soda Ash.

Very strong furnaces are employed, and into each, according to its size, there is placed a quantity of salt, into which is poured about the same weight of the oil of vitriol. The interior of the furnace presents a splendid variety of flaming colors of green, blue, purple, and yellow. The mass is boiled for about six hours—the product is sulphate of soda. Each furnace communicates with a huge square stone pillar, having a hollow interior, which forms a condenser. Muriatic gas formed in the furnaces enters these condensers at the bottom. A tank is fitted to the top of each, and filled with water. The hollow interior is filled loosely with coke. The water from the tank on the top trickles through the coke, to meet the muriatic gas which enters from below, and the meeting converts the gas into a liquid state, and forms muriatic acid. After this the sulphate of soda is taken to other furnaces (large crucibles they may be called), each of which is charged with 250 lbs. of lime to a like amount of the sulphate, and about 150 lbs. of charcoal ground into powder. The mass is roasted for about one hour, then taken out in burning cakes, like lava, and wheeled into great stone caves or receptacles. It is then called "black ash." Hot water is then suffered to run on this ash, and dissolving it, the liquid product is run off by pipes to a reservoir, on its way to the coolers, which form merely stages on the path towards more furnaces. In the first it evaporates slowly into a residium, which resembles a salt, from which it is conveyed into a brick furnace, and from that to two iron furnaces; in the first it remains for eight, and in the second for 1½ hours before the carbonate of soda is produced.

The carbonate of soda is dissolved in tanks of warm water, and the contents are conveyed by pipes into a furnace, where they are exposed to a heat. During this period, it must be raked with iron pokers, for two or three hours. It is then drawn into a second furnace, and managed in the same way, when it is taken out as a carbonate of soda. It is now dissolved in tanks filled with hot water, where the carbonate is allowed a considerable time to dissolve, and the contents are pumped up into a cistern, where it is again allowed time to consider its position, and deposit a residuum, until the liquor becomes tolerably clear, and is then removed to cast metal coolers, where it is allowed to stand from six to nine hours. From them it is then run off into a large malleable iron pan. This vessel is warmed until the contents are brought up to a heat of 54° on the hydrometer. The pan is then allowed to cool down until the contents are brought back to 90° or thereabouts, and then run into flat cast-metal coolers. Very little is done to help the process of crystalising, which closely resembles freezing, and takes a week to accomplish. The time varies with the season and temperature, and crystals of soda are more rapidly produced in winter than in summer, in cold than in warm weather. Upon the first day a thin filmy crust gathers over the surface of the cooler, like the ice of an autumn morning on a stagnant pool. This crust gets daily thicker and stronger, until a considerable pressure is requisite to break the ice; and when broken after the mass has become nearly solid, the appearance of the crystals, in every imaginable form and shape, hard as ice, clear as water, and sharp as steel at the edges, is extremely beautiful.

The crystals of soda soon become opaque when exposed to the air. Simple soda is dearer than the salts of soda, because about one pound of the ash will make two of the salt. The soda ash, before it reaches the market, is ground down beneath two immense stones.

The American Miller.

Friction.—The above is the title of a most excellent book just published by Mr. Wm. Carter Hughes, of Detroit. We select this article on friction from it, knowing that the subject is an interesting one.

In the years 1831, 1832, and 1833, a very extensive set of experiments were made at Mentz, by M. Morin, under the sanction of the French Government, to determine as near as possible, the Laws of Friction, and by which the following were fully adduced and established :

1st, When no unguent was interposed, the friction of any two surfaces, whether of quiescence or of motion, is directly proportioned to the force with which they are pressed perpendicularly together, so that for any two given surfaces of contact, there is a constant ratio of the friction to the perpendicular pressure of the one surface upon another. While this ratio is thus the same for the same surfaces of contact, it is different for different surfaces of contact. The perpendicular value of it in respect to any two given surfaces of contact, is called the co-efficient of friction in respect to those surfaces.

2d, When no unguent is interposed, the amount of the friction is, in every case, wholly independent of the extent of the surfaces of contact; so that the force with which two surfaces are pressed together being the same, their friction is the same whatever may be the extent of their surfaces of contact.

3d, That the friction of motion is wholly independent of the velocity of the motion.

4th, That where unguents are interposed, the co-efficient of friction depends upon the nature of the unguent, and upon the greater or less abundance of the supply.

In respect to the nature or supply of the unguent, there are two extreme cases; that in which the surfaces of contact are but slightly rubbed with unctuous matter; as, for instance with an oiled or greasy cloth,—and that in which a continuous flow or stratum of unguent remains continually interposed between the motive surfaces of contact.

Professor Morin found that with unguents, hog's lard and olive oil, in a continuous stratum between surfaces of wood on metal, wood on wood, metal on metal, when in motion, have all of them very near the same co-efficient of friction, being in all cases included between 07 and 08.

The co-efficient for the unguent tallow is the same, except in that of metals upon metals. This substance seems to be less suited for metallic substances than the other; and gives for the mean value of its co-efficient under the same circumstances, 10. Hence, it is evident, that where the extent of the surface sustaining a given pressure, is so great as to make the pressure less than that which corresponds to a state of perfect separation, this greater extent of surface tends to increase the the friction by reason of that adhesiveness of the unguent, dependent upon its greater or less velocity, whose effect is proportioned to the extent of surface between which it is interposed.

The Honey Bee.

A Lecture on the Honey Bee was recently delivered before the Smithsonian Institute at Washington, by Dr. Morris. A correspondent of the National Intelligencer, in noticing the lecture, makes some interesting statements, and furnishes some practical hints. Bees, said the lecturer, are villanous thieves. They enter the hives and steal away the honey. Bees never pay complimentary visits. A bee never lights upon the platform of a hive not its own, with honest intentions. The careful observer will instantly detect a stranger bee. It is well known as an enemy by the guard at the entrance to the hive, for a guard, day and night, is stationed there of sufficient force to repel intruders, and will certainly do it if this entrance is properly adjusted in size to the use of the community. Attention to this subject will prevent robberies among bees. Where, however, the entrance is of an unnecessary and unreasonable size, enemies will effect an entrance in spite of the guard. Then a war of extermination or subjugation ensues. It is fierce and dreadful. Reinforcements on both sides are rapid, and many bees are slain. The battle is soon determined, nearly always in favor of the assailants. The strong are most likely to attack the weak. The vanquished party then unite with the conquerors, assist to carry away their own honey, and go with it. Such is the war of bees. The following is the best way to manage robbing bees. Close the door of the hive five minutes; in this time the robbers will have obtained their loads, and will be pressing to the door. Open it, and let them out, as soon as the hive is emptied of these intruders, close again so nearly as that but a single bee can pass at a time. With so small a space the robbers will soon give over, after which open gradually. When robbers are thus suddenly checked, they often attack an adjacent hive with a rush which the guard cannot resist. This should be looked to, and it will be prudent, at the time of closing the entrance to the hive first attacked, also greatly to reduce the width of the entrance to all the hives standing near, until this danger is past. These directions are given on the presumption that the hive is ventilated, as every hive should be. Without ventilation, in a hot day, five minutes exclusion of the atmospheric air may be dangerous or fatal. In this case caution must be used, but upon the same principle the intelligent apiarian can still succeed.

The First Printed Book.

It is a remarkable, and most interesting fact, that the very first use to which the discovery of Printing was applied was the production of the Holy Bible. This was accomplished at Mentz between the years 1450 and 1455. Guttenberg was the inventor of the art, and Faust, a goldsmith, furnished the necessary funds. Had it been a single page, or even an entire sheet, which was then produced, there might have been less occasion to have noticed it; but there was something in the whole character of the affair, which if not unprecedented, rendered it singular in the usual current of human events. This Bible was in two folio volumes, which have been justly praised for the strength and beauty of the paper, the exactness of the register, and the lustre of the ink. The work contained twelve hundred and eighty-two pages, and being the first ever printed, of course involved a long period of time, and an immense amount of mental, manual, and mechanical labor; and yet, for a long time after it had been finished, and offered for sale, not a single human being, save the artists themselves, knew how it had been accomplished.

Of the first printed Bible, eighteen copies are now known to be in existence, four of which are printed on vellum. Two of these are in England, one being in the Grenville collection. One is in the Royal Library of Berlin, and one in the Royal Library of Paris. Of the fourteen remaining copies, ten are in England—there being a copy in the libraries of Oxford, Edinburgh, and London, and seven in the collections of different noblemen.

The vellum copy has been sold as high as $1,300.

Thus, as if to mark the noblest purpose to which the art would ever be applied, the *first* book printed with moveable metal types was the Bible.

Turpentine by the Steam Process.

Messrs. Editors—In No. 16 of the present volume of the Scientific American, I have seen the engraving and description of an apparatus invented by a French gentleman, M. Violette, for "The Extraction of Essence of Turpentine by Steam." The application of steam to the production of spirits of turpentine has been made more than three years ago, by Mr. Amos Wade, of this place—a gentleman who, by his practical and scientific knowledge and his many experiments, has contributed to throw no little light upon this subject. The apparatus used by Mr. Wade, for simplicity and economy of construction, the production of a larger amount of spirit, saving of time and expense, and perfection in the attainment of the end desired, excels that of M. Violette in each of the above-mentioned points. Mr. Wade uses a four horse boiler for the generation of steam, and but two alembics, or stills, with which he is able to "run off" a charge of 30 barrels (280 lbs, to the barrel) in two hours, instead of six, according to M. Violette's method.

It is not my design to occupy the space of your valuable paper with a minute and detailed account of Mr. Wade's apparatus for making spirit and *rosin*, but simply to advise you of the fact, and to bestow the credit of this invention or "application" upon him to whom it may be justly due. B.

New Berne, N. C.

Kanawha Salt Springs.

Messrs. Editors—It may not be uninteresting to give a statement of the manner in which salt water and gas are obtained on the Kanawha River. Wells are bored immediately on the river, to a depth of from 600 to 1700 feet, mostly through solid rock, sometimes as hard as the hardest flint. The diameter of the bore is from 2¾ to 3 inches; it is then enlarged from the top to the depth of from 40 to 300 feet, for the purpose of putting down a pump to draw the water to the surface, which is done by steam power at those wells where gas is not obtained; but there are some wells which, at the depth of about 1000 feet, have a vein of gas that blows the salt water out with a tremendous force. This gas is used in boiling the water, at a saving of from 600 to 800 bushels of coal to each furnace, per day. It usually takes from six to eight months to bore a well of 1,000 feet in depth, employing an engine of from 6 to 8 horse power. There are, at this time, more than 150 salt wells here. C. W. A.

Kanawha, Va., 1851.

German Honors Conferred on the Disciple and Friend of Dr. Jenner

The Emperor of Austria has conferred the Golden Cross of the Order of Civil Merit on the Nestor of Bohemian physicians, the Chevallier Jean de Castro, M. D. (born at Geneva, 1770), the friend and apostle of Edward Jenner. The honor thus bestowed on one of the most distinguished physicians was publicly celebrated in Carlsbad on the 19th of December 1850, to the great satisfaction of all its inhabitants. The friends and colleagues of the venerable physician assembled at his house, and, preceded by a band of trumpets, conducted him to the place chosen for the decoratien, the Cabinet de Gazettes, the house du Muhlbad, where the investment was performed in the presence of all the authorities of the town, and a numerous assemblage of the public. The ceremony having terminated, the Chevalier was, with great formality, and accompanied by the witnesses to the installation, reconducted to L'Etoile d'Or, where a banquet was given by M. Knoll, Burgomaster of Carlsbad, in honor of the newly-decorated physician. During the dinner the band of the Regiment de Welden, consisting of 70 instruments, attended, and executed the most brilliant pieces of music. The company received with enthusiasm the toasts, all applicable to the occasion. During the evening a collection was made, at the suggestion of the respected chairman, for some poor families of the place; and thus completed, by an act of benevolence, a celebration remarkable for its unaffected cordiality and proving how much the Bohemians appreciate real merit.

Occupations of Inhabitants of Wall Street New York.

According to Doggett's New York Directory, there are 1,985 persons in Wall street, N. Y., and their employees will bring up the number occupying the street to about 6,000. The number of buildings is 123, making the average number to a building about 40. There are 14 banks, 61 bankers, 504 lawyers, 297 brokers, 162 merchants, 80 insurance companies, 11 notaries, 3 clergymen, 17 expressmen, 71 agents, 9 telegraph offices, 23 auctioneers, 4 newspapers, &c. &c. In all, members of 78 different professions and trades.

A Long Light.

Professor Grant's Light, for illuminating light houses, has been submitted to an experimental test at Fort Tompkins, Staten Island. From about half-past seven until fifteen minutes after eight o'clock the rays of the light were thrown on Castle Garden—a distance in a direct line of eight and a half miles.

Governor Trousdale, of Tennessee, has given an order for a block of stone to be inserted in the Washington Monument. The inscription is to be as follows:—"Tennessee: the Federal Union, it must be preserved."