

clean the plate after it has been inked. The first, L, is charged with the greatest part of the ink in excess, since the five others finish the business, and the last must preserve its cloth almost immaculate. If we suppose the plate properly inked for the first time, the following are the series of operations through which the continuous printing by the machine will be effected. Starting from the point, P, the plate passes under the rubbers, which, at this moment, are raised automatically and do not touch it. It goes under the cylinder, D, which has received a sheet of paper and which prints it at the moment at which the plate is passing beneath it, leaving the printed sheet in the hands of the pressman, while the plate continues on its way. It passes under the inking roller and afterward returns in an opposite direction. This time it passes under the cylinder, D, without touching it and reaches the rubbers, E, which are depressed and perform their office. It then rebegins its course in an opposite direction, and so on.

It is possible with this machine to print from 1,200 to 1,500 copies per day, while by the ordinary process scarcely a hundred can be printed. There is here, then, a real progress that will permit of giving more easily, and without too great an increase of cost, copper plate engravings in books and in journals that publish plates outside the text.—*La Nature*.

Notes from the World's Columbian Exposition.

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from the ordinary scow to the latest improved launch. Venice contributed a state gondola, upholstered and bedecked sumptuously, and rowed by six gondoliers, dressed in mediæval costumes, also ordinary gondolas and fishing boats. Crews of Ottomans manned several distinctive Turkish crafts; half-dressed Dahomeyan natives paddled two curious dugouts; Esquimaux displayed their skill in the use of kayaks; Quacktail Indians, from British Columbia, paddled about in one of their grotesquely decorated dugouts; and there were peculiar fishing boats from Norway, South Sea Island crafts, as well as boats from Ceylon, Java, Egypt, Brazil, Japan, and other corners of the earth.

The feature of the afternoon was a procession of land vehicles which represented nearly every country that has an exhibit in the Transportation building. The procession was headed by Turkish sedan chairs, African palanquins, and other vehicles carried on the shoulders of men. Then followed an array of donkeys and camels harnessed in saddles used in various parts of the world, and carrying loads of different kinds, the several drivers being dressed in their native costumes. The remaining part of the procession comprised several historical vehicles and a long line of carriages of the latest patterns, from phaetons to tallyho coaches. There was the state carriage of Abraham Lincoln, a vehicle that looks odd now, because of its antiquated design, and which is the worse for wear, as its once beautiful trappings are now badly faded and time-stained, but nothing in the day's observance so stirred the hearts of the multitudes as the appearance of this vehicle. The state carriage of the late Dom Pedro, of Brazil, was also in the procession. A large display of bicycles ended the pageant. This same day was also California Day, and it was observed in characteristic style. In addition to the regulation exercises of speech making, etc., several car loads of fruit were given away. Great stacks of luscious-looking fruit occupied a large part of a lawn at the southeastern corner of the State building, and at the appointed time men endeavored to give it out in small packages to each applicant, but thousands of people jammed into the space, and the crush was so great that, finally, the fruit was distributed any way to get it into the hands of the surging crowd.

The great Schuckert search light, illustrated on the first page of the SCIENTIFIC AMERICAN of September 2, has a formidable American rival, which has just been placed on the colonnade between the Palace of Mechanic Arts and the Agricultural Palace. The reflecting lens is not quite as large as in the German lamp, but is designed to be more powerful. This lamp will require about 200 amperes of current. The upper carbon is $1\frac{1}{4}$ inches in diameter and 22 inches long, while the lower carbon is the same size, but only 15 inches long. The carbons are set in such relation to each other that the reflector absorbs all the light from the incandescence of the carbons as well as the light of the arc. The lamp is rated at about 100,000 candle power, and its light, when magnified by the reflector, will reach 200,000,000 or so candle power.

Harriet E. Wilson, writing to *Minerals*, tells of some of the minerals to be seen in the Palace of Mining:

"While looking at the carbonates—calcites and dolomites—I thought: Ah, nature, what art thou not doing! Converting such beautiful things out of limestone. There was a bird's nest with four tiny eggs in it, and a basket with pears and hazel nuts, all incrustated with lime, from Clermont, France, and formed by water flowing down over steps, the spray falling on the objects, and as it evaporates it leaves a deposit of carbonate of lime.

"There was a fine collection of minerals which are

used as gems, cut, polished, and in cases. Also imitations of noted diamonds and a case showing the different styles of cutting diamonds. In Mr. Ward's collection are copies of celebrated gold nuggets, the largest of which is the Welcome nugget, found June 11, 1858, at Ballarat, Victoria, Australia, weighing 2,166 ounces, value \$41,883.

"In the collection of Mr. A. B. Crim, of Middleville, N. Y., are sections of rock showing cavities containing carbon, calcite, and quartz crystals; quartz crystals doubly terminated; tube containing 1,000 quartz crystals, weight $3\frac{3}{4}$ grains, 128,000 to the ounce, all from famous Herkimer County.

"Speaking of crystals, every person should visit the crystal cave from the Black Hills, now being exhibited in Horticultural Hall, just under the mountain underneath the dome. The original cave is about twenty miles from Harney Peak. It has been explored fifty-two miles, and the admittance is \$1. Here you can see it for nothing, and if you buy \$10 worth of specimens or pictures they will give you a ticket admitting you into the cave any time within three years. The entire exhibit is for sale at \$50,000.

"Iowa has a coal mine, miner at work, and car loaded with coal: coal value, 1892, \$9,800,000; production, 1892, 7,000,000 tons. Model of the Centerville coal mine of Appanoose County. Mantel piece, fireplace, and hearth, with ornaments, made of wave marble; slab unfinished; ores of iron, lead, zinc, or dry bone. A specimen of lead weighs 500 pounds; was at the New Orleans Exposition. Geodes from Keokuk; marble from Warekanase; paper weights and book weights made out of bird's-eye marble, fish-egg, and cat's eye. Mottled stone, color brown and white; variegated sandstone, white and red; glassware made from Iowa sand, white, blue, black, and green. Clays in jars. A monument made of Iowa cement; magnesian limestone, lithographic stone, and yellow sandstone; clays, bricks, and tiles before and after burnt."



A CONVENIENCE FOR SMOKERS.

A neat and quite ornamental little device, designed to serve as a convenience for smokers, is manufactured by Messrs. Enos, Richardson & Co., of Maiden Lane, New York. It is a sterling silver cutter for removing the ends or tips of cigars, before one lights the cigar. As will be seen by the picture, it may be hung on a watch chain, where it will be always ready for use.

The Use of Salicylic Acid as a Preservative.

As the time arrives for the collection of fruits, the question, "How shall we preserve our crop for winter use?" comes up again for consideration. That it is not yet settled to every one's satisfaction is sufficiently evidenced by the number of questions on the subject which appear every autumn in the papers partly or entirely devoted to domestic interests. A variety of plans are suggested for preventing the fermentation or moulding of fruits and preserves. Thus, some lay great stress, in preserving whole fruits, upon the selection of only the soundest material; upon treating it at once; upon heating it, covered with sirup, in glass vessels, etc. Unfortunately, even when all precautions are taken, the result is by no means always satisfactory. Another practice much recommended at one time was that of pouring chloroform over the fruits and hermetically sealing. This plan seemed to answer very well until it was found that the chloroform communicated a curious flavor to some fruits, which no amount of cooking could remove.

Then, with regard to jams, the same difficulty has been experienced. The proneness of these preparations to change is well known, and attempts have been made to minimize it by a number of devices more or less successful.

In salicylic acid, however, we have a ready means of preventing such loss of material and the consequent annoyance and disappointment. In the proportion of 4 to 8 grains per pint or pound, salicylic acid prevents fermentation and the formation of mould in any saccharine liquid. Fruit juices of all kinds, jams, preserves, and the like can be in this manner kept unchanged for years.

Experiments have shown that apple and pear compote prepared with only a small quantity of sugar (1 lb. to each 5 lb. of fruit), after ten months, during which time the vessels had been frequently opened and various portions removed, showed no trace of mould or acidity, or fermentation. Similarly, cherries and blackberries may be preserved with from one-fifteenth to one-tenth their weight of sugar; in the presence of a small proportion of salicylic acid they keep from one year to another with unaltered taste and quality.

With regard to the manner of applying the preservative, it may be added as it is to the jam in the process of preparation. It is advisable to gradually introduce it in the solid state into the boiling mass with constant stirring, or the acid may be rubbed down smooth with a portion of the fruit juice and then added to the

whole. In any case the finished product ought not to show any white flocks.

A peculiar method of preserving with salicylic acid is to pour over the cold uncooked fruit the cold salicylated juice of the same fruit, so that the former is entirely covered. The cold salicylated juice is prepared by pressing out the fruit, heating the juice, adding to every pound 15 grains of salicylic acid, and allowing to cool. In this way fruits, such as cherries, plums, etc., can be preserved through the winter uncooked, so that they are suitable for any and every kind of application, even for use in pies.

The advantages of salicylic acid in the preservation of fruits and fruit preserves may therefore be summed up as follows. If properly applied, it is always successful; it does not communicate any unpleasant flavor to the preparations; it is in no way injurious to the consumer, being present only in minute quantities.—*Chem. Tr. Jour.*

Photographic Discovery of Asteroids.

One of the most remarkable of recent astronomical developments is the result of the application of photography to the discovery of asteroids or minor planets.

By the old methods of search the annual rate of discovery ranged from one to twenty, the average for the twenty years, 1872-91, being 10.2. In 1892 twenty-nine were discovered, two only by the older method, while between Jan. 1 and April 15 of the present year twenty-five were picked up by the two observers, Wolf, of Heidelberg, and Charlois, of Nice, who have pressed the camera into service.

The negatives are made with an exposure of from three to five hours, each covering an area two or three degrees square. On the plate the images of the stars are round, clean, while any planets or planetoids which may be present are at once recognized by the elongation of their images due to their orbital motion; and three or four of these oblong lights are sometimes found on a single plate. If the number of observers using this method should be much increased, the number of annual discoveries may easily mount into the hundreds. The total number of these little bodies which circulate in the space between Mars and Jupiter stands at 375 so far as now known, but it is almost certain that those still undiscovered must be counted by the thousand, and obviously it will soon be hopeless to attempt to keep the run of them all.

We may reasonably suppose that all the larger ones have been already discovered and that those still remaining are all extremely minute. It is true that from a certain defensible standpoint the size of a planet has nothing to do with its astronomical importance. Mathematically considered a planetoid's orbit is just as worthy of investigation as that of Jupiter itself, but practically it is plain that the computers will be obliged to select a limited number which present special points of interest and confine their attention to them alone.—*Prof. C. A. Young, in Inter-Ocean.*

Philistine Records of the Hebrew Invasion.

Science contains an interesting account of the Tell-el-Amarna tablets, from the pen of the Rev. Thomas Harrison, of Staplehurst, Kent. These tablets, 320 in number, were discovered by a fellah woman in 1887 among the ruins of the palace of Amenophis IV., known as Kku-en-Aten, between Missieh and Assiout, about 180 miles south of Cairo. They have been found to contain a political correspondence of the very greatest interest, dating from some 3,370 years back. Many are from Palestine, written by princes of the Amorites, Phenicians, Philistines, etc., the burden of almost all being: "Send, I pray thee, chariots and men to keep the city of the King my Lord." Among the enemies against whom help is thus invoked are the *Abiri*, easily recognized as the Hebrews. The date fixes that of the Bible (1 Kings vi. 1) as accurate. Many names occur which are familiar in Scripture, as, for example, Japhia, one of the kings killed by Joshua (Josh. x. 3); Adonizedek, King of Jerusalem (ditto); and Jabin, King of Hazor (Josh. xi.). Very pathetic are the letters of Ribadda, the brave and warlike King of Gebel, whose entreaties for aid are observed to grow gradually less obsequious and more businesslike as his enemies prevailed against him, robbing him eventually of his wife and children, whom he was powerless to protect. But the greatness of Egypt was waning under the nineteenth dynasty; enemies were pressing her at home, and the chariots and the horsemen went not forth.

Cholera a Nitrite Poisoning.

Emmerich and Tsuboi, according to publications in the *Munchener med. Wochenschrift*, come to the conclusion that cholera is a nitrite poisoning, basing their conclusions upon the facts that the cholera bacillus is able to a greater extent than any other bacillus to reduce nitrates to nitrites and the internal administration of nitrites in quantity of 0.5-0.6 gm. is capable of producing very similar physiological effects in man. While other varieties of bacteria are capable of forming nitrites, none of these thrive in the intestines.—*Apotheker Zig., 1893, 322; Amer. Jour. Pharm.*