Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW, NEW YORK.

O. D. MUNN. A. E. BEACH.

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VOL. XXXIX., No. 4. [NEW SERIES.] *Thirty-third Year.*

NEW YORK, SATURDAY, JULY 27, 1878.

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VULCANIZING RUBBER.

In reply to numerous queries from our correspondents, we give the following general information respecting the processes in common use for vulcanizing caoutchouc. The purified and masticated gum is kneaded on warm rolls with the proper proportion of flowers of sulphur. Other substances, as whiting, white lead, litharge, zinc oxide, disintegrated refuse rubber (vulcanized), etc., are often added to increase the volume of the product and economize the more costly caoutchouc. Lead compounds blacken the goods through the formation of lead sulphide.

For soft goods the proportion of sulphur added is usually about six per cent. For the cheaper grades of fabrics a mixture in common use is, rubber 32, sulphur 2, whiting 25, white lead and litharge 4. The product is black, resembling that of which rubber overshoes are made. For lighter fabrics oxide of zinc is sometimes substituted for the lead. After thoroughly kneading the mixture into a homogeneous mass, it is rolled into sheets or boards, and from these the forms are moulded—the substance readily receiving and retaining the impression of a warm mould into which it is forced.

The heating or vulcanizing is conducted in strong cast iron cylinders, one end of which is movable and serves as a door. The goods to be vulcanized are loaded upon a car and run in upon a railway extending along the bottom of the chamber. Powdered steatite (soapstone) is freely used to prevent adhesion of the different articles, the goods often being packed in boxes filled with this substance. When the heater is charged and the door made fast, high pressure steam is admitted until the desired temperature is attained. This varies somewhat with the character of the articles—according to Dr. Chandler, five hours at 240° Fah. is said to be the temperature for fire hose. In factories where smaller articles are made, the goods are generally exposed in the heaters for four to four and one half hours, the temperature, at first about 250°, gradually being augmented to 275° Fah., at the termination of the operation. A temperature exceeding 280° Fah. injures the goods. Hard rubber, vulcanite, or ebonite differs from ordinary vulcanized rubber only in that a much larger proportion of sulphur enters into its composition and the vulcanizing process is conducted at a more elevated temperature. Usually the caoutchouc has incorporated with it half its weight of sulphur; but, as in the preparation of soft rubber, various foreign substances—metallic sulphides and oxides, shellac, asphaltum, etc.—are often added. Mixed with a little litharge it becomes very black; with sulphide of mercury (vermilion), bright red; and composition similar to the red vulcanite used for dental purposes is prepared with six parts of sulphur, sixteen of caoutchouc and eleven or twelve of vermilion. The vulcanizing operation is usually conducted at temperatures increasing from 275° Fah. to 305° Fah., the time required being about six hours. The articles are packed in steatite or supported in water trays in the vulcanizer, and, if to present a glossy exterior, are sometimes enveloped in thick thin foil.

Thin sheets of rubber or small articles are sometimes vulcanized by what is called the cold process (Parks's). In this the caoutchouc is simply immersed in a mixture of forty parts of carbon disulphide or benzolene and one part of sulphur chloride. It is next placed in a room heated to 70° Fah., and when all the carbon sulphide has been volatilized the process is in so far complete that it is only requisite to boil the material in one pound of caustic potash in about 2 gallons of water, the vulcanized caoutchouc being next washed to remove excess of alkali. The results of this treatment are not always satisfactory owing to the superficial action of the vulcanizing substances.

STRAWBERRIES AND CONSTIPATION.

Professor F. H. Storer, of Harvard University, in a communication to the *Journal of Pharmacy*, calls attention to the fact, not generally known (and which certainly would scarcely be expected), that ripe strawberries are very apt to induce constipation. He remarks that in this country particularly, "where an immense and well nigh universal consumption of this fruit is coincident with the setting in of hot weather, the constipating action of the berry is complicated and, as it were, increased by the excessive waste of water from the body, by perspiration, which occurs at this period; and there can be little doubt that, taking the two causes together, the strawberry season—though perhaps beneficial to some constitutions—is the occasion of much ill health among the American people."

This binding action of so popular a fruit as the strawberry is just the reverse of what might be expected, when we take into consideration the numerous small seeds of the berry, which, it would be supposed, would tend to promote discharges from the bowels by mere mechanical action.

It occurred to Professor Storer several years ago that Liebig's theory that the cathartic action of many saline medicines should be referred to their osmotic relations to the membranes of the intestinal canal and the blood vessels might be extended and made the basis of a rational treatment of constipation. He reasoned that it might perhaps be easy to annul the tendency to constipation so common in the hot, dry weather of early summer, by "checking or diverting the course of some part of the water which would naturally be exuded by the skin at this season, and causing it to pass into the rectum." This result he thought might be brought about by eating or drinking, frequently, small quantities of harmless indigestible colloid substances, which, while holding water forcibly, could not readily pass through the walls of the stomach by osmose, and would therefore reach the rectum as a liquid, and prevent its contents from becoming hard. He states that it is not improbable that the pulp-like flesh of prunes and tamarinds contains just such an inert indigestible colloid substance, and that to its presence is due the medicinal efficacy of these fruits. However true this may be, he has had no time as yet to study the matter; but having lately noticed that the action of one of the many mineral waters now in common use is closely analogous to that of his proposed colloid medicament, he deems the conception worthy of being kept in view and subjected to further tests. He finds that Friedrichshall bitter water, taken in doses of a small wineglassful three or four times a day, is an effectual cure for the constipations of early summer, and for those produced by strawberries; not that the water in these small doses acts as a cathartic, but that it carries enough water to the rectum to keep its contents soft. He has, however, prepared a solution of far less disagreeable taste than that of the Friedrichshall water, and equally effective against the kinds of constipation under consideration, by simply dissolving 15 grammes of Epsom salt and 8 grammes of common salt in a quart champagne bottle full of water. A small wineglassful of this solution may be taken on going to bed at night, on arising in the morning, in the middle of the afternoon, and of the forenoon also, if need be. Sometimes a couple of doses will be all-sufficient, taken at night and morning. These salts can be obtained almost everywhere, and may readily be carried about in traveling, in the form of dry powders, to be dissolved in water whenever they may be needed.

The mode of action of these small doses of saline matters is possibly to be explained on the old theory that the salts have a tendency to detain the water in which they are held in solution, and to prevent its passage through the walls of the intestines by osmose, thus allowing to be carried into the rectum a certain amount, which but for the presence of the salts would have been discharged through the skin.

PROFESSOR LANGLEY'S PAPERS ON THE SUN.

Those who are familiar with Professor Langley's high rank as a skillful observer of solar phenomena will not need to have their attention specially called to the series of articles on the sun which he has prepared for this paper. For freshness of information, clearness and aptness in illustration, they will be found superior to anything that has appeared on this subject for a long time. The article on eclipses, in this week's issue, is particularly timely, and we trust that not a few of the readers of the SCIENTIFIC AMERICAN will follow his advice in observing the coming eclipse and in reporting their observations. As Professor Langley shows, it is often in the power of non-professional observers to add materially to the scientific results obtained during the progress of such rare and imposing phenomena. The circumstance that the line of totality passes for the most part over a sparsely settled region makes it all the more important that every one who has an opportunity to witness the eclipse should become, if possible, for the moments of darkness at least, a scientific observer.

DESTRUCTION VS. CONSTRUCTION OF IRONCLADS.

While other nations are expending immense sums in the construction of heavy ironclads, and without apparently coming any nearer to a decision as to which is the more irresistible, shot or armor, we are wisely giving especial attention to studying how they may best be destroyed and now that our naval officers have become so familiar with the management and the capabilities of the submarine torpedoes, we expect soon to hear of an aerial torpedo, which, propelled by steam or compressed air or after the manner of a rocket, may as successfully attack the deck as the other can the bottom of these ships.

While political conditions demand of others that they should perfect and multiply all means of attack, we, fortunately, may confine ourselves to those of defense, making ourselves impregnable against scores of ironclads at less than the cost of two or three of them.

How Raisins are Prepared.

A strip of land bordering the Mediterranean, somewhat less than 100 miles in length and in width not exceeding 5 or 6, is the raisin producing territory of Spain. Beyond these boundaries the Muscatel grape, from which the raisin is principally produced, may grow and thrive abundantly, but the fruit must go to the market or the wine press. When the grapes begin to ripen in August the farmer carefully inspects the fruit as it lies on the warm dry soil, and one by one clips the clusters as they reach perfection. In almost all vineyards slants of masonry are prepared, looking like unglazed hot beds, and covered with fine pebbles, on which the fruit is exposed to dry. But the small proprietor prefers not to carry his grapes so far. It is better, he thinks, to deposit them nearer at hand, where there is less danger of bruising, and where bees and wasps are less likely to find them. Day by day the cut branches are examined and turned, till they are sufficiently cured to be borne to the house, usually on the hill top, and there deposited in the empty wine press, till enough have been collected for the trimmers and packers to begin their work. At this stage great piles of rough dried raisins are brought forth from the wine press and heaped upon boards. One by one the bunches are carefully inspected, those of the first quality being trimmed of all irregularities and imperfect berries and deposited in piles by themselves; so in turn are