Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT

NO. 37 PARK ROW, NEW YORK.

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VOL. XXXIX., No. 16. [NEW SERIES.] *Thirty-third Year.*

NEW YORK, SATURDAY, OCTOBER 19, 1878.

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THE SCIENTIFIC AMERICAN SUPPLEMENT

No. 146,

For the Week ending October 19, 1878.

Price 10 cents. For sale by all newsdealers.

IMPROVEMENTS IN SUGAR MAKING WANTED.

A short time since the attention of inventors was called by us to a prize of 100,000 francs ($20,000) offered by the authorities of Guadeloupe for a process that would obtain fourteen per cent of sugar from canes. Through the kindness of U. S. Consul Charles Bartlett, Point à Pitre, Guadeloupe, we are able to add a few important particulars.

In reply to a communication from Mr. Bartlett relative to an improved American cane mill, which would increase the yield of juice from 20 to 30 per cent above the mills in use on the island, the administration replied that improvements of that sort were not what the Council had in view when the premium was offered. What is called for is a process of treating the juice which shall bring the yield of sugar up to 14 per cent. All the expenses of transit, fitting up of the apparatus on the island, and others connected with the experiments are to be borne by the inventor, the colony providing only for the expenses of a special commission to make the requisite tests.

The prize is worth trying for in itself: yet it would be small compared with the total profit the successful inventor would reap from his patents in Cuba and elsewhere, particularly our own land. The sugar industry of this country is comparatively undeveloped; and there is no reason why we should not supply ourselves with this necessary commodity. The notion that cane sugar can be profitably produced only in hot and unhealthy regions seems to be a mistake. According to an official report from our consul at Hamilton, Canada, an Ohio man has raised this season, on a farm near that city, five acres of sugar cane, which has been pronounced equal to any ever grown in the Southern States. The cane attained a height of thirteen feet, and yielded an abundant saccharine product. It is believed that the cultivation of sugar cane will soon become an extensive industry in that region; and if successful there, it should succeed in many parts of the States, away from the miasmatic valley of the lower Mississippi.

The experiments in sugar making from cornstalks and sorghum, which Dr. Collier of the Department of Agriculture has been carrying on in Washington, are worth noting in this connection. The aggregate weight of the cornstalks used was 11,237 lbs., and the weight of sorghum 13,958 lbs. The weight of the juice from the cornstalks was 2,773 lbs., and from the sorghum 4,963 lbs. The specific gravity of the cornstalk juice was 10·54; that of the sorghum juice 10·58. The percentage of juice in the cornstalks as they came from the field was 24·68; the percentage of the sorghum, 35·56. Thus 2,571 lbs. of cornstalk juice yielded 382 lbs. of sirup, and 4,355 lbs. of sorghum yielded 660 lbs. of sirup. This sirup contains 75 per cent of its weight of sugar. The mill used in these experiments was an indifferent one, and the sorghum was in small stalks. Better results would have been reached had the stalks been larger. Dr. Collier says he is satisfied that there is not a farmer in the country who cannot rely upon results 50 per cent greater than he has secured, with a better mill.

Since the cultivation of beets for sugar was begun, the percentage of sugar in the root has been more than doubled. Like care in the getting and perfecting of the more hardy varieties of sugar cane might very largely increase the saccharine product, so that our cooler and more healthy climates might easily compete with the best sugar countries of the tropics. And it is quite possible that with a vastly increased product of sweet corn for summer use and for canning, there might be developed an even more profitable sugar product from the stalks. In this way two valuable crops could be reaped from the same ground, at one time, with a very slight increase of labor. The corn leaves would have no small value also for fodder, and possibly the pressed stalks would yield a fair revenue for fiber.

The field for improvement in this direction is not only wide, but extremely promising. Our farmers, mill-makers, and chemists will do well to work it.

DUST EXPLOSIONS.

Apropos to the discussion concerning flour mill explosions we are informed that the burning of the large fertilizer manufactory in the town of Lake, near the Chicago Stock Yards, in January, 1874, was due to a like cause, that is, the ignition and explosion of fine dust.

The building was of wood, one story, 75 x 100 feet, with a wooden addition about 20 feet square. In the main building the fertilizer was manufactured from the blood and tank stuff received from the neighboring packing houses; mixed together they were fed into a long revolving cylinder of iron, through which flame constantly passed, and were delivered as a fertilizer containing from 15 to 18 per cent moisture. The fertilizer was then fed into a pulverizer, which reduced it to a fine powder, and blew it through a long tin pipe (into which hot air from a heater was also admitted) into cylindrical sieves or bolters of different grades, which terminated the pipe and which were located in the 20 foot square building. After the material had passed through the bolters it contained but from 6 to 8 per cent of moisture. The bolting room always contained hot air, hot steam, some ammoniacal gases, and the fine floating dust of animal matter.

About a week before the destruction of the works one of the workmen entered the room, with a lantern, to clean the bolters; as the dust soon settled on the lantern glass and obscured the light he opened it to take the lamp out that he might see better; an instantaneous explosion followed, and he was thrown down, and his hair, face, hands, and clothes badly scorched. The force of the explosion was, however, expended through the open door, and no further damage resulted.

A week after this occurrence, on another occasion of the clogging of the bolters, the intelligent foreman of the factory entered the room with the lantern, with two of the workmen, and repeated the interesting performance of exposing the naked light, with disastrous results; the explosion shook from the beams and rafters of the buildings the long accumulation of dry fertilizer dust, which was at once ignited by the burning gas, and the whole building was instantly filled with flame and burned to the ground.

From this it is evident that the dry dust of animal as well as that of vegetable matter will take fire and generate gas with explosive rapidity, provided the necessary conditions are presented, that is, sufficient and intimate mixture with air, and the temperature of a burning lamp. In this case the conditions were complicated by the presence of steam and ammoniacal gases, which, however, contrary to what would have been predicated of them, apparently excited no preventive influence.

A SECOND MATTHEW VASSAR.

Two years ago, Mr. J. C. Jacobsen, a wealthy brewer in the neighborhood of Copenhagen, Denmark, set aside the sum of a million Danish crowns—$275,000—for the support of a laboratory for scientific research. The money is vested in the hands of five persons, nominated by the Danish Royal Academy of Sciences. Part of the annual revenue is to be expended in keeping up the splendid laboratories attached to the brewery and devoted to chemical and physiological researches, with a view to establishing as complete a scientific basis as possible for the great industries of brewing and malting; the rest, after the death of the donor and his wife, will be expended in the advancement of the various natural sciences—mathematics, philosophy, history, and philology. The laboratory is fitted up in the most liberal manner, and already excellent work has been done in it. The first report of such work has just been published in Copenhagen, and contains papers on the following subjects: "On the rotatory power which beer wort exercises on polarized light, and on its variations during fermentation," "Estimation of extract," and "Estimation of alcohol in beer," by M. J. Kjeldahl; "Researches on some factors which affect the propagation of the low yeast of *Saccharomyes cerevisiæ*;" "On the influence which the introduction of atmospheric air into fermenting wort exercises on fermentation;" and "Researches on the influence of temperature in the production of carbonic acid on barley germinating in darkness," by M. R. Pedersen.

From the nature of their occupation our successful brewers are compelled to become interested in science, if not actually scientific. At every stage in the varied processes of beer making a high order of chemical knowledge is valuable, indeed almost indispensable; and with every year's advance, scientific brewing becomes more and more essential to success. Properly conducted the business is very profitable; and so commerce, the iron trade, and other paying industries have furnished the means for many munificent gifts to science and education. We may reasonably expect that there will be among our wealthy brewers not a few who will emulate Mr. Vassar and Mr. Jacobsen, and build lasting monuments to their honor by the endowment of institutions for the advancement and diffusion of knowledge. There are several fields of scientific research the cultivation of which might be greatly helped by the establishment of working laboratories after the Danish model; and we have several millionaire brewers who might provide them handsomely out of a single year's profits. As a class the brewers are notably freehearted and generous in regard to public improvements and the like. They owe much to practical science, and, we are confident, will sooner or later make many praiseworthy acknowledgments of the debt.

POISONOUS HATS, GLOVES, STOCKINGS, AND CLOTHING.

It is not long since several cases of arsenical poisoning were traced to the wearing of scarlet and blue stockings. Next came a somewhat remarkable case in which the mischief was traced to a highly colored hat lining. More recently English and German papers, medical and other, have called attention to dangerous gloves. In the London *Times* a writer describes the poisonous effect of a pair of the fashionable "bronze green" silk gloves, when worn by a member of his family. After wearing them a day or two the patient was attacked with a peculiar blistering and swelling of both hands, which increased to such an extent that for three weeks she was compelled to carry her hands in a sling, suffering acute pain, and being, of course, unable either to feed or dress herself. Inquiries among the writer's friends discovered three other ladies similarly afflicted.

A German medical journal reports a case of serious poisoning by a pair of navy blue kids. Dress goods of woolen, silk, and cotton have been found to contain arsenic in dangerous quantities; so also gentlemen's underclothing, socks, hat linings, and the linings of boots and shoes. Professor Nichols, of the Massachusetts Institute of Technology, reports the examination of a lady's dress which contained eight grains of arsenic to the square foot. In Troy, N. Y., lately, the death of a child was attributed to arsenic sucked from a vail which had been thrown over the child's crib to keep off flies.

At this rate it will soon become necessary to test for arsenic all goods purchased before venturing to wear them; or else the label—"warranted to contain no poisonous dye"—