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THE SCIENTIFIC AMERICAN SUPPLEMENT

No. 203,

For the Week ending November 22, 1879.

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INCENDIARY SILK.

The extent to which the adulteration of certain textile fabrics, notably silk and cotton, is carried in many European factories, is little suspected by the buyers of such goods, and it is only by some event outside the regular course of trade that the enormity of the practice is ever brought to light.

Thus, about a year ago, a suit brought in an English court to recover payment for sizing a quantity of cotton, revealed the extent to which that form of adulteration is carried. In the course of the trial the plaintiff was forced to explain that his process of sizing involved the loading of cotton goods with flour, clay, Epsom salts, chlorates of zinc and magnesia, and glue, to the extent of 70 per cent. He had used as high an average as 130 per cent; and he confessed that there were men in the business who loaded their goods with size as much as 230 per cent.

Silk fares even worse. The steamship Mosel, on the way from Bremen to this port, last month, mysteriously took fire in mid-ocean. Fortunately the fire was promptly discovered, and after a hard fight of five hours was put out. When the Mosel reached this city an examination was made, resulting in clear evidence that the fire spontaneously originated in certain silk goods. Samples were placed in the hands of a chemist, who reported that, under the microscope, the silk presented a remarkable appearance. The fibers ran very irregularly, and were partly covered with scales of a metallic luster, while on other fibers heavy sponge-like knots of dark color could be observed. The physical structure of the fiber seemed unimpaired. A careful chemical analysis disclosed that 100 parts of the silk were made up as follows: Moisture, 9·15; pure silken fiber, 21·35; oxide of iron, 13·45; other minerals, not determined, 3·30; fatty oils, 1·85; organic dye-stuffs and coloring matters, 50·90. The silk was free from cotton or wool fibers. For each part of fiber, 0·75 part of oxide of iron and nearly 2·50 parts of organic dyes were used for coloring. The coloring substances for this silk most probably contained tannic acids or similar substances. As much of the dyestuff and iron salt was not absorbed, it lay upon the surface of the fiber. Iron salts, when precipitated and combined with tannic or similar acids, will undergo, by action of the oxygen in the atmosphere, a certain chemical change, and in doing so give out heat. The combustion thus started was assisted by the inflammable silk fibers and fatty oils.

The report further stated that for several years manufacturers of silk goods in Germany and France have supplied the market with an article remarkable for its fine luster and heaviness, combined with extraordinary cheapness. Frequent fires in warehouses and railway cars, where such silks had been stored, led to a close investigation, and its dangerous character was discovered. Its liability to spontaneous combustion arose from its being overloaded with dyestuffs and chemicals. Steps were at once taken by insurance and railway companies to secure themselves against loss from this cause.

The steamship company to which the Mosel belongs announce that hereafter silk of this incendiary character will be stowed in a separate compartment of their steamers, where it can be constantly under observation, the officers being provided with means for flooding that part of the cargo at a moment's notice. This is no doubt a good rule; but a better and surer preventive of risk from spontaneous combustion in such dangerous materials would be to stop buying them.

A gentleman who was in Lyons at the time of a fire, from a similar cause, on the Oder, is quoted as saying that then the matter was brought to the notice of the silk manufacturers in that city. They acknowledged that there was danger from spontaneous combustion in heavily-weighted cord and sewing silk, as instances had been known of its flaming up when thrown in heaps in the factories. They, however, doubted whether there could be any danger in manufactured silk. This, after coming from the dyer, went through so many processes, that they thought all danger was worked out. The gentleman further stated that at one time sewing silk was regarded with such suspicion by the Russian authorities, that its carriage on passenger trains in Russia was prohibited. He stated that the dangerous quality in silk arose entirely from the chemicals used in the dyeing to give it weight. He knew of silk which came from the dyer's with an increased weight of over 275 per cent.

Ladies who complain that American silks do not show the brilliant luster of certain foreign brands, may now estimate the actual percentage of silk in their brilliant but brittle imported gowns. Dyestuffs may be bright of luster, but they are not cheap at the price of silk, nor are they durable or particularly desirable for wearing apparel, let alone any risk from spontaneous combustion.

ORIENTAL SAND AND MUD BATHS.

In many low plains in the neighborhood of the sea, in Greece, immense quantities of sand are constantly being deposited from the inrolling waves, particularly at the promontory Sunium, near Missolonghi, near Corinth, and on some of the islands, as Noxos and Mykone. Professor Landerer, writing from Athens to *New Remedies*, says that these places are visited by persons affected with chronic rheumatism, anchylosis, and chronic synovitis of the knee joint, for the purpose of taking a sand bath. The patients (who are generally of the poorer classes) bury themselves in the sand or cause others to cover them with it, so that only the head, which is covered with a night cap or straw hat, remains free. It is a ludicrous sight to see twenty or thirty such odd looking heads sticking out of the sand. In consequence of the weight and the saline character of the sand, the skin of the patients becomes so red that when they emerge from their sandy bed (which they occupy as long as possible) they look like boiled lobsters. Wooden huts, or tents improvised with oleander and plantain branches, are used as bathing houses, and a piece of bread, some grapes, and a glass of wine, generally constitute the meal of a patient. Direct inquiry of the patients has elicited the fact that the effects of this sand treatment are decidedly beneficial.

Another variety of bath is likewise not uncommon, the so-called "mud bath." In the canals and ditches into which the sea water is allowed to flow, in order to obtain common salt by spontaneous evaporation, a mother water containing chiefly magnesium bromide remains behind, after the crystallized salt has been removed. At the same time, an aluminous mud collects at the bottom. This mother water, together with the mud, is used by patients affected with chronic splenitis caused by the frequent malarial fevers prevailing among the workmen in these localities, and with intestinal infarctions. The method consists in smearing the whole body with the saline mud, and in exposing themselves afterwards to the rays of the sun until the coating has become dry, when it is washed off with the saline mother water. Sometimes both the sand and the mud bath are used locally on a special portion of the body only, as, for instance, the legs or feet.

THE NATIONAL ACADEMY.

The first paper of the last day of the meeting of the National Academy was by Professor Joseph Le Conte, on the glycogenic function of the liver. It was read by Dr. George T. Barker, and was a continuation of the paper read at the previous meeting of the Academy. Dr. Le Conte contended that the chief function of the liver is in preparing sugar to be oxidized in the capillaries, whither it is carried by the blood. He regarded the liver also as a sort of storehouse for fuel; the carbon received one day may be held until the next day, when it is oxidized in the capillaries in contact with the tissues, with the evolution of heat. The paper provoked a lively discussion.

Dr. Barker followed with a brief paper detailing the results of certain variations of Arago's experiment to prove that a wire through which an electric current is passed becomes for the time a magnet. This view was overthrown by the tests applied by Professor Franklin Bache, some fifteen years ago.

Professor Bache placed a piece of cardboard against the wire in such a way as to cut the "magnetic field" containing the filings into halves. Immediately all the filings dropped. The inference was that the wire was not a magnet. The filings, it was believed, had been held in position before the interference of the cardboard in one of two ways: either by their magnetic adhesion to each other, or by the direct support of the currents circulating in the magnetic field. Dr. Barker has made some experiments to disprove these inferences. He employed a powerful magneto electric machine of the Wallace pattern at Ansonia, Conn. The energy it developed was so enormous that at a distance of seven feet an iron bar five feet long held opposite it would be instantly so charged with electricity as to hold up an ordinary nail. This current of electricity would heat to cherry redness in a minute a quarter inch gas pipe three feet long. Dr. Barker performed the "experiment of Arago" with this machine, using a copper wire. Copper, being diamagnetic, seemed not so likely to become a magnet as iron. A five inch iron spike was held below and close to this wire during the passage of the current. The spike was attracted, but not sufficiently to lift it clear. When the spike was touched to the wire, it immediately stuck fast at right angles to the wire. But when the spike was removed from the wire only the thousandth part of an inch, it fell to the floor. This showed that the great energy of the magnetism was in the wire, and not in the surrounding field. Then Dr. Barker had a glass plate prepared with a hole through its center; the wire was passed through the hole and iron filings sprinkled on the surface of the plate. When the current was passed through the wire, the filings arranged themselves in concentric circles around it. Further experiment showed, by reversing the wire current, that in this magnetic field the currents were traveling in circles around the wire. Finally, when the iron spike was held by the head parallel to the copper wire and near it, the spike deflected itself out of the perpendicular in the direction in which these currents were passing around the wire. Dr. Barker considers that his experiments yield conclusive proof that the old view was correct—that the wire through which a current is passing does become for the time a magnet.

In the afternoon, Professor J. S. Newberry, of Columbia College, delivered an essay on the vegetation of the Atlantic coast of North America in the cretaceous era, and illustrated his remarks by an exhibition of fossil leaves from the greensands of New Jersey. No angiospermic leaves appear in the Trias or Jurassic formations, but in the pottery clays of the lower cretaceous they occur in abundance. One trayful of specimens contained only leaves belonging to the salix family—willow leaves, much resembling those of the present day, but in greater variety. The other tray contained the leaves of conifers, many of them beautiful specimens; twigs showing the skin or bark; cones, etc. Some of the leaves were imbricated.

The question to which these fossils give rise is a difficult