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RETROSPECT.



HIS number completes the second volume of the New Series of the SCIENTIFIC AMERICAN; and in glancing back over its pages, we find, in the full record which they contain, abundant proof that the wonderful progress of man in his conquest over the forces and elements of nature, which marks the century in which we live, above all the centuries that have preceded it, has experienced no check during the

last six months, but is moving onward with accelerated rapidity. Though no brilliant discovery in science or art has startled the world during this brief period, there is hardly a department of either art or science which has not been marked by evidence of broader development and more steady growth than during any previous period of equal length.

In science, the greatest activity is displayed by the naturalists. Not in the days of Buffon, Linnaeus, or Cuvier, nor in any earlier day, have so many powerful intellects been directed to the study of all departments of natural history as in the day that now is. And these intellects are now stimulated to unusual activity, by the earnest discussions of the origin of species excited by the publication in England of Darwin's book, and the issuing in this country of the first volumes of the incomparable work of Agassiz. One year ago the age in an intellectual view would have been designated as the age of great historians, but during this time the scythe of death has made a fearful sweep in the ranks of these illustrious men. We now never lay down a volume of Prescott, Irving, or Macaulay, without a sad feeling of personal regret that, except in re-reading their priceless productions, we are no more to derive pleasure and instruction from their profound, comprehensive, and richly-stored minds. Notwithstanding that Grote, Carlyle, Guizot and Bancroft are left, we presume the age now would be styled the age of great naturalists.

In our own more special department of the mechanics arts, our columns record a constant progress in every branch. Baudelot's Beer-cooling Apparatus, Burley's Dovetailing Machine, Holmes's Machine for Dressing Staves, Lum's Power-accumulating Windmill, Normandy's Freshwater Apparatus, Fletcher's Surface Condenser, Decker's Stave Machine, and Davidson's Boat-lowering Apparatus, and several others, would have been famous a hundred years ago, as great inventions, but they now take their places almost unnoticed among the crowd of admirable ideas which the busy brains of this generation are pouring forth in inexhaustible succession.

Besides a full description of the leading inventions in this country and Europe, with our usual variety of intelligence in science and art, and our correspondence, which is constantly becoming more extensive and valuable, this volume contains an account of three of the leading industrial interests of the country—statistics of the growth of the railroads and shipping, and a full illustrated description of the plan of telegraphing at present in use. In all three of these great interests, this country is considerably in advance of all others.

Thoroughly identified with both the intellectual and material interests of the country, the SCIENTIFIC AMERICAN has moved onward in the van of increasing intelligence, propagating useful information, stimulating invention, and advocating the rights of industry. Our retro-

spect is pleasant, and our experience of the past animates us with renewed zeal to labor with redoubled energy in the cause of science and the mechanic arts.

THE JAPANESE, THEIR PROFICIENCY IN MECHANICS, AGRICULTURAL SCIENCES, &C.

The advent of the Japanese Embassy, and the interest in this but partially known people, which the event has awakened in the minds of our citizens, has induced us to give some account of their acquirements in the agricultural and mechanical departments. In many things our oriental visitors may shake hands with us upon the same platform of progress; but whether we look upon them in the light of equals or from the height of our own superior attainments as a nation yet in the middle stages of advancement, we cannot but look upon them with great interest; and nothing affords better indices of a nation's advancement than its attainments in mechanical or agricultural pursuits.

The seclusion of the Japanese has rendered them chiefly dependent upon the products of the soil for their subsistence; and being compelled to make the most of their not very extensive and rather poor soil, they have arrived at a very high state of perfection in the arts of agriculture. Though a great part of the country is hilly and mountainous, yet almost every available foot of land is cultivated and very abundant crops are raised. Where the land is inaccessible to the plow, it is cultivated by manual labor. In many places terraces are made, and these, adding the beauty of regularity and domestic cultivation to the natural scenery, renders the landscape exceedingly beautiful—a charm which none appreciate better than the Japanese themselves; for over all the islands, temples are built in positions commanding the best views, and around these temples are gardens set apart for entertainment and pleasure; and we might add not always of a character comporting with the neighborhood of the sacred edifices.

Like the Chinese, they pay great attention to manuring and to irrigation. The grain principally raised is rice, which is of a superior quality. The tea-plant is next in importance to the cultivation of rice. Sugar is obtained from the sap of a tree. The gardeners of Japan have attained to the art of dwarfing, and also of unnaturally enlarging all vegetable productions. In the gardens of their towns they exhibit full grown trees of various kinds, only three feet in height, with heads of about the same diameter. As long ago as 1826, a box was shown to the president of a Dutch factory at Nagasaki, 4 inches long, 1½ wide, and 6 inches in depth, in which were grown a bamboo, a fir, and a plum tree, the latter in full blossom. They sometimes stimulate the growth of their trees to such an extent that the branches stretch to a great distance from the trunk, and are supported by props.

In the manufacture of cotton fabrics, the Japanese display considerable skill; their best silk is said to be superior to that of China. They are also said to excel the Chinese in the manufacture of porcelain; like them they have long manufactured paper and glass, although not until comparatively later years have they understood the process of manufacturing flat glass for windows, and probably what they make now is of an inferior quality. They manufacture paper in great abundance as well for writing and printing as for tapestry and handkerchiefs. It is made of various qualities, and some of it is as soft and flexible as cotton cloth. Indeed that used for handkerchiefs might easily be mistaken for cotton cloth, so far as toughness and flexibility are concerned. The peculiarities of this paper we think sufficient to warrant us in giving a description of the process of its manufacture.

It is made of the bark of the mulberry (*moras papyifera*). In December after the tree has shed its leaves, they cut off its young shoots, about three feet in length, and tie them up in bundles. They are then boiled in a lye of ashes in a covered kettle, till the bark is so that half-an-inch of the wood may be seen at either end of the branch. When cool the bark is stripped off and soaked in water for three or four hours until it becomes soft, when the exterior black cuticle is scraped off with a knife. The coarse bark, which is full a year old, is then separated from the fine, which covered the younger branches, and which makes the best paper. The bark is then boiled again in clear lye, continually stirred with a stick, and fresh lye from time to time added to make up for the evaporation. It is then carefully washed at a

running stream by means of a sieve and incessantly stirred until it becomes a fine pulp. For the finer kinds of paper this process is repeated, a piece of linen being substituted for the sieve. After being washed it is beaten with sticks of a hard wood, on a wooden table till it is brought to a pulp, which is put into water and dissolved, and dispersed like meal. This is put into a small vessel with a decoction of rice, and a species of *hibiscus* and stirred until it has attained a tolerable consistence. It is then poured into a large vessel whence it is taken out and put in the form of sheets in mats or layers of grass and straw. These sheets are laid one upon another with straw between, and pressure is applied to force the water out. After this they are spread upon boards in the sun, dried, cut and gathered into bundles for sale or use.

They excel all other people in lacquering on wood. They manufacture steel swords, unapproachable in quality, and also make from steel excellent mirrors. They are skillful in carving and die-sinking, and in the casting of metal statues. Their iron works, tobacco factories, breweries, distilleries, and other manufacturing establishments are frequently on a large scale, employing hundreds of men. These are mostly situated at Miako, Yeddo and Osaki. At Miako are made damasks, satins, and silk fabrics of every kind, lacquered articles, caps, scarfs, screens, fans, pins, bow strings, paints, tea boxes, grindstones, porcelain and earthenware; at Osaki, cotton goods and iron ware, and at Yeddo nearly every species of manufacture is carried on.

The short time the embassy has already been with us, shows how eager they are to profit by the experience of foreigners, and to imitate their useful arts. The inhabitants of Japan are already supplied with microscopes, telescopes, clocks, watches, knives, spoons, &c., made by themselves from European models. They manufacture Colt's revolvers and Sharp's rifles, and it is said that they have made improvements upon them. At Nagasaki works have been erected for the manufacture of steam-engines without European assistance, and a screw steamer built, which has been successfully navigated from Nagasaki to Yeddo, by native seamen and engineers.

In no portion of the world is education so thoroughly disseminated as Japan, all children—poor and rich, male and female—being obliged to attend a school.

They are proficient in medicine, astronomy and mathematics, but their superstition has prevented their dissecting human bodies, and consequently they are deficient in surgery. Among their inventions are acupuncture and moxa-burning, both of which, though now superseded by other processes, were long practiced in Europe, into which they were introduced from Japan. Their most remarkable discovery, however, is that of a powder called *mosia*, which is reputed to possess great and beneficial power in child-bearing, diseases of the eye, and for other maladies; taken in perfect health, it cheers the spirit, and refreshes the body. But its most remarkable effect is to restore a dead human body to as great a degree of flexibility as it had while living. This is done by introducing the powder into the ears, nostrils and mouth of the deceased. We have thus narrated some of the attainments in which our curious eastern visitors excel, in the hopes that they will lead us to better appreciate the importance of the events which are now transpiring in our midst. To America belongs the honor of again opening communication with this interesting people, so long shut out from the rest of the world, except the Hollanders. No one can calculate the immense good that will flow from the opening of the country of Japan to the rest of the world.—We can only wait, watch, and note it down upon our journal of progress.

W. S. COLEMAN, a London publisher, has just issued a work on British insects, in which he expresses the belief that insects do not feel pain. He states that when insects are mutilated in such a manner as would cause the death of vertebrate animals, they afterwards perform all the functions of life—eating, drinking, &c.—with the evident power of enjoyment.

Two young men in Epsom, N. H., profess to have found gold upon a farm in that place, and one of them has exhibited a chunk worth over \$10. Two returned Californians have visited the spot, and report that they found gold, but whether it exists in quantities that will repay digging remains to be seen.