that a more extended exposition on both sides would have been valuable to each.

FRANCE.

The French have arranged their examples of raw cotton with other raw materials in the avenue under the North Gallery, near the passage leading to the central refreshment rooms. Here, in conjunction with a beautiful display of raw silk, are specimens of cotton from Algiers, the examples varying very considerably in colour and in quality. The best appears to be Kaddous cotton (*coton de Kaddous*); and with the specimens are yarns spun from the same—360 s single yarns being the highest number, and the yarn so spun is of the quality of the above-named. There are also several examples of cotton from the French colony of Louisiana, thus showing that our neighbours are alive to the importance of endeavouring to help themselves in this particular; and the probabilities are, that so far as Algiers is concerned, they may succeed in the lower qualities.

The manufactured specimens at present arranged for display are very few. Specimens of quiltings for waistcoats, exhibited by Messrs. Vacossin, are to be found under the South Gallery. These are very excellent in design and in execution, the coloured effects being well thrown in, and producing a tasteful and satisfactory result. In the South Gallery, in the midst of a display of printed fabrics, Messrs. Hartmann and Son, Munster, Upper Rhine, exhibit yarns ranging to 353 s English, with specimens of Madapolans and other cloths of excellent quality.

BELGIUM.

With the exception of specimens of quiltings from the Government workshops at Wellerin, which are of a respectable character and in considerable variety, there is little to notice from Belgium. M. J. F. De Cuyper, of St. Nicholas, exhibits common checks and tickings; and these, with specimens of cotton blankets by M. A. De Behault du Carmoi, of Ternonde, constitute the leading features of the Belgian display in the cotton trade, which is the more remarkable as much attention has been paid to its progress by the Government of the country. The laces and embroidery, Brussels and Valenciennes, will, however, compensate for any deficiencies in the lower textiles.

AUSTRIA.

From Vienna, J. Ramedep (300) sends examples of quilted cotton counterpanes, into which figures are introduced in dyed thread. The effect is good, and the designs have much merit in their special direction. Cravat fabrics and ginghams are also exhibited from Vienna, by J. Furst (296); whilst A. Budinsky, of Reichenburg, Bohemia (393), makes a display of muslins, in addition to hosiery and other articles.

WIRTEMBURG.

Window-curtains, of good design and excellent execution, exhibited by Van Zwerger, Deffnerp, and Weiss, of Ravensburg (52), give a good idea of the perfection to which this class of manufactures is carried in this industrious and thriving principality. There are also some striped muslins, too, of excellent make, whilst the lace curtains in the manner of *appliqué* are very beautiful in style and workmanship. As these are placed near the Central Avenue, they will be easily found and recognised.

SAXONY.

The arrangements of the contributions from Saxony are an example to the whole Exhibition; and, in addition to this, the Saxon Commissioners have printed a catalogue of their own department, containing much useful information, together with a list of prices. There has been a good understanding amongst the manufacturers, and they have united with good effect for the exposition of their respective trades. The contributions in mull jacconet, cotton gauze, and linen cambric, are generally very good, as also the cotton hosiery. There is, however, a very admirable display of cotton fringes, by G. T. Bach and Son, of Bucholz (158), which, though exhibited for cheapness and execution, certainly excel in the latter and in design; and the same may be said of their neighbour, Hans Helweg, also of Bucholz (159). Altogether, this exposition of cotton fringes is a most satisfactory one, and will give hints of some value to our manufacturers. These fringes, as also laces, galloons, gimps, and tassels, are manufactured in the centre of Saxony and give employment to many thousand persons. The exhibitors are merchant manufacturers in the towns of Augsburg and Bucholz, and the system of distributing the work over the adjacent country seems to be very similar to that pursued in Scotland and the north of Ireland, to which, as already promised, we purpose directing attention in a future notice of linen and embroidery. Much of the business carried on in Saxony seems to be done in this way, rather than by our factory system.

UNITED STATES.

As might have been expected from the country whence we get the great mass of our cotton, examples have been sent to show how far the manufacture of the raw material with which it supplies us has been carried; and though not a very extensive display, yet it is as a whole well worthy of attention, and in many points of high commendation in the more useful fabrics. The cotton sail-cloth, for instance, exhibited by Messrs. Fox and Polthemus, for the Willimantic Duck Company, state of New York, is an example of the application of an abundant material to a very valuable purpose, and it is scarcely possible to conceive a finer looking article. In its way there is nothing like it in the Exhibition. The drillings, too, are very good. The Amoskeag Manufacturing Company, Manchester, New Hampshire, also exhibit drillings of various qualities, striped shirtings, tickings, and sheetings—all good examples of their class. The Ocean Steam Mills, Newbury-port, Massachusets, display cloths for printing, sail-cloth, sheetings, and jeans; and extra fine straw twist is shown by the Wamsatta Mills, New Bedford, in the same state. Altogether, the United States cottons are at once creditable to the skill and ingenuity of their manufacturers, and a proof that in the utilities of manufacture they are rapidly learning to help themselves.

We have thus completed our sketch of the state of the cotton manufacture as represented in the Exhibition; and, without discovering any striking novelty, it is certain that on examination it presents many features of high interest, and more than ordinary commercial importance.

EAST INDIAN AGRICULTURISTS AND AGRICULTURE.

NORTH AND SOUTH BAYS WEST OF THE TRANSEPT.

The collection of machines, tools, manufactures, and models of the various trades and callings of the natives, afford a series of illustrations of the condition of that extraordinary country, which cannot be passed over in a few words. Among the manufactures are specimens of purely native work, and of imitations or copies from European models. From an examination of the latter, it is quite plain that the native Indians are as capable of learning improvements in mechanical arts as Europeans; while both in jewellery and in weaving there are specimens which the best European mechanics would have great difficulty in equalling. But when we turn to the agricultural implements and tools used by mechanics, at first sight it seems extraordinary that no advance should have been made for centuries. The Hindoos of the present day seem to have had handed down to them an unbroken legacy of the agricultural and manufacturing arts of the ancient Egyptians. A comparison of the models in the East Indian collection with the drawings of the same kind of implements in use among the Egyptians, affords a number of very curious coincidences. But, without tracing back the history of these agricultural tools to such very remote periods, we find, by Abul Fazl's chronicle of the reign of the Mogul Emperor Akbar, that, 300 years ago, rice, wheat, sugar, indigo, hemp, sugar-cane, and cotton were cultivated with at least as much skill as at the present day; as high a rent was paid for land; and the numerous regulations on the subject of irrigation, and the allowances to cultivators under losses, and the estimates of revenue raised given by Abul Fazl, show that a great part of central India was under regular cultivation.

Why this people have made so little progress, why the great bulk of them are in the same condition, moral, social, and intellectual, that they were in 300 years ago, is a question too large to be discussed here; but we may venture to point out certain obvious reasons. The first is to be found in the narrowness of their wants. Look at the army of little figures, modelled from life, representing various trades and callings, chiefly in Bengal, which are exhibited in the north bay of the Indian collection, and observe how little these people need, how few are their incentives to exertion. Putting out of the question domestic servants, like the butler and groom, whose clothes are part of their master's state, it will be seen that the native rural population need scarcely any clothes. The gardener, the shepherd, the village waterman, the carpenter, the blacksmith, the ploughman, the waggoner, and a number of others of the same rank, wear nothing except a cap or turban (the Hindoos have adopted the turban from their Mahommedan conquerors), and a piece of cloth round their loins, which is occasionally used rather as an ornament than as a covering, thrown like a Highlander's plaid over one shoulder. Oil—to obtain which, linseed, sesamum, and palma Christi are largely cultivated—is liberally applied to their naked skins, in the place of those coats, breeches, waistcoats, shirts, and stockings, which so largely absorb the funds, and employ the population, of the inhabitants of colder climates.

What would the Great Exhibition be, in the two great displays of machinery and textile manufactures, if we dressed like the Indian population?

The Zemindars and great Indian gentlemen hold the same feelings with respect to garments as their subjects and tenants. Clothes, with them, are ornaments, not necessaries. After appearing in public blazing in jewellery, in shawls of countless price, and gold-embroidered silks, on an elephant or a prancing Arab, as represented in the model of an Indian fair, an Indian Prince, Sir Thomas Munro tells us, will pull off everything, and sit semi-nude in a calico wrapper, just in the same manner that we Europeans relax in slippers and dressing-gown. Magnificent embroidered shirts and shawls, like those hung up in the Indian tent, are often heirlooms in a native gentleman's family.

Then, again, the system of vegetable food, cooked in the simplest manner, promotes an economy which is very much opposed to the commerce and competition on which improvement rests. But the chief cause of the stagnation of mechanical arts in the interior of India (leaving out the question of religious influences) is to be found in the extraordinary state of isolation in which the rural population live.

There are no made roads in the interior of India; where the natural roads are sufficiently good carts drawn by one, two, up to twelve bullocks, cows, or buffaloes are employed; and excellently well constructed for the purpose are these carts or drays for ascending or descending precipitous hills, with the small weak cattle of the country, as may be seen in the models in the southern bay. But it is only for short distances, or in the neighbourhood of great towns, where roads have been made, that carts can be used at all. The chief mode of conveying produce and merchandise in India is on bullocks' backs. In the north bay, a set of models of loaded pack bullocks will be found. In the rainy season, when for an uncertain number of months the rain pours down in a deluge, travelling with merchandise or produce becomes all but impossible; dry water-courses grow into dangerous torrents, and villages cannot depend on supplies from their neighbours. The evils of this geographical isolation are to a certain extent alleviated by a system which discourages intercourse between village and village.

The rural population of India is not spread over the country in detached dwellings, but lives collected in small villages or towns, for protection against robbers and wild beasts, and are each in themselves miniature commonwealths. They are like islands, with very little external commerce and no internal competition. The mechanical arts and several other callings are placed in the hands of parties who are public officials. The blacksmith, the carpenter, the potter, the ropemaker, the shoemaker, as well as the water-carrier, the barber, the butcher, the washerman, the goldsmith, the poet, and the astrologer, receive each a piece of land rent-free, and a stipend in grain or money from each villager, in return for which they are bound to perform the duties of their respective vocations, to make ploughs, build houses, dig wells, shave heads, tell tales, and cast horoscopes for the community. No system could have been devised better calculated to render mechanical arts stationary, and each little population is perfectly independent of foreigners. Competition is unknown—trades are hereditary—improvements of machinery never displace hand labour. The land is the property of the supreme Government, and every head of a family has a piece of it. Almost all laws are defrayed by a tax, which is, in effect, the rent of land. In fact, the condition which certain social reformers desire to carry out in Europe is realised, and has been realised for centuries, among the Indian villages.

Bad roads, rivers, jungles, marshes, tigers, and robbers, effectually fill up the place of custom-houses and protective duties. Agricultural improvements are useless, where surplus produce would be valueless, because it would never pay to carry it to market.

Under these circumstances, the quarter of wheat is worth from 7s. to 10s.; famines are periodical, and improvements are unknown in the interior, while on the coast ships are built, furniture is manufactured, and English goods of many kinds are executed with very great skill, of which examples have been sent.

Among the agricultural implements, we must note that the Indian plough is not ill adapted for its intended purpose. The shape is nearly the same as that of the Roman plough, and less rude than that employed by our Saxon ancestors, which was attached to the tails of their bullocks.*

The Indian plough is chiefly used for stirring up and running a furrow through moist ground, preparatory to sowing rice. It does not answer to dry up the land by turning a furrow. The mould-board of the English plough has been used in some tropical countries and abandoned. Dry land for other crops is broken up with coarse hoes, of which full-sized specimens will be found under the table on which the agricultural models are displayed. These hoes, except that they are shorter in the handle, are of the same shape as those still in use in the West Indian islands, where the plough has not been introduced. It is also the implement of the modern Egyptian peasantry.

The ploughs in the southern bay consist of a taper piece of wood, shod with a sort of spear-head of iron, which forms the share, the sole being of wood, without either mould-board or coulter. Into the wood a handle is fixed, one or two buffaloes are harnessed, and the ploughman, naked all but a bit of cloth round his loins, holding the handle in one hand, and the reins in the other, will get over more ground than could be accomplished with an English plough, quite effectually enough for his purpose. Into the furrows the rice is dropped, and covered by one of the harrows, of which several models and one full-sized implement are shown, made with iron, and wooden teeth. These harrows are much more finished works than those often used in the bush of Australia, where wheat is harrowed in with a bough of a tree, or by running a flock of sheep over the ground.

The Hindoos generally get two crops of rice off the same ground—the first for food, the second for straw; and there is reason to believe that successive crops of this grain, which is the staple of the native population, except in the north-western province, where they live on wheat cakes, has been grown on the same fields for a thousand years. Rice-fields must either lie on the banks of rivers, flowing at a level where the soil can be fully saturated and at a proper time flooded, or artificial irrigation must be resorted to.

There are a number of hydraulic machines exhibited of the kind used for irrigation, on which so much tropical cultivation depends. It is one of the arts we have yet to learn and apply to our semi-tropical colonies. In one instance, in the north bay, six bullocks are to be seen employed in hauling a leather bucket out of a well in the same manner that we sometimes see a brewer's horse haul an empty barrel out of a cellar. It is impossible to imagine a more wasteful employment of power. In the south bay are several endless-chain buckets worked by bullocks moving a gin or horizontal wheel round. In another instance the bucket is raised by the lever principle.

We would suggest that this set of models might afford the means of a very useful and interesting lecture on the application of simple machinery to irrigation. To intending colonists, such lessons would have great value. Our agricultural schools and colleges, which are preparing many colonists, should take up the question. The resources of the very promising colony of Natal cannot be developed without machinery for irrigation, as the principal rivers run between deep steep banks.

Five or six models of hoes drawn by bullocks are shown: these are used in the cane-fields exhibited. It is plain that hundreds of years before Jethro Tull wrote on the sovereign merits of horse-hoeing, part of his system was in practice in Central India.

In all these implements iron is used where it can be got; and no doubt, if we succeed in bestowing railroads on the Indian peninsula, a rapid improvement in all the mechanical implements will follow the cheap conveyance to new markets which railroads will create.

The implements variously known as "scarifiers" and "extirpators," and "cultivators," which first began to attract notice in this country about forty years ago, have long been known to the Indian farmer, and are constructed very efficiently for working in light land. They consist of a set of teeth shod with iron, arranged in a heavy bar, and drawn by a bullock.

The sickles with which the grain is reaped are shown, with a model of the floor on which it is trodden out; and on the wall of the South Bay hangs a rope muzzle for "muzzling the ox that treads out the corn." This plan of treading out grain is not confined to the East; it is practised in Spain, in South America, and occasionally, when labour is very scarce, in Australia. The corn is winnowed by throwing it up against the wind. The next operation (that is to say, grinding) has been illustrated. Two women are squatted down opposite each other, having a pair of millstones between them, of which the upper one fits into a hollow in the lower one: a handle is fixed eccentrically in the upper stone in such a manner that one of the two women is always pulling towards her. This implement is as old as the time of Job.

The last operation of Indian agricultural economy to which we will refer is the manufacture of sugar, which may be seen near the level on the north bay. Two grooved rollers of wood, placed face to face, are turned by two men with handspikes, while two or three sugar-canes are thrust between them: the small percentage of juice extracted by this imperfect force falls into a pan below, and is thence conveyed to open earthenware pans, which are shown boiling close at hand. And yet India sends us a good deal of sugar.

After a very cursory examination of this picture of the rural life of the Indian population, presented in this very curious set of models and figures, it is impossible to doubt, that, with the increased means of communication which roads and railroads would open, the interior of central India is capable of affording a largely-increased exportation of cotton, sugar, rice, linseed, hemp, and other staples peculiar to the soil and climate; and that the result of increased intercourse would be to greatly improve the social and intellectual condition of the native population, and to render them better customers for the manufactures, which we can produce so good and so cheap.

At present we shall not say anything respecting the set of looms exhibited for weaving cloth, shawls, and carpets (the last is on a working scale), but be content with observing that since, by the powers of our mechanical inventions, we are able to import cotton from India, manufacture it, and import at such a price as to undersell by 75 per cent. the half-naked rice-eating producer of the finest muslins, it is as much our duty as our interest to assist in stimulating the growth of cotton and other agricultural produce of India.

At a convenient opportunity we shall continue our notices of a department of the Exhibition to which large additions have lately been made.

* The act of the Irish Parliament, forbidding, under penalty of fine and imprisonment, "a barbarous custome of ploughing, harrowing, drawing, and working with horses, mares, geldings, garrans, and colts, by the taile, whereby the breede of horses is much impaired in this kingdom," was not passed until the reign of Charles II., in 1634.

ARTICLES FROM THE INDIAN ARCHIPELAGO.

THE contributions forwarded from the islands of Java, Borneo, Sumatra, Celebes, Singa, Malacca, and others in the Indian Sea, although possessing some degree of interest for the naturalist, the agriculturist, and the manufacturer, do not form quite so attractive a collection as those from the Indian continent. A portion of these articles, we perceive, have been forwarded by the Sarawak authorities, and the remainder by the local committee of Singapore.

From Borneo the collection of natural productions is large, including, as it does, a considerable variety of woods, ornamental and useful; grains, minerals, utensils, agricultural implements, and arms and accoutrements The greater part of this portion is from the north-west coast of the island.

The agricultural and industrial implements from Singapore, Sumatra, and Malacca, are interesting from their extreme simplicity. The plough, for single or double yoke, although not quite so primitive as that in use in Ceylon, is still of ancient date. The harrow, the scarifier, and large hoe, all appear to be much as when designed by the first inventors, and bear full testimony to the abundance of labour, and the light loamy character of the soil in those sunny regions. Far more taste and ingenuity would appear to have been exercised upon the *siri*, or betel-box, and the betel-nut cracker, than upon their household and field implements. The little silver cracker which serves to bruise, and silver or gilt box which contains, the betel-nuts used by the inhabitants of these islands for mastication, are really elegant articles, and have, doubtless, received many modifications in their make; but the remark we find attached to one of these, to the effect, that, as yet, they have not been imitated, and shipped to the East, by any of our British manufacturers, is a mistake, as regards several parts of India. Betel-boxes and crackers have been for years past articles of manufacture at Birmingham, just as have the bangles and bracelets, all of which are freely exported to India and Ceylon. The carts employed in Java and Singapore bear a close resemblance to the gharree of continental India, and the bandie of Ceylon, especially the smaller description for two bullocks. To a European these vehicles appear unserviceable from their heaviness and clumsy build; but, looking to the wretched condition of most Indian roads, they are, in reality, the only description of cart which could be employed to advantage for bullocks. In many parts of India, especially throughout the cotton districts of Tinnevelli, there are no roads whatever, and the cart-driver directs his cumbrous but substantial carriage, as best he may, over the sandy rocky plain, between stumps of trees and masses of stone.

The hand-looms, the cotton-presses, the oil-mills, the sugar-grinders, are all of one simple make, as primitive in their form as they are possible to be; and all alike bear testimony to the cheapness of human labour in those countries. In the cotton-presses and sugar-mills of India we find no multiplying power, no complication of wheels; the labour is performed by means of one simple prime mover, worked by direct power.

Although the silk sarongs and salendongs embroidered with gold have a rich and picturesque appearance beside the more simple cotton fabrics, they can hardly compete with the costly fabrics of the Deccan, Oude, Delhi, and Guzerat. By the side of the Java sarongs are similar goods from Jerpore, Cutch, and Boowa. Nearly all these cotton manufactures are of very low quality, and the dyes heavy or sickly in hue. The style of some of the Cutch goods is curious, and they have, perhaps, a rather showy appearance, but they lack quality. The towelling, &c., from Beerbhoom, though not bad, hardly equals the texture and make of the Patna diapers and towels, which are really of excellent make and pattern.

Among the vegetable productions, raw and prepared, exported from the Eastern Archipelago, not the least important are the coffees, spices, and teas of Java. The cultivation of cinnamon was introduced into this island about twenty years ago, a number of young plants and "chalias" having been taken thither from Ceylon, where, at that time, the high price of the spice made it a very profitable occupation. About 5000 acres of land have been planted with cinnamon, and the prepared spice has for some years past formed an important item in the shipments from Java. The quality, however, is far below that of the Ceylon cinnamon, as may be seen by a comparison of the samples exhibited from each country. It is chiefly shipped to Holland, where it finds its way into some of the Continental markets. The samples of coffee from the Soorabaya and Passeruang districts of Java are of fair average quality; but do not appear to much advantage by the side of the Madras coffees, the produce of the estates lately formed on the Sherwarry Hills, at an altitude of 2000 feet above the sea. This article is one of large amount to the Dutch Government, and, as well as sugar, is mostly cultivated by forced labour, or brought in to the Government stores for sale at a fixed low rate.

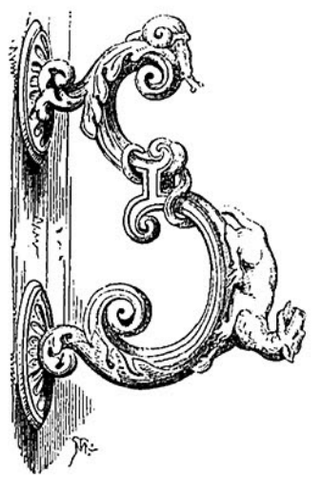
The teas exhibited from Java as the produce of the Government plantations, are chiefly pekoe and congo, but do not seem to be of very particularly fine quality, though said to be manipulated by Chinese workmen: they appear to be inferior in make and aroma to the Assam teas, which are shown to some advantage by their side.

If we cannot say much in praise of the coffee, tea, and cinnamon of Java, we must at any rate admire the spices from the Moluccas, Penang, &c., as being of first-rate quality. The samples of nutmegs, mace, pepper, cloves, &c., are perfect of their kind, and the visitor will be much pleased with the beautiful appearance of the ripe nutmeg enclosed within its network of rich red mace, preserved as it grows upon the tree. A more lovely sight can scarcely be imagined than that of a nutmeg or a clove tree in full bearing, loaded with its rich clusters of yellow and red or brown fruit, which offers a fine contrast to the deep emerald green of the tropical foliage, lit up as it is by the noon-day sun, and waving to and fro in the cool sea breeze. We regret that specimens of fruits and seeds, similarly preserved in their original state, have not been sent here from other countries. The coffee berry, the cocoa bean, the cocoa-nut in flower and fruit, and many others, are all beautiful objects, and might readily have been preserved.

Some of the cordage and ropes made from new varieties of fibrous substances, struck us as being apparently of fair quality. We may instance the cords from the wild aloe, the plaintain, the pine-apple, the

Hibiscus cannibinus, and some other materials peculiar to the Archipelago, such as ejou, gogoo, dunchu, hemp, &c. A good deal of attention has of late years been given to some of these substances by the Madras and Ceylon authorities, and we have seen in India some beautiful fibres produced from the pine-apple, the wild aloe, and the *Hibiscus*. The former and latter of these grow most readily in any soil, and we shall not be surprised to learn that in time they form the basis of some extensive manufactures.

The medicinal oils and spirits forwarded from this part of India, as well as from other Asiatic regions, scarcely admit of comment from any true professional men, and require to be tested experimentally before their reputed value can be properly estimated. The woods are numerous, and some of them of rich and close grain; but without some further particulars than are to be gathered from the Catalogue, we cannot venture an opinion on them.



2.—KNOCKER.—BY FEETHAM, CLIFFORD-STREET.

The gutta percha manufactures are eclipsed by those made in this country by Mackintosh and others. The minerals, ores, &c. will, however, repay a careful inspection by any who are curious in such matters.

To obtain a view of the models of vessels and boats of the Archipelago we must cross the great nave, and, on the north side, in the East Indian section, we shall find specimens of the prahus, sampans, and padewah-kans of Sumatra, Singapore, and Mindanao. The Samm pirate prahu of the first class is an imposing-looking craft of about 120 tons, manned by 80 or 100 men, and armed with six long swivel carronades, and a heavy stern piece. These are truly formidable vessels when met in any numbers, as they usually are; and to any but steamers or men-of-war are most unwelcome visitors. Until of late years they infested the Eastern seas in vast numbers, cutting up the native trade, and frequently capturing European merchantmen. The active services of her Majesty's war-steamers, and those of the East India Company, have, however, pretty well scoured those waters; and it will not be long before their calling will be obsolete, and their very existence a tale of bygone days. It was not long since that so many as a thousand of these marauding craft were following piracy on the open seas; and by their swiftness, and their suitability to the dangerous navigation of the many eastern islands, eluding the utmost vigilance of our men-of-war. It was not until steam-vessels were brought against them, that any successful attempts were made at extirpating them.

4.—SILVER GROUP OF SIR ROGER DE COVERLEY AND THE GYPSIES.—BY JOSEPH ANGELL.

WEAPONS OF WARFARE.

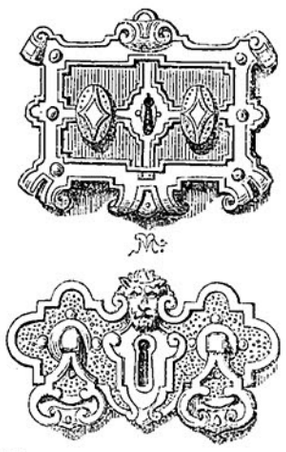
INTERSPERSED among the products of Peace and Industry, lying side by side with the instruments of agriculture, commerce, and luxury—a strange companionship that might well suggest the lion lying down with the lamb, in the millenimum of '51—are to be seen specimens of the countless varieties of implements of death and destruction which man employs against his fellows.

Without going into the question of whether war is really a necessary evil in the present state of human nature and political society, we propose to introduce to notice some of the principal objects in this department of the Exhibition, as well as to give a slight glance at the weapons of war in bygone times, when death was not dealt out on such scientific principles as at present.

We read, a few days back, a paragraph, extracted from a Transatlantic journal, which spoke of a newly-invented pistol, which had been sent as a donation to the Anti-duelling Society, and which, it was said, if generally adopted, would effectually compass the avowed objects of that association. This pistol was so constructed, that, however pointed, it would inevitably kill the person firing and his second. This wondrous machine certainly seems to promise well for the end proposed; and taking the hint from this pistol, we may (strange though it seem) congratulate the lovers of peace upon the thoroughly exterminating powers of several of the articles now to be seen within the glittering walls of the Crystal Palace.

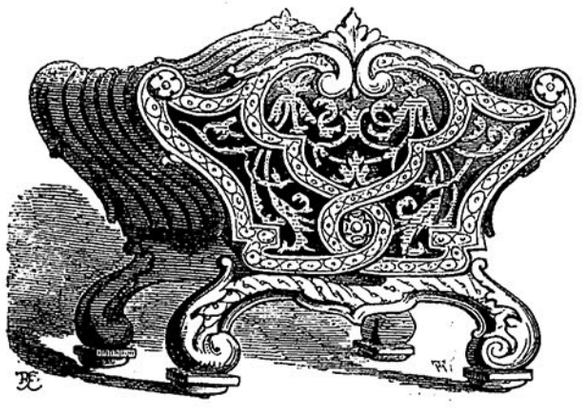
It may not be uninteresting, in the first place, to turn to the past proficiency of the world in the manufacture of warlike weapons, which is brought forcibly beforeus by some specimens of the primitive weapons still used by savage nations. Perhaps one of the most obviously simple of these is a New Zealand war club, which is a piece of stone about a foot in length, merely cut into shape. From the western coast of Africa we have bows and arrows, spears, and other rude weapons. Most of these, however, are ornamented by carving, some of it being both elaborate and beautiful.

In the savage state these and such as these are still the weapons used in war—sharp stones, clubs, the pointed horns of different animals affixed to a pole in the form of a spear; the bow cut from the trees of the forest, strung with a thong of some wild animal's skin; arrows formed of reeds, and headed with sharp pointed stones; the sling for throwing stones; the knife, formed either of flint or of the teeth of the shark tied on to a stick (of which we have a curious specimen from New Zealand).



3.—SCUTCHEON AND HANDLE FOR DRAWER.—BY FEETHAM, CLIFFORD-STRET.

Turning to the more civilised instruments of destruction in the Crystal Palace, and, without taking any regular course, dotting down a few notes of the most striking objects in the order in which chance may bring them under our view, we find ourselves in the department allotted to Prussia and the small States. Here we have improved rifles, with a very excellent contrivance for loading at the breech, from Dusseldorf; and another rifle, from Magdeburg, with two barrels bored in a converging direction, so as to direct the balls to the same mark. Close by is a rifle from Bavaria, beautifully ornamented in the old German style, with a series of engravings along the barrel of the history of arms—commencing with Nimrod, with his bow and arrow; showing the invention of gunpowder; the flint-lock, &c.; and finishing with the percussion cap. Here, too, we have every variety of swords, fine-tempered weapons, light fencing-swords, heavy elegant cutlasses for cavalry and infantry service, superbly inlaid dress-swords, and specimens of the waved blade, formerly fashionable in the Prussian service. One sword in this compartment, a beautiful bit of workmanship, bears the following inscription in German:—"To the hero of Kemorn, the General George Klapka, as a token of their respect and friendship, from A. and E. Hoeller, Solingen." There are also splendid specimens of gun-barrels of common wire, of flower damask, of Turkish damask, and various others which amply repay inspection. We must, however, hurry on, not omitting to notice as we pass a beautiful steel cannon, which seems to guard the frontier of the North Germany compartment, being stationed at the entrance to it from the centre aisle. France also sends a very large assortment of arms, swords, guns, and bayonets; and from Spain we see some elegant blades, the inscription on which, "Fabrica de Toledo," suggests the remembrances of ancient chivalry. One of these is a wonderful instance of fine temper. The scabbard, which is very chaste in design, represents, with the hilt of the sword, a serpent, completely coiled round in a circle. The blade, when inserted into the scabbard, takes this curve, but the instant it is drawn it becomes perfectly straight. A brass howitzer, of 9-inch calibre, from the Royal cannon foundry, Seville, called the "Formidable," and, from its



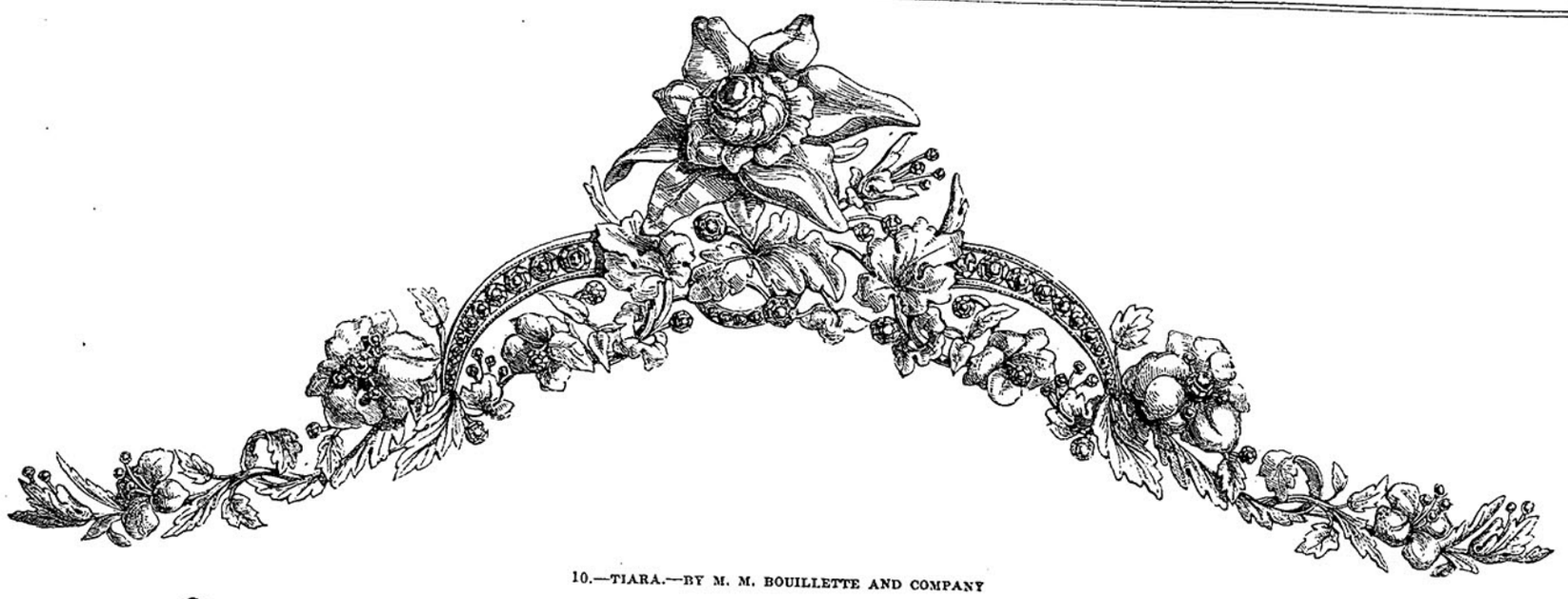
5. CANTERBURY.—BY JENNENS AND BETTRIDGE.

6.—SILVER INKSTAND.—BY MARTIN AND CO., CHELTENHAM.

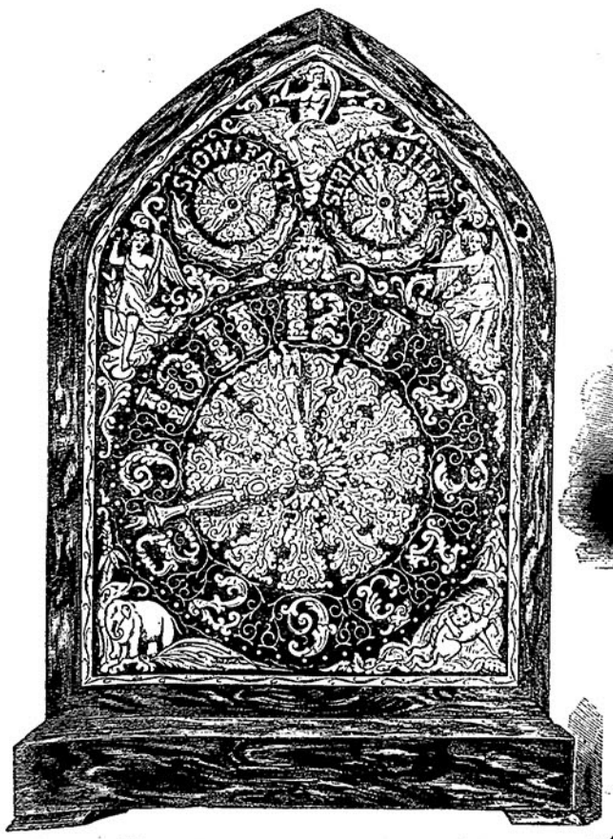
7.—CANDELABRUM.

9.—ARM-CHAIR—PAPIER MACHE.—BY JENNENS AND BETTRIDGE.

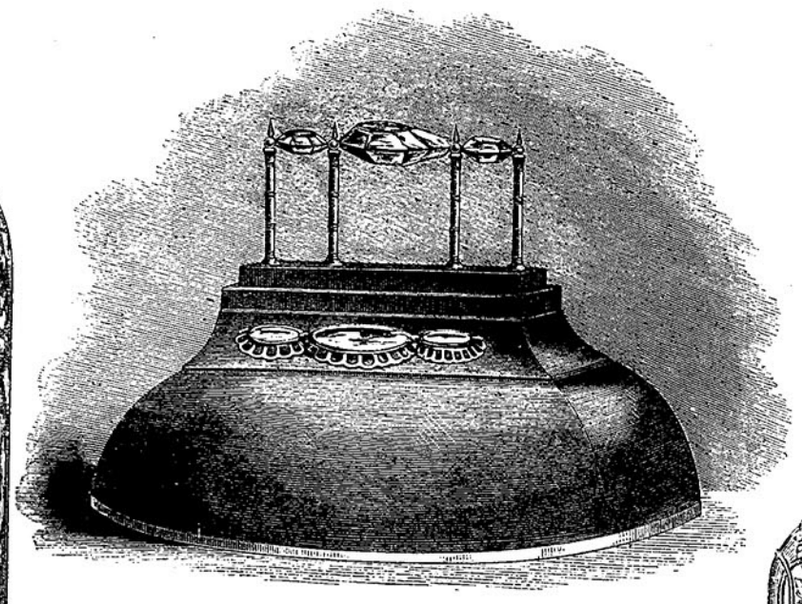
8.—CANDELABRUM.



10.—TIARA.—BY M. M. BOUILLETTE AND COMPANY



11.—CLOCK.—BY MESSRS. R. AND J. MOORE.



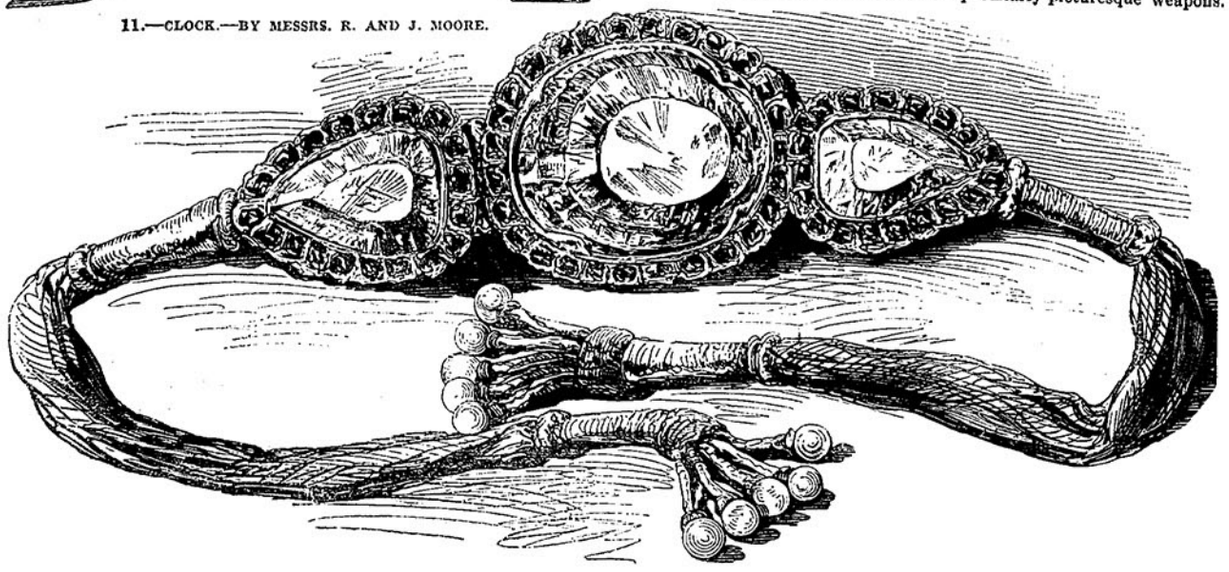
12.—KOH-I-NOOR, AS ARRANGED IN THE GREAT EXHIBITION.—EXHIBITED BY THE QUEEN.

size, amply deserving its name, is not likely to be passed unnoticed. Belgium sends us some rather heavy metal from the Royal foundry, Liege, as well as a copious collection of small arms.

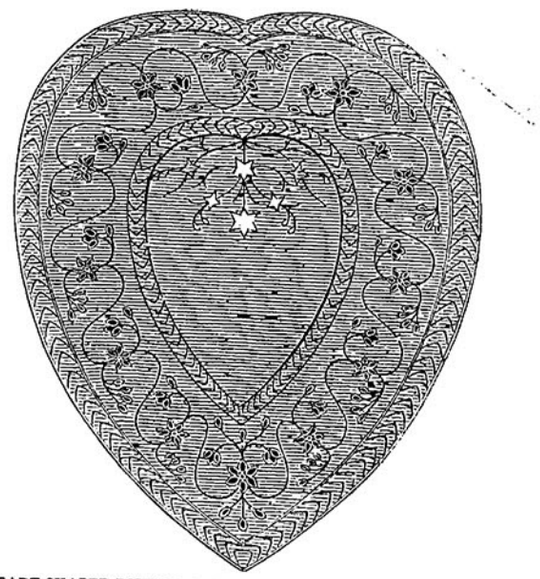
In the United States department we noticed some rifles and pistols on the "revolver" principle. They have but one barrel, which is stationary, the breech alone, which contains the load, revolves, each portion of it coming in its turn to the barrel.

The Turks contribute some of their peculiarly picturesque weapons.

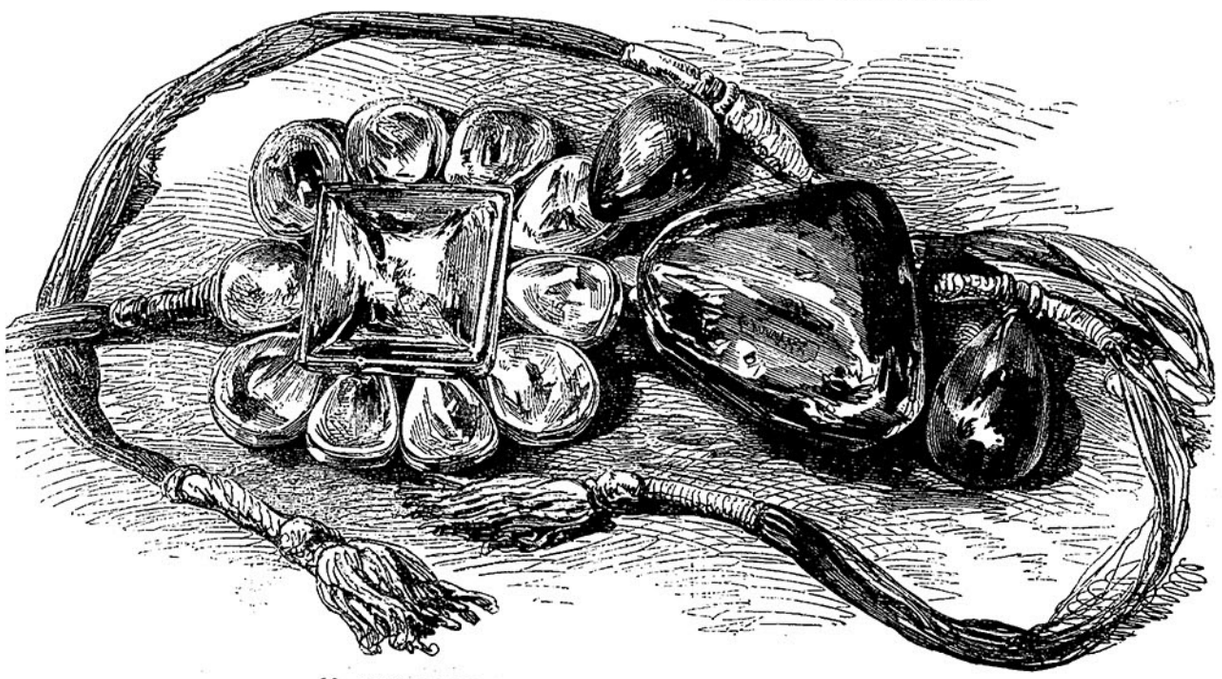
13.—SILVER CLARET JUG.



14.—KOH-I-NOOR (MOUNTAIN OF LIGHT) IN ITS ORIGINAL SETTING.—BY HER MAJESTY.



16.—HEART-SHAPED DISH OF JASPER, JEWELLED.—BY THE EAST INDIA COMPANY.



16.—DURRA-I-NOOR; OR, SEA OF LIGHT.—BY THE EAST INDIA COMPANY

Guns and pistols, heavy and massive, with inlaid gold and silver, and with stocks of all strange shapes; sabres, knives, and daggers.

Canada, in addition to the articles appertaining to the native Indians, sends some very beautiful rifles, &c.

A very interesting collection of weapons is exhibited by the East India Company. Bows and arrows, beautifully made and elaborately ornamented; matchlocks, inlaid with the greatest skill, from Lahore, Jugdispore, Rajpootana, and other parts of their vast territories. A fine specimen of chain armour, and a head cover from Rajpootana. A very curious gun, to fire from the back of a camel, from Lahore; battle-axes, clubs, &c., and cannon of different sizes, from small models up to some very murderous-looking field-pieces. In addition to these are one or two objects which call for especial mention. A sword with a fine Damascus blade is quite a curiosity, of nice exactness in fitting. It is a perfect sword to all appearance, and can be used and tested as such in all the usual ways; but by touching a spring in the handle, it splits, and forms two perfect swords with two perfect edges, so closely joining that when together the single edge seems of almost razor sharpness. A shield, manufactured in the arsenal of his Highness the Rajah of Kola, in the states of Rajpootana, is also very ingenious. It has four gold bosses, in each of which is concealed a pistol. A sword with a pistol in the handle, which can be fired while the sword is held in the usual manner, is also to be found in this compartment.

A good illustration of savage warfare may be seen in the model of a New Zealand war pah, contributed by Lieutenant Balneaves, H.M. 58th Regiment, which shows the method of fortification, by means of pallisading, &c., adopted by the natives. The watch-towers at all the salient angles, made in the form of hideous figures, and painted with "the ochre of wrath," are characteristic.

Of our native contributions, as might be expected, Birmingham takes

the lead, and exhibits a very large collection of small arms and swords. A very instructive collection is exhibited by Mr. H. Hart, of that town, showing the complete manufacture of gun-barrels, from the old horse-shoe stubs of the earliest periods to the latest improvements.

While upon the subject, we must not omit to notice the invention which, though not exactly relating to weapons of war (being adapted chiefly to sporting guns), still will hardly be thought out of place while treating of guns. It is "Erskine's newly-invented waterproof and safety gun." The object of this invention is to provide in one action against the percussion-cap being prevented from exploding by exposure to the rain, and also to prevent the accidental discharge of the gun by the hammer falling. This is effected in a very simple manner. A metal shield containing a ring of Indian-rubber encloses the cap completely, so as to keep out all damp, and at the same time prevent the hammer striking the cap, should it fall accidentally. The instant the gun is brought to the shoulder for the purpose of firing, a spring in the butt of the gun, by the mere pressure against the shoulder, immediately releases the shield, which flies up and leaves the cap free for the action of the hammer. There are other improvements in connexion with this, but the above is the chief invention; and from its eminent simplicity and great utility, it will, we have no doubt, be generally adopted.

The swords also exhibited, from Birmingham, are very beautiful specimens of cutlery, and fully sustain the reputation this town has so long enjoyed for that particular manufacture. It has often been disputed when the making of swords commenced in England, and very little is known for certain on the subject. A MS. psalter, written about the time of Stephen, and preserved in the Library of Trinity College, Cambridge, gives a representation of two men grinding a sword-blade at a large wheel. Although there is little doubt that swords were manufactured in England at a very early period, the blades made in Spain and Italy, and more especially those brought from the East, were considered very superior to the English swords. The Toledo blades, which are still celebrated for their exquisite temper, were eagerly sought after in the time of the Romans. During the eighteenth century, English blades had fallen into such disrepute, that in 1783 the sword-sellers petitioned the Lords of the Treasury for permission to import sword-blades from Germany. This naturally drew public attention to the humiliating inferiority of English workmanship in this particular branch, and led to important results, in fact, to the present excellence of the Birmingham manufacture. In December, 1783, Mr. Gill, of Birmingham, memorialised the Lords of the Treasury, stating that he could make sword-blades equal to those of Germany, and requesting a fair comparison. This public trial, however, was, by some circumstance or other, continually postponed, until, in 1786, the East India Company, requiring 10,000 horsemen's swords, they divided their favours among the English and German makers. Mr. Gill determined not to lose the opportunity for the comparison he courted, spared no endeavour to obtain it, and he was successful. Every sword sent in was submitted to a severe test, by means of a machine recommended by the celebrated Matthew Boulton of Soho, by which the blades were forced into a curve which reduced the length from 36 inches to 29½. The result was, that of Mr. Gill's swords 2650 were approved, and 4 rejected; of the German manufacturers, 1400 were received and 28 rejected, giving a superiority to Mr. Gill in the ratio of about 13 to 1. As a proof, however, that the complaints against the English makers were not without foundation, We find that of the other English swords (besides Mr. Gill's), there were 2700 approved, and 1084 rejected, being about two bad ones to every five good ones! However, the state of the manufacture in Birmingham at the present day, as witnessed in their show at the Crystal Palace, may well serve to wipe off the disgrace of this former shortcoming.

We should mention, before we close this article, that the manufacture of swords is also shown in all its stages.

Two noble guns, too, from the Low Moor Iron-Works, one a 52-pounder, and the other for 10-inch shells, should not be omitted; they are mounted on improved carriages and slides.

CHEMICAL AND PHARMACEUTICAL PRODUCTS.

THE benefits conferred on society by Chemistry since the opening of the 19th century have been enormous, causing millions to circulate annually, where thousands sufficed previously, besides reducing the cost to the consumer of various useful articles, giving at the same time employment both directly and indirectly to large numbers of workmen. A glance at a few of the most prominent improvements, and also at the extensive scale on which some chemical manufactures are conducted, will be of service at the present time.

Foremost among them is the improvement of Howard by refining sugar in vacuo, which is also now adopted in making extracts from vegetable substances of easy decomposition at elevated temperature. The extraction of sugar from the cane is likely to be greatly increased by either the use or some modification of the recently introduced lead process. No process has produced such direct and indirect influence on so many of our staple manufactures as the introduction of that of Le Blanc for decomposing salt with sulphuric acid, and its subsequent conversion into soda by treatment on a reverberatory furnace with lime and small coal. Previous to this invention all our soda was derived from burned sea-weed (kelp), the whole produce of which, at the period of the introduction of Le Blanc's mode, would not be equal to more than 1500 tons of carbonate of soda, costing in the aggregate £300,000, or £200 per ton. The same can now be bought for £12 per ton, and 100,000 tons are annually made, besides a large amount of sulphate of soda (the salt cake of commerce), which is manufactured and consumed in glass-making. The diminished cost of soap, owing to the reduced price of carbonate of soda, enables our woollen manufacturers to scour their cloths at a much lower rate than they otherwise could. Although partial evil arose by throwing the kelp-makers out of employment, it is clear that four times the amount of wealth has been created; notwithstanding the charge of the material to the consumer is reduced to one-sixteenth of its previous cost. It is easy, therefore, to see what a powerful influence this must have on the comforts of the various classes of the community. When the King of Sicily was so imprudent as to levy a high tax on the export of sulphur, a thousand heads were at work to convert our mineral stores of sulphur to an economical use, and with such success, that probably not less than 400 tons of pyrites (the mundics of Cornwall) are weekly used in this manufacture, the produce of the British dominions: 600,000 tons of coal and 180,000 tons of salt are also consumed.

Indirectly connected with the above is the manufacture of chloride of lime, which is formed from the decomposition of the muriatic acid of the soda process by manganese, the chlorine being absorbed by lime in chambers constructed for the purpose. Were it not for this economical mode of preparing chlorine, calicoes could not be bleached as cheaply as they are, for the entire surface of the United Kingdom would not form a bleaching-ground sufficiently extensive to bleach by the old mode the annual manufacture of calicoes in England.

Another substance of importance in calico printing, viz. alum, has been reduced by chemical ingenuity from £100 to £10 per ton. On other substances, if the price has not been reduced, the skill of chemists has prevented an advance in price, equally thus benefiting the community. Such an instance is given below in the case of garranium. The introduction of chromate of potash as a dye is most important. At the commencement of the present century, native chromate of lead, imported from Siberia, was sold at 20s. per lb.; it can now be obtained at any respectable oilman's for 2s. per lb.

Owing to some remissness on the part of the great soda manufacturers, their processes are not shown at the Exhibition. It is difficult to render instructive the simple exhibition of a bottle, whose contents are merely some white powder. In the following notice of various cases it will be seen that we have endeavoured to convey, in the most important instances, a brief account of their manufacture, together with a history of their introduction to economical use.

In agriculture, chemistry has pointed out the proper course for manuring the soil. Though only partially put into operation, the manufacture of artificial manures is, however, on the increase; such, for instance, as the preparation of the phosphates by sulphuric acid from bones and coprolites. We hope, in a short time, that potash will be set free, in like manner, from our granites and felspars.

In coal gas we have a remarkable instance of the great benefits derived by society from the researches of chemistry, by converting the tar into naphtha for the solution of india-rubber and gum resins; the gas water into ammonia, ammoniacal alum, and salts of ammonia, or sal ammoniac, &c., to be used as a manure for fertilising the soil, or in arts and manufactures. Bisulphuret of carbon, which, up to the last ten years, was merely made in small quantities for philosophic inquiry, is now manufactured extensively for its powerful solvent qualities; to which substance also is due the merit of displaying the varied bright and shaded portions of the electro-plate, brilliant examples of which are to be found amidst the splendid collection seen at the Exhibition. Electro-metallurgy and electric telegraphs are the offspring of chemical science. After witnessing their prodigious infantile displays, what may we anticipate when the young giants have arrived at maturity? The demand for lubricants, required by our coarser description of carriages and machinery—such as the waggons and engines used in collieries and mines—has been supplied by a substance called grease, made from an oil procured by the distillation of resin forwarded from the backwoods of America, and obtained from trees felled by the hardy settler—the pioneer of a resistlessly advancing civilisation. This oil, when formed into soap by combination with soda, composes a very useful and cheap lubricant, greatly diminishing the otherwise increasing cost and waste of the more expensive articles, tallow, olive oil, &c.

In dyeing, the science of chemistry has been of such service, that a volume would be required to detail the all but innumerable advantages which our manufacturers have derived from this source. Over and above those detailed under the articles soda and chlorine, we may summarily state, that all colours vast parts or mordaunts, that either wholly or in part are composed of the following articles, have been greatly reduced in price since the opening of the present century; viz. alum, actate and nitrate of lead, chromates, sulphuric, nitric, and muriatic acid, chlorine, the prussiates, salts of tin, copper, ammonia, acetic or pyroligneous acid, &c. To the production by the chemist of iodine and bromine we are indebted for the proper preparation of plates for the Daguerréotype, &c.; and, lastly, it is not probable that the Glass Palace would have had an existence but for the reduced cost of the material, principally owing to the assistance of chemical science, not to dwell upon its agency in multiplying, cheapening, and facilitating the production of the gorgeous array of splendid and useful articles which the visitor to the Exhibition will meet arrayed around him on every side. The details of the manufacture, and other remarkable circumstances connected with the principal substances exhibited, will be detailed in what follows.

In Case 1, Messrs. Pontifex and Wood, Shoe-lane, Fleet-street, and who have chemical works at Blackwall, exhibit some specimens of the metallic products of which they are such extensive manufacturers; viz. copper, spelter (crude zinc), lead, and tin. There are also some very fine specimens of crystallised tartaric acid—the largest, we believe, ever shown. This substance, which is now so extensively used, is obtained from an impure bitartrate of potash, familiarly known as cream of tartar: the commercial form in which it is imported is that known as red and white argols, these argols being the lees or sediment of wine deposited in the course of fermentation. The thick crust on the bottles and casks that have been filled with red wine is principally composed of argols. The mode of manufacturing tartaric acid from argols consists in first bleaching it through animal charcoal; after which it is mixed with pulverised chalk and boiled, during which an insoluble tartrate of lime and soluble neutral tartrate of potash is formed: the latter is then converted into tartrate of lime by means of chloride of calcium. The insoluble tartrate of lime is then well washed, and treated with sulphuric acid, thus forming sulphate of lime and gypsum: the liquid tartaric acid is subsequently crystallised. Messrs. Pontifex, who are also extensive paint manufacturers, exhibit some interesting samples of colours and pigments, which will well repay observation. The mode by which they procure their sulphate of copper is worth relating. Messrs. Pontifex and Wood are, perhaps, the most extensive coppersmiths in the world. In the course of working heated copper, a large amount of scales are formed; these are treated with sulphuric acid, which combines with the exterior coating of oxide of copper, forming sulphate of copper, commonly known as bluestone. The interior metallic copper scales remain, and are remelted.

Case 5, C. Butter, Holborn-bars, has a very fine assortment of the rarer chemical preparations.

No. 6, J. Wilson, Glasgow. This gentleman is, perhaps, the largest alum manufacturer in the world. The alum shale is procured from the coal-mines near Glasgow, which is a pyritous bituminous schist: by exposure to the atmosphere and moisture, a chemical action takes place, and heat is generated in the pyrites, which is a composition of 30 parts of sulphur and 28 parts of iron. As the decomposition proceeds sulphates of alumina and iron (common copperas, or green vitriol) are formed. The alum of commerce is not, however, a simple sulphate of alumina. That article is a compound of sulphate of alumina and potash or ammonia: the latter is now manufactured on a large scale, in consequence of the cheapness and facility with which it can be procured from the ammoniacal liquor of our gas-works; but for many purposes the double salt of alumina and potash is absolutely required. In crystallising the alum large crops of crystals of sulphate of iron (copperas) are obtained. Mr. Wilson has in several cases shown the process of decomposition of the alum shale in various stages, highly interesting to the chemist and geologist, the filamentous character developed by the decomposition being remarkably like serpentine. In the same case is a fine and rare specimen of naphthalin, which is obtained by subjecting coal tar to distillation. It passes over after the naphtha or coal oil: it is not used in any manufacture. In No. 7, the next case, P. Spence, of Pendleton alum-works, near Manchester, exhibits the manufacture of alum from solid pyrites, obtained from the coal-mines: by this mode it is requisite to burn clay to afford the alumina. Mr. Spence also exhibits some zinc cement or hydraulic mortar, the precise properties of which we were not able to ascertain. In the same case are also shown, by Messrs. Tennant, Clow, and Co., salts of copper, zinc, and tin, potash, soda, &c., used in calico dying and printing. This is a branch house of the great concern of Tennant and Co., of St. Rollox, Glasgow. The latter not having sent any specimens to the Exhibition, we shall here notice the same through their Manchester representatives. Although not in the Catalogue, there may be seen in the same case glass jars, containing samples of garracine or subitan, probably unknown to our readers. Madders are well known, and have long been used as the source of Turkey red dyes. Up to a recent period, the remainder of the madder, after infusion, was thrown away. It has, however, been found that a large portion of the colouring matter of madder remained in this refuse combined with lime. It ingeniously occurred to a Frenchman, we believe, that, by applying sulphuric acid this hitherto fixed colouring substance would be set free; the result proved the correctness of the supposition, and what was thrown away previously is now of equal value as a dye with the madder as originally imported. The salts of copper manufactured by Messrs. Tennant, Clow, and Co. are procured in a different manner from those obtained by Messrs. Pontifex and Wood. In the case under notice, old copper sheeting, &c., is subjected to the action of fire in a reverberatory furnace, which converts the metallic copper into an oxide, on which sulphuric acid will act: after such treatment the liquor is crystalised in the ordinary mode in cisterns or vats lined with lead. Messrs. Tennant and Co. manufacture about eight tons per week in this mode. The salts of soda shewn are the ordinary carbonates of soda, respecting which we shall have more to state at a future period. The salts of potash are principally interesting for some splendid specimens of chlorate of potash. The zinc salt is the sulphate, and the tin compound consists of chloride and stannates, We feel much surprised at the circumstance that the chloride of lime is not shewn by this house, as they are the largest manufacturers in the world. Adjoining the specimens shown by Messrs. Tennant, Clow, and Co., is a model apparatus exhibited by their intelligent manager, Mr. James Young, intended to display his patented method for obtaining the stannate of soda. Stannate of soda is not novel to the calico printers, it having been manufactured for some time by other processes. Previously, however, to the improvement of Mr. Young, the stannates were formed from metallic tin, which was oxidised by different modes for the purpose. The ingenuity of this invention consists in subjecting tin ore and soda, or potash, to a high heat, by which means the requisite combination is formed. The stannates are used in dyeing steam colours. Mr. Young has also shown a bottle of mineral oil from a coal-mine in Derbyshire, which is found to be the finest lubricant for machinery yet discovered. Adjoining this is a sample of paraffine, formed by subjecting coal to a low heat, an inspection of which is well worth the attention of those engaged in the conversion of peat to economical purposes, for in all the commercial statements hitherto made on this subject, paraffine is set down as an important item; we are, however, informed by Mr. Young that it can be produced from coal in any quantity. On inquiring in other quarters, we are given to understand, also, that paraffine is not, nor likely to be, employed extensively for any economic purpose.

Case 9. Kurtz and Schmersahl, Manchester.—Several new colouring matters for printing and dyeing cotton, linen, silk, and wool, with specimens. Their new dies are principally formed from various woods, extracted by means of alkalies; also some ultramarine, of various qualities. We feel somewhat surprised at their being so few specimens of ultramarine exhibited; nor have we seen any good specimens forwarded from Germany, which is the more surprising as Nuremburg is so famed for its production. Ultramarine, formerly made from lapis lazuli, previous to the introduction of the factitious mode of manufacture, used to be so high priced as four and five guineas per ounce; an equal is now produced for two shillings and sixpence per pound: the beautiful blue papers used by druggists, perfumers, and bookbinders are coloured with this material.

Case 10. Howard and Kent, Stratford, Essex, the celebrated preparers of fine chemicals.—Bottles containing quinine and chinconine (the active principles of Peruvian bark), accompanied by an assortment of raw materials, and various salts and compounds; specimens of the *Nectandria radicei*, or greenheart bark, and its alkaloid liberine, a very bitter substance. To detail the various other preparations and chemicals would be, in fact, to give a list of the articles in a druggist's shop.

Case 13. W. Moberley, Mulgrave Alum-Works, Whitby.—Here are to be seen raw alum shale, calcined shale, alum meal, and finished alum; sulphate of magnesia, rough and refined, and the ammonia phosphate of magnesia as a manure.

22. F. C. Hills, Deptford.—Nitrate of potash, made by a patent process, consisting of the double decomposition of muriate of potash and nitrate of soda, which is thus converted into nitrate of potash, saltpetre, and muriate of soda (common salt).

31. Cheshire, J., Jun., Northwich.—Specimens of best table and other salt: this appears to be the representative of the immense annual wealth derived from our salt-mines.

39. H. Hopwood, Richmond, Surrey.—Fine piece of mannate of sugar of milk.

42. W. Lindsey and Co., George-street, Glasgow.—Specimens of Prussian blue and yellow and red prussiate of potash. The prussiates of potash are formed by fusing horns, hoofs, &c., of animals in a thick iron pot along with potash; by which means a compound is formed, called ferro-cyanite, or prussiate of potash, which, when mixed with a free salt of iron, forms the well-known pigment, Prussian blue: it is extensively used in calico printing. In various cases are exhibited splendid crystalline specimens, of different fanciful forms.

48. W. Watt, Glasgow.—A sample of sea-weed (*Fucus bulbosus*), with its chemical products; viz. kelp, sulphate of potash, chloride of potassium, carbonate of soda, iodine, and iodide of potassium. The manufacture of kelp was a most important art in the Western Highlands and Islands of Scotland, and along the coast of Connaught, in Ireland. Previous to the introduction of the manufacture of the alkaline soda, by the decomposition of common salt with sulphuric acid, as much as 25,000 tons were annually manufactured, worth from £8 to £10 per ton, containing on an average only five per cent. of carbonate of soda, for which it was purchased by the soap-boilers, the remainder of the substances being thrown away. At present, commercial carbonate of soda, containing 80 per cent., can be purchased for £10 per ton. The manufacture of kelp consequently languished for many years, until the the substance iodine was found so valuable. On an average, each ton of kelp contains four pounds of iodine: but to make a ton of kelp, 30 tons of dried sea-weed are required. The sea weed so collected is burned, and the ashes kept stirred in a fused state until it presents the appearance of the sample exhibited. By various means of great ingenuity, the iodine is extracted. The price of iodine has ranged from six shillings to forty shillings per pound: it is at present worth about fifteen shillings. It forms a beautiful blue with starch, and crimson with mercury. The fumes are of an exquisite violet hue.

52. Brarly. W. A. Douglas, Isle of Man.—Refined oil and pure oleine, for watches, clocks, chronometers, and other fine machinery. The value of such a lubricating substance is well known to those engaged in the construction of time-pieces.

59. M. H. Piceivth.—Some gum-arabic bleached by a patent process, and sample of ultramarine blue.

70. J. Fisher, Madely, near Shiffnal.—Bisulphuret and chloride of carbon. The former substance is now extensively employed as a solvent for india-rubber; for which purpose it is prepared on a large scale, especially in the vicinity of Birmingham and Wolverhampton, in which neighbourhood it is also much used for gilding and electro-plating. It dissolves phosphorus very freely, which solution is used to give a thin film of that substance to delicate articles intended to be coated with metals—being first dipped into the solution and then into a solution of silver or copper, by which a film of the metal is produced on the surface; upon this other metals can be precipitated by voltaic influence.

71. S. H. Godson, Tenbury, Worcestershire.—Native mineral waters, concentrated and tested to show their bromine constituents. Bromine is found in all mineral waters. In consequence of the increased demand for bromine, owing to its extended use in the preparation of Daguerréotype and other plates, for taking portraits, &c., its economical preparation has become of some importance.

86. W. Robertson, Banff, Scotland.—Cod-liver and skate-liver oil, extracted by steam heat, manufactured at the various fishing villages on the coast of the Moray Frith.

92. A. Tilloch, Waltham Abbey Powder-Mills.—Prepared materials for gunpowder. There has also been forwarded from the Waltham Abbey Mills a very tastefully got-up design, composed of a box lined with sublimed sulphur, enclosing the representation of a cave made of fused saltpetre, which latter encloses a small beehive of sublimed sulphur. At the back are the letters "V. A.;" over this is the Prince of Wales' feathers, and in the upper compartment "V. R.," and a crown of sublimed sulphur, surmounted by a wreath composed of saltpetre. The appearance of the whole is very pleasing.

94. J. H. Kent, Stanton, near Bury St. Edmunds.—Dried pharmaceutical indigenous plants in glass vessels, with extracts. The plants are admirably preserved.

105. C. M'Culloch, Covent-garden Market.—Dried English and American herbs and roots. These are well worth attention.

107A. T. Keating, St. Paul's Churchyard.—Jalap, saffron, kousso, or *Brayera anthelmintica*, from Abyssinia; matico, or *Piper angustifolium*, from Bolivia. These are rare drugs.

[illegible]138 and 141 inclusive principally contain pigments, and tools for their application, with varnishes, &c. Amongst the rarer materials is the white oxichloride of lead, as a substitute for white lead: there are also several specimens of *cudbear* prepared from orchil, a weed which is much used to give a bloom or finish to silks.

143—Jellarshall Lud—is a valuable collection for study, consisting of samples of indigo, carmine, orchil, cudbears, lac dyes, turmeric, and specimens of 36 kinds of European and native manufactures of lac dye in India.

145. W. Denteth and Co., Manchester.—Ornaments of crystals of bichromate of potash and nitrate of lead, with mineral colours, and used by calico printers and dyers, china and earthenwares manufacturers. The chromates of potash are made by calcining chromate of iron obtained from India, America, and the Shetland Isles: from these salts the fine yellow pigments are made, known as chromes. The process is a simple one; viz. the admixture, in combining proportions, of nitrate of lead and chromate of potash. Chrome salts are most extensively used in dyeing yellow, and chromic acid is used to dispel colours. A beautiful green—the green oxide of chromium—is prepared for pottery and other uses.

BOOKBINDING.

(SECOND NOTICE.)

IN one of the divisions at the extreme south of the space allotted to France will be found the contributions of the French bookbinders. We are sorry to say, that, at present, only two or three of the best class have set out their cases, though several other names of repute are included in the Exhibition Catalogue. M. Gruel first claims our attention for his two large volumes bound in morocco, inlaid with coloured leathers, forming very bold and good designs; and for a missal in velvet, richly ornamented with gilt metal and jewels: but commend us more to some smaller books of "Hours," one in carved ebony, one in velvet, covered with a tracery of ivory, another in bright velvet with a beautiful design in carved box-wood; and to two or three other volumes in russia and velvet slightly ornamented with metal hinges and clasps of exceedingly graceful ecclesiastical design, very different from the ill-formed and heavy Gothic patterns to be found on our English bibles. In the adjoining case M. Niedrée exhibits the perfection of workmanship in delicate gilding. There are two tiny volumes of this collection that may challenge the world for their superior. M. Niedrée seems to prefer spending his chief talent on the inside of his covers; and on one of these little volumes especially there is the most exquisite design, most ably executed. For honest bookbinding, without the factitious aid of metal-work carving or inlaying, M. Niedrée clearly, in our opinion, bears the palm; and a refined taste will, perhaps, be better pleased with this little show of volumes than with all the glories of their more magnificent-looking