THE INDUSTRIAL PROGRESS AND REQUIREMENTS OF NEW SOUTH WALES.

From the report of the Intercolonial Exhibition, held at Sydney, New South Wales, we extract the following information relative to the manufactures, requirements, and industrial progress of the colony. Prior to the discovery of gold in 1851, but few manufactures were established, and these few were confined to Sydney. Machinery was not then so generally used in every department of trade as now, and the greatest efforts at production were the manufacture of cooking stoves and other domestic articles, mill work and marine work. These, with the manufacture of soap and candles and the refining of sugar, formed the bulk of the native industries.

At the present time, although a steady progress has been made in the industrial arts, there is still room for enterprise: and the fact that imports of machinery and skilled labor from Great Britain and the United States are still large shows that the colony is as yet unable to develop completely its resources. There is a large demand for foundery and machine work for purposes of marine engineering, induced by the repairs which are constantly necessary for the steamers employed in the ocean postal service as well as in the coasting and intercolonial trade. The machinery and tools necessary for the various processes are all imported from England. Mechanical appliances on shore, flour mills, quartz mills, sugar mills, kerosene works, sheep washing apparatus, hydraulic wool presses, etc. etc., are all needed, and it has been found that they can be brought from England or America cheaper than they can be manufactured in the localities where required.

Among the minor articles of iron work, stoves occupy a a prominent place. Large numbers from America find a ready market, though, as regards durability and economy, they are believed to be inferior to those of local manufacture.

Two sewing machines have been produced containing improvements invented in the colony; but these were rather curiosities than indications of a young trade. The import of machinery for 1869 was valued at £68,589, exclusive of weighing and sewing machines; the import of iron and steel for the same year amounted to 17,520 tuns, exclusive of tanks, pipes, bridge work and old iron.

Galvanized iron, for various purposes, was introduced in 1863. The work of galvanizing for the whole colony is carried on in Sydney by a single manufactory.

Wood, particularly the softer kinds for indoor work, is obtained in large quantities from Europe and America. Most of the modern steam driven tools for wood working are also imported.

There is but one paper mill in the colony. A new material for paper is found in a sedge known as *cyprus vaginalis*, which grows in considerable abundance in the neighborhood of Sydney. It is said to be as suitable as the Spanish esparto grass. We notice that reference is made also to another useful vegetable termed the "colonial cabbage tree," which is employed as a substitute for straw in the manufacture of hats.

The list of new inventions made in the colony is rather small as compared with the number which would be produced by a population of equal size in the United States. The report, however, somewhat naively admits that the inventive genius of Australia has not yet developed like that of America, although the necessity for labor saving machines is as great in one country as in the other.

In minerals, New South Wales is particularly rich, new gold fields being constantly discovered. The yield to every man engaged in gold mining has been estimated to average about £72 4s. 6d. (nearly $350) per annum. The largest amount of this metal received at the mint during a single year was 575,538 oz. in 1862. In 1869 but 224,382 oz., valued at £866,746, were received, the decrease being attributed more to lack of enterprise than to the mines becoming exhausted. Diamonds have been found in the wash dirt taken by the gold miner. The number found up to the present time is, at a rough estimate, about 5,500, the largest stone having been one of 5¾ carats, and the smallest, one tenth of a grain. They are always accompanied by rubies, topazes, and other gems.

In view of the large amount of machinery imported, and the constant demand which must arise for new labor saving inventions, our conclusion, drawn from a perusal of the report before us, leads to the belief that a promising field is here presented for the inventor and the manufacturer. The resources of the colony are great and comparatively undeveloped, a fact to be accounted for by the greater part of the population entering largely into stock farming and gold mining, and depending upon England and America to furnish, ready made, the implements and machines which might easily be manufactured from abundant native material.

BUTTER.—The German *Agriculturist* says that a great portion of the fine flavor of fresh butter is destroyed by the usual mode of washing, and he recommends a thorough kneading for the removal of the buttermilk, and a subsequent pressing in a linen cloth. Butter thus prepared is preeminent for its sweetness of taste and flavor, qualities which are retained for a long time. To improve manufactured butter, we are advised by the same authority to work it thoroughly with fresh cold milk, and then to wash it in clear water; and it is said that even old and rancid butter may be rendered palatable by washing it in water to which a few drops of a solution of chloride of lime have been added.

THE total production of hops in the United States for the census year ending June 1, 1870, was 25,456,669 pounds.

SCIENTIFIC AND PRACTICAL INFORMATION.

TREE PLANTING.

The great consumption of lumber, which has so reduced the acreage of forest land in Maine, Michigan, and other States of the North and Northwest, and the consequent probable scarcity of timber at no very distant date has induced the Maine Legislature to pass an act to the effect that "any landholder who shall plant or set apart any cleared lands, for the growth and production of forest trees, within ten years after the passage of the act, and shall successfully grow and cultivate the same for three years, the trees being not less in number than 2,000 on each acre and well distributed over the same, then, on application of the owner or occupant of such lands to the assessors of the town in which the same is situate, . . . the same shall be exempt from taxation for twenty years thereafter."

HONEY DEW.

M. Boussingault has recently published in the *Comptes Rendus* a communication on the chemistry of honey dew, a saccharine matter found on the leaves of many species of trees. He noticed in 1869 the formation of considerable quantities of this substance, which formed a sort of varnish on the leaves in such quantities as to fall in viscid drops to the ground. He analyzed the substance, commencing by eliminating the albumen and mucilage by the use of the sub acetate of lead; and he thus obtained a residuary sirup with distinct sugar crystals in it. The saccharine matter disappeared after fermenting the sirup with yeast, leaving dextrin, which has been proved by Berthelot to exist largely in the manna of Sinai and other parts of the East. M. Boussingault points out that the secretion cannot be the result of meteorological or atmospheric influences, and that the fact of one tree in a group being thus affected indicates the probability that it is a production of insect life. The manna of Sinai was attributed by Ehrenberg to a species of *coccus*, called by him *tamarix mannifera.*

COPPER IN COCOA AND CHOCOLATE.

Careful chemical analyses show that cocoa and chocolate always contain a small percentage of copper. The husks of the cocoa have been found to contain as high as 0·025 per cent of copper, while the kernel of the bean only contained 0·004. Samples of chocolate contained 0·0125 of copper. Substances containing copper, even in the smallest proportions, cannot be very desirable for the diet of invalids, for which the above articles are quite extensively used.

A CHEAP CONTINUOUS BATTERY.

The need for an inexpensive battery, created by the extended use of electric bells in hotels and other large establishments, has induced Herr L. Kohlfurst to describe the following invention: The negative plate is formed of a truncated hollow cone of copper, closed at the top. The inside of the cone being protected with varnish, it is filled with sulphate of copper in crystals and inverted in a glass vessel deeper than itself. The cone is notched around the rim, and the apex is pierced with a small hole. For the positive element, a thick cake of zinc is used (suspended over the face of the cone); it has a hole in the center, through which is passed a covered wire connecting with the copper. The glass cylinder is then filled with water, and the sulphate of copper begins to melt, the rapidity of the deliquescence varying with the access of the water through the notches in the cone; and so long as this latter maintains a uniform rate, the current will be uniform in power. If common or Epsom salt be used in the water, the current will be intensified. The inventor states that 1½ pounds of the copper salt will continue the battery in operation for a year.

Beet Sugar.

There must now be over a thousand beet sugar factories in Europe.

While both the manufacture of beet sugar and the growing of the beets are seen to profitable, it would seem, however, that the peculiar advantage of the industry to a country is its influence in diffusing a skillful practice of farming and of promoting agriculture in general. To show the appreciation in which it is held in France, Mr. Howard states that, at an agricultural meeting held a few years ago at Valenciennes, a triumphal arch was erected, on which appeared the following inscription: "The growth of wheat in this district, before the production of beet root sugar, was only 976,000 bushels; the number of oxen was 700. Since the introduction of the sugar manufacture, the growth of wheat has been 1,168,000 bushels, and the number of oxen, 11,500."

ARTIFICIAL WATER LIME.—It has been long known to chemists that water lime consists substantially of quick lime, burnt clay, and a small portion of the oxides of iron and magnesia, but scarcely any effort has been made to utilize this knowledge. All yellow or red clays contain iron, and most specimens of lime in use contain the required magnesia. If burnt clay or brick dust in the fine powder be mixed with an equal weight of fresh slacked lime, and twice this weight of clean, sharp sand be added, a compound will be formed which will harden under water equal to the best hydraulic cement.

CARBOLIC ACID AS A DISINFECTANT.—C. Homburgh, of Berlin, proposes to use carbolic acid as a disinfectant, by saturating sheets of Bristol board, or any thick spongy paper, with a solution of carbolic acid in water. The paper, in pieces of any convenient size, may be hung up in the room to be disinfected, or may be placed in drawers or wardrobes, where it is desired to protect clothing from moths or other insects. This suggests a convenient method of using this excellent disinfectant and insect destroyer.

THE RECEPTION OF THE MINING ENGINEERS AT THE STEVENS INSTITUTE.

A very pleasant reception was recently tendered to the American Institute of Mining Engineers by the Trustees and Faculty of the Stevens Institute of Technology, at Hoboken, N. J. The visitors were received by the members of the Faculty, and by them escorted through the different departments of the college building. The various instruments of the physical laboratory were carefully explained both by professors and students, and their uses shown by actual experiment. A Hipp's chronoscope of exceedingly accurate construction is one of the latest additions to this already large collection; its delicacy is such that it measures time to the one thousandth of a second, and enables the laws of failing bodies to be demonstrated at a height of only eighteen inches. A large induction coil of over 100 miles in length, producing a spark of twenty-one inches, is another noticeable feature.

The workshop, containing a steam engine of twenty-five horse power, with link motion and Huntoon regulator, planers, lathes, milling machine, and other mechanical apparatus, was next inspected, after which visits were made to the chemical laboratory, lecture room, and department of mechanical engineering. The latter contains a large collection of models of every description, together with a number of engineering relics in the shape of letters from Robert Fulton, Commodore Decatur, and other eminent men of times gone by. In the lecture room of the department of physics, a number of interesting experiments in magnetism were exhibited on a screen by means of the vertical lantern, and in the president's lecture room, numerous beautiful illustrations, showing by the aid of polarized light how strains are distributed in bodies under pressure, were shown in the same graphic manner.

After inspecting the departments in the upper portion of the building, the visitors met in the large lecture hall, where they remained for some time interested spectators of Professor Mayer's experiments with the huge electro-magnet belonging to the institution. A short address of welcome from President Morton followed, after which the party adjourned to the elegant mansion of Mrs. E. A. Stevens at Castle Point, where an excellent lunch was provided. Among those present were Peter Cooper, Ex-Governor Ward of New Jersey, Generals Gillmore and Barnard, President Morton, Professors Silliman, Draper, Vander Weyde, Mayer, Thurston, and Leeds, and Drs. Torrey and Raymond, besides many other eminent scientific gentlemen.

The admirable arrangement of the various departments of the Institute and its superior facilities for instruction called forth the warmest commendations from every one. The college is yet in its infancy, being barely a year old, but if the same spirit of enterprise, by which the management of its affairs has been characterized in the past, be continued in the future, we can safely predict for it a foremost position among the scientific schools of the country.

Parchment Paper.

It has long been known that certain acids exercised a wonderful effect upon woody fiber. Early in the year 1857, Mr. Gaines described before the Royal Institution a method practiced by him of making artificial parchment. His process consisted in the mixing together of two parts of sulphuric acid and one of water, and, after it had become cool, immersing in it, for about one second, blotting or unsized paper, immediately washing it in several changes of water, after which it was allowed to dry spontaneously. This treatment conferred upon it new properties. No longer weak, it was now tough and strong, semi-transparent, and resembled parchment, being capable of use for the same purpose.

This treatment causes the lignin to undergo no chemical change. The weight is the same as before, and there is no indication of the presence of the acid. The paper no longer permits water to pass through it; it is, in fact, waterproof. Paper, however, is not the only form in which the lignin may be submitted to the action of the acid, for textile fabrics, such as calico, are affected in a similar manner and rendered tough in an extraordinary degree. Fishing nets, and fabrics of that kind, may also have their strength increased many degrees by the same cause.

Another method is to dip white unsized blotting paper for half a minute in strong sulphuric acid, sp. gr. 1·842, and afterwards in water containing a little ammonia. Another method is to plunge unsized paper for a few seconds into sulphuric acid diluted with a half to a quarter of its bulk of water, the solution being allowed to cool down to the temperature of the air before being used, and afterwards washing in water containing ammonia. The latter is said to be the method employed by Messrs. De la Rue and Co., who prepare parchment paper largely for various purposes.

We may here state that as blotting paper alone must be used for this process of conversion, common paper may in turn be converted into blotting paper by immersing it for a few seconds in hydrochloric acid. Some recommend for this purpose a mixture of hydrochloric acid and water; but, in the experiments that we have tried in this direction, we have immersed the paper in a bath of the ordinary undiluted acid, removing it, after a few seconds, to a vessel of water in which it was treated to several changes.—*British Journal of Photography.*

LAKE SUPERIOR TIN.—At a recent meeting of the New York Lyceum of Natural History, Professor Henry Wurtz exhibited some beautifully crystallized specimens of heavy tin stone or cassiterite, discovered a few months since on the most northerly shore of Lake Superior, near Neepigon Bay. The deposits are said to be extensive and valuable.