(Translated from the Official Reports upon the Exposition.)

THE VEGETABLE FIBERS AT THE UNIVERSAL EXPOSITION VIENNA.

BY PROFESSOR DR. JULIUS WIESNER.

Number II.

In the English colonial exhibit. furthermore, there were displayed two East Indian fibers, up to the present time quite unknown to European commerce. We refer to the *yercum* fiber and the *jetee* fiber, which, so far as tenacity is concerned, throw all the vegetable textile fibers with which we are acquainted into the shade. The first is the fibrous bark of *calatropis gigantea*, and the latter that of *Marsdenia tenacissima*. A comparative estimate of strength is afforded by the following example: A jute cord of given size will support, say 140 lbs., while a cord of *jetee* fiber of the same diameter will support a weight of 248 lbs., the ratio of strength being very nearly as one to two. For the manufacture of ropes and cordage needing great tenacity, the above named fibers are therefore deserving of high recommendation.

The fiber *sunn*, finally, is worthy of some attention on the part of our hemp and coarse flax manufacturers. This is a very strong fibrous material obtained for many years in India from the *crotalaria juncea*, extensively cultivated in India, Java, and Borneo. Since its first introduction to European manufacturers, which occurred at the Paris Exposition in 1867, the *sunn* has been to some extent employed in England. The appearance of this material is not very prepossessing, the commercial product resembling tow more than anything else. This is, however, to be attributed to the method of its preparation. By the employment of a more complete mode of separation, the fiber could be much improved in fineness and homogeneity. Strength and great ability to withstand alternations of wet and dry are its chief characteristics.

In one qualification—namely, its want of hygroscopic properties—the *sunn* surpasses every known fiber; and whereas the last named raw materials are able to absorb from 16 to 22 per cent of moisture from the air (and some are known that take up as much as 40 to 50 per cent by weight of moisture when exposed to a damp atmosphere), the *sunn*, under ordinary circumstances, contains only 5 to 6 per cent of water, and can absorb, from an atmosphere charged with moisture, only 10 to 11 per cent. As these raw products are sold by weight, and no account is taken of the weight of moisture absorbed therein, this property of the *sunn* is worthy of consideration.

The colonial exhibits were likewise rich in their display of manilla hemp and cocoanut fiber; to these, however, it is unnecessary to do more than simply refer, inasmuch as our manufacturers are already sufficiently familiar with their qualities. The material called *pite*, the fiber of certain *agaves*, has been introduced in Vienna within the past few years under the name of *fibris*, and so largely employed, in the manufacture of brushes and the like, that it may be of interest to name the countries that make exhibits of the raw material. These are: Martinique (*agave Mexicana*) Guadeloupe (*a. Ame icana* and *a. faltida*), Guiana, Brazil, Venezuela (the exhibit of this country, called *cocuisa* fiber is closely allied to the *pite*; it is the product of *Fourcroya gigantea*), India, Mauritius, Réunion, Algeria and others. Central and South America, however, are the chief producers of this fiber. The *piassava* of Brazil, with which we are already familiar, was likewise well represented at the Exposition.

Before passing over to the consideration of the vegetable silk and wool, and of the vegetable horsehair displayed at this exhibition, it will be well to enumerate some of those vegetable textile materials, thus far entirely unknown to commerce, but which are largely utilized in their native countries, and may in time play an important *rolé* in our textile industries. In this enumeration belongs the bark fiber of numerous species of hibiscus (*h. cannabinus, tiliaceus, sabdariffa*, etc., found and utilized chiefly in India); the genuine *aloes* and *ananas* fibers; and the *vacoa* or *vacoua*, consisting of the leaf fibers of the pandanus, and produced chiefly in Réunion, Mauritius, and the French colonies.

The so-called vegetable silk, the seed tufts of numerous *asclepiadaceæ* and *apocynaceæ*, were happily not so strongly represented as at the recent Paris Exposition. At that time the French colonies presented such a quantity and variety of these products that one was tempted to regard them as wares of much importance.

In spite, however, of the beauty and eminent luster of these silks of the vegetable world, their technical value is very small. The fiber is both weak and brittle, and therefore poorly adapted for woven fabrics. And unfortunately these are the varieties that might be placed in the market in unlimited quantities: the seed tufts, for example, of *asclepias gigantea* and *curassavica*, that are least valuable for industrial purposes. In this connection, the seed tufts of *Beaumontea* (East Indies) appear not to have received the attention that the material deserves, inasmuch as its comparatively greater strength would appear to render it more adaptable for utilization than those previously named.

The vegetable silk appears to be far better adapted for the manufacture of artificial flowers and similar artistic work—in which direction it has been considerably employed—than for textile uses. It has likewise been suggested as a substitute for down in filling bolsters, pillows, and the like; but for this use, the brittleness of the fiber will be likely to prove a serious objection. The samples of this product at the Exposition were almost exclusively from the French colonies; and in the published catalogue of their exhibits its merits were placed in the most flattering light.

More modest in its pretentions was the vegetable wool It was nowhere exhibited save as an article shown in practice to be an excellent substitute for mattrass filling. This fine material consists of the seed tufts of several trees of the family *bombaceæ*. Of these raw materials we noticed the following varieties on exhibition: *paina limpa*, from Brazil (seed tufts of *bombax heptaphyllum* and *b. ceiba*); the *kabok*, from the Dutch colonies (obtained from *eriodendron anfratuosum*); the *Edrédon végétale*, from the West Indian French colonies, called also *patte de lièvre* (from *Ochronia lagopus*); Venezuela exhibited, under the name of *laine végétale*, the wool of both *O. lagapus* and *B. cumanensis*. The wool of *O. lagapus* is brown, while that of the several bombax species is white, or only slightly colored. All of the vegetable wools above enumerated consist of a delicate, not brittle fiber, which forms when in bulk a soft, elastic mass, well adapted for the purpose to which it is applied (see above).

In Holland, the *kapok* is very largely introduced; and in Germany, likewise, the wooly product of *eriodendron anfraetuosum*, under the name of vegetable down, has recently been introduced. The statement, occasionally met with in books, that these vegetable wools, either alone or in mixture with cotton, could be satisfactorily made into woven fabrics—upon which point, I have on a former occasion expressed my doubts on account of the weakness of the fibers—appears to be quite erroneous; at all events, no such goods were at the Exposition, nor were any of the exhibitors aware that this result had ever been accomplished; in addition to which, all the exhibits were entered as bedding materials.

In addition to the above, a number of coarse vegetable fibers, generally characterized as vegetable horsehair (*crin végétale*), are deserving of notice. The desirability of securing a cheap substitute for the expensive horsehair, which should possess similar properties, and resemble it closely enough to be mistaken for it on cursory observation, has long been felt in several important branches of industry. In Austria and Germany, the leaves of *carex brizoides*, brought into the market from Upper Austria and certain quarters of the Grand Duchy of Baden, is used in enormous quantities as a substitute for horsehair. The material in question is but slightly elastic and not very durable, and affords only an indifferently good substitute.

The *crin d'Afrique* (called also *crin Åvering*) of the French, the split leaves of the dwarf palm (*chamærops humilis*), is a far superior article for this purpose, and it is now being imported into Europe from Algeria in large quantities. The same material has lately been brought into the Vienna market for bedding, and colored black (the natural color of the product is green); it is known by the name of Afrik, and is employed for a great variety of uses. The introduction of the *crin d'afrique* has unquestionably been of great utility to numerous industries. Despite its excellent qualities, however, the leaf of the dwarf palm is by no means the best substitute for horsehair with which we are acquainted. Of far greater value for this purpose, inasmuch as they possess the properties of horsehair to a much higher degree, are to be mentioned the three fibers *ejoo*, *pitool*, and *caragate*. The *ejoo* fiber, called also *gomuti* fiber, is the product of a very common sugar palm of India (*arenga saccharifera*), and occurs in the form of a black horsehair-like mass, growing on the stems where the leaves have been attached. This fiber remains behind when the leaves fall off. The black fiber *kitool* has a similar origin. It is derived from the palm species, *caryota mitis* (Réunion) and *c. urens* (India, Ceylon). The best substitute for horsehair, however, is without question the fiber *caragate*, called also tree hair. This fiber is a portion of the aerial roots of a parasitic plant (*bromelincea*) infesting certain trees, and occurring in Tropical America. It attains a length of 8 or 9 inches, and in appearance, elasticity and tenacity approaches so closely to the genuine horsehair that an ordinary observer will scarcely be able to distinguish the difference. By burning one of the fibers, however, its vegetable character may be readily established by the absence of the characteristic odor of burning horn, which accompanies the combustion of horsehair and similar animal matters. The following very essential difference between the two materials, which is observable upon close inspection, will serve to distinguish them apart quite readily: The horsehair consists of one single fiber throughout its length, while the *caragate* consists of a succession of branched fibers. At the present time Guiana is perhaps the most important producer of this valuable material, and the only objectionable feature incident to its introduction is found in the fact that dealers employing it cannot resist the temptation of representing their goods as being made of the genuine article.

The coarse fibers were represented at the Exposition by the *esparto* fiber, and another obtained from Spanish cane, by mechanical disintegration. Ropes, cords, etc., made from the last named material, were amongst the novelties of the Exposition, having been exhibited for the first time. Ropes, and the like of the *esparto* formed one of the features of the Paris Exposition of 1867, and their reappearance at Vienna demands no special notice in this report.

Permanence of Vital Power.

In clearing away the refuse from the ancient silver mines of Laurium, in Greece, a large number of seeds of a papaveracea of the *glaucium* genus were found, which must have been buried there for at least fifteen hundred years. Exposed to the beneficent influence of the sun's rays, they rapidly took root, flourished, budded, and blossomed, their yellow corollas being beautiful in the extreme. This interesting flower, unknown to modern science, is particularly and frequently described in the writings of Pliny and Dioscorides, and is thus again resuscitated, after having disappeared from the surface of the globe for more than fifteen centuries.

Nature of Nerve Force.

In one of Jean Paul Richter's novels—if our memory serves us rightly, in that one called *Der Comet*—the hero is said to have had, when a boy, a peculiar light visible around his head when in a darkened room, something like the aureole or nimbus with which the old painters used to represent divine or saintly personages. Richter, who in such matters faithfully followed the extraordinary in Nature, gives, as his wont is, various references to medical works wherein such a phenomenon is mentioned. There is indeed no question of the correctness of such observations. But the explanation of the phenomena has been insufficient.

Dr. Brown-Séquard, in a recent lecture, quotes an analogous phenomenon. He remarks that there are animals which are phosphorescent, and which are so under an act of their wills, so far as we can judge, and under the influence of the nervous system; so that light also can be evolved as a transformation of nervous force. There are cases of consumption in which light has come from the lungs. The fact has been pointed out by Sir Henry Marsh and other physicians. The light appears not only at the head of the patient, but it may be radiated in the room. It has been considered that the light was only a peculiar effect of the mucus that came from the lungs of the patient. Dr. Brown-Séquard continues:—"It is not likely that this is the case, because mucus in greater quantity is evolved, and all sorts of mucus, from the chests of the people, every day, without any such phenomenon. I have read the history of each individual case of the kind, so far as I have been able to get it, and in every one of the cases, the patient, I find, was in a terrible state of nervousness."

If this were shown beyond a peradventure, our theories of nerve force would undergo material alterations, as it would at once come into the category of the *forms of motion*, and be seen to be a correlate of light, heat, etc. To this investigation seems tending, but no one can aver that it has been proven.—*Medical and Surgical Reporter.*

DECISIONS OF THE COURTS.

United States Circuit Court.--Eastern District of Pennsylvania.

PATENT LOCOMOTIVE TRUCK.—THE LOCOMOTIVE ENGINE SAFETY TRUCK COMPANY *vs.* THE PENNSYLVANIA RAILROAD COMPANY.

The patent in suit (patent of Alba F. Smith, February 11, 1862) was for the pilot truck of a locomotive engine, resting on a bolster, and connected with it by a king bolt, on which it oscillated; the bolster being suspended from the truck frame by links diverging outwardly, so that when the engine moved laterally in passing a curve it was raised on that side, and its weight tended to bring it back to its normal position.

This arrangement was found to have been previously in use upon railroad cars; but in applying it to the pilot truck of an engine, the operation and effect of it were held to be essentially different and useful, and the patent was sustained.

It appeared that a pilot truck had been previously patented in which the engine rested upon a bolted to a curved block, which moved on either side in a curved slot in the truck frame, so that the engine would oscillate around a point in rear of the truck, which was the center of the curves. Either the king bolt or the curved block might be made to rest on inclined planes, so that a lateral movement would raise the engine, and it would tend to settle back. Though these devices were regarded as the equivalents of those described in the plaintiff's patent, it was nevertheless held valid, because the previous patent made no provision for the oscillation of the engine on the king bolt.

Imperfect and crude descriptions of an invention imparted to others are no evidence of an intention to abandon it.

Neither is the use of an invention for the purposes of experiment, though made in public from necessity.

Neither does such use debar from a patent, although it takes place more than two years before the application.

In closing the case, Judge Strong says:

My conclusions, then, upon the whole case, are as follows:

1. The combination claimed by Alba F. Smith, and described in his specification, was a patentable invention.

2. The patent granted to him on the 11th day of February, 1862, is not void for want of novelty of the invention. The invention had not been anticipated.

3. There is no sufficient evidence that the patentee abandoned the invention.

4. The patent is not invalid because the invention was in public use, or on sale, with the allowance of the inventor, more than two years before his application for the patent.

The only question that remains is whether the defendants have been guilty of infringement. In regard to this there is no controversy. An infringement is very clearly proved. I shall, therefore, order the injunction prayed for in the bill, and decree an account, etc.

Let a decree be prepared accordingly.

[*Charles M. Keller* and *Charles F. Blake*, for complainants.
J. H. B. Latrobe and *Chapman Biddle*, for respondents.]

United States Circuit Court.---Southern District of Ohio.

[October Term, A. D. 1873.—Rehearing October Term, A. D. 1874.]

PATENT BAKING OVEN.—HOSEA BALL *vs.* GEORGE K. WITHINGTON AND O. M. LANGDON.—SAME *vs.* JOHN BAILIE.

EMMONS AND SWING, *J. J.*:

OPINION OF THE COURT.

EMMONS, *J.*:

The bills charge infringement of letters patent granted to complainant September 23, 1856, for an "Improvement in Ovens," reissued October 12, 1869, and, a second time, June 14, 1870, and extended for seven years from September 23, 1870.

By agreement of counsel, both cases were argued together, and the decision to be delivered governs both.

The reissued patent, upon which the bills are founded, contains three claims, but the first, which is as follows, is the only one in controversy:

1. One or more swinging bread holders, suspended from the arms or end plates of a rotating reel, in combination with a furnace so arranged and connected that the products of combustion will pass into or through the chamber within which the bread holders move.

We prefer to rest this judgment solely upon the ground that the original patent did not warrant that part of the claim, in the reissue, which includes the direct application of heat to the bread chamber. We say the direct application of heat, because we thus construe the words "products of combustion."

The only significance which we can give to that part of the claim is that the rays of heat from the fire must be radiated directly into the baking chamber.

The reissued patent, as we construe it, claims a device which will accomplish this result. The infringement is said to depend upon the fact that the defendants' apparatus applies the "products of combustion" directly to the baking chamber, and that, as the reissue claims this feature, there is an infringement. That it does so is entirely clear; all the "products of combustion" which ascend at all move upward and around the swinging breadholders.

There is no proof, nor is there any suggestion from counsel, that there is any "product of combustion," heat excepted, which is efficacious in the baking of bread. Conceding—which we much doubt—that there are what maybe called two principles in a legal sense in the application of heat to the baking of bread, we can draw the line between them only as follows:

1. The one, that used by the defendants, and which we suppose complainant's reissued patent to claim, radiates the heat directly from the fire into the chamber, with no intervening wall or medium, the air excepted, between them. The other heats the baking chamber by heating its external walls, or by carrying heated currents of air into it, but excluding all the direct rays of heat from the fire. The former mode greatly economizes fuel. The fire is in close juxtaposition to the baking bread, which is rotated in the chamber above the directly ascending and, therefore, greatest possible amount of heat which can be economized from a given amount of combustion. This mode defendants' device employs to the full. Turning to that of the complainant it completely excludes the employment of the principle, if principle it be. Not a single direct ray, radiated from the furnace, can enter the chamber. Its bottom is solid, and completely shuts off the fire of the furnace. The flues by the side of the bread chamber are so far removed and so cut off from the fire of the furnace that nothing but heated currents of air can pass into the former, through the apertures in the side walls. There is not only not a word in the original patent calculated to hint at the leading idea or principle employed by the defendant, but the drawings and model suggest a mode of operation wholly different. They rely upon heated walls and heated current of air to bake the bread, and must have been contrived at a time when fuel was used, whose unconsumed gases and smoke were noxious, and which, therefore, had to be conveyed away without contact with the dough. So far from suggesting the defendants' device, or the unwarranted claim made in the reissue, had a baker been about to adopt the device of the defendants and believing that that of the complainant embodied the best application o