

ON THE ACCLIMATISATION OF ESPARTO GRASS
FOR THE MANUFACTURE OF PAPER, AND
THE ESTABLISHMENT OF A PAPER MILL IN
TASMANIA. BY J. BARNARD.

A casual inquiry from a friend led me to search the files of a periodical, *Public Opinion*, for some account of Esparto grass, extracted from *The Economist*; and I was fortunate enough to meet with the following information on the subject, published in January, 1866, and which I thought might not be unacceptable to the Members of the Royal Society.

The important position which the lately discovered article of petroleum has rapidly taken in commerce is very interesting in itself, as suggesting how quickly the discovery of any new principle of motion would exercise an important influence on the present state of our industry. Another discovery has lately been made, which, though of less importance than that of petroleum, is still so interesting in character, and so useful as regards an important article of manufacture, as to be deserving of attention from those desirous of witnessing the introduction into Tasmania of a new industry.

The discovery alluded to is the applicability of the *Atocha*, or, as it is called in Spain, "*Esparto*," to the manufacture of paper. Mr. Lloyd, of the Walthamstow Paper Mills, is stated to have had a great share in the merit of this discovery; and Mr. Mark, the British Consul at Malaga, has drawn up an interesting report on the subject, which has lately been made public in the commercial reports.

This grass is the produce of waste lands: it requires no expense in cultivation, and little in collecting. It is best propagated from the roots, and not from seed. It is perennial, and propagates of itself, and improves by a regular yearly gathering if plucked with sufficient care. Mr. Mark has devoted great care in his endeavours to ascertain the climate and soil which are favorable to the development of the plant; and it appears that the *Atocha* requires a decidedly hot and dry climate,—that it grows equally well in the plains and in the mountains to a moderate elevation,—and that as regards soil it flourishes both in calcareous and argillaceous soils, or when these soils are blended in the form of marl.

The greatest quantity is shipped from the provinces of Almeria and Murcia; but it is found, though in less abun-

dance, in all the southern provinces of Spain.* It is also said to be plentiful in some parts of the opposite coast of Africa, and shipments were made from Oran to England.

Prior to the discovery of its being available for the manufacture of paper, the Esparto has been used in Spain as fuel, in the manufacture of ropes for mining and rigging, and for making baskets and matting. But the discovery of the valuable properties of the grass has made a complete revolution in the districts where it grows. Fortunes have been realised by individuals who were the proprietors of the land which produce it. The price has more than doubled, and is now estimated by Mr. Mark at £4 2s. per English ton on board. The greater part of the exports have as yet been directed to England, where in the brief space of three or four years the article has become a requisite of the highest importance, 160,000 tons having been, as it is said, imported into England in that period; and Mr. Mark estimates the present rate of annual export at 50,000 tons.

Mr. Mark estimates that, even at its present enhanced price, the Spanish grass will take a place with cotton, hemp, and wool as one of the staple and essential bases of manufacturing industry: and if this anticipation should be realised, in addition to the valuable resource which it seems likely to prove to our paper manufacturers, it will form an important element in trade between England and Spain; indeed, our shipowners have already largely profited by a discovery which has enabled them to find freights for their vessels employed in conveying coals and machinery to the mining districts in Spain, and which had hitherto, in the majority of cases, been under the necessity of returning to England in ballast.

From the *Quarterly Review* for April, 1868, are derived the following important particulars of this useful article. In 1852 a patent was taken out for Esparto as a substance for the manufacture of paper by Jean Antoin Farina, and again in 1854 and 1856 by James Murdoch and Thomas Routledge. Specimens of paper made from its fibre had previously been seen in the Algerine section of French products in the Exhibition of 1851. The *Akhbar*, daily paper, has been printed in Algiers for years upon it; and it was introduced to the whole world in the "Exposition" of 1867, the catalogue of which is printed upon paper made from Esparto alone. The grass known to botanists by the name *Stipa*, or *Machrochloa tena-*

* Seeing that there is a difference of several degrees of latitude between the provinces of Spain where this grass flourishes and the colony of Tasmania, I confess that I am not sanguine as to whether this grass could be successfully acclimatised here; but, as its geographical range may be wider than supposed, a trial might at all events be made in certain localities most favorable for the experiment. Should it fail, it might doubtless prove a success in the adjoining colonies of Australasia.

cissima, grows wild upon both sides of the Mediterranean for about five degrees of longitude. It comes on the European side from the east coast of Spain, principally from Carthagera, Almeria, Aquelas, &c., where it has long been used for making mats, ropes, soles of sandals, and the Iberian scourges of Horace (Epod. iv.); and it appears that any quantity of it may be obtained from Algeria, where it is a most abundant weed. It is white, and very tenacious in fibre; and, after rags, it is pronounced to be the best material yet discovered for the making of paper. The favour in which it is held by the British paper-maker may be gathered from the fact that between 65,000 and 70,000 tons of Esparto grass were imported into England for paper-making purposes in the year 1866.

This closes the information derived from the *Economist* and the *Quarterly Review*,—and here I should leave the subject were I not desirous of associating with it some remarks on the additional facilities likely to be afforded by the cultivation of this grass for the establishment of a paper mill.

At the present time, when there exists an earnest desire to do something to ameliorate the condition of the forlorn children who throng our streets, the introduction of a new local industry, affording means of employment, must be fraught with great public advantage whether regarded in a social, moral, or economical point of view.

When in England, in 1862, I visited several of the principal paper mills, for the purpose of gathering information as to the best processes of manufacture that might possibly prove useful in the event of this industry becoming established in Tasmania. I had in view the existence here of certain auxiliary means and appliances for this important object; viz., the great extent of water-power available along our creeks and rivers; the vocation given to the neglected and destitute in our population for the collection of rags and old clothes lying useless and worthless in almost every domicile,—and which would hence acquire, however small, a certain commercial value; the utilising the labour to be found in our penal, charitable, and kindred institutions in sorting and washing and preparing the rags for the mill. I assume that the resort to labour of this description should stop here, and that the actual manufacture of paper should be taken up at this point and be carried on in a separate and independent establishment, whether by the Government as a really reproductive work, employing the necessitous receiving eleemosynary relief from the State, who would thus be made to contribute to their own support, or by the agency of a public company influenced in its formation by adequate material encouragement, it is foreign

to this paper now to discuss. One thing is clear that, at the present moment, were a paper mill to be worked altogether by coerced labour, independently of its skilled management and direction, the scheme would be free from the objection that has hitherto attached to the products of penal establishments, of their clashing and coming into competition with the fruits of free and unfettered industry.

Acting upon these views, I procured from an eminent engineering firm in London a design for a paper mill upon the most modern and improved construction, drawn to a scale of feet, with specifications, and reliable estimate as to its cost.

This mill would be capable of turning out 10 tons per week, working daytime only, or 20 tons working day and night as in England. The number of hands that it would employ—men, women, and children—would be about 120 in all, producing 20 tons of paper a week; or say 80 persons only, should 10 tons weekly suffice for the present demand, in addition to a general superintendent or manager, and such other staff as may be found necessary for the commercial part of the business.

A constant and unfailing supply of pure water is absolutely essential to the enterprise. If sufficient water-power can be obtained at a convenient site, considering transport, &c., it is undoubtedly the cheapest prime motive power.

The undertaking would require a capital of £25,000 to defray the entire cost of the necessary buildings and plant, all of the most complete and improved descriptions, full particulars of which I could detail if required.

I fear that I have prolonged this paper beyond reasonable limits, and will, therefore, to avoid further prolixity, simply add that the drawing of the works, with specifications and general statement, will, with pleasure, be placed by me at the service of any persons disposed to engage in this branch of industry.

Reverting, in conclusion, to the Esparto grass, some seeds might be procured from Europe, possibly through the British Consul in Spain, or even through the Secretary of States, upon the intervention of the President; and it would be in harmony, I conceive, with the scope of the Royal Society's functions to take the initiative for adding to the resources of the colony.

[Mr. Barnard has written to London for seeds, samples of the pulp, and specimen sheets of the Esparto paper. On arrival they will be laid before the Society.]