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REC^D REG^D 12 MAY 20

PRITCHARD C.H.

POWELL WOOD PROCESS

1920
10thMAY

Last previous Paper.

P/22226

Trans report by Professor Boulger on. Requests original may be returned after being compared with duplicate copy enclosed

I have thanked & returned the original. The testimonial to the Process is a handsome one & they go to Mr Eggeling, who has the earlier pp.

W.C.B. 12-5-20

Col Carmichael [illegible]

Ack & orig: enclosure ret^d, 12th May '20

Next subsequent Paper.

P/30262

(36052—4 h) Wt. 26689—35 50,000 11/19. H. St. G. 122/41.

All Communications to be addressed to the Firm and NOT to individuals

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THE POWELL WOOD-PROCESS SYNDICATE, LIMITED.

TELEGRAPHIC ADDRESS:
"POWELLIZED, AVE, LONDON."

CODES:
A.B.C. 5TH EDITION.
LIEBER'S.

TELEPHONE No.
70813 CENTRAL.

718/719, SALISBURY HOUSE,
LONDON WALL,
LONDON, E.C. 2.

23596

REC'D 12 MAY 20

Replying to yours

In reply please quote K.66

10th May 1920

W. C. BOTTOMLEY Esq.,
Colonial Office,
Downing Street, S.W. 1.

Dear Mr. Bottomley,

I enclose herein the report by Professor Boulger on the question of the efficacy in British East Africa of the Powell Process.

You will remember that I promised this in my last letter in order to dispel certain doubts expressed in your letter of the 23rd ultimo.

I enclose the original and a typed copy. When you have compared them, would you kindly return the original to me at your convenience.

Yours very truly,

C. H. Pritchard.

enc:-
1original report
1 typed copy

12, Lancaster Park,
Richmond, Surrey.

8th May 1920.

Dear Mr. Pritchard,

I have read with much interest the letter of the Colonial Office (No. 17312/1920) to you as to the suitability of the Powell Wood Process for use in British East Africa. There are four points in it on which I can, perhaps, give you some useful information.

First, as to the rapid seasoning effect of the Process. I would remind you that all the warping and cracking of unseasoned wood arises from the irregular emptying, drying and consequent contraction of the structural elements of the wood. It has been found from the very earliest experiments in Powellizing - now a good many years ago - that the Process is most successful with newly-felled absolutely green wood. On boiling the wood in the preservative solution, the sap, which is not only putrescible but also very largely colloid and hygroscopic, is driven out and replaced by the solution. The elements are thus filled and mechanically prevented from contracting, twisting or becoming otherwise deformed. In these experiments we have found small cracks close up and wood (even after having been cut across the grain into irregular shapes) retain its form in a most remarkable degree. I would specially mention an armchair cut from green Mahogany, wet from the dock, which in a week or two was as successfully seasoned as in several years of ordinary drying. Coniferous soft woods, if on account of their more simple structure less liable to complex deformation or twisting than hardwoods, are also for the same reason more readily completely penetrated by the preservative.

Secondly, as to the resistance of Powellized sleepers to fungoid attack, I would remind you that it was against dry-rot and other fungi that the Process was originally directed, the arsenic having been added for the tropics mainly as against the white ant. The action of yeasts or even moulds and many of the

lower fungi, and also of bacteria - even those in the soil - upon wood is very generally very slow and superficial, serious damage being mainly effected by the penetration of the wood by the spawn or "mycelium" of rather higher types. In Powellizing the wood is boiled for some time in a solution, the boiling point of which is higher than that of water and which contains in sugar a vehicle well known to chemists for its singular penetrating power. The wood is thus very thoroughly sterilized throughout, any mycelium in its interior and any fungus spores (more likely to be on the exterior) being certainly killed. The subsequent re-infection of the interior of the wood by fresh fungal attack is, perhaps, mainly hindered by the mechanical filling of the cells and vessels, probably by a colloidal compound formed during processing, together, perhaps, with the complete coagulation of any albuminoid matter that may remain in the wood. If the processed wood is thoroughly dried after processing it will, I think, be far less hygroscopic than ordinarily seasoned wood &, therefore, far less susceptible to any surface attack (which the atmospheric moisture of equatorial latitudes generally favours). Even if the surface of the processed wood be not dry, it will from the impermeability of the surface elements, produced by the processing, be far less susceptible than unprocessed wood.

The toxicity of arsenic upon living organisms is unquestionably a difficult and imperfectly investigated question. Much, of course, depends on the solubility of the arsenic-compounds in question not only in water but in the vital juices of the organism, much probably also on the strength and on the cumulative action of the solution. Sensibility to arsenical poisoning, or its converse, tolerance of arsenic, would seem to be even a matter of individual and not only of specific generic or group idiosyncrasy. On human beings small doses of arsenic may have a tonic effect; it is cumulatively poisonous but individuals and whole communities can habituate themselves to continuous considerable consumption of the drug. On higher plant-life, such as that of grasses &r

other weeds, it is commonly employed as a deadly poison in most ordinary "weed-killers" and it is now being successfully employed in conjunction with caustic soda - in Queensland to kill the stumps of felled trees. In 1856 Boussingault recommended sodium-arsenite as the best substance he could find for rendering seed-corn immune to the attacks of smut, bunt, rust and ergot, with the additional advantage of protecting it from animals, such as mice, after sowing. (Bourcart, "Insecticides, fungicides and weedkillers" (1913), p. 95). Some recent experiments (South African Journal of Science, 16 (1919), pp. 369 - 374) show that yeasts and moulds are "highly tolerant" of arsenic; that some bacteria actually live in arsenical solutions; and that many others, though fairly tolerant of arsenate, are relatively sensitive to arsenites. It is, of course, largely to ward off insect attack that skins in museums, etc., are treated with arsenical soap, and that wood powellized with arsenic is distasteful to termites has been demonstrated in India, South Africa and other countries.

Thirdly, as to the suitability of East African Yellow-wood (Podocarpus elongata or P. gracilior) for Powellizing, in the absence of direct experiment, I can only say that the Podocarps have a simple coniferous wood, which takes creosote readily, but splits and warps rather badly if not processed. During the last thirty years three million sleepers of this wood have been cut from the Knysna forests. Any wood that can be creosoted can be, at least as readily, powellized and this class of coniferous wood, owing to its simple straight grain would lend itself particularly well to this process. You can also, I think, be confident that by Powellizing you will eliminate all tendency to split or warp.

Fourthly and lastly, as to the doubt whether the Powell Process, which has proved successful elsewhere, would be so in East Africa, I would point out that it has now been put to the severe test of experiment, extending over a good many years, in the dry tropical heat of West Australia and the moist heat of India, besides being used in temperate latitudes and among termites in

South-East Africa. Timbers fall, in point of structure and facility of processing, into a small number of classes, such as soft coniferous, soft broad-leaved, ordinary deciduous hard-woods and dense evergreen hard-woods, which are represented in almost every country. Many of the last class either do not require any preservative processing, or are not readily treated in any way; and the other classes vary in the ease with which they can be impregnated. Powellizing has been proved effective with numerous representatives of these classes, so that we can infer with considerable certainty its applicability to species as yet untried. The woods of one country are not more peculiar in character than are the climatic characteristics.

The above are, I think, the main points on which the Colonial Office hesitate to accept the Process.

Believe me,

Yours sincerely,

(Signed) G. S. BOULGER, F.L.S., F.G.S.,

C. H. PRITCHARD Esq.,

30,
, Auckland Road,
Upper Norwood, S.E. 19.

8th May, 1920.

Bottomley, Esq.,
Colonial Office,
Downing Street, S.W. 1.

Dear Mr. Bottomley,

As I know that you are overwhelmed with work, I do not like to ask for interviews. There are, however, many points on which we have never yet touched, and I am submitting some of them in this letter so that you may consider them at your convenience.

Assuming that the Protectorate acquires the Rights and Operates a Powelliwing Plant, it may be argued that the latter would, at times, be idle if railway-construction did not proceed at the rate of 100 miles per annum. That is not so. Sleeper-requirements having been met, the officials concerned could purchase olive-wood and other suitable timbers, process them in various thicknesses, and send them to the English market for sale to cabinet-makers, thus continuing to help lumbermen in the Protectorate.

The capacity of the Plant I have suggested is something like 500,000 cubic feet yearly. Say, that 100,000 cubic feet of the output took the form of cabinet-making material, a profit of 2/- per cubic foot would bring the Protectorate a revenue of £10,000 per annum, and the supply of such timber would be a godsend to this country.

Should Sir Edward Northey desire me to undertake the management of the Powellising Plant, I would not ask for a salary, once the output began, contenting myself with my Royalties, if these are at the rate of 1½d per cubic foot, for which I asked in my last letter.

As there was an expression of doubt, on the part of the Chief Engineer, Uganda Railways, as to the efficacy in B.E.A. of the Powell Process (see your letter of 23rd ult.), I have asked Professor Boulger to explain that there are absolutely no grounds for fear on that point. I will send you his statement as soon as I receive it.

Bridge building. It may be that, in planning and estimating the cost of the projected Railway, steel bridges have been provided for. I submit that, if selected baulks of local timber are processed for the purpose, much capital expenditure would be saved by building wooden bridges.

I attach a letter regarding three such bridges in Australia.

I trust that any points on which information is required (before a final decision can be taken) will be referred to me to allow of my placing such information before you.

Yours very truly,

C. A. Pritchard

EXTRACT OF R ART FROM MR. TINDALE, ENGI ER FOR THE NORTH WEST TO THE ENGINEER-IN-CHIEF, WESTERN AUSTRALIAN STATE RAILWAYS ON POWELLIZED TIMBER IN THE NORTH WEST.

..... 1st July 1916.

PORT HEDLAND-MARBLE BAR RAILWAY:-

In 1910 three bridges were built on the above Railway of Powellized timber.

The piles were sent up in the rough and unfinished; the bridges were all of silled type.

In the construction of the bridges, the round Powellized sticks used for sills were "spotted" on the job to receive the butt end of the piles; the sills were mortised and the piles tenoned.

The sup structure was of sawn timber with the excepti of the stringers, which were of round sticks.

I certainly had doubts about the durability of thes tures at the time they were built, against the attack of ants, seeing that the round sticks had to be so much cut subsequent to the Powellizing, to satisfy jointing condi

I examined the structure for the appearance of an times during 1911, but leaving the job early in 1912, I have another opportunity until May last year, when passin the district; on which occasion I again inspected the timbe being naturally interested, although the railway was then und the operation of the Railway Department.

My inspection last year did not reveal the appearance of white ants attack on the timber, although I dug round the piles in an endeavour to make an efficient search for some.

Further along I questioned a ganger working on the line was informed that he had seen the appearance of the ant on the timber but they had left without doing damage.

It was significant to note that old boxes and wooden remai of construction camps near by had been demolished by the ants, a had also dog-spike boxes scattered along the railway.

BROOME FENCE:-

Around the Goods Shed at Broome in 1913 (latter end) we erected a Powellized Jarrah Picket Fence (this was ridiculed by the townspeople at the time as they considered the fence would not last six months). Every visit to Broome since the construction of same, say twice a year, I have carefully examined this structure, but without discovering the appearance of the ant; my most recent inspection was in March this year, the fence was then as substantial as when first erected.

This as you know is a particularly vigorous region of the white ant.

(Signed) E. TINDALE,

Engineer for the North West.