

DISCUSSION.

MR. TOURNAY-HINDE: I am pleased to have had an opportunity of moving a vote of thanks, as I do now, to Mr. Bell, for his interesting paper and data of such importance to the Commonwealth of Australia. The immense monetary value of the goods dealt with alone—£43,000,000 worth of product per year—proves how important the subject is to this country.

I cannot claim to have any detail knowledge of wool-dumping; but many years ago, when I was quite a youngster, I was with the late Mr. Norman Self for about four or five years, and I saw some of his work at that time. But, like most young fellows, I was really too young to appreciate what Mr. Self was actually doing in the way of economies, and so on, in the cost of handling the wool from Australia to Europe. However, I have been very much interested to-night to see that the industry has increased to such large proportions, and that there is so much in the various methods used to dump the bales of wool.

The author, just towards the end of his paper, referred to the big difference in the pressure, and I should like to make a few remarks on that. I think he said there was a pressure of 53 tons up to 140 tons on the bales. So far as I could gather from the photos. of the bales after they were dumped, they were all of about the same size. I presume from that—I do not know whether I am right or not—that the real pressure on the bale, at the final stage, is practically the same in both cases, but that the higher pressure had been used by the firms that adopted it for the purpose of squeezing up the bales in less time and getting through a greater number of bales with fewer men on the job. And if the bale was really subjected to a pressure of nearly three times as much it would be smaller, and its diminished size would be visible in the photograph.

I also notice in one of the photographs, where there appear to be single bales stacked in the sheds at Wentworth Park, that some of them have five bands on, and some of them three. I do not know whether the extra bands were on the bales that had been dumped under the highest pressure. If that is so, Mr. Bell will have to correct my assumption that the bales are pretty well pressed to the same pressure ultimately.

I have nothing further to add except to say that I have listened to the paper with very much pleasure indeed. It has given me quite a deal to think over.

MR. SINCLAIR: Mr. President and Gentlemen, I have very much pleasure in seconding Mr. Tournay-Hinde's vote of thanks for Mr. Bell's interesting paper on wool-dumping.

I have not personally done any wool-dumping since my apprenticeship days, when we were working on some presses down at Flood's Wharf. In those days there were double dumps converted into single dumps. Since looking at the presses shown on the screen to-night, it has occurred to me there has been very little difference in the press of 1881 and the press of 1870 and the press of to-day, with the exception of the side gear in the presses of to-day. The only marked difference seems to have been in the pumps. Only the other day I was looking at an old set of hydraulic pumps with a view to purchasing them, and comparing them with the modern pump I was engaged in designing at the time; it occurred to me that the man who originally designed the old style of pump had not given sufficient thought or care to the packing. Speaking to the engineer-in-charge, he frankly confessed it was a day's work to do any packing on the pumps, and that seems to have been a point that was overlooked on the earlier jobs. Before I leave the matter of pumps, I note the efficiency of one pump referred to by the author was 94 per cent. That seems to be very high, and I would like to know whether there was any test of that.

Following on the remarks of Mr. Tournay-Hinde as to the pressure on the bales, the same thing occurred to me, and the way I look at it is this: I have had a good deal to do, one way and another, with oil pressure and hydraulic pressure, but the system referred to to-night is a different one altogether. In the one case you get the actual pressure on the oil cake itself, and, strange to say, the speed of oil pressing is absolutely opposite to that of wool pressing. That is to say, the oil man looks to have as much time as he possibly can with the cake of oil, whereas the wool man looks to do it as quickly as he possibly can.

It is very handy to have a collection of data such as that provided by Mr. Bell in this case. I am very pleased to have it, myself, and I am sure it will be a useful contribution to the Society's records.

MR. CONNIE: I have listened to Mr. Bell's interesting paper with much pleasure, and I am sure the data he has furnished will be a very valuable contribution to the Society's records. I do not think there is anything of the same kind that I have been able to come across during my search for information on wool-dumping. I had the pleasure of helping one of your ex-Vice-Presidents to modernise to some extent, No. 1 plant, and to instal No. 2 plant, described on the sheets. During the course of that work I discovered a number of things about wool-dumping that I did not know before.

As the author said he had not been able to discover anything with regard to the practice in Victoria or in Queensland, I thought it might be of interest to show on the board a photograph of what Mr. Sinclair will be pleased to see is an improvement in wool presses that is decidedly modern. The idea in pressing wool is to get it into a square shape—the ideal bale being a butter-box section. At present the latest improvement we know of in New South Wales is the squeezing of it top and bottom and two sides. In the

photograph on the board you will see presses in Victoria which press it top and bottom, on the two sides, and on the front and back as well, by the same appliance with a novel new attachment. We have not a press like that in New South Wales; we have not yet that attachment on any of our presses. While in Melbourne last week I saw the press I have just referred to at work, and I can assure you it is a decided improvement; it makes a very compact and shapely bale, and it will be very valuable if the present system of double-dumping is continued. My opinion is that it will be continued. My earliest recollection of wool-dumping takes me back over 20 years ago, when I have seen stevedores, at Port Chalmers, squeezing the bales into the hold, and using a racket and screw-jack.

I have also put on the board a photograph of the press they use in Victoria for pressing scoured wool. That is different from the contrivance explained by Mr. Bell, and illustrated on the screen. It is used very extensively in Victoria, and as there is nothing of the kind in New South Wales, I thought, if they were exhibited during the course of the paper, it would be of interest to members.

I have to thank you for the opportunity of taking part in the discussion of a very interesting paper. The data furnished will be useful. Although the paper could not be described as super-scientific, it nevertheless contains evidences of a considerable amount of hard work, and thoughtful, painstaking research on Mr. Bell's part; and it will prove an acquisition to the Society's records.

MR. TOURNAY-HINDE: I should like to ask the last speaker where they get the hydraulic pressure from to operate those presses in Victoria?

MR. CONNIE: In places where there is no hydraulic power available, it is customary to instal a small set of hydraulic pumps.

MR. TOURNAY-HINDE: Petrol engines?

MR. CONNIE: No; either by hand or belt-driven usually, because in most wool-scouring establishments they have power. In one of the sheds alongside the wharf in Sydney we have a pump connected with two presses, and an hydraulic pressure by means of the belt drive which works the press itself without an accumulator.

CHAIRMAN: I cannot add anything of a technical nature at all to the discussion to-night. Mr. Bell's paper is largely descriptive, and in that respect it is exceedingly useful and very interesting. Anything connected with the production or handling of wool and its journey overseas must be of interest to all Australians. I have no doubt Mr. Bell has given us a lot of useful information which, as some of the speakers have mentioned, it would be a difficult matter to find collated anywhere.

The question raised by Mr. Tournay-Hinde was the only one of a technical nature that occurred to me—and I think we all hit upon it—and that was, if a press is given three times the pressing capacity, there must have been some solid reason for it in the minds of the designers. It is possible that the only reason can be that the rate of work would be far more under the control of the operators.

In asking Mr. Bell to accept the vote of thanks that has been moved and supported, I desire to compliment him on the paper he has produced, in the first place, because he has set out in a novel direction, so far as this Association is concerned, and secondly, because he is one of our youngest members. It has always struck me as a very healthy sign in the progress of our Association when we see our young men coming along and producing excellent papers. On the other hand, one could not help feeling a glow of pride when listening to the eulogistic references to the work of the late Mr. Norman Self, by the members who form practically the "Old Brigade" of our Association.

Hardly a session has passed in my recollection during the past 10 or 12 years when the monumental work in the development of engineering practice as carried out by that gentleman has not been referred to in the papers submitted.

I will now put the motion that has been moved for a vote of thanks, support it, and ask you to carry it in the usual way, with acclamation. (Carried with acclamation.)

I will now call on Mr. Bell to respond.

MR. BELL: Mr. Chairman and Gentlemen, I thank you very much for the way you have received my paper, and the time and trouble I have spent in preparing it has been fully repaid by the attentive hearing you have given me to-night.

Mr. Tournay-Hinde mentioned something about some bales with two bands on them. If he will look closely into the protograph he will find there are a couple of wire strands, in addition. I have never seen a double dump in the shed at Wentworth Park with only three bands; but I have seen them with five No. 8 strands.

The efficiency of the pump was also referred to. I think I corrected myself and said from 90 to 94 per cent. Of course, the 94 per cent. was given to me by an engineer. From what I can make out, it is water efficiency. The tank is 22 feet above the engine-room, and therefore the pump chamber is always full, and, I take it, on account of the volume of water, there is so little leakage, in any way, that it can be regarded as practically nought.

With regard to the large statical pressure of 140 tons, I cannot, for the life of me, see where it goes to if it does not go on the bale. You cannot alter a statical load; it must go direct on to the bale. The weight comes up to the chamber of the grand cylinder, and it must go on to the bale.

MR. TOURNAY-HINDE: The ram, or cylinder, need not be any higher in either of them, although there is a high pressure in the accumulator.

MR. BELL: I have not gone any more into the question; but from what I can gather, and from what I have learnt, I cannot see where the other power goes if it does not go on to the bale.

MR. CONNIE: My experience is that the high pressure is used in order to have the work done more quickly. The length of the band by which the bale is bound controls the size; the other is only a matter of time being the essence of the contract.

CHAIRMAN: I think, too, it is a question of time. The rate of work is much quicker with the higher pressure.

MR. BELL: At the same time the weight must go on to the bale.

CHAIRMAN: Ultimately, yes.

MR. TOURNAY-HINDE: I remember one time carrying out some tests with regard to hydraulic cylinders. They were large-sized cylinders, fed with water from an accumulator at 90lbs. to the square inch. While they were operating and lifting the load, the pressure sometimes was not higher than 14lbs. to the square inch, due to the fact that the piston was moving. And when the piston is moving, I think the same thing happens to the wool press.

MR. MORSE: With regard to my friend, Mr. Tournay-Hinde's remarks, I would like to point out to members of the Association that there is absolutely no reason for the difference between the pressure of 53 tons and 140 tons; it is simply that the wool press has been designed with regard to the statical pressure that should go on the bale.

MR. BELL: At the discussion on my Wool Dumping Notes, one member inclined to the belief that (a) the great diversity of statical pressures given therein, was the result

of flexibility, such as may be obtained by pumping, limited only by the power of the pump.

Another member suggested that (b) the intensifier rams may not come to rest, consequently the higher pressures are merely possible, but not probable; otherwise he thought (c) "there must be a reason" for so great a variation as that between 53 tons and 140 tons, as for instance (d) in a different class of bale, or (e) greater speed in dumping.

I therefore desire to add the following particulars, which should make the subject clear:—

(a) In all cases the second, or highest, pressure, when ram motion ceases, is a constant quantity, being derived either from the Hydraulic Power Company's main, or from an independent accumulator, and not direct from a pump.

(b) The motion of ram which produces final pressure on bale, in all cases, ceases; consequently the ultimate pressure is received by the bale.

(c) That there is no "reason" for the great variation in the statical pressures of 53 tons and 140 tons. I have the authority of the designer of the plant producing the latter, who stated that he did not then know, nor did he think any other engineer knew, what ought to be the correct ultimate pressure. This was ascertained by him, some years later, by an analysis (given in my paper) of several large dumping plants.

(d) The bales are not classified with respect to any particular press, but are common to all the presses referred to in my paper.

(e) The greater travel of the rams giving the higher pressures tends to slower output, since, when bands are fixed, the bale has greater expansion into them.

Also, it may be stated, that if the power be taken from the Hydraulic Power Company's main, the cost of unnecessary

water would be considerable. In order to give an idea of the financial loss consequent upon pressing above 50 tons, which permits facility in banding, the following figures are submitted:—

Assume that a bale subjected to 140 tons is reduced 3in. more than from 50 tons. Then 3×8.321 ratio = 25 inches of 8in. press ram; = 4.5 gallons of power water per bale, and 900,000 gallons for a season's dumping of 200,000 bales, the cost of which, at 5/-, would be £225.

(Contributed Discussion by Mr. Lea—Member.)

I have read with great interest Mr. Bell's paper on Wool-Dumping and Pressing. I am unfortunately too far away to get my few lines to you in time for the discussion, but a few remarks as regards improvement in wool press device may be of interest to the author, and also to members that are interested in wool-pressing.

Regarding the pressing of greasy or slipe wool. The majority of wool-working establishments do the pressing by manual labour, i.e., most of the gears are fitted with a long lever, with ratchet attachment. This is worked usually by two or three men to force the monkey down; the system is out of date. This was the case at these works three years ago, and I could see that an enormous loss of time occurred during the process, and therefore turned my attention to devise some method of doing the work quicker and with less labour. The press is one of the split type, being divided at the centre, both ends being filled with wool and well tramped down, then the top half is hoisted up, and the pressure applied, making a bale of 4 cwt.

I did not alter any of the wire rope gears attached to the press, but simply put in one hydraulic cylinder 8in. long by $10\frac{1}{2}$ in. bore; this is fixed alongside of the press, and attached to the existing wire rope by means of a sheave fitted on to a crosshead at the end of the piston rod. The

piston rod is 3in. diameter, and the piston head is fitted with one cup leather.

The pressure, "200lbs." per sq. inch, is admitted at the bottom of the cylinder by means of a three-way cock.

The end of the wire rope is fixed to a shackle at the top of the cylinder, and passes over the crosshead and under a second sheave, which is placed at the opposite side of the cylinder; this device gives 16ft. of travel for the rope, which is ample for pressing the bales. Regarding the time saved by installing this power, working by hand lever for three men took $7\frac{1}{2}$ minutes; working with hydraulic power takes one man three-quarters of a minute. It can therefore easily be seen that a great saving in time and labour has been brought about by the introduction of hydraulic power. I have visited all of the principal meatworks in New Zealand, and have not seen a press that will do the work as quick and with as little labour as the one I have altered. And for the benefit of those interested in the wool-pressing business, I shall be pleased to give any further details.

I conclude in thanking the author for his able paper, and express my regret at not having time to get my few remarks to you at an earlier date."

