



LANCASHIRE SECTION. Meeting at Ashton-under-Lyne, 16th October, 1918. Mr. W. Hamer:, J.P., in the Chair. PRODUCTIVE COSTS IN COTTON SPINNING

A. H. Hardman

To cite this article: A. H. Hardman (1918) LANCASHIRE SECTION. Meeting at Ashton-under-Lyne, 16th October, 1918. Mr. W. Hamer:, J.P., in the Chair. PRODUCTIVE COSTS IN COTTON SPINNING, Journal of the Textile Institute Proceedings and Abstracts, 9:8, 180-183, DOI: [10.1080/00405001808630836](https://doi.org/10.1080/00405001808630836)

To link to this article: <http://dx.doi.org/10.1080/00405001808630836>



Published online: 24 Nov 2008.



Submit your article to this journal [↗](#)



Article views: 3



View related articles [↗](#)

be put to the making of shells. We should have to emancipate ourselves from the ideas which turned the industrial revolution into courses so disastrous for the freedom and the development of the human race. This could only be done by starting out boldly in reconstruction—building the foundations of civilised life; making our towns places in which men and women could live with an inspiration to their minds; making our schools real nurseries of happiness and freedom; and making our mills and factories and workshops institutions reflecting the great co-operative power of men and not, as they were made by the industrial revolution, reflecting a reluctant discipline imposed upon the minds of men by the few who had the power. It was not an easy problem or a simple task, though it was perhaps easier because the war had, in one sense, made the whole world one. He had hopes that out of the League of Nations a system would develop under which the labour laws of all nations would be reformed. At the end of the great French war, one great thing had happened. In the 18th Century almost all over Europe there existed the jurisdiction of a number of arbitrary little courts under which personal rights received no recognition and men could be imprisoned without trial. The French Revolution produced the Code Napoleon, and the French armies carried that Code with them, so that, after the peace of 1815, although Europe was plunged into re-action, yet over half of Europe that great civil Code stood and men began to think of the rights of men. Would not it be some reparation for the sufferings of this war if, as the part of the League of Nations, some machinery could be devised by which the scandalous abuse of the industrial system could be suppressed in all countries? In all countries, the mass of men wanted a different industrial life. No man, workman or employer, wanted to have the whole life of the people swallowed up in the industrial system. If an employer wanted it, he wanted it because he thought it necessary and not because it was a good thing in itself. No one country could do it. In all countries, as a result of the war, we should probably find some demand for a more human life, and that demand might be organised through the League of Nations on the principle of the Industrial Councils, calling into play the best responsible industrial spirit. By this means we might lighten the great industrial burden over the whole world, and put an end to the paradox by which men and women labouring to minister to the needs of the race find themselves obliged to throw fetters upon each other. He believed it was possible, because he was certain that from one end of the world to the other there were millions of people determined at this moment that, whatever the life of the future of the world is to be, it should be something very different from the life out of which this great catastrophe has come upon men.

DISCUSSION.

The CHAIRMAN said they had all listened intently to a most compelling address. He felt sure that the work of the Industrial Councils would be of immense benefit to all concerned.

Mr. G. R. GAUNT (Leeds) said he would like to have more information as to the steps necessary to achieve the desired results.

The LECTURER said he would like to see a very ambitious housing policy and an ambitious education policy. In regard to industry, he would like to see a development of what he thought had already begun—the development of public spirit for industry. Industry ought to be eminently interesting and stimulating; it offered great opportunity for the development and satisfaction of the sense of beauty. If the Industrial Councils were started in a bold spirit, a great deal could be done to make industrial life interesting to the people engaged in it. The development of amenities to make actual mill life more satisfactory was obviously one reform. The gradual association of workpeople with some degree of control over their industry was another. In all these matters a great deal had to be done by education—education which would give added sense of responsibility. To overtake the great losses of the war, great production would be essential. His own belief was that if the life of the nation were made healthy and vigorous production would follow. To start by sacrificing human life, human freedom, and development, to production, would mean the loss of both. The war had brought home to the least imaginative this principle—that there are enormous resources of character and intelligence buried in the industrial system. Our battle-fields were strewn with men who, if judged by their place in the industrial system before the war, were of little importance to their country. But judged by the greatest test, they were capable of rendering the greatest service to their country. If we were misled into thinking that output and production were the one standard of success of our country and to that we were prepared to subordinate the proper development of our faculties and human resources, then we should find we had missed the goal we were seeking.

On the motion of Mr. A. G. LUPTON, Pro-Chancellor of Leeds University, seconded by Professor BARKER, the lecturer was heartily thanked.

LANCASHIRE SECTION.

Meeting at Ashton-under-Lyne, 16th October, 1918.

Mr. W. HAMER, J.P., in the Chair.

PRODUCTIVE COSTS IN COTTON SPINNING.

By A. H. HARDMAN.

ONE would naturally suppose that a question of vital importance to the manufacturer of goods of any description would be that of the cost of his product. And yet I venture to say that in the cotton industry there is no department in which rule-of-thumb methods are more extensively employed than in this matter of costing. There are, of course, bright exceptions—firms whose skill and energy are regularly devoted to the investigation of costs; but in a very great number of cases

the matter is left to a few chance moments of spare time, when there is nothing else to do, to be dealt with perhaps by someone having an expert knowledge of processes but only an elementary knowledge of arithmetic, or else by a brilliant arithmetician with no knowledge of the trade.

Costing necessitates, first of all, a knowledge of the processes to be costed. It necessitates, secondly, a true conception of the value of figures—a kind of instinct which decides upon the figures which are valuable and those which are valueless.

In this country, much fun has been poked at American systems of costing. Some people tell us that in America the cost of finding the cost of an article is as great as the cost of producing the article. But in spite of the American tendency to be somewhat over-elaborate in their costing systems, I believe that much more real and useful work has been done there than here in this matter.

Some five or six years ago, for the purpose of revising the tariff on imported cotton goods, a very large investigation in costing was carried out by the American Government. They ascertained in very great detail the costs of production of over five million cotton spinning spindles, and of a very large number of looms. For this purpose, the American spinning and weaving mills were put upon an authorised, standardised system of costing, worked out by the best brains of the trade. The information acquired, properly worked out and tabulated, and in which the various mills were referred to under numbers, was placed at the disposal of the trade, and, now, no American mill has any excuse for having a bad costing system. English spinners and manufacturers interested in this matter would do well to read, mark, learn, and inwardly digest the report of the American Tariff Board published five or six years ago.

If a costing system is to be of any value it should be a continuous one—that is to say, the data should be recorded regularly and systematically, and should not be the result of odd, chance calculations carried out when there is nothing better to do. Why are so many of our ranges of prices of to-day entirely antiquated and unreliable? Because they are based on data ascertained in pre-war times. If wages and expenses are practically stationary, 1d. per lb. may be a reasonable difference between 60's and 70's counts, but if wages and expenses are moving upwards by leaps and bounds the same difference may be quite wrong. When cotton was 10d. per lb. it might have been reasonable to add ½d. per lb. for reeling, but when cotton is 35d., and the cost of waste loss higher in proportion, such a figure is perhaps ridiculous. And yet, look over our price lists and see how many of us are making the same range difference as we did four years ago.

A costing system, therefore, must be continuous to be of any real value.

I know that at present there are many factors which conspire to make the ascertaining of costs somewhat more difficult than formerly. Machinery is stopped, which increases working expenses; working expenses almost seem to be an unknown quantity; and wages

are far from stationary. But, in spite of all these difficulties, I do not think that there is in them anything to prevent us, given reasonable care and accuracy, from ascertaining the costs of production.

Let us rapidly review the factors which must be taken into account in finding the costs of yarn. Cotton is bought at a price per lb. and arrives at the mill in bales. Bales of different qualities and prices are mixed together in a stack to make yarn of a required quality. The cotton then passes through six or seven machines, some of which extract from it sand, seeds, and heavier waste, whilst others take out the nep, short fibres, and lighter waste. This waste is sold at varying prices or portions of it may be used for the making of yarns of a lower count or quality. In addition to this visible waste, which may be weighed and sold, there is an invisible waste. Raw cotton, under normal conditions as to temperature, contains about 8 per cent of natural moisture, a portion of which is evaporated during the passage of the cotton through the mill. There is also a small amount of fine dust which rises into the air and is lost. But a portion of the lost moisture is recovered. After the cotton has been spun into yarn its return to a normal atmosphere causes it to regain some of this moisture, thus giving a greater selling weight of yarn than has been actually spun. During all these processes, wages are being expended which will be more per lb. for fine counts than for coarse counts, since one takes longer to produce than the other. The cotton is also absorbing its share of general working expenses—of oil, ropes, taxes, depreciation, coal. When the yarn is marketed, it is sold subject to a discount and credit, differing with the different markets.

Let me say here in passing that I think the time has arrived when discounts, where they are added to the cost merely to be taken off, and do not represent payment for services rendered, should be abolished. They serve no purpose except to complicate our calculations.

Costing calculations, then, will take account of raw cotton, wages, and expenses. They will allow for the waste lost in working and for the amount received on sale of the waste; they will take into consideration the regain and the amount of discount on sale.

The first item in a costing system will be raw cotton. I pass over the ascertaining of the cost of mixing, as that is so elementary that there can be no mistake about it. Bales of different prices are mixed together in different proportions for yarns of a certain count and quality, and, from the different prices and proportions, the cost of mixing is obtained, which is the basis of our calculation. Now, how much cotton will be required to make one pound weight of yarn? This can only be ascertained satisfactorily by taking a full six months' working, which will be the method of ascertaining it in a good system of costing. To put a small sample, say 100 lbs., of cotton through the various processes and to take the waste shown as being representative of the whole waste produced is, to my mind, most unsatisfactory. There are a great many wastes which cannot be found by such a method. For instance, there is a loss in weight in the bale before

ever it is opened. If you doubt it, weigh a few bales which have stood in your cotton room for several weeks and compare them with the invoice weights for which you have paid. Then there are such losses as flat wastes, scavenger wastes, and several others, which cannot possibly be determined by a small test. Rather than have a bad system of costing, it is perhaps better to have no system at all. The man whose yarn cost is 15d. per lb., but who, by clumsy methods, figures it out at 12d., had better never have touched the subject. For such a man it is better to keep to the prices at which he knows his competitors are selling. They will probably be much nearer the mark than his own costs.

Let us assume, however, that the spinner has discovered, by proper methods, that the waste he is extracting for a carded yarn is 18 per cent on the weight of cotton used, and that, of this, 15 per cent is visible waste which can be collected and sold, and 3 per cent invisible loss. This means that from 100 lbs. of raw cotton there will be produced 82 lbs. of yarn. The regain we will assume to be 5 per cent, *i.e.*, on 82 lbs. yarn 4.1 lbs. There is, therefore, available for sale 82 + 4.1 or 86.1 lbs. yarn from 100 lbs. of cotton, and the cotton required to produce 1 lb. of yarn is $\frac{100}{86.1} = 1.16$ lb. Now if cotton is 30d. per lb. the cost of cotton to produce 1 lb. yarn is $30 \times 1.16 = 34.8$ d.

Let me here indicate the fallacy of adding to the price of cotton a fixed charge for any one count. Suppose the price of cotton is 30d. per lb. Then, with an 18 per cent waste loss, we have seen that the cost of cotton per lb. of yarn is $30 \times 1.16 = 34.8$ d., or the cost in waste is 4.8d. per lb. But if cotton is 35d. per lb. the whole cost is altered, for $35 \times 1.16 = 40.6$ d. or the cost in waste is 5.6d., an increase of practically 1d. per lb. due to waste loss alone. Every change in the price of cotton means a change in the cost of production. If cotton, to-day, is different in price to the price of yesterday, then the waste loss cost is also different. We must, therefore, calculate the cost of cotton afresh with every variation of price, and this is done most easily and simply by means of a cotton constant based on the amount of waste extracted. If 18 per cent of waste is being taken out we have seen that 1.16 lbs. of cotton will be required to produce 1 lb. of yarn, and by using this figure as a constant and multiplying it by the price of cotton we obtain the cost of cotton per lb. of yarn produced. This, however, will not be the nett cost of cotton per lb. of yarn, as we have seen that 15 lbs. of the 18 lbs. loss is saleable waste. Assuming that we obtain an average price of 10d. per lb. for the waste sold, then the amount received for waste per lb. of yarn is $\frac{15 \times 10}{86.1} = 1.74$ d. per lb., and the nett cost of cotton per lb. of yarn is $30 \times 1.16 = 34.8$. $34.8 - 1.74 = 33.06$ d.

Having obtained the cost of cotton, we next proceed to ascertain the costs of wages and expenses. Some mills do this on what is called "the average count basis." Suppose a mill is spinning counts ranging from 40's to 60's, and that, taking a year or half year, the average count spun is found to be 52's and the average cost of

working the mill in wages and expenses to be 12d. per lb. of yarn for the whole production. Now, in this method of the average count basis, this average cost of 12d. per lb. is taken as the basis cost per lb. of 52's counts, and the cost of every other count is found from it by simple proportion, *viz.*—

$$\text{Cost of 40's} \dots\dots \frac{12 \times 40}{52} = 9.23\text{d. per lb.}$$

$$\text{Cost of 60's} \dots\dots \frac{12 \times 60}{52} = 13.85\text{d. per lb.}$$

Or, a constant may be obtained from the standard count say cost of 52's = 12d., then cost of 1's = $\frac{1}{52}$ d. = .231d., and the cost of other counts is obtained by multiplying the counts by the constant number as .231d. \times 40 = 9.24d. cost of 40's; .231d. \times 60 = 13.86d. cost of 60's, and so on.

Costs worked out on this plan, in my opinion, are not correct. Most items of yarn costs vary according to production—more production less cost, less production more cost. But the productions do not vary in exact ratio to the counts. Given the production of 50's you cannot obtain the production of 60's by inverse ratio, and yet that is what this method assumes. The production depends on many other factors than the counts. Your cotton may be quite suitable for 50's, but it may be at its utmost limit when spinning 60's and the production of 60's may therefore be low relative to 50's. Each count must be dealt with separately according to its own production and cannot be correctly calculated on the average count basis. It is much more satisfactory to assess your wages and expenses on a spindle basis.

Let us consider this in relation to wages. Suppose the weekly wages average 1200d. per 1,000 spindles and the production of 40's counts is 570 lbs. per 1,000 spindles then the cost in wages is $\frac{1200}{570} = 2.11$ d. per lb. for wages. If the production of 80's counts is 250 lbs. per 1,000 spindles, then the cost in wages is $\frac{1200}{250} = 4.8$ d. per lb. and so on. This is, I should

say, the method most commonly employed and is much more accurate than that of the "average count basis." Personally, I should go further than this and subdivide wages over the different processes, treating as one process only those processes in which all the cotton is treated alike. Suppose, for instance, a mill spins its yarns from one hank roving only. This means that all yarns, of whatever count, cost exactly the same amount per lb. up to the spinning machine. But if wages are divided according to spinning-room productions only, then the cost of 40's which you obtain is too low, and the cost of 50's is too high. These two yarns, if spun from the same hank roving, only differ in their costs in spinning and cost exactly the same in the preparation processes. In such a case, therefore, I should ascertain separate wages costs for card-room and spinning-room, and in a mill where the preparation processes differed for the different counts or qualities I should carry this division still further, which can easily be done without a great deal of additional labour.

Consider the item "General expenses" or "Working

charges.' These include a great variety of expenses, rents, rates, taxes, gas, water, insurance, oil, leather, interest, depreciation, in fact, every charge of working except wages. There need be no guessing as to their amount; every spinner's half-yearly trade account, if properly prepared, will show them grouped under appropriate headings. Care should be taken, however, that the amount arrived at is properly adjusted. Some expenses, such as oil, coal, depreciation—where it is a fixed amount—are in normal times fairly constant; others are periodical, such as lighting, painting, re-setting machinery, &c. Others, again, such as breakdowns and repairs, are not even periodical, but come at irregular intervals. Care should be taken that all these are brought in in their proper proportion by taking a sufficiently long period from which the basis figure of expenses is drawn.

When this figure has been ascertained, the spinner will proceed in the same way as that which I have outlined in the case of wages, bringing out his expenses to so much per 1,000 spindles or per pair of mules, and dividing the productions of the different yarns into this figure.

If it is desired to divide expenses over preparation processes and spinning processes, for the reason I explained in the case of wages, a little difficulty arises. It is easy to say what are the exact card-room wages, and what are the exact spinning-room wages, but not so easy to state the expenses of these processes—how much oil and leather, rent and rates are absorbed by the card-room processes, and how much coal, interest, and depreciation by the spinning process.

To ascertain these figures exactly by booking them against the different processes when they were used would require an army of storekeepers and an army of clerks, and we do not want to lay ourselves open to the criticism that I said was sometimes made against American systems: We must find some simpler method, making sure at the same time that we omit no items of expenditure.

If we carefully examine the expenses of a cotton spinning mill, we shall find that they fall into two or three groups. Consider, for instance, an item of expenses like depreciation. Suppose you have two processes, one of which contains £10,000 worth of machinery, and the other £20,000 worth of machinery, then it is reasonable to assume that the £20,000 process will cost twice as much in depreciation as the £10,000 process. I say it is a reasonable assumption. It may not be absolutely true, because the £10,000 process may involve short-lived machinery, and the £20,000 process long-lived machinery. On the whole, however, it will be true.

Consider now such items of expenditure as lighting, rents, and rates. If you have a process which occupies 1,000 square yards and another which occupies 2,000 square yards, then it is a reasonable assumption that the 2,000 square yards process will consume twice as much lighting as the 1,000 square yards process—twice as much rent and twice as much rates. Or, take fuel and oil. If you have a process requiring 100 horse power and another requiring 200 horse power, then

the 200 H.P. process will require twice as much coal as the 100 H.P. process and twice as much oil.

I throw these considerations out merely as suggestions. Each mill will be best dealt with on its own merits as to the division of expenses, but by an intelligent application of this principle the expenses can be easily apportioned. Once apportioned, they can be expressed on the basis of 1,000 spindles, or per mule, or per roving frame, or on whatever basis is most suitable, and applied to the productions ascertained on the same basis.

As regards discount, this is so simple a matter that I do not propose to say more about it than that it must be reckoned on the selling price and not on the cost of production.

Such is a brief outline of the subject of Productive Costs in Cotton Spinning Mills. The illustrations I have used are, of course, of simple character, and in actual practice would be complicated by mixtures of cottons, varying wastes, and all kinds of internal combinations and divisions which would have to be taken into consideration, but they serve to indicate the principles which I wish to emphasise. May I add that once a mass of data for costing is accumulated, endless means of application will suggest themselves. Variations in production are shown up: excessive costs and wastes become apparent, and can be remedied. The mere fact of recording and classifying production has, in a great many instances, actually increased the productions of non-pieciwork processes, as there is nothing which so much contributes to slackness in industry as the knowledge that no notice is being taken of the work which is being done.

DISCUSSION.

The CHAIRMAN welcomed the opportunity to hear the paper by Mr. Hardman, and said that whilst he had every confidence in the ability of those engaged in the industry, he realised that progress must be maintained in all departments. Efficiency must be developed to higher and higher levels and, along with a better educated class of workpeople, there must be better trained staffs in the mills. With regard to discounts on yarn, he noticed that the Yorkshire spinners had agreed to abolish discount. The question had been considered in Manchester and would be further considered. The spinners would have to push along in this matter.

Mr. JOHN CROMPTON moved a vote of thanks to Mr. Hardman, and said that the importance of many points raised in the lecture was accentuated by the abnormally high price of cotton. These district meetings were intended to arouse interest in the work of the Textile Institute, and he was glad to see an excellent attendance on that occasion. It was high time that the huge textile industry possessed an Institute worthy of its dimensions.

Mr. T. FLETCHER ROBINSON (Chairman of Lancashire Section Committee) seconded, and the vote was heartily accorded, a similar vote being passed, on the motion of Mr. JOHN INGHAM, seconded by Mr. T. FLETCHER, to the Chairman and to the Education Committee for facilities for holding the meeting.