The Fair Number of Apprentices in a Trade
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The grouping does more. It makes it the employer's interest, as it is essentially the workman's, to *avoid* accidents. The law gives the corporations ample powers for the purpose. They may decree preventive measures, they may inspect factories, they may impose heavy fines and raise contributions for non-compliance. As experts, and persons liable for the expense incurred, they are in a far better position to deal effectively with careless or refractory employers than even the state. And they *use* their power. Their own factory inspectors are stricter by a good deal than the Government officials. Preventive measures and appliances accordingly are now studied and resorted to as they never were before. The consequence is an avoidance of accidents, which in Germany and Austria is never so much as questioned—though the number of *notices* of accidents has very accountably increased—and which is particularly striking in the diminution of *serious* accidents.

Here is undoubtedly good work done, work which deserves, as it promises, to be carried beyond the limits of the country in which it has been first practised. It is nonsense to talk of the measure as socialist, or the insurance as state-supported. The state pays nothing except the trifling cost of the supervising central office. The superiority of this state-supervised, compulsory insurance over purely voluntary insurance, which often does not give his due to the workman, is now generally admitted. Dr. Bödiker also considers his own method decidedly preferable to our own of trying cases at law. Litigation must mean delay, heavy costs, uncertainty of award, bad blood between employer and employed. It may mean evasion, contracting out, intimidation, appeals beyond the reach of the poor man's purse.

The results set forth in President Bödiker's handy and compact, yet full and, of course, strictly accurate account of what has been and is being done certainly go far to bear out his contention in respect of accident insurance. The magnitude of the work accomplished may be judged by the fact that in the past year compensation was paid in respect of more than 266,000 accidents. Dr. Bödiker's book certainly deserves to be studied. It may not convince all of us that insurance is better than liability and law-suits. But it will help us in preparing to perform the task which every one allows to be one of the most pressing and most important of the day: the task of providing security against loss by accidents to our workmen, and so advancing one step nearer to industrial peace.

HENRY W. WOLFF

THE FAIR NUMBER OF APPRENTICES IN A TRADE.

THE problem of supply and demand has by this time been solved in the general case. In the special case of skilled labour it is probable that the theory requires some slight modification, because skilled labour is distinguished by several peculiarities from other instruments

of production.[1] One of these consists in the fact that it takes a long time to produce a skilled labourer—whereas the final product of this labourer's skill is produced by him in a comparatively short time. it takes several years to produce a skilled cabinet-maker, but not so many weeks for this cabinet-maker to make a cabinet.

When labour was unorganised the capitalist, or more accurately, the undertaker, had the task of deciding how many young men should be taught the trade that he was directing. We may assume that, *cæteris paribus*, his general policy would be to have as many apprentices as he conveniently could in order to keep the skilled labour market somewhat overstocked, and consequently to keep wages as low as possible.

At the present time in this country we find that the skilled workmen of different trades unite themselves into powerful organisations with the object of protecting their interests as workmen. Realising that a large supply of skilled labour tends to keep their wages down, and conversely that a small supply of skilled labour tends to raise their wages, these Trade Unions not infrequently make rules limiting the number of apprentices that should exist in any trade (or branch of the trade in any locality) and endeavour to force the acceptance of these rules upon the employers. On account of these rules disputes frequently occur. At present there appear to be but three methods for settling an industrial dispute—(1) a strike or lock-out, (2) conciliation, (3) arbitration. In either of the last two methods some general idea of what would be a reasonable basis of settlement would appear to be desirable. In the case of the first method public sympathy is often so important a factor that it is desirable that the public should have some idea of the probable consequence of the success of either party.

When the dispute is about the number of apprentices in the trade, the question to be settled is 'What is a "fair" or "reasonable" number of apprentices in the trade?' What number is best for the united interests of the employers, the employees, and the public at large? The employers considered alone wish the supply of skilled labour to be as large as possible, the skilled workmen already in the trade wish it to be as small as possible, the interests of the public require, to use a vague phrase, that the supply of skilled labour should be adequate for the requirements, both present and prospective, of the trade.

It is a hopeful sign that all parties generally express a desire to do what is fair or reasonable, and that in many Trade Union rules we find that one of their objects is not to restrict the supply of skilled labour but 'to keep the number of apprentices within reasonable limits.' The main object of this article is to attach some meaning to this expression.

At the outset an objection to such an inquiry being undertaken by a student may reasonably be urged. It may be said, 'This is a practical

[1] Marshall. *Principles*, pp. 591–614.

question, and therefore a mere student is not competent to deal with it.' To this I reply, that practical men have tried to deal with it, and have failed, in my opinion, because they were not clear about the theory. To justify this assertion I propose first to take an actual practical case—in fact the most important actual case that has arisen—which has been discussed by practical men of great ability. The actual discussion of this case shows that there is a confusion between two theoretical standards of fairness. I shall therefore discuss these theoretical standards separately both theoretically and in reference to the existing state of affairs in this country. Finally, I shall make a few observations in order to indicate which of these standards of fairness is the better. What I chiefly want to bring out is that these two standards are not merely theoretically different, but that they also may lead to quite different practical conclusions.

We will now turn to our practical case. It is that of the action of the 'Boiler-makers' and Iron and Steel Ship-builders' Trade Union' in endeavouring to limit the number of apprentices so that the ratio of apprentices to journeymen should be 1 : 5. On this question evidence on the side of the employers was given before the Labour Commission by Mr. J. Inglis (of the firm of A. and J. Inglis), and on behalf of the men by Mr. R. Knight (of the Boiler-makers' and Iron and Steel Ship-builders' Society).

Mr. Inglis in his examination in chief[1] before group 'A' of the Labour Commission, states that among the boiler-makers apprenticeship begins at the age of 17, lasts five years till 22, and that a journeyman's life lasts 23 years to 45. Taking an age-distribution table for English males, he finds that for every 100 males between 17 and 22 there are about 323 between 22 and 45. He therefore says that if the ratio of 1 : 5 were fixed and adhered to in every trade 36 per cent. of the population would have to remain idle (since $\frac{1}{5}$ of 323 is about 64, and therefore only 64 out of every hundred young men could have a trade). He then goes on to say that if the ratio is less than 1 : 3 the number of journeymen in the trade will positively decrease, whereas, as the shipping business on the Clyde is expanding, it is probable that more rather than less men will be necessary in the future to meet the requirements of the trade. It will be seen that in this statement Mr. Inglis suggests or implies two standards of 'fairness.' On the one hand, he thinks it 'unfair' that a trade should not absorb its fair proportion of the growing population; on the other hand, he thinks that the number of apprentices should be such as to meet the probable future requirements of the trade.

Now in a growing population these two standards of fairness are by no means the same. In order to find out what ratio of apprentices to journeymen is the same as that of the number of men of apprentice's age to the number of men of journeyman's age, we evidently want an age-distribution table for the population. This Mr. Inglis

[1] Q. 26,093. . . . C. 6,194 III.

quite correctly uses. But if we want to know what is the ratio of apprentices to journeymen which will either keep the number of journeymen constant or will make them increase at a certain rate, it is clear that we want a life table (and in a growing population a life table is by no means the same as an age-distribution table).

Mr. Knight[1] wished to dispute Mr. Inglis's conclusion, and obtained some figures from the Right Hon. Joseph Chamberlain, from which he concluded that the ratio of journeymen to apprentices which would keep the number of journeymen constant is 4·7 : 1.[2] But he distinctly states that his Trade Union 'are anxious to take their fair share of the lads into the trade according to the male population of the United Kingdom.' For this he would want an age-distribution table, whereas the figures furnished by Mr. Chamberlain and the Prudential Assurance Society give a life table.

Here, then, we have a definite confusion; both Mr. Inglis and Mr. Knight confuse two different standards of fairness; the former takes the figures for one, the latter for the other standard. Neither can understand the other's argument and calculation, and neither is really assisted by efficient cross-examination. We are confronted with the sad spectacle of two men who are experts in matters of their trade, who both wish to do what is just and fair, who come to different conclusions because neither realises that there are two different standards of fairness in question. And this confusion is not merely of theoretical interest. It is one of not inconsiderable practical importance; we have a strong federation of employers arrayed against a strong Trade Union; a serious dispute between them might cause something like a national disorder. And if a strike or lock-out had arisen it would have been caused by a somewhat imperfect knowledge of vital statistics on the part of two extremely able, intelligent, and fair-minded men.

We find, then, that there are two distinct standards of what is 'fair' or 'reasonable' existing in the minds of both employers and employees. But no one seems to have perceived that they are different, and that two different sets of statistics are necessary in the two cases.

The two standards suggested are as follows:—

(1) That the ratio of apprentices to journeymen should be that of the number of males in the country of an apprentice-age to that of the number of males at journeyman's age. To find this we require an age-distribution table.

(2) That the ratio of apprentices to journeymen should be such that the number of journeymen remains constant, or else increases at a definite rate (to be determined by the probable future requirements of the trade). For this we require a life table for men employed in this trade.

[1] Q. 20,681.

[2] Since the report of the Labour Commission Mr. Knight has kindly furnishe me with figures obtained from the Prudential Assurance Society which led to 4·1 : as the ratio.

In order to be quite clear, and to show that these two methods are not only theoretically distinct, but are liable to lead to widely divergent practical results, it is necessary to give a short theoretical discussion of the relation between a life table and an age-distribution table.

The life table is constructed as follows (see Fig. I.):—

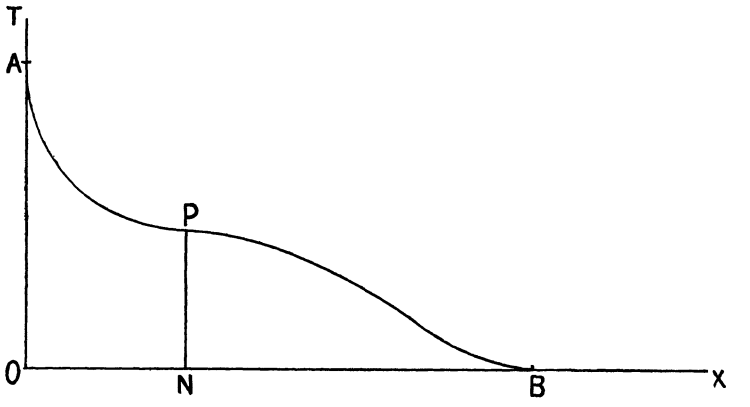

FIG. I.

Take two rectangular axes and draw a curve *APB*, so that if *PN* is any ordinate *PN* denotes the number of males alive out of *AO* (say 1,000,000) born at a time *ON* ago. That is, suppose *AO* represents 1,000,000 babies born in 1800. Then if *ON* is thirty years, *PN* will be the number of them still living in the year 1830. *OB* is something like 100 years.

The age-distribution table is constructed as follows:

For a given year draw a curve *APB* so that the ordinate *PN* denotes the number of persons living at the age *ON*. We see that in a stationary population the age-distribution table and the life table coincide.

To see the relation between an age-distribution and a life table draw life tables for each year from (say) 1800–1900, taking the initial ordinate to represent the actual number of children born in that year. Place them side by side so that we obtain the solid figures *ABC*, *DEF*. *ABC* is the life table for 1800, *DEF* for 1900, and its section by any plane parallel to them will give the life table for the corresponding year. The number of babies born in a year has increased from *AB* in 1800 to *DE* in 1900 (see Fig. II.).

Then it is evident that the diagonal section *DEC* gives us the age-distribution table to be obtained by a census in 1900.

Analytically we express the relations between them as follows (see Fig. V., p. 636):—

Let $y=f(x)$ be a life curve; that is, out of (say) 1,000,000 infants born at a given time, y denotes the number alive at the age of x. To

convert this into an age-distribution table we must diminish each ordinate in the ratio of the population at the time ON years ago to that at the present time. If, for simplicity, we assume that the popu-

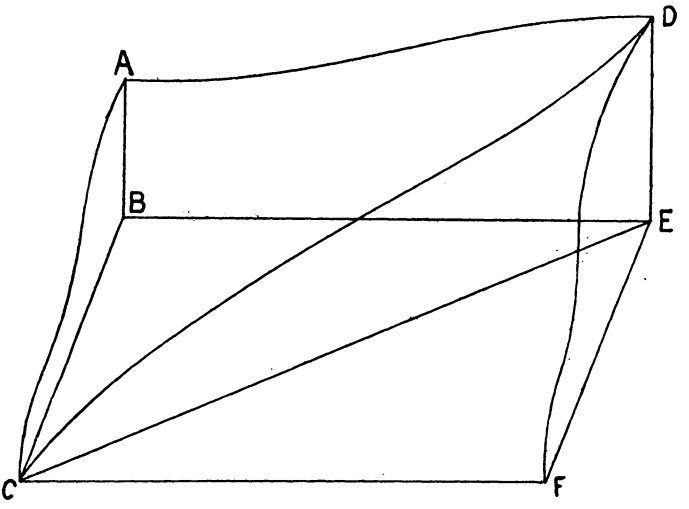

FIG. II.

lation has been increasing uniformly at the rate of r per cent. per annum we must replace the ordinate PN by $P'N$, where

$$\frac{PN}{P'N} = R^{ON} \quad \text{and} \quad R = 1 + \frac{r}{100}$$

Hence if y' is the ordinate of our age-distribution curve, we obtain $y' = yR^{-x}$

and our age-distribution curve is $y' = f(x)\ R^{-x}$

If apprenticeship begins at the age t_1, ends at the age t_2, and the journeymen cease working at the age t_3, then according to the first standard of fairness the ratio should be

$$\int_{t_3}^{t_2} y'dx : \int_{t_2}^{t_1} y'dx \text{ or } \int_{t_3}^{t_2} f(x)\ R^{-x}\,dx : \int_{t_2}^{t_1} f(x)\ R^{-x}\,dx$$

Whereas if we take the second standard of fairness (that the number of journeymen should be constant) we obtain the ratio

$$\int_{t_3}^{t_2} f(x)dx : \int_{t_2}^{t_1} f(x)dx$$

And these are evidently by no means necessarily the same. The actual differences in the figures will be given later. For our present

purpose there is not much need to give any further theoretical discussion, as any further points that arise can be discussed in connection with the numerical data available. But some theoretical discussion was absolutely necessary, if only to clear up the great

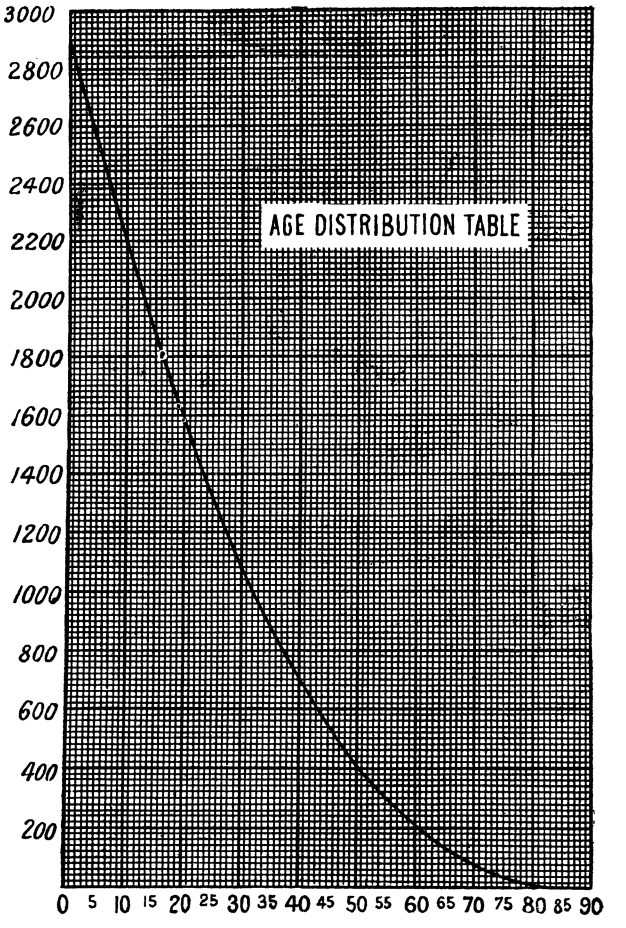

FIG. III.

Age Distribution Table (English males).
Abscissæ denote years of age.
Ordinates denote number of people (0,000 omitted) at and above that age.
From the 1891 Census, Appendix A, Table II.

confusion into which 'practical' men fall when dealing with problems which depend upon statistical data. From the short account that has been given of the evidence and cross-examination of both Mr. Inglis and Mr. Knight before the Labour Commission, it will be seen that the

confusion existed not only in the minds of the employers and employees, but also, apparently, in the minds of those members of the Labour Commission who were present on those occasions. To clear up this confusion it was necessary to have recourse to those theoretical considerations which it is the fashion of practical men to despise.

If now we are going to be practical we must have definite and accurate numerical data. Naturally it is not possible to obtain them. It will be seen from what we have said above that what we want are (1) An age-distribution table for this country, (2) Life tables for the different trades.

For the age-distribution table I have taken the result of the 1891 census. It appears to be full of errors; setting aside the fact that by certain classes of people their ages are deliberately given wrongly for various reasons, we find the melancholy fact that most people do not know their age, and so put it down at a round number, 30 or 40 or 50 as the case may be. In order to get the age-distribution table it is necessary to take five years' average and then interpolate. It seems probable that this table is accurate enough for our purpose.

Instead of taking the ordinary form of the age distribution curve in which the ordinate represents the number of males alive *at* the age represented by the abscissa I have drawn a curve in which the ordinate represents the number of males *at and above* the age represented by the abscissa. So that if $y = \phi(x)$ is the ordinary age-distribution table, then $y' = \frac{1}{\Delta x}\int_{100}^{x} \phi(x)dx$ is the curve that has been drawn.[1]

The life table question is much more serious. Not only theoretically but practically we want a separate life table for each trade. I cannot find that any such tables have ever been constructed. I have therefore taken the life table in the supplement to the forty-fifth Annual Report of the Registrar-General. I have again, for purposes of this investigation, constructed a table in which the ordinate, instead of representing the number of people *at* a given age, represents the number *at and above* that age; so that in my table the ordinate represents the number of persons at and above an age given by the abscissa, if the birth rate had been constant and equal to the death rate for a century.[2]

Actually the life tables for different trades must diverge enormously from that for the whole male population. Different trades attract men of different physique, and subject the men employed in them to different conditions of unhealthiness. There is a good deal of information about the different rates of mortality in different trades,[3] and about the special diseases caused by following different occupations.

[1] See Fig. III. [2] See Fig. IV.

[3] See Farr's *Vital Statistics*, Newsholme's *Vital Statistics*, and the reports of the Registrar-General and Mr. Burnett's reports to the Board of Trade; also several papers read before the Statistical Society.

The census returns make a rough classification of trades, with the numbers of men employed at different ages (in groups of five years), but the classification is too vague to be of any use for the present purpose.[1] It is therefore necessary either to exclude abnormally unhealthy trades

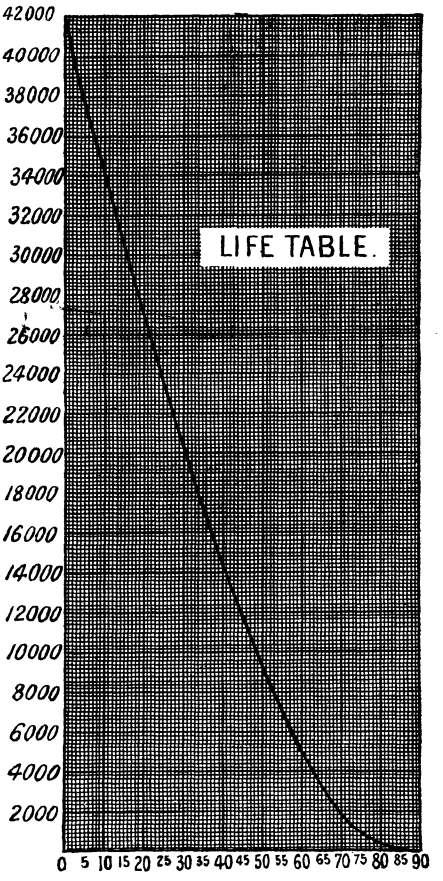

FIG. IV.

Life Table (English males).
Abscissæ denote years of age.
Ordinates denote proportional number of people at and above that age, if the birth rate had been constant and equal to the death rate during the past century.
From the Supplement to the Forty-fifth Annual Report of the Registrar-General, pp. vii., viii.

from our present consideration, or else to realise that many calculations dependent on the life table applied to them are subject to enormous error. In all cases the error is probably a good deal larger than any error that

[1] See Dr. Ogle's examination before the Labour Commission. It is little short of a public scandal that we have not got a quinquennial census.

arises when we are discussing numerically our first standard of fairness. But in the absence of other data it was necessary to use this life table, and I think that in the case of many trades the error will be slight, the more especially as in the case of some trades there seems to be a sort of compensatory action due to the fact that men of strong physique go into trades in which the work is very hard. The trades that must, I think, be excluded are those like certain chemical trades which are especially deadly without necessarily requiring any special physical exertion.

Taking the data we have got we can get definite numerical conclusions. The results show that there is or may be a large difference between the two standards of fairness. To show how the numerical work is done I will work out a few cases as specimens and then will give tables of numerical results.

Problem.

In a certain trade a workman begins his apprenticeship at 16, becomes a journeyman at 21, and ceases to work at 45. What is a 'fair' ratio of journeymen to apprentices?

(1) Taking the first standard of fairness we require an age-distribution table. From this we see (see table) that in England for 18·3 millions of persons of the age of 16 and over, there are 15·4 of the age of 25 and over, and 5·5 of the age of 45 and over. If the ratio of journeymen to apprentices is to be that of men between 21 and 45 to men between 16 and 21, we see that the required ratio is given by

$$\frac{154-55}{183-154} = \frac{99}{29} : 1 \text{ or } 3{\cdot}4 : 1$$

(2) Taking the second standard of fairness we want a life table.

1. Suppose we want to keep the number of journeymen constant, then from the table we see that the ratio is 147 : 34 or about 4·3 : 1, for we see that for every 34 men between 16 and 21 we have 147 between 21 and 45.

2. Suppose we want the journeymen to increase at the rate of μ per cent. per annum. Let x denote the required ratio; then formerly 6 out of 34 apprentices became journeymen every year, now $\frac{4{\cdot}3}{x}6$ is the number.

$$\therefore 6\left\{\frac{4{\cdot}3}{x} - 1\right\} = \frac{\mu}{100}147$$

$$\therefore x = \frac{2580}{600+147\mu}$$

Whence we obtain

if	$\mu =$	1,	2,	3,	4,	5	and if	$x =$	2,	3,	4,	5
	$x =$	3·5,	2·9,	2·5,	2·2,	1·9		$\mu =$	4·7,	1·8,	0·3,	−0·6

I will now give tables of numerical relations for both standards of fairness. Taking our first standard of fairness, which requires an age-

distribution table, the most natural form in which to put the problem is this: 'Given the ages at which lads begin to be apprentices, and at which they become journeymen, and the age at which men cease to work at the trade, what is the fair ratio of journeymen to apprentices?' To answer this we have—

AGE OF LEAVING THE TRADE.[1]

Time of Apprenticeship.	40.	45.	50.	55.	60.	65.	70.
14—21	2·0 : 1	2·4 : 1	2·7 : 1	3·0 : 1	3·2 : 1	3·4 : 1	3·6 : 1
15—21	2·4 : 1	2·8 : 1	3·2 : 1	3·5 : 1	3·8 : 1	4·0 : 1	4·4 : 1
16—21	2·9 : 1	3·4 : 1	3·9 : 1	4·3 : 1	4·5 : 1	4·9 : 1	5·0 : 1
17—21	3·8 : 1	4·5 : 1	5·1 : 1	5·6 : 1	6·0 : 1	6·4 : 1	6·6 : 1

But as the age at which men cease to work at the trade is not very definite, we sometimes find it useful to put the question in the form 'Given the time of apprenticeship, and the ratio of apprentices to journeymen, at what age do men leave the trade if the ratio is fair?' To answer this we have—

RATIO.[2]

Time of Apprenticeship.	1 : 2	2 : 5	1 : 3	2 : 7	1 : 4	1 : 5	1 : 6
14—21	$39\frac{3}{4}$	46	55	67	—	—	—
15—21	$36\frac{1}{4}$	$41\frac{1}{2}$	46	$54\frac{1}{2}$	64	—	—
16—21	33	37	$41\frac{1}{2}$	46	$51\frac{1}{2}$	69	—
17—21	30	32	$35\frac{1}{2}$	$38\frac{1}{2}$	$41\frac{1}{3}$	49	59

Turning to our second criterion of fairness we have different cases according to the probable expansion of the trade. First, suppose that we wish to keep the number of journeymen constant. Then taking our life table for English males we can construct the following table.

AGE OF CEASING WORK.[3]

Time of Apprenticeship.	40.	45.	50.	55.	60.	65.	70.
14—21	2·5 : 1	3·1 : 1	3·7 : 1	4·1 : 1	4·6 : 1	5·0 : 1	5·2 : 1
15—21	3·0 : 1	3·6 : 1	4·2 : 1	4·8 : 1	5·2 : 1	5·7 : 1	6·0 : 1
16—21	3·5 : 1	4·3 : 1	5·1 : 1	5·7 : 1	6·3 : 1	6·9 : 1	7·2 : 1
17—21	4·4 : 1	5·4 : 1	6·4 : 1	7·2 : 1	8·0 : 1	8·6 : 1	9·1 : 1

[1] From doing the work in various ways I have come to the conclusion that the error in the ratio is within ± ·1.

[2] In this table I think that the error in the number of years is within ± ½.

[3] Error within ± ·1.

As in the previous case it is sometimes useful to have the inverse table.

RATIO.[1]

Time of Apprenticeship.	1:2.	2:5.	1:3.	2:7.	1:4.	1:5.	1:6.	1:7.	1:8.	1:9.
14—21	35½	39½	44	48½	53½	66	—	—	—	—
15—21	33½	37	40½	44½	48½	57½	70	—	—	—
16—21	31½	34	37	40	43	49½	57	67	—	—
17—21	29½	31	33½	36	38	43	48	53½	60½	69

Next suppose that the volume of trade is increasing rapidly, and that therefore the number of journeymen should increase at the rate of 5 per cent. per annum. We calculate this in the same way as in the example above given. It is interesting to note how very different the results of this table are from the one in which the number of journeymen is constant.

The table is:—

AGE OF CEASING TO WORK.

Time of Apprenticeship.	40.	45.	50.	55.	60.
14—21	1·3:1	1·4:1	1·5:1	1·6:1	1·6:1
15—21	1·5:1	1·6:1	1·7:1	1·8:1	1·9:1
16—21	1·8:1	1·9:1	2·1:1	2·2:1	2·2:1
17—21	2·2:1	2·4:1	2·6:1	2·7:1	2·8:1

If the rate of increase of journeymen is only 1 per cent. per annum we obtain—

AGE OF CEASING TO WORK.

Time of Apprenticeship.	40.	45.	50.	55.	60.
14—21	2·1:1	2·5:1	2·9:1	3·2:1	3·4:1
15—21	2·5:1	2·9:1	3·3:1	3·6:1	3·8:1
16—21	2·9:1	3·5:1	4·0:1	4·3:1	4·6:1
17—21	3·7:1	4·3:1	5·0:1	5·4:1	5·9:1

I also give tables showing the ratios required for giving percentage rates of increase of 1, 2, 3, 4, 5, for each of the four periods 14–21, 15–21, 16–21, 17–21 (*see* page 628).

Actually we find that many of the Trade Union rules for limiting apprentices do not merely aim at keeping a fixed ratio between the number of journeymen and the number of apprentices, but are much more complex. In many cases a maximum number of apprentices is fixed for each office, in others the ratio is given in the form $\phi(n) : n$

[1] Error within $\pm \frac{1}{2}$.

where n is the number of apprentices; sometimes some combination of these two rules is used. The number of apprentices is also restricted in many other ways; in some trades a high premium has to

14—21.	40.	45.	50.	55.	60.
1 per cent. increase	2·1 : 1	2·5 : 1	2·9 : 1	3·1 : 1	3·4 : 1
2 ,, ,,	1·8 : 1	2·1 : 1	2·4 : 1	2·5 : 1	2·7 : 1
3 ,, ,,	1·6 : 1	1·8 : 1	2·0 : 1	2·1 : 1	2·2 : 1
4 ,, ,,	1·4 : 1	1·6 : 1	1·7 : 1	1·8 : 1	1·9 : 1
5 ,, ,,	1·3 : 1	1·4 : 1	1·5 : 1	1·6 : 1	1·6 : 1
15—21.					
1 per cent. increase	2·4 : 1	2·9 : 1	3·3 : 1	3·6 : 1	3·8 : 1
2 ,, ,,	2·1 : 1	2·4 : 1	2·7 : 1	2·9 : 1	3·0 : 1
3 ,, ,,	1·8 : 1	2·1 : 1	2·3 : 1	2·4 : 1	2·5 : 1
4 ,, ,,	1·6 : 1	1·8 : 1	2·0 : 1	2·1 : 1	2·1 : 1
5 ,, ,,	1·5 : 1	1·6 : 1	1·7 : 1	1·8 : 1	1·9 : 1
16—21.					
1 per cent. increase	2·9 : 1	3·5 : 1	4·0 : 1	4·3 : 1	4·6 : 1
2 ,, ,,	2·5 : 1	2·9 : 1	3·2 : 1	3·5 : 1	3·7 : 1
3 ,, ,,	2·2 : 1	2·5 : 1	2·7 : 1	2·9 : 1	3·0 : 1
4 ,, ,,	1·9 : 1	2·2 : 1	2·4 : 1	2·5 : 1	2·6 : 1
5 ,, ,,	1·8 : 1	1·9 : 1	2·1 : 1	2·2 : 1	2·3 : 1
17—21.					
1 per cent. increase	3·7 : 1	4·3 : 1	5·0 : 1	5·4 : 1	5·9 : 1
2 ,, ,,	3·1 : 1	3·6 : 1	4·1 : 1	4·4 : 1	4·7 : 1
3 ,, ,,	2·8 : 1	3·1 : 1	3·4 : 1	3·6 : 1	3·9 : 1
4 ,, ,,	2·4 : 1	2·7 : 1	3·0 : 1	3·1 : 1	3·3 : 1
5 ,, ,,	2·2 : 1	2·4 : 1	2·6 : 1	2·7 : 1	2·9 : 1

be paid, in others only the sons of members of that trade may be instructed in the trade, in others no man may have an apprentice until he is of a certain age. To make general numerical tables for all the cases that are likely to occur would not only be laborious, but also rather useless as there are so many small variations. I have therefore contented myself with drawing up the numerical tables, given above, which give the numerical relations under the simpler and more natural rule, that of a simple ratio.

If now we wish to consider facts, where are we to obtain these facts? The sources of information are meagre and inadequate. In the first place we have the blue books issued by the Labour Commission. They unfortunately are somewhat badly indexed, and are not well arranged, at any rate for the special purpose in hand. But they contain an enormous amount of valuable information on the subject, which I have endeavoured to extract to the best of my ability. We have also the admirable reports of Mr. Burnett to the Board of Trade. There are a certain number of review articles and some information in the

text-books. With regard to the health in different trades we have a good deal of information in such books as Dr. Farr's *Vital Statistics*, and there is some in Mr. Burnett's reports. But we have no life tables for different trades. The classification of trades in the census report is very vague, so that practically an age-distribution table is all we obtain from this source. I have endeavoured so far as possible to supplement my information by making inquiries from various Trade Union secretaries, and I have obtained much information in this way. The chief difficulties arise from two sources—

(1) Definite apprenticeship is dying out; and it is therefore somewhat difficult to find out which are the sources of skilled labour.

(2) With regard to this particular matter Trade Union rules are subject to so great a local variation, that it is difficult to make any general statement about many Trade Unions.

If we look at the apprenticeship in England we find in general that there is very little regular indentured apprenticeship, and not much apprenticeship of a looser kind. In many trades all apprenticeship has died out, and boys are left to pick up the trade as best they can. This tends to produce inferior workmen. In trades in which there are apprentices we often find that they are taught to perform a few simple operations, in lieu of being given a thorough knowledge of the trade, but this specialisation is probably due to the ever increasing use of machinery. Still there are a good many trades in which there is some sort of apprenticeship system. Many Trade Unions have rules which aim at limiting the number of apprentices, either because they find that the employers prefer to use boys who work cheaply and in consequence do not employ so many journeymen, or with the intention of lessening the supply of skilled labour in the trade and thereby causing wages to rise. As a matter of fact in many cases the Trade Unions are not strong enough to enforce these rules; and when the rules are unwise the harm caused by their existence is extremely small. For the purposes of this article, however, I merely consider the actual rules, without attempting to estimate how far they are really operative, and I only deal with those Trade Unions which have definite rules whose object is to limit the number of apprentices.

Looking broadly at the trades as they are grouped by the Labour Commission we find in group 'A,' which includes mining, iron, engineering, hardware, shipbuilding, and cognate trades, but three instances of a definite rule for the limitation of apprentices. In Group 'B' which deals with agriculture, railways, shipping, canals, docks, and tramways, we do not find a single instance. In Group 'C' we find a good many instances, bakers, builders, coopers, the printing trade, and others, all have some sort of rules, which vary a great deal locally and are in some cases rather complex. Roughly speaking there exist about 100 Trade Unions which have a more or less definite rule for the limitation of the number of

apprentices. But the total number of men belonging to the unions in all probability does not exceed 200,000. I have considered the effect of the rules of each of the unions separately, and have come to the following conclusions :—

(1) In the case of 21 Trade Unions, whose total membership exceeds 26,500, the rule is such that, if carried out strictly, it would cause the number of journeymen in the trade to diminish.

(2) In the case of 23 Trade Unions, whose total membership exceeds 35,500, the rule is such that, if carried out strictly, it would not cause any diminution in the number of journeymen in the trade, but, on the other hand, it would not permit the number of journeymen to increase as fast as the male population of England is increasing.

(3) In the case of 43 Trade Unions, whose total membership exceeds 86,500, the rule is such as to permit the number of journeymen to increase at least as fast as the male population of England.

There are also 16 Trade Unions which have definite rules, but about which I am unable, for various reasons, to form any opinion.

We must now consider which of the two standards of 'fairness' is the better.

At first sight, it would appear that the supply of labour should be determined merely by the future requirements of every trade. As a matter of fact, however, the actual supply of unskilled labour, ready to be converted into skilled labour, is not determined by these considerations, but very much more by the general prosperity of the country in the past. At any rate the consideration of what does determine the actual number of youths in the population at any given time is outside the scope of this article. It must be assumed as given within certain limits. Supposing then that experts, chosen from both employers and employed were fairly well agreed as to what the requirements of each trade in the country are likely to be in the near future, would it not be obviously reasonable to take these estimates and to adjust the number of apprentices in every trade in accordance with them? It might be fair, but what if it were impracticable? If we had all these estimates, and if we had in addition accurate life tables for every trade in the country, we might find, for example, that the required future supply of skilled labour was such as to require that the population was increasing at the rate of five per cent. per annum. If the population was actually increasing at the rate of only one or two per cent. per annum, we should have as a first approximation to reduce all our ratios in accordance with this. Or if we found that on the whole the trades in this country were likely to want a decreasing number of workmen, but that the population was increasing, should we care to fix ratios which would result in giving us an ever increasing number of unemployed?

This is perhaps only hypothetical, but it illustrates the difficulty. The amount of labour required in any trade depends, *inter alia*, upon the price to be paid for that labour. We cannot estimate this without considering many factors, one of which is the rate at which

the population is increasing. From a practical point of view the first of the two standards has the great advantage that it is very definite. The age-distribution table for the male population remains very nearly the same from decade to decade, and does not vary from trade to trade. The construction of life tables for all the important trades would be very laborious, and in cases where the conditions of life were at all abnormal might be very difficult. But this much may perhaps be said. If the ratio of apprentices to journeymen actually existing in any trade, or that ratio which either the employers or the Trade Unions wish to institute, is unfair on the basis of both standards, taking the opinion of experts with regard to the future requirements of the trade, and having calculated the ratio from a life table for that trade—if, I say, the ratio is unfair according to both standards we may, I think, say quite straightforwardly that it is unfair, and direct our sympathies accordingly in the case of any industrial dispute on this point. We may perhaps go even further than this, and say that the existing circumstances or the aims of either employers or employed are contrary to the public interest, and blame them from the point of view of the community at large. By this I do not mean to advocate, or to approve of, any arbitrary interference by the Government in matters which principally concern those engaged in the trade. But if we are going to interfere either actually or by expressing our opinions, we must have some basis to go upon. To give that has been the object of this article.

At this point it may fairly be asked, 'Is this question one of practical importance?' It must be admitted that at the present time it is not a question of very great practical importance. If a Trade Union has had an unfair rule on this point it has rarely been able to actually carry it into effect. Employers as a whole have not had any very definitely formulated policy. A great number of individual instances may perhaps be collected where an employer has an unfair number of apprentices, but this applies at most to employers in a particular locality, rarely or never to the employers in a given trade as a whole. But in the future it may I think become a question of not inconsiderable importance because of the present tendency of both employers and employed to combine. Already in one or two important trades an agreement on this point has been come to (*e.g.* shipbuilding), or the matter has been settled by arbitration (*e.g.* boot and shoe trade). And locally there have been a good number of disputes, in which the question of apprentices or boy labour has played a not unimportant part.[1] With greater organisation disputes may become less frequent, but when they do occur they are of greater magnitude. So everything that tends to cause disputes is bad. Every attempt to settle disputes, whether by conciliation or by arbitration, is to be commended. A definite basis for argument makes it easier to come to an arrangement, and is so far desirable. But it is perhaps still more desirable that the agreement

[1] In England about one strike in every 300 is connected with this question.

should not be contrary to the interests of the public. How far any agreement on this point is likely to be so much contrary to the public interest that it would come within the eye of the law is the question that must now be considered.

Before considering how far any possible arrangements or agreements with reference to the number of apprentices in any given trade are illegal or invalid it will be well to give a brief statement of that part of the law of contract which has a direct bearing on this question. I do this with considerable hesitation because I am fully aware of the fact that it is dangerous for any one but a lawyer to make such a statement; yet I do not see how I can neglect to make the attempt. I shall exclude on the one hand any discussions of legal and valid relations that may exist between individuals or groups of individuals, and on the other hand I shall omit to consider any of those acts or contracts which are criminal.[1] The two kinds of relations that I shall consider are (1) contracts or acts which are tortious; (2) contracts which are invalid or void, though not in themselves wrong.

An individual or a combination of individuals may commit an act which is civilly wrongful, so that an action for damages will lie against that individual or group of individuals. The law on this point, so far as it is pertinent to our subject, is as follows:—

An act which would not be wrongful if done by one person does not become so merely because it is done by several persons acting together, but concerted action may be material as evidence that it was done with the wrongful intention of causing harm. (Mogul Steamship Co. *v.* McGregor, Gow, and Co., '92 A.C. 47.)

The courts will not undertake to define the limits of legitimate competition. That is to say, acts due to competition only become illegitimate when a definite wrong is done. In the Mogul case Lord Bramwell quoted with approval the words of Fry, L.J., to the effect that 'To draw a line between fair and unfair competition, between what is reasonable and what is unreasonable, passes the power of the courts.'

But an action for damages will lie against any one who maliciously procures a breach of contract, though he use perfectly lawful means in so doing. This is clear from Temperton *v.* Russell ('93 1 Q.B. 727). In this case Lopes, L.J., referred to Bowen *v.* Hall (6 Q.B.D. 733), and said that (1) A person who induces a party to a contract to break it, intending thereby to injure another person or to get a benefit for himself, commits an actionable wrong. (2) A combination by two or more persons to induce others not to deal with a particular individual or enter into a contract with him, if done with the intention of injuring him, is an actionable wrong, if damage results.[2]

[1] On this see Sir J. Stephen's *History of the Criminal Law*. See also Sir F. Pollock's memorandum to the Labour Commission.

[2] See also Wright and Co. *v.* Hennesy before Mr. Baron Pollock, reported in the *Times*, July 27th, 1895.

Since the organisations of employers and employed have no legal personality, they cannot sue or be sued for a breach of agreement.

Agreements which the members of a group of individuals make with one another, or which one group makes with another group, though they be not illegal in themselves, may yet be invalid because they are in restraint of trade or contrary to public policy.

Such an agreement is one by a body of men engaged in a trade to be bound by the will of the majority. In Hilton *v.* Eckersley (1855 6 E. & B. 47), Crompton, J., said, 'I think that combinations like that disclosed in the pleadings' (a number of manufacturers had agreed to act in accordance with the will of the majority) 'are illegal and indictable at common law, as tending to impede or interfere with the free course of trade and manufacture,' and further, 'I think it not to be endured that majorities and delegates of workmen or masters should in effect be allowed to legislate upon questions immediately affecting the happiness of the working classes and the prosperity of the trade and commerce of the whole nation.' From this view Erle, J., dissented, holding that the purpose of the agreement and its tendency was for the advancement of trade. Since the Trade Union Act such agreements are no longer illegal, but if they are in restraint of trade they are invalid. This is in accordance with the Mineral Water Bottle Exchange and Trade Protection Society *v.* Booth, 1887 (36 Ch. Div. 465). In this case a society of masters had a rule that no member should employ a traveller, carman, or other servant who had left the service of another member, without his consent, until two years after he had left the service of that member. Chitty, J., held that this rule was in restraint of trade and therefore void. On appeal the judgment was upheld by Cotton, L. J., Bowen, L. J., and Fry, L. J.

I will now apply these rules to the cases that are most likely to occur in connection with the limitation of the supply of skilled labour.

The delegates of a federation of employers and a federation of employed in a certain trade form a board of conciliation for the discussion and adjustment of their differences. They agree to limit the number of apprentices in the trade in accordance with the view of the majority of the delegates. Such an agreement, in accordance with what has been said above, is in restraint of trade, and is therefore invalid. That is to say, not only is it unenforceable against a society of employers or employed, but it is unenforceable against the representatives or delegates who made the agreement.

If, on the other hand, a group of employers agree that each will never have less than a certain number of apprentices, in order to keep the labour market for skilled workmen overstocked, and consequently to lower wages, it is difficult to see how such an agreement could be said to be in restraint of trade.[1] It is still more difficult to see how

[1] I am assuming that they are unanimous, and have not agreed to be bound by the will of the majority.

definite damage could be shown to have been caused to any one who lost or failed to obtain employment owing to the overstocked condition of the labour market.

If the members of a Trade Union agree to coerce an employer, by threat of a strike, into limiting the number of his apprentices, such an agreement, between the individual members, is probably invalid. If they succeed in preventing an employer from using an undue amount of boy labour,[1] and thereby prevent him from fulfilling a contract, it is difficult to argue that an action would lie against the Trade Union officials, who, under threat of a strike, made him keep the number of apprentices within the required limits, for such an action, if the object is merely to raise or keep up wages, is not malicious, and the breach of contract is only an indirect consequence.

If an official of a Trade Union induces an employer to dismiss an apprentice, or not to take on a boy as an apprentice, is this action malicious? If so, an action will lie against the Trade Union official. And even if the action is not malicious, but the employer is induced to break his contract with the apprentice, in accordance with Temperton *v.* Russell, an action may lie.

Other cases are likely to occur, but they can probably be decided in accordance with the above principles. From them it is seen that, except in the case of malice which causes definite contracts to be broken, or prevents a person from entering into contracts with definite individuals, there is but little in law to prevent either an unfair excess or deficit of apprentices, or to cause an agreement on this matter to be kept to, except the good feeling of the parties concerned.

Now it is, I think, clear that the number of apprentices in any trade may be so large or so small that the plain man would consider any agreement or contract to keep the trade in this condition to be contrary to public policy or in restraint of trade. On the precise point—whether an agreement about the number of apprentices could be in restraint of trade—we have no legal decision. But it appears to be unlikely that a court of law would say that such an agreement was in restraint of trade. The tendency has been rather in the direction of limiting the doctrine of the restraint of trade than of extending it.[2] It would probably be both difficult and dangerous to declare such contracts illegal. The real difficulty consists in the fact that organisations of employers and employed have no legal personality, and cannot make contracts as corporate bodies. On this point I am in agreement with the observations appended to the final report of the Labour Commission by the chairman and seven other members of the Commission, and I cannot do better than quote sections 5, 6, 7, and 8 of their observations.

'5. The present limitation of the law appears to be expressed in

[1] For the American view see a dictum in an extra-judicial capacity by Judge Tuley of Chicago when he was arbitrating for the masons in 1887.

[2] *E.g.* about space, in Maxim Nordenfelt Co. *v* Nordenfelt, '93 1 Ch. 655.

Section 4 of the Trade Union Act of 1871 which provides that "Nothing in this Act shall enable any court to entertain any legal proceeding instituted with the object of directly enforcing or recovering damages for the breach of any of the following agreements, namely :—

'"(1) Any agreement between members of a trade union as such concerning the conditions on which any members for the time being of such trade union shall or shall not sell their goods, transact business, employ, or be employed.

'"(2) Any agreement for the payment by any person of any subscription or penalty to a Trade Union.

'"(3) Any agreement for the application of the funds of a Trade Union (*a*) to provide benefits to members ; or (*b*) to furnish contributions to any employer or workman, not a member of such trade union, in consideration of such employer or workman acting in conformity with the rules or resolutions of such Trade Union ; or (*c*) to discharge any fine imposed upon any person by sentence of a court of justice ; or (4) any agreement between one Trade Union and another ; or (5) any bond to secure the performance of any of the above-mentioned agreements.

'"But nothing in this section shall be deemed to constitute any of the above-mentioned agreements unlawful."

'6. The object of this Act appears to have been, while freeing Trade Unions from the last remains of their former character of criminal conspiracies and giving full protection to their property, (1) to prevent them from having any legal rights against their members or their members against them ; and next (2) to prevent their entering into any legally enforceable contracts as bodies with each other or with outside individuals, except with regard to the management of their own funds and real estate.

'7. We think that the extension of liberty to bodies of workmen or employers to acquire fuller legal personality than that which they at present possess is desirable in order to afford, when both parties wish it, the means of securing the observance, at least for fixed periods, of the collective agreements which are now, as a matter of fact, made between them in so many cases.

'8. We think that such an extension of liberty, if conceded (and in so far as it might be acted upon) would not only result in the better observance for definite periods of agreements with regard to wages rates, hours of labour, apprenticeship rules, demarcation of work, profit sharing and joint insurance schemes, the undertaking of special works, and other matters, but would afford a better basis for arbitration in industrial disputes than any which has yet been suggested.'

If legal personality is ever given to unions of employers or employed, we may, though not without some hesitation, look forward to conciliation or arbitration as the natural and normal method of settling a trade dispute.[1] If it is then found that the agreements, which are

[1] See an article by Bernard Holland in the *Nineteenth Century* March, 1895, on some legal disabilities of Trade Unions.

come to, about the number of apprentices in any trade are frequently unfair, it may be advisable to insist that such agreements shall only be made within certain limits; to define these limits is difficult, but as I hope this article has shown is not quite impossible. It is dangerous for the public to interfere in such matters, but the possible harm that may be caused by such interference may be almost indefinitely dimin-

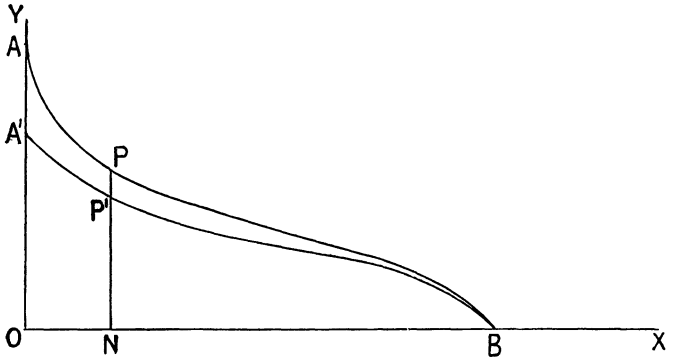

FIG. V.

ished if the public realise exactly what the result of their interference is likely to be. If economics is to be of practical use, it should afford us methods for deriving definite conclusions from definite premises. If our conclusions are to have much practical value, our premises must consist of accurate statistical data. Perhaps in time the Government will give us some statistics.

C. P. SANGER

THE TRADES' UNION CONGRESS OF 1895.

THE chief feature of the week's proceedings at Cardiff this autumn, standing out clear and distinct from all other incidents, was the extraordinary *coup-d'état* by which the Parliamentary Committee secured the adoption of a brand new constitution. It will probably be remembered that when the Norwich Congress was on the point of terminating, there still remained untouched upon the agenda a large number of resolutions. Many of these embodied proposals for remodelling the standing ' orders by which the Congress is governed. However, the whole of them without distinction were referred to the Parliamentary Committee—the official report merely says ' for consideration.' When the Committee met they elected a small sub-committee, with instructions to draw up a suggested code of new ' orders.' This was done, and upon the new code being presented to the Committee as a whole, they resolved—by means, be it said, of the chairman's casting vote