Report addressed to Her Majesty's Principal Secretary of State for the Home Department, relative to the grievances complained of by the journeymen bakers : with appendix of evidence / presented to both Houses of Parliament by command of Her Majesty.

REPORT

ADDRESSED TO

HER MAJESTY'S PRINCIPAL SECRETARY OF STATE FOR THE HOME DEPARTMENT,

RELATIVE TO THE

GRIEVANCES COMPLAINED OF BY THE JOURNEYMEN BAKERS;

WITH

APPENDIX OF EVIDENCE.

Presented to both Houses of Parliament by Command of Her Majesty.

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TO THE RIGHT HONOURABLE SIR GEORGE GREY, BART., M.P., HER MAJESTY'S PRINCIPAL SECRETARY OF STATE FOR THE HOME DEPARTMENT.

3, Dean Street, Park Lane, W.
July 3rd, 1862.

SIR,

Instructions.

ON the 30th of April last year, the Right Honourable Sir George Lewis, your predecessor as Secretary of State for the Home Department, informed me "that his attention "had recently been directed to a statement of the Jour- "neymen Bakers of the Metropolis, complaining of the cir- "cumstances adverse to health under which their labour "is carried on; and that he wished me to investigate the "nature of their complaints, and to report to him my "opinion whether their grievances are of a nature which "admits of being removed or mitigated by legislation."

Their complaints were brought before Parliament on the 30th May 1848, and were at that time fully stated and commented upon. The facts were then not disputed, and it appears from the evidence appended to this Report that they remain substantially the same.

Their nature, and their bearing upon the points submitted to me, will be more distinctly seen if brought into view in connexion with the several conclusions to which this inquiry has led me. I will, therefore, first state those conclusions, and then proceed to support them by reference to the evidence I have collected.

Legislative remedies.

Many of the grievances complained of are beyond the reach of legislative remedies. The only propositions which I am prepared to recommend for the consideration of the legislature are the following:—

General statement of.

1. That no youth under 18 years of age should be allowed to be employed in a bakehouse later than the hour of 9 p.m., or earlier than 5 a.m.
2. That bakehouses should be placed under inspection, and subjected to certain regulations in regard to ventilation, cleanliness, &c.
3. In the course of the inquiry several questions presented themselves, more or less directly affecting the condition and welfare of the journeymen bakers, but having also a wider scope, and involving matters of much interest to the public generally. I should not have satisfactorily fulfilled the immediate duty imposed upon me had I declined entering upon those questions. Therefore, in the interests both of the

journeymen and the public, I am prepared to submit to you, thirdly, that it would be desirable that the provisions of the Act "for preventing the adulteration of articles of food," &c. (23 & 24 Vict. c. 84.) should be made more effectual.

Although these are the only measures which I feel justified in submitting to the judgment of Parliament, with a view to the removal or mitigation of some of the evils at present connected with the employment of the journeymen bakers of the Metropolis, there is another important subject to which it is highly desirable to direct the attention of themselves, their employers, and the public at large, as not only involving great prospective benefits to the journeymen, but certain economical and other advantages to the community, of no small value. This subject is,

ther remedies t legislative.

The introduction of machinery in the process of bread-making,

ne introduction of machinery.

1. By Mr. Stevens's Patent Dough-making Machine.
2. By Dr. Dauglish's system of making what is termed the "aërated bread."

utual concessions for the olition of ght-work.

Lastly, although it would be impossible for Parliament to interfere with the night-work and the long hours of day-work of the adult labourers in the baking trade, it is to be hoped that this inquiry, and the renewed discussion of the subject to which it is likely to give rise, may have some effect in leading to such mutual concessions, of a simple nature, between the men and their masters, as may place those questions upon a footing satisfactory to both parties.

etails of legisive remedies.

I will now proceed to deal with each of the above subjects in order.

s to youths der 18.

I. *Youths under* 18.—The work of a London journeyman baker begins, as a rule, at about 11 at night. At that hour he "makes the dough,"—a laborious process, which lasts from half an hour to three quarters of an hour, according to the size of the batch or the labour bestowed upon it. He then lies down upon the kneading-board, which is also the covering of the trough in which the dough is "made;" and with a sack under him and another rolled up as a pillow, he sleeps for about a couple of hours. He is then engaged in rapid and continuous labour for about five hours,—throwing out the dough, "scaling it off," moulding it, putting it into the oven, preparing and baking rolls and fancy-bread, taking the batch-bread out of the oven and up into the shop, &c. &c. The temperature of a bakehouse ranges from about 75 to upwards of 90 degrees, and in the

smaller bakehouses approximates usually to the higher rather than to the lower degree of heat. (47.) When the business of making the bread, rolls, &c. is over, that of its distribution begins; and a considerable proportion of the journeymen in the trade, after working hard in the manner described during the night, are upon their legs for many hours during the day, carrying baskets or wheeling hand-carts, and sometimes again in the bakehouse; leaving off work at various hours between 1 and 6 p.m., according to the season of the year, or the amount and nature of their master's business (22-25, 108-9, 117–134); while others are again engaged in the bakehouse in "bringing out" more batches, until late in the afternoon.

That the number of youths so employed in the baking trade in London is considerable, cannot admit of a doubt. It may be gathered from the evidence that a very large majority of the journeymen begin to work in this manner when they were under 18; usually when only 16, and frequently when 15 and even 14 years of age. At the establishment of Mr. Nevill, which is by far the largest in London, out of 25 men, only 5 were 18 and upwards when they began night-work; 5 were only 15 years of age, 3 only 14. (651.) With few exceptions, every journeyman of the very many to whom I put the question in the course of the inquiry, answered it within the above limits. The total number of journeymen bakers in the Metropolis was stated by Dr. Guy in 1848 to be 12,000. It is now considerably more than 14,000 (80). Of these it is calculated that about 2,000 are under 18 years of age. (11, 524.)

According to the census of Great Britain in 1851 there were in London, that is, "within the limits adopted by "the Registrar General for the weekly bills of mortality, "comprising 36 districts situated in Middlesex, Surrey, "and Kent,"

Bakers - - -	11,580
Confectioners - -	2,182
	13,762

Of these there were, above 15 and under 20, bakers, 1,857; confectioners, 343; total, 2,200. ("Trades and Occupa- "tions," Class XIII.)

I am informed by the Registrar General that the abstracting of the "Trades and Occupations" is not sufficiently advanced to enable him to furnish me with the particulars as to 1861. But an approximation may be arrived at by adding to the three-fifths of the above number

of 2,200 (for those between 15 and 18) the increase for 10 years at the ordinary rate, an allowance for the increase of bakers' shops within that time, and a small one for youths employed between the ages of 14 and 15. This will bring the estimate very near to 2,000. And of these a considerable proportion are employed at night with the men.*

It needs no argument to prove that the loss of the usual hours of sleep, and the hard and continuous work for many hours in such a temperature as that of bakehouses in general, must have a great effect in undermining the constitutions of the young, and laying the foundation of that liability to various diseases by which the average duration of life of a journeyman baker is reduced to the age of 42. (164, 265, 354, 366, 381, 413, 521, 704.)

The unanimity with which the masters in the trade agree that it would be desirable that the employment of youths under 18 at night-work should be forbidden by the legislature, is remarkable and creditable to them.

That the exclusion from night-work would also be for the real and ultimate benefit of the youths themselves is sufficiently obvious. It might, indeed, oblige them to continue for two or three years more than at present at the work more particularly connected with the shop, and therefore at a rate of wages lower by a few shillings than what they now earn; but their working powers would, when they attained the age of manhood, be less impaired, and their prospect of health and life materially improved. It is alleged also, with apparently good reason, that this inversion of the usual hours of work leads to a mode of life which has a very bad effect upon their morals, and places great obstacles in the way of their intellectual improvement. (86, 206, 207.)

The question will naturally occur, How would such a provision be enforced? The answer is, that it would be enforced by the adult journeymen in the trade, with, in all probability, considerable vigilance.

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* According to the census of 1851 there were in the whole of Great Britain.—

Bakers - - -	43,372	
Between 15 and 20 - - -		12,291
Confectioners - -	6,988	
Between 15 and 20 - - -		2,059
	50,360	of whom 14,550 were between 15 and 20.

Of whom it may be estimated that 9,000 (three fifths) were between 15 and 18.

The supply of labour in the baking trade of the Metropolis is maintained as follows. In the first place, it is a trade, many of the processes of which, and those chiefly performed by the younger hands, are very easily learned. A young man of fair intelligence will acquire them in a few weeks. (477–652.) In the next place, they do not oblige a workman to be furnished with any tools. He can, therefore, obtain work without anything of his own besides the clothes that cover him (477-479.) Thirdly, his work is not liable to interruptions from the accidents of weather; his earnings are the same all the year round, and are also, in amount, above those of any other trade or calling which in very many cases his own physical aptitudes or mental ability would enable him to enter. (477-479). Notwithstanding, therefore, the many disadvantages under which a considerable portion of the journeymen bakers labour, a large class of young men are naturally attracted to the employment, and are better off in it than they would be if they were in any other trade.

In addition to the natural supply furnished by London itself, the trade is continually recruited by young men from three principal sources;—from Scotland, from the Western Counties of England, and from Germany. (11, 356, 383, 477.)

When they first begin to do night-work they will earn from 12*s.* to 14*s.* a week in money, having also other privileges which are worth some shillings more. (421. 479.)

In these situations they are, in fact, doing the work of men, and, so far, supplanting men in a branch of work which more properly belongs to men of confirmed strength than it does to youths under 18.

The facility with which almost any one can enter the baking-trade as a journeyman, and the attraction which it affords to certain descriptions of men and youths, have caused the labour-market to be considerably overstocked. If, therefore, some 1,200 to 1,500 youths under 18 who are now doing night-work in the Metropolis were to be removed, by a legislative prohibition, from that work, they would, in the event of night-work continuing the rule of the trade, make room for so many more men at a rate of wages probably somewhat above that now paid to those youths; and this transference would relieve to the same extent the competition among the men for the employments next in upward gradation in the trade. It would therefore be so obviously to the advantage of the men to prevent youths under 18 returning to this work, that they would for their own sakes

keep a check upon any master who might possibly be disposed to evade the law. But that any disposition of that kind would exist is not probable, as the great body of masters with whom I have been in communication, both large and small, are universally, as above stated, in favour of the restriction in question. Nor would it be likely to be in any way injurious to the interests of the master. Although he might pay a little more to a journeyman above 18 who did night-work than he would do to a youth under 18 for the same work, his work would in all probability be better done. Neither would the change affect the price of bread, the addition to the amount of wages being so small. The only other change would be, that the youths themselves would be continued up to the age of 18 at other branches of the employment, either attending in the shop, in carrying out "orders," or in delivering bread. And if up to that age they earned a little less they would be amply compensated in after years by better health and by the greater opportunities of improvement which they would have enjoyed.

Although, therefore, the circumstances of the case are so different from those with which the legislature has had to deal in protecting labour employed in factories, I nevertheless submit that legislation upon the point in question would be effectual, although unaccompanied by the machinery of verification of age and of inspection which in the case of factories is desirable and possible, but in the case of the numerous small insulated bakehouses of the Metropolis would be entirely out of place. Legislation would also be desirable in a public point of view, inasmuch as by contributing to the better health, longer life, and better morals of that portion of the population, it would protect the ratepayers from burdens which invariably flow from the impaired health and the demoralization of one large body of the working classes.

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The hours between 9 p.m. and 5 a.m. are suggested as those between which no youth under 18 should be allowed to work in a bakehouse, because those hours are least likely to interfere with the usual routine of business, present or future.

It will at first sight seem that to permit youths under 18 to work during the 16 hours of the day between 5 a.m. and 9 p.m. in any branch of their employment, provided it be not in the bakehouse, is to expose them to an undue amount of labour. This, however, cannot be said to be the case. If night-work combined with day-work should remain the

practice of the trade with the adult journeyman, the most laborious part of the business of bread-making would in most cases, as at present, have been got over during the night; in the rest, if youths took a part in it during a portion of the day, the other portions of their time would be occupied with work of a light description, approximating to domestic work, which would afford no ground for the legislature to interfere, with a view to their protection. If, on the other hand, night-work should be put an end to, and a system of day-work be adopted, as far as the peculiar and varied circumstances of the trade allow, by mutual arrangement between the masters and the men, the hour for the commencement of the day's work which would be found most convenient in the greatest number of cases where it would be possible at all, would be 5 a.m. It would be desirable, therefore, that the youths should be allowed to commence work at the same hour. If the day's work for the adults terminated at or about 5 p.m., the work which would remain to be done by a youth under 18 (who in most instances would be an inmate of the house) would, in the bakehouse, be in the nature of cleaning, or other light work; or, out of it, in superintending the shop, or shutting it up at night. Provided, therefore, that he was protected from night-work in the bakehouse between the hours of 9 p.m. and 5 a.m., the legislature would secure to him all the protection that the circumstances of his case require.

The first Factory Act (passed 29th August 1833), after reciting that "the hours of labour were longer than is desirable, "due regard being had to health and the means of edu- "cation," enacted (s. 1.) that from and after the 1st of January of the year following, "no person under 18 years "of age shall be allowed to work in the night." The definition of night-work, by the same section, was "between "the hours of half-past 8 o'clock in the evening and half- "past 5 o'clock in the morning." By section 3. the time was allowed to be altered in certain cases to between the hours of 9 o'clock in the evening and 5 o'clock in the morning. Although the definition of night-work finally fixed for factories was "between the hours of 6 p.m. and "6 a.m." (13 & 14 Vict. c. 54. s. 1.) the limit laid down in the 3d section of the Act above mentioned, is, I submit, from the evidence, the one which it is most expedient to adopt in the case of the youths under 18 who work in bakehouses.

The justification for legislative interference in this case

appears to me so strong, that it hardly requires support from any other considerations than those that are suggested by the evidence. Nevertheless, it may not be amiss to recall to mind that, in the baking trade in the Metropolis, the practice of taking apprentices is almost wholly abandoned. Were it still in existence, there cannot, I presume, be a doubt that if complaint were made by any parent or guardian of any youth under 18 years of age apprenticed to a baker, that the youth was compelled by his master habitually to begin his so-called day's work at the unnatural hour of 11 o'clock at night, and to continue with little intermission at work not only through the night but during several hours of the day, it would afford a full and satisfactory ground for the magistrates to "discharge the "apprentice from his apprenticeship." Under the provisions of the 5th Eliz. c. 4. and the 20th Geo. 2. c. 19., "if the "master . . shall misuse or evil intreat his apprentice, "or the apprentice shall have just cause to complain," the justices at sessions may discharge the apprentice, and have a power of ordering a restitution of the premium. (Chitty's Burn's Justice, 1845, p. 194–202.) Or by 33 Geo. 3. c. 55., instead of discharging the apprentice, the master may be fined "for any ill-usage of such apprentice." And in the form of indictment given at p. 249 of the same work, for ill treating an apprentice, the words occur, "and did force "and compel the said apprentice to work and labour . . "immoderately and beyond his strength, in the business of "the said A.B., for the space of hours then next follow-"ing." The legislature, therefore, by forbidding such employment between the hours of 9 p.m. and 5 a.m., would only extend to youths not apprenticed the protection which the law would give them if they were apprenticed.

Inspection of Bakehouses.

II. *Inspection of Bakehouses.*—The number of bakers in the parishes and districts of the Metropolis comprised within the jurisdiction of the Metropolis Local Management Act is commonly stated, by persons conversant with the baking trade, to be in round numbers about 3,000. In 1860 M. Le Play, in his Report to the Council of State of France, upon the Supply of Bread in the Department of the Seine*, gave the number of bakers "in London" as 2,800

* Question de la Boulangerie du Département de la Seine. Deuxième Rapport aux Sections Réunies du Commerce et de l'Interieur, du Conseil d'Etat, sur les Commerces du Blé, de la Farine, et du Pain. Par M. F. Le Play Conseiller d'Etat, Rapporteur. Paris, Imprimerie Impériale, 1860.

(p. 210). The Postal Directory of this year gives their number as about 2,500; it is probable, however, that the addresses of many of the smaller bakers are not included. But as many bakers have shops of their own, or agents for the sale of bread, where there are no ovens, the number of bakehouses may perhaps be safely stated to be somewhat above 2,000.

There is probably no branch of trade supplying a vast and constant demand which has so completely remained in its primitive condition of ministering to that demand from a multitude of small and insulated sources, as the baking trade. It was anticipated by the Committee of the House of Commons which in their Report of 1815 recommended the abolition of the assize of bread, that if the trade was thrown open by the repeal of the assize laws, it would have the effect of gradually drawing persons of capital into it, and of diminishing the waste of labour and unnecessary subdivision of profits which appear by the evidence at present to exist (p. 8). One witness before that Committee, Mr. Harvey, flour factor and baker, of Charlotte Street, Portland Place, stated (p. 90) that "he did not "think that the abolition of the assize would diminish the "number of bakers. The public require bakers' shops at "every corner. It would be as inconvenient to be served by "large bakers as by large brewers." This has proved to be the actual result. A witness before the Committee of the House of Commons in 1824, Mr. G. F. Turner, baker, Bishopgate Street, stated (p. 2), as to the effect of the taking off of the assize of bread (by stat. 3 Geo. 4. c. 106., passed 22d July 1822), that although the expectation of the Committee of 1815 was "that the baking trade would "get into the hands of men of capital, and that it would "be carried on as a manufacturing concern on a large "scale, that idea had completely failed; the number of "bakers is upon the same scale." It was stated before the Committee of 1815 (p. 12) that "there are more "bakers who bake under 10 sacks a week than over." This remains the case at the present day. (810.) Twelve sacks a week are considered to be a good business; 20 sacks are much above the average. (85.) The smallness of the amount of business thus carried on appears by contrast with what are considered large businesses, as where upwards of 100 sacks a week are baked in one establishment, of which there is but one example in London (Mr. Nevill's),—and the still larger amounts of some bakers in Glasgow and elsewhere. (95.) This small

average amount of flour made weekly into bread in London by each baker, amounting daily to no more than from a sack and a half to three sacks, requires the use of only one or two ovens. In the comparatively rare cases where three are found, a large fancy bread and confectionery business is for the most part united with that of making the ordinary household "batch" bread.

As a rule, the locality in which the bread of London is made is what in houses in general is the coalhole and the front kitchen; the back kitchen being the place where the small store of flour is kept, together with the other things in daily use. The oven or ovens are usually placed under the street; but in many cases the arrangement is reversed, the ovens being towards the back of the house, and the space under the street being appropriated partly to the flour, &c., partly to the manual portions of the work.

It is obvious that the size and character of the bakehouse is determined in most cases by the dimensions of the house under which it is. The smaller the house, the lower and more confined will be the little front kitchen, which has been converted into the place where the various processes of bread-making are gone through. In favourable instances the back yard has been excavated and made into a flour store, and the back kitchen added to the bakehouse. But this implies a larger business, and a greater command of capital, as well as the means and opportunity of effecting this enlargement, which are not always to be obtained, especially in the more crowded parts of the Metropolis, where space is of so much value.

One of the principal complaints of the journeymen relates to the injury done to their health by the absence of all proper arrangements for ventilation and cleanliness in the great majority of bakehouses. (94.) It was stated to me by the first witness examined, Mr. John Bennett, the Secretary of the London Operative Bakers' Association, that "very many bakehouses in London are in a shockingly "filthy state, arising from imperfect sewerage and bad "ventilation and neglect; and the bread must, during "the process of fermentation, get impregnated with the "noxious gases surrounding it. Many journeymen bakers "also in London sleep under the pavement, in the bake-"houses." (94.) "The sleeping places, especially in the "East End of London, and some at the West End also, "are of the worst description, frequently in the basement "of the building and under the stairs; plenty of them have "no beds except in the bakehouse itself." (79, 609, 619.)

The next witness stated (100) that "the places where he had "worked had almost always been arches under the ground, "with no means of ventilation, except through the doors. "They are generally, therefore, fearfully hot, and many "of them infested with vermin, &c." * * "The bake-"houses are also often so close to the drains that they smell "very bad. It is a common practice to lock the bake-"houses at night, while the men are at work; consequently "where there is no ventilation except through the doors, it "is very stifling, and very apt to ruin men's health alto-"gether." Mr. Nevill stated (164), "I have known many "bakehouses in a shocking state as places of work, and "most injurious to the men, and so infested with rats, "beetles, cockroaches, &c., and so full of noxious smells, "that it must infect the bread."

The whole current of the evidence as to the state of a large proportion of the bakehouses in London is to the same effect, and it was more than confirmed by my own observations. I visited a considerable number in various parts of London; some that had been previously named to me as bad specimens; very many others, of which I knew nothing beforehand, and which I selected at hazard; and others belonging to the higher grades in the trade. I committed to writing the facts in between 70 and 80 of them, and found the circumstances so uniform that it would have been mere repetition to have recorded the particulars of any more. I must, in the first place, bear testimony to the fact that nearly all the bakehouses belonging to the principal persons in the trade visited by me, and more particularly to those in the full-priced branch of it, were found to be in a perfectly clean state, and that there was seldom to be seen any deficiency in the amount of the ventilation, although frequently the mode appeared to be capable of much improvement. But in about half the total number of bakehouses visited by me, I found not only the ventilation very defective, but the state of dirt even beyond what I had been led to expect.

It is impossible that the public could be aware that a large proportion of the bread of London was made in such places as I have described in paragraphs 487 to 497 of the evidence. Those ten specimens, some of which I visited without any knowledge beforehand whether I should find them clean or dirty, are no more than fair types of their class. I could have added very considerably to this list from my own personal observations. They were, however, quite sufficient as examples, inasmuch as no one in the trade dis-

putes the fact that they represent to a greater or less degree probably one half of the total number of bakehouses in London.

The principal fact, for which I certainly was not prepared, was their extreme dirt, and in many cases the almost total covering of the entire space between the rafters with masses of cobwebs, weighed down with the flour dust that had accumulated upon them, and hanging in strips just above your head. A heavy tread or a blow upon the floor above, brought down large fragments of them, as I witnessed on more than one occasion; and as the rafters immediately over the troughs in which the dough is made are as thickly hung with them as any other part of the bakehouse, masses of these cobwebs must be frequently falling into the dough. (413.) Other bakehouses of this description were less thickly hung with cobwebs, but they were in most cases numerous enough to afford a great probability of their being frequently incorporated with the dough. The rafters were usually so black with the sulphurous exhalations from the oven that it needed not the admission of the proprietor that the bakehouse was very seldom whitewashed. Animals in considerable numbers crawled in and out of and upon the troughs where the bread was made, and upon the adjoining walls. The dust had accumulated upon the broken and uneven floors. (423.) The smells from the drains, &c. were very offensive, the draft of the oven continually drawing the effluvia through the bakehouse. The ventilation was generally so injudiciously contrived as to produce a strong current of cold air upon the men while at work; and as they are always heated by their work, and very susceptible of cold in consequence of the high temperature to which they are habitually confined for so many hours, they rarely avail themselves of both the openings for the admission of air. (366, 424.) The result is, that the air of those small bakehouses is generally overloaded with foul gases from the drains, from the ovens, and from the fermentation of the bread, and with the emanations from their own bodies. The air thus contaminated is necessarily incorporated with the dough in the process of kneading, &c. (Ure's Dictionary of Arts, Manufactures, &c., London, 1861, p. 403), and also by absorption. On this point Dr. Ure states (p. 408), "If we reflect that bread, like all porous substances, readily absorbs the air that surrounds it, and "that, even under the best conditions, it should never, on "that account, be kept in confined places, what must be "the state of bread manufactured" * * * in the

manner common in London, "and with a slovenliness "greater than it is possible to conceive." There cannot be a doubt that the public has a right to insist that their bread shall not be made in such filthy places as these, and that means shall be taken to put a stop to the injury that must be inflicted by them upon the health of the journeymen. It is, as it appears to me, fairly argued by those who desire to see bakehouses placed under a system of inspection, that if slaughterhouses are inspected and subjected to regulations on sanitary grounds, there is quite as much reason, not only on sanitary grounds, but for the satisfaction of the public, in such an important matter as that of the making of their daily bread, that bakehouses should be dealt with on a similar principle.

What I have stated above on this portion of the subject is only confirmatory of the evidence given by Dr. Guy before the Sanitary Commission, in reference to the persons employed in the baking trade, and which was ordered by the House of Commons to be printed on the 29th May 1848.

Dr. Guy, who in that evidence, and in a lecture on the same subject, delivered July 8th, 1848,* has done more than any one else to call attention to the grievances of the journeymen bakers, informed the Commission that the bakehouses, of which he had examined several, "were, with very "few exceptions, in the basements under the shops. In "some instances I have found them clean, in good repair, and "well ventilated, the sleeping places being in the upper part "of the house; but in others (and I am afraid this is the "state of the great majority) I found them in a very un-"wholesome state, very close, very dirty, very damp, and "very offensive." * * "When I add that the bed-"room of the journeyman baker is often a dark, dirty, "cupboard at the foot of the stairs, I have said enough to "show that the baker is likely to have added to the other "causes of disease that of working and sleeping in a dark "place, and a close impure atmosphere."

I sought in different parts of London for any evidence that might be obtained of the proportion of clean to neglected and dirty bakehouses. I was able to obtain some from three or four different quarters.

In the summer of 1860 the Medical Officers of Health for

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* The Case of the Journeymen Bakers. A Lecture, &c. by William A. Guy, M.B., Professor of Forensic Medicine at King's College, &c. &c. &c. Renshaw, Strand, 2nd Edition, 1860.

the parish of St. George, Hanover Square, Dr. Aldis and Dr. Druitt, were led, by the allegations that had been made relative to the long hours of work of the journeymen bakers, and the state of their places of work, to visit nearly all the bakehouses in this parish. They gave the master bakers who admitted them to understand that in case anything amiss should be found, no details should be made public. Upon that assurance a cordial reception was given to them. [Dr. Aldis, 735.]

They visited 78 (732), and found the great majority of them in a much better state than they had been led to suppose. This was reasonably to be expected in such parts of London as Mayfair and Belgravia. But shortly after that inspection, Mr. James Grant, Sanitary Inspector for the parish of St. George Hanover Square, was desired by the Sanitary Board to endeavour to ascertain the state of the bakehouses in the parish. He called at the whole of them, 85, and asked permission to see them. None refused. He found 26 in a state requiring sanitary improvements (742.) I think it may fairly be assumed from this, that if nearly one third of the bakehouses in Mayfair and Belgravia were found in a state in which the Sanitary Inspector, having once obtained admission, saw reasons to enforce the provisions of the Nuisances Removal Act (18 & 19 Vict. c. 121), the conclusions which Dr. Guy came to in 1848, and which I have been led to recently, namely, that, taking London generally, one half the bakehouses would be found to require the application of that Act if they should be placed under its jurisdiction, have been well founded.

Mr. Grant states (742), with regard to those 26, that he "ordered 12 to be whitewashed and cleaned, 6 to have "common privies converted into water-closets, 4 to have "the ventilation improved, 4 to have the sleeping places "removed; they were mere pens or boxes boarded off "from the bakehouses, quite unfit for men to sleep in."

Mr. Grant adds (743), that, having been in early life in the building trade, and latterly a sergeant and acting inspector of police, he has had great opportunities of being acquainted with the bakehouses in many other parts of the Metropolis, and is able to say that those of St. George, Hanover Square, "are very favourable specimens, as com-"pared with those of the Metropolis generally."

Dr. Ballard, the Medical Officer of Health for the large parish of St. Mary, Islington, informed me that he had for some time devoted his attention to the questions relating

to the condition of the journeymen bakers. In that district he had inspected very few bakehouses; but those he had seen, with the exception of Mr. Nevill's establishment, "have been miserably defective in respect of cleanliness "and ventilation, and some in respect also of drainage." He is of opinion "that it would be highly desirable that "they should be placed under sanitary supervision, and "this both in the interests of the public and those of the "workman." (752.)

Dr. Buchanan, the Medical Officer of Health for the St. Giles's district, stated to me, in a letter dated 28th Feb. of this year, that a partial investigation had been made in 1860 into the condition of the bakehouses in his district; that these establishments were susceptible of much improvement; and that the extended inquiries which I was making would, in his opinion, bring to light the need for wider interference than had appeared on his own limited observation. In Dr. Buchanan's Report to the Local Board of Works, for 1860–61, he states (p. 19) that "the really "deleterious part of the business [of a baker] appear to be "the inhaling of gas-light vapours, and of the particles of "flour. The bakeries generally are so hot that in any "weather plenty of external air should be admitted by "day and night, and if this were contrived judiciously "it would be the best remedy for these injurious inhala-"tions."

In the "London City Mission Magazine" for February of this year, there is a very circumstantial and interesting account of the proceedings of the missionary who was appointed in 1860 to visit the bakers. Among other things, he states, that of the 500 bakers' shops in his district (all to the West of Farringdon Street, including the West-end suburbs) he "got down" to 120 bakehouses (p. 35). "Of "these 120," he says, "only about half a dozen are bad, "two or three of them very bad; but the masters of those "very bad ones said they were incapable of improvement. "I am suspicious that a number of those bakehouses to "which I have not had access cannot stand inspection; and "I suspect that I am put off with a trifling excuse, such "as 'the men are very busy,' just to prevent the bake-"house being seen." This suspicion was founded on what he had been informed by the men themselves, who spoke of the bakehouses as "underground cellars or dungeons," "that many of the sleeping places were bad," and that "many men died prematurely from diseases caught in the "bad bakehouses." (p. 34.) He adds, that "many masters

" have made improvements in their bakehouses and pre-
" mises since he went among them. The bakehouses have
" been whitewashed, better ventilated, and in some in-
" stances enlarged." (p. 37.)

In order to ascertain whether any inspection of bakehouses, similar to that of the parish of St. George, Hanover Square, above described, had been made in any other parts of London, I addressed letters to the Medical Officers of Health of the parishes and districts of Marylebone, St. Giles's, Strand, the City, Shoreditch, Bethnal Green, Whitechapel, St. George's-in-the-East, Poplar, Southwark, Rotherhithe, and Lambeth. The answers obtained were to the effect that no such inspection had been made, the powers of the Medical Officers of Health under the Nuisances Removal Act not enabling them to do so as of right. In one or two cases a partial inspection had taken place, with results to the effect above stated. Indeed, the minute inspection which was made in the parish of St. George would not, I understand, have taken place but for a desire which existed at the time among some influential persons in the parish to ascertain the truth of the allegations of the men as to their hours of work, as well as regarding the sanitary state of the bakehouses. Many of the answers expressed a hope that power would be given to the medical officers, with respect to bakehouses, similar to those which they now exercise under the Act in respect to slaughterhouses.

The powers of the Nuisances Removal Act (18 & 19 Vict. c. 121.) are insufficient to meet the caae of bakehouses. The reasons are well stated by Dr. Aldis, as follows:—

" 737. No inspection of bakehouses has been made since in either of those districts. I do not doubt that not only occasional supervision, but inspection at stated periods, is very desirable in the case of bakehouses, and I do not consider that we are empowered by law to make such inspection. We cannot infer that circumstances injurious to health exist in all bakehouses; for the result of the above inquiry was to show that it was not so. And we cannot depend upon circumstances being brought to our knowledge which would justify our taking the initiative at all as often as an interference on our part would be desirable, with a view to the health of the people employed. The 'local causes' which by s. 132. of The Metropolis Local Management Act (18 & 19 Vict. c. 120.) we are required to point out the existence of, as likely to originate disease, do not seem to me to comprehend bakehouses as a matter of course; and that being so, we do not feel justified in visiting them unless after complaint made or sufficient cause shown to us why the state of a particular bakehouse should be inquired into. And as regards suggesting

improved ventilation in them, the subsequent part of that same clause, which directs us 'to point out the most efficient modes 'for the ventilation of churches, chapels, schools, lodging-houses, 'and other public edifices within the parish or district, and to per- 'form other duties of a like nature which may be required" of us, confines our powers in that respect to public edifices."

They are also clearly stated by Mr. Grant, Sanitary Inspector for the parish of St. George, Hanover Square:—

"744. I have made no visitation of bakehouses since the above date (1860). I have no power to do so. To enable me to enter a bakehouse as of right, I must have, in the terms of the Nuisances Removal Act (s. 11), reasonable grounds for believing that a nuisance exists. I cannot infer this of bakehouses generally. And notices are not given, or likely to be given, to the local authority under s. 10 of the Act, enabling the local authority 'after entry made,' 'to take cognizance' of the nuisance. Many bakehouses may be a 'nuisance, or injurious to health,' as described by clause 8, and may be so for a long time before 'any person aggrieved thereby (s. 10), or before 'two or more householders,' or 'the relieving officer,' would bring it to my notice, or to that of the local authority. It is not like the case of offensive drains which annoy the neighbours, or any other nuisance likely to affect the public. The persons injured are those who work in the bakehouse, and they are very often insensible of the injury done them, or unwilling to complain.

"745. I think it highly desirable that the powers of entry of the Sanitary Inspector into bakehouses, given him by s. 11. of the Act, should be enlarged."

Recommendations as to inspection of bakehouses.

I think it desirable that the powers which the Sanitary Inspector already has in certain cases, under the 11th section of the Act, to enter a bakehouse *without notice*, should be extended.

That section enacts that "the local authority shall "have power of entry" . . . "to inspect or examine any ". . . corn, *bread, or flour*." And "for this purpose "the local authority or their officer may from time to time "enter the premises where . . . . corn, *bread*, or "*flour* is found, at *all reasonable hours, or at all hours* "*during which business is carried on in such premises*, "*without notice*." This power, which the Inspector already possesses in regard to *bread* and *flour*, should be given to him as regards the bakehouse generally. Accordingly, I recommend—

1. That the Sanitary Inspector should have the power to enter any bakehouse at all reasonable hours, or at all hours during which business is carried on in the premises, without notice, to inspect and examine the

ventilation, drainage, and general cleanliness of the bakehouse and premises, under the powers and for purposes of the Act 18 & 19 Vict. c. 121.

2. That it should be enacted, that every bakehouse should be limewashed once at least within every successive period of six months, to date from the period when last limewashed. (See the Factories Act, 7 Vict. c. 15. ss. 18 and 58.)

3. Bakehouses, although often, as has been shown, containing sleeping places for the men, of a very close, dark, and unwholesome character, are not within the provisions of the Metropolis Local Management Act, 18 & 19 Vict., c. 120. s. 103, inasmuch as they are not "occupied separately as a dwelling."

But it is very desirable, on sanitary grounds, and is much wished for by the men, that their sleeping places should be greatly improved, or forbidden to be used in their present state. So much, therefore, of the 103rd section of the above Act as is applicable to the circumstances of the case might with good effect be adopted. I accordingly recommend, *thirdly*,

That no place on the same level with a bakehouse shall be used as a sleeping place, unless it be effectually separated from the said bakehouse by a partition extending from the floor to the ceiling; or unless there be an external glazed window opening of at least nine superficial feet in area, of which at the least four and a half superficial feet must be made to open for ventilation. (See 18 & 19 Vict. c. 120. s. 103.)

4. It should be enacted that no premises to be hereafter newly constructed or rebuilt for the purpose of being used as a bakehouse should be used as such, unless they are provided with sufficient means for the admission of pure air, and the escape of vitiated air, to the satisfaction of the Surveyor of the vestry of the parish or of the Board of Works of the district in which such bakehouse is situated. (See 18 & 19 Vict. c. 120. s. 75, 81.)

Penalties.

5. If any person should employ a youth under the age of 18 (see p. x.) in a bakehouse between the hours of 9 o'clock at night and 5 o'clock in the morning, or should obstruct any officer or other person acting under the authority of the above-mentioned Acts or the proposed Act, or should neglect to comply with

the requirements of this proposed Act in respect to any sleeping places on the same level with any bakehouse, or with the requirements of this proposed Act in respect to the ventilation of bakehouses to the satisfaction of the Surveyor of the Vestry and the Board of Works in which such bakehouse is situated, within fourteen days after notice in writing requiring him so to do, has been given to him by such Vestry or Board, every person so offending should forfeit and pay any sum not exceeding five pounds, and a further sum of not more than ten shillings a day during his default, or during his violation of the proposed Act. (See 18 & 19 Vict. c. 120. s. 100. and 18 & 19 Vict. c. 121. s. 14.)

6. Penalty for neglecting to limewash within the period required should be not less than three nor more than ten pounds, and not less than two pounds additional penalty for every month during which the occupier shall allow the said bakehouse to remain without being limewashed as aforesaid after being convicted of the offence. (See the Factories Act, 7 Vict. c. 15. ss. 18 & 58.)

7. The Vestries and Boards of Works constituted and appointed under the above-mentioned Acts of 18 & 19 Vict. c. 121. (the Nuisances Removal Act), and the 18 & 19 Vict. c. 120. (the Metropolis Local Management Act,) and the Medical Officers of Health, Sanitary Inspectors, the District Surveyors, and other officers acting under the appointment of the above-named Vestries and Boards, and the other persons named in the above Acts, should have the same powers and authorities for enforcing the provisions above-mentioned in respect to bakehouses as if bakehouses had been expressly named in the above-recited Acts, and as if the above provisions had been embodied in those Acts respectively, and the provisions relating to the recovery and application of penalties, and for appeal, in the said recited Acts, should be equally applicable to this proposed Act.

Vestries, &c. to have power in respect to bakehouses.

It was proposed by several of the witnesses, that bakehouses should not only be inspected, but licensed and placed on the same footing as slaughterhouses.

Preposals as to licensing bakehouses inexpedient.

By the Metropolitan Market Act of 1857, 20 & 21 Vict. c. 135. s. 35. it is enacted, that "no place within the "Metropolitan Police District, other than those erected or

" to be erected under the authority of the said first-recited " Act (14 & 15 Vict. c. 61), and of this Act, shall be used as " a slaughterhouse, without a licence had for that purpose " from the justices of the peace, &c. at a Special Sessions, " and no fee or reward exceeding one shilling shall be taken " for any such licence."

And by the Metropolis Local Management Act, s. 131, one month's previous notice of the intention to apply for such licence must be given to the Vestry or District Board of the parish or district in which the slaughterhouse is situated, to the intent that such Vestry or Board, if they think fit, may show cause against the grant of such licence.

Under these Acts, the slaughterhouses are inspected previously to the annual licencing, by the Sanitary Inspector, and, if necessary, by the Medical Officers of Health. They are also liable to be inspected at any time ; and Mr. Grant, Sanitary Inspector, St. George's, Hanover Square, reports (750) that he has 34 in his district, and that he inspects them once a fortnight. " At first the ventilation and drainage " and the pavements were very bad; all now are in a good " state in all those respects. 11 lost their licences in con- " sequence of being underground and unfit."

Dr. Ballard, Medical Officer of Health for the parish of St. Mary, Islington, suggests (752) that the licence fee of a bakehouse should be five shillings in order to remunerate the Officer of Health for the more frequent inspections that he thinks would be desirable.

A remarkable suggestion was also made by two of the witnesses, Mr. Dwarber, master baker, of Fetter Lane (434,) and Mr. Purvis, master baker, Blackfriars Road (503). They represent the views of a large portion of the baking trade, the undersellers. Their proposal is, that a licence fee of ten guineas should be placed on every baker's shop and on every shop in which bread is sold. It would be superfluous to repeat their arguments, which are given with great clearness and force in their evidence, and with much plausibility. The point which made it necessary for me to enter fully with them into the subject was, that they alleged that if their views were adopted the men would be relieved from a portion of their work, very injurious to their health. I believe I shall be able to show in a subsequent part of this Report that the benefits to the men which they point out, as well as to the public in checking the production of adulterated bread, can be better obtained in another way, without resorting to a measure open to such objections as a high licence fee upon every

baker's shop. Mr. Nevill, by far the largest manufacturer of bread in London, who depends for a large portion of his sale upon the agency of a multitude of small shops, shows conclusively (165) the injustice which would be inflicted by so high a licence fee.

The circumstances of bakehouses do not seem to me to place them in the same category as slaughterhouses in regard to the necessity of licensing them. A slaughterhouse, if neglected, will become a public nuisance, and injurious to the health of all persons living near it. A dirty ill-ventilated bakehouse is only injurious to the health of the persons working in it, or at furthest to the inmates of the house where it is. Inspection, the power of ordering the improvements above pointed out, and a fine for non-compliance, would be sufficient for the protection of those most nearly concerned, namely the workmen. And considering that one half the bakehouses in London are probably both clean and sufficiently ventilated (though not always judiciously) (p. xvi), it would be a needless annoyance to impose upon the proprietors of those the trouble of applying for and renewing their licence to sell bread from year to year.

That the benefits of good ventilation in bakehouses would extend beyond those who work in them, is clear from facts communicated to me in several instances. Dr. Aldis informed me (741) that he had met with a case of the health of a baker and his family being greatly improved by the removal of the bakehouse from underneath the dwelling. In paragraph 320 an instance is mentioned of the sulphurous vapour from the oven and the steam from the bread pervading the house and affecting the health of the family. Other cases of the same kind were related to me in the course of the inquiry. These facts strengthen the reasons for placing bakehouses under inspection and regulation, on sanitary grounds of a wider nature than considerations for the workmen only; and the example of what took place in consequence of the voluntary inquiry in the parish of St. George, Hanover Square, shows that inspection, with the powers proposed, would be eminently useful and satisfactory.

Reasons why the provisions of the Act for preventing the adulteration of articles of

3. I am now about to submit to you, in the interests of the journeymen, that it would be desirable that the provisions of the Act "for preventing the adulteration of articles of food," &c. (23 & 24 Vict. c. 84), should be made more effectual; and it need not be added that if this were done it

food should be made more effectual.

would very much contribute to the satisfaction and advantage of the public also.

I shall be unable to show the bearing of this question upon the present condition of the journeymen bakers, without referring to some particulars in the past history and present state of the baking trade.

Competition in the baking trade.

The present condition of a large portion of the journeymen bakers in the Metropolis is the direct result of the very active competition that exists in the trade, both among the men and among the masters.

The causes of the overcrowded state of the labour market, which produces this competition for work among the men themselves, have been already pointed out. (p. ix.) It remains to show what has produced the severe competition which prevails among a large class of the masters, and by what means it is sustained, to the injury of the men, and to the disadvantage, in some important particulars, of the public.

History of the baking trade in the Metropolis.

The history of the baking trade of the Metropolis is briefly this :—

The regulation of bread and bakers by the assize* is of earlier date than the first statute upon the subject, the 51 Hen. 3. stat. 1., A.D. 1266. This statute recites that "We have seen certain ordinances of the assize of bread," &c., "made in the times of our progenitors, sometimes kings "of England;" and it is said to be "an exemplification "of certain ordinances of assize made in the reign of King "John."†

From the statute of Hen. 3. until the 8th Anne, c. 18, (1709,) the price of bread was regulated by the price of wheat (irrespective of the price of flour), and the weight of the loaf was increased or diminished as the price of wheat rose or fell.‡

The mode of "setting the assize" is thus described in the first-named Act :—"The bailiffs shall be commanded to "bring in all the bakers," &c. "First they shall inquire

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* Defined in the law books to be "an assembly of knights or other substantial men, together with a justice, in a certain place, at a certain time;" from assideo, "to sit by," or, according to Lord Coke, "to sit together." Assido, in law Latin, signifies to assess or tax. Tomlins's Law Dictionary.

† Report of Committee of House of Commons on the laws relating to the manufacture, sale, and assize of bread; 17th Feb. 1815.

‡ Quando quarterium frumenti venditur pro xii d. tunc panis quadrantis de wastello ponderabit sex libras et sexdecim solidos," &c. &c. And by a stat. temp. Edw. I. (Statutes at Large, vol. I. p 86.) "non mutetur assiza nec "pondus nisi per sex denarios crescentes vel decrescentes in quarterio "frumenti."

" the price of wheat * * and how the bakers bread in " the Court do agree, that is to wit, wastel and other " bread after wheat of the best, or of the second, or of the " third price; also, upon how much increase or decrease in " the price of wheat a baker ought to change the assize " and weight of his bread."

The process is more fully described in the remarkable compilation from the records of the city of London entitled the " Liber Albus."*

According to an ordinance of the City of London, in force in the year 1419, " it is enacted, that there shall be four " principal hallmotes held among the bakers in each year; " the first, before the Feast of St. Michael, that so the " bakers summoned thereto * * * may recall to mind " such statutes as pertain unto bakers, and receive the assay " of bread. * * * The second hallmote must be held after " our Lord's Nativity; that so, if there shall be any trans- " gression during the first term of the year, no default may " arise among the bakers, howsoever they may be minded " thereto, as well with regard to flour as to corn for making " their bread. The third hallmote is customarily sum- " moned after Easter, and the fourth will have to be held " after the Nativity of St. John the Baptist (24th June). " * * * At the four hallmotes aforesaid all the bakers " ought to appear. * * * And an assay of bread " ought to be made after the Feast of St. Michael in each " year, by four discreet men chosen and sworn thereunto; " and according to the proportion in weight set by such " assay, the baker ought to bake throughout the whole of " that year. Of which procedure the following is the " method:—The four men so sworn as aforesaid are to buy " three quarters of corn; one, namely, upon the pavement " in Chepe, one at Greschirche or at Billyngesgate, and a

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* " In the Record Room at Guildhall there is an unbroken series of letter books, journals, and "repertories," extending over nearly six centuries." From these archives, as they existed in the year 1419 (7th Hen. 5th), the "Liber Albus" is a compilation or "repertory," as it is designated by the compiler, the celebrated Richard Whitington, mayor, and was prepared by him for the instruction and guidance of those who might thereafter have "the governance of the City." This book has been recently translated and published. Its title is "Liber Albus:" The White Book of the City of London, compiled A.D. 1419, by John Carpenter, common clerk, and Richard Whitington, mayor. Translated from the original Latin and Anglo-Norman, by Henry Thomas Riley, M.A., Barrister-at-Law, London. R. Griffin & Co., 1861. The first part of the work describes the usages of the City from the period of the Norman Conquest. The latter portion relates principally to details "intimately con- " nected with the social condition, usages, and manners of the people, during " the 13th and 14th centuries." (Preface, p. vi.)

" third at Queen-Hythe; of which corn they are to make " wastel (2d quality), light bread, and brown; and after, " with great diligence, they shall have baked such loaves " they shall present them, when hot, to both the mayor and " aldermen at the Guildhall, and there, while so hot, such " loaves shall be weighed. [Then follows the process of " determining the weight to be sold for a penny, which " weight was to vary with the price of corn.] As to de- " mesne bread (Panis Dominicus, made of the very finest " flour, and with an effigy of our Saviour impressed upon " it), the halfpenny loaf was to weigh the same as the " farthing loaf of wastel." (p. 302–5.)

The principle on which the remuneration to the baker was estimated was from the earliest time as follows:

" And be it known that a baker may gain in every quar- " ter of wheat, as is proved by the baker of the Lord the " King, 4*d.* and the bran, and two loaves for his advantage; " for three servants, 1½*d.*; for two boys, ½*d.*; for salt, ½*d.*; " for kneading, ½*d.*; for candles, ½*d.*; for wood, 2*d.*; for " bolting, 1½*d.*"*

Nearly a century and a half later, A.D. 1497, (12 Hen VIIth.) " As the Book of Assize declareth, when the " best wheat was sold at 7*s.*, the second at 6*s.* 6*d.*, and " the third at 6*s.* the quarter, the baker was allowed, for

	s.	*d.*
" Furnace and wood - - -	0	6
" The miller - - -	0	4
" Two journeymen and his apprentices -	0	5
" Salt, yeast, candles, and sack bands -	0	2
" Himself, his horse, his wife, his dog, " and his cat - - -	0	7
	2	0

" And the bran to his advantage." (Report of 1815.)

Both the mode of setting the assize and the principle on which the price of bread was determined appears to have remained unchanged by legislation from those early periods until the time of Queen Anne. The statute 8 Ann. c. 18. (A.D. 1709) recites the statute 51 Hen. 3., " and that many " doubts and difficulties do daily arise in the construction " thereof, whereby little or no observance hath in many

* " Et sciendum est quod pistor potest lucrari in quolibet quarterio frumenti, " ut probatum est per pistores Domini Regis, quartuor denarios et furfur, et " duos panes ad furnagium; tribus servientibus unum denarium et obolum; " duobus garconibus obolum; in sale obolum, in gesto obolum, in candelis q: " in bosco ii. d., in bultello habendo denar. et ob." (51 H. 3. c. 1. A.D. 1266.)

" places been made, either of the due assize or reasonable " price of bread, and covetous and evil-disposed persons " taking advantage of the same have, for their own gain " and lucre, deceived and oppressed Her Majesty's subjects, " and more especially the poorer sort of people." For remedy whereof it enacts "that the Lord Mayor of the " City of London, and the Mayor or other chief magistrates " of any other city town, corporation, or borough, and " two or more justices of the peace in such town and " places where there shall be no mayor, &c., shall ascer- " tain and appoint the assize and weight of all sorts of " bread to be sold by any baker or other person what- " soever, having respect to the price the grain *meal or* " *flour* whereof such bread shall be made shall bear on the " several public markets, &c., and making reasonable al- " lowance to the bakers for their charges, ovens, and live- " lihoods."

A table is then given of the weight that each kind of bread—white, wheaten, and household—must be, according to the price of wheat, and the allowance of the magistrates to the baker for baking; the latter varying from 1*s.* to 1*s.* 6*d.* per bushel of wheat.

By s. 7. if any baker or seller of bread shall put into any bread any *mixture* of any other grain than what shall be appointed by the assize, he shall forfeit 20*s.*

By s. 7. it is enacted that "it shall be lawful for the " Lord Mayor or aldermen, or chief magistrates of any " other place, or the justices, &c., at all times hereafter, in " the day-time, to enter into any house, shop, stall, bake- " house, &c. &c. to search for, view, and try all or any of " the bread of such person or which may there be found; " and if any bread shall be found wanting, either in the " goodness of the stuff whereof the same shall be made, or " be deficient in the due baking or working thereof, or " shall be deficient in the due weight, * * it shall be law- " ful * * to seize and take the bread so found * * ."

Causes of the abolition of the assize of bread.

During the whole of the following century, and until the abolition of the assize of bread in the Metropolis in 1822, and in the country in 1836 (by the Acts 3 Geo. IV. c. cvi., and 6 & 7 Will. IV. c 37.), complaints were frequent of the unfair average price, resulting from the different and contradictory modes of setting the assize adopted in different parts of the country. In some places, although the prices of wheat and flour were combined, "screenings" and inferior wheat, not made into bread, were averaged with the rest. In 1813 the country bakers complained

that the assize was set on wheat and not on flour. It was stated by Mr. Edward Grose Smith, clerk to the Bakers' Company, before the Committee of 1815, that wheat not fit for mealing, but only to be made into starch, or paste for bookbinders or papering rooms, or for biscuits, was brought into the averages in the country.

"The wheat table (price of wheat) never was considered "by the London bakers of any account, either by the "Lord Mayor or by the trade,—only the flour table" (Mr. G. F. Turner, Esq., before the Committee of 1815). It was also shown before that Committee (p. 8) that the London bakers took their flour from the millers at the price they chose to set upon it, as, whatever price was set upon it, it was returned to them in the price of the loaf as set by the assize, on the weekly return of the bakers upon the flour used. Some bakers returned the full credit price, although they subsequently obtained a discount for prompt payment. Much flour was returned at a higher price than that at which it was purchased, and much low-priced flour was omitted (pp. 8 and 9). "Mealmen and "millers looked to the assize, and raised the price of flour. "The bakers had no interest in cheap flour; they did not "care what the price was, and gave it no care in their "purchases." (Mr. Wm. Hill, baker, Bishopsgate Street, evidence before Committee of 1821.)

Both the bakers and the public were dissatisfied with the operation of the assize laws.

As regards the bakers, the Committee of the House of Commons of 1821 reported that the assize acts "were "instruments of oppression against the fair tradesman, by "the power given to informers of seizing bread and of keep-"ing it three days before he could be compelled to have it "weighed" before a magistrate. They rendered him there-fore liable to information and conviction "on account of "the necessary waste of the article," and also "on "account of the bread being accidentally under weight by being burnt in baking." The Act 55 Geo. III., for the protection of the baker on those points, "was found in-"sufficient," and he was frequently "driven to bribe "common informers."

The public were dissatisfied, because they thought, and rightly, that the price of bread, instead of being kept at a fair and equitable rate by the assize, was unduly raised by it.

After various changes in the weight of bread, which the baker was required to give per quarter of wheat (or sack

of flour), it was finally assumed by the Act 31 Geo. II. and 37 Geo. III. that 20 peck loaves, or 80 quartern loaves (of 4 lbs. 5½ oz. each), were made from a sack of 280 lbs. of flour.

In reality, with good flour, more than 80 quartern loaves could be made per sack. The surplus, together with the allowance for his expenses, &c., gave the baker a good profit. (786.)

But on various grounds the bakers applied from time to time to have their allowance for expenses, &c. raised.

They applied in 1797, "and obtained an increase in the tables of London of 1*s.* 8*d.* per sack;" but this increase was against the opinion of the oldest and most experienced master bakers, "as it would tend to introduce competition "in the price of bread; every increase of profit increasing "the number of bakers." (Report to House of Commons of the Committee of 1824, p. 5.)

Again, in 1804 the London bakers petitioned to Parliament "for an increased allowance," and stated that it was an application on behalf of the whole trade collectively."* They grounded their application on the fact of the increase of their expenses; "that the prices of yeast, wood, candles, "and salt had risen;" and "that rents had also risen." They also brought forward a statement showing that "the clear profit to the baker per sack" had declined as follows. It was in 1747, 5*s.* 7¾*d.*; in 1789, 5*s.* 4½*d.*; in 1799, 4*s.* 2½*d.*; in 1800, 4*s.* 0¼*d.*; in 1801, 3*s.* 10½*d.*; in 1802, 3*s.* 11½*d.*; in 1803, 3*s.* 7*d.*; in 1804, 3*s.* 4*d.*

The result of these applications was that the tables of assize were increased 1*s.* 8*d.* in 1797, and 1*s.* 8*d.* in 1804. (Evidence before Committee of the House of Commons of 1824, p. 5), and twice again between 1804 and the period of the abolition of the assize.

The actual sum allowed previously to 1797 appears to have been under 12*s.* per sack; in 1813, it was 13*s.* 4*d.*; subsequently, it was as high as 15*s.* 10*d.*; but the witness making that statement said his actual profit was less on account of increased expenses.

Rise of the system of making and selling "cheap bread."

But, as adverted to above, these advances in the allowance were made against the opinion of some of the more far-seeing members of the trade, inasmuch as it was well-known that their real profits were larger than they were made to appear, in consequence of their being able to make more than 80 quartern loaves from the sack of flour;

* Report of Committee of the House of Commons on the London Bakers, 27th April 1804.

and the increase was greater the better the quality of flour used.

Accordingly, even before 1797, a system had commenced among certain persons in the trade, of selling bread below the price fixed by the assize.*—(Minutes of Evidence of 1824, p. 5.)

This practice of making and selling "cheap bread," when once commenced and found profitable, increased rapidly in consequence of the great facilities for getting into the trade, from the small amount of skill and capital required. "Many became proprietors of bakehouses, "into which they put journeymen, or encouraged jour- "neymen to set up for themselves; buying flour in "large quantities, and selling for ready money at a price "below the assize." The master of the Bakers' Company (Mr. G. Wright), stated to the Committee in 1815 (p. 92 of Evidence), that according to the returns of the Cocket Office of the city of London, there were, in 1797, in London 1,300 bakers; in 1815, there were 1,706, besides about 400 in Westminster. There had been an increase of, perhaps, 200 in five years, "and the under- selling was "rapidly increasing on borrowed capital." And a very intelligent witness before that Committee

* The following table is a specimen of the manner in which the price of bread was adjusted in London according to the price of flour :— (See also s. 788.)

A table showing the price and weight of bread according to the ancient assize as set by the Lord Mayor in 1814.†

Price of Flour.	Price of a Quartern Loaf.	Price of a 8lb. Loaf.	Price of a 4lb. Loaf.	Price of a 3lb. Loaf.	Price of a 2lb. Loaf.	Price of a 1lb. Loaf.	Weight of a Three-penny Loaf.	Weight of a Two-penny Loaf.	Weight of a One-penny Loaf.
Sack.	*s. d.*	*s. d.*	*s. d.*	*d.*	*d.*	*d.*	*lb. oz. dr.*	*lb. oz. dr.*	*oz. dr.*
30	0 6½	1 0	0 6	4½	3	1½	2 1 0	1 5 6	10 11
35	0 7¼	1 1¼	0 6¾	5	3¼	1⅝	1 12 11	1 3 2	9 9
40	0 8	1 2¾	0 7¼	5½	3¾	1¾	1 10 1	1 1 6	8 11
45	0 8¾	1 4	0 8	6	4	2	1 7 13	0 15 14	7 15
50	0 9½	1 5½	0 8¾	6½	4¼	2¼	1 5 15	0 14 10	7 5
55	0 10¼	1 6¾	0 9½	7	4¾	2¼	1 3 5	0 13 9	6 12
60	0 11	1 8¼	0 10⅜	7½	5	2½	1 2 15	0 12 10	6 5
65	0 11¾	1 9¾	0 10¾	8	5¼	2¾	1 1 10	0 11 12	5 14
70	1 0½	1 11	0 11½	8¾	5¾	3	1 0 13	0 11 2	5 9
75	1 1¼	2 0½	1 0¼	9¼	6	3	0 15 12	0 10 8	5 4
80	1 2	2 1¾	1 1	9¾	6¼	3¼	0 14 14	0 9 14	4 15
85	1 2¾	2 3¼	1 1½	10¼	6¾	3½	0 14 2	0 9 6	4 11
90	1 3½	2 4½	1 2¼	10¾	7¼	3½	0 13 7	0 8 15	4 7
95	1 4¼	2 6	1 3	11¼	7½	3¾	0 12 13	0 8 8	4 4
100	1 5	2 7¼	1 3¾	11¾	7¾	4	0 12 4	0 8 2	4 1

† "An assize" was ½*d.* per loaf. (37 Geo. 3. c. 98. s. 16.) According to the rise or fall of flour, the price of bread was raised or lowered "an assize" or "half of an assize." See Books of Bakers' Company; referred to, 784.

(p. 90), Mr. W. Harvey, stated that "Every man in "this country who can muster enough may take a "chandler's shop or a baker's shop; there is no possibility "of hindering people from embarking in the trade. They "calculate in this way: 'I get so much now; can I do "better if I am for myself?" When a young man begins "business, being young and strong, he works day and night "to double his weekly wages. I did so myself when I "began business; I did two or three men's work. When "these little men are very clever and successful they get "up to be great men, but then there are other little men "starting up daily, and some are successful and some are "unsuccessful."

This witness "did not think that the abolition of the assize "would diminish the number of bakers" by causing the "trade to fall into the hands of capitalists" (p. 90); and his anticipation has proved correct. The causes mentioned by those two witnesses are still in active operation, and are contributing continually to recruit and increase the number of bakers in the trade, and to keep up that severe competition, the effects of which, as regards the journeymen and the public, are now under review.

Means by which competition sustained.

The principal means by which this competition is now sustained are derived from two distinct sources, in both of which the public is concerned as well as the men.

To the first of these two sources belongs the perfectly legitimate one, above adverted to, (p. xxxii), of watching the opportunities of the flour market; buying large quantities at a time, and selling the bread for ready money. Among the "undersellers," who now are believed to compose at least three fourths of the London trade, (26, 430), are many highly respectable men who carry on business in a large way in several shops, and some with a smaller amount of business, the profits of all of whom are legitimately made by that system. This manifestly enables them to sell good and pure bread under the price which those bakers must charge who buy flour in small quantities on credit, or who give credit in the sale of their bread. To this is added, by many of the undersellers, the profit to be derived from the extra labour of their men, and also from the use of a cheaper kind of yeast. (27, 113, 359, 430, 470, 471, 612, 788, 831.)

For some years after the abolition of the assize the general quality of the bread sold in London does not appear to have been much affected by the competition which arose. Witnesses before the Committees of 1818 and 1824 stated, in reference to the great and rapid increase of the number

of undersellers, that "the quality of the flour remains the same." Mr. Huntsman, an underseller, stated to the Committee of 1824, that "their flour was as good as that of the full-priced bakers." "The abolit on of the assize," according to Mr. Wm. Hill, baker, Bishopsgate Street, before the Committee of 1818, "has effected this change; it has "tended very much to impoverish the bakers to the benefit "of the public, inasmuch as in the present competition that "exists in the underselling part of the trade there are "few parts of London where they can hold together their "trade, as bakers, unless they sacrifice part of their profits. "He himself had been obliged to lower his price to meet "the undersellers. The increase of undersellers was very "great in all parts of the town."

Illegitimate means.

This leads to the consideration of the second, or illegitimate, source or sources of the competition above adverted to.

The adulteration of bread.

Although for some years after the abolition of the assize the quality of the London bread was not in general much altered, a system nevertheless had begun among the lower grades of undersellers of selling at a low price impure and inferior bread, made to appear like the best bread, and also deficient in weight. This fact is referred to by Mr. Hill and by Mr. Turner, in their evidence before the Committee of 1818. The latter stated that "the cheap bakers had neither quality nor weight." It was also shown to that Committee that a system of adulterating bread had begun. Mr. Francis Crisp stated (p. 28), that the ingredients used to adulterate bread were alum, pearlash, soap of a particular description which creates a strong fermentation, and whitens bad flour; and also "stone flour, which is made from Derbyshire stone;" of which he produced a sample found in the possession of a baker at Deptford.

These illegitimate sources of producing cheap bread, above enumerated,—impure flour or mixtures of other meals with wheaten flour, inferior flour made to assume the appearance of good flour, and adulteration with other substances, some of which are deleterious,—are matters in respect to which the public are concerned to know whether and to what extent they exist at present, and if to any extent, how they can be put an end to.

According to the evidence of Mr. Dwarber, (418–443), one of the ablest and most experienced members of the underselling branch of the trade in London, confirmed by numerous witnesses throughout the entire mass of the evidence which I have brought together, the severity of the competition in the baking trade, arising from the very great

facilities of getting into it as above described, has aggravated the temptations to dishonesty in the production of inferior and adulterated bread, and bread deficient in weight, to a great degree. (32, 430, 443, 470, 611, 774–7, 780, 784–788, 812.)

No doubt many undersellers of known character and respectability maintain their position by the legitimate means of judicious purchases of flour, good management, and selling a good article; but very many in the trade are exposed to the mortification of seeing their business undermined by others in that branch of the trade below theirs—"the cutting trade," as it is called,—who attract custom by advertising their bread at a much lower rate, and by giving it the appearance of bread of the best quality. The bakers in this branch of the trade are also subject to the keenest competition among each other, so that it will frequently occur that bread is advertised to be sold at a price at which good and pure bread could not possibly be sold at a profit. This bread is, in some cases, good bread sold knowingly at a loss, on the calculation of destroying the trade of a neighbour. To meet this, the neighbour or neighbours in the trade are strongly tempted to resort to means by which they may avoid ruin. One will use alum to give a good appearance to a cheaper, but still pure, flour; another will over-ferment his bread, and therefore injure its nutritive qualities, in order to give it a superior attraction by its whiteness; another will use flour partly composed of mixtures of cheaper meals; or will mix up a portion of the species of flour called "cones," used for "dusting" the dough, with his batch of flour; in both which cases alum must be used to produce whiteness. Other mixtures have been detected, some very deleterious, but not commonly.* Another baker will make his loaves originally of short weight, and in addition to this, will under-bake them, by which they will weigh heavier within the next few hours after being taken out of the oven; or throw sacks over them to keep the steam in. Some who are affected by the competition will resort to many of these means at once. One has no sooner done so to any extent

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* Dr. Normandy stated, before the Committee of the House of Commons on the Adulteration of Food (1856), that he had found in flour carbonate of magnesia, chalk, and clay. (547.)

John Mitchell, Esq., Analytical Chemist, stated before the same Committee (1051), that he had found sulphate of lime and chalk in flour, used to give it bulk; and that some flour was sold at so low a price that bakers ought to suspect it was not genuine.

appreciable in the selling price of his loaves, and leaving him at the same time some small profit, than another will carry one or the other of these adulterations, or other kinds of fraud, a step further than the former has done. The first will then go still beyond his competitor in the same direction, until they have reached the limit of possible deterioration in the quality of the article sold, consistently with giving it such an appearance as will enable them to sell it at all. (32, 74, 235, 504, 552–6, 611, 717, 752, 762, 768, 769, 774–7, 784, 806.)

The extent to which this process is carried on in London is, without doubt, considerable. As regards alum in particular, although probably the use of it has been checked to some extent of late years, the evidence upon the subject shows conclusively that it still prevails very extensively in the lower branches of the baking trade in all parts of London. The fact is not denied by any one. Alum, ground fine, both pure and mixed with salt, and sold under the name of "Bakers Stuff," is a common object of trade, and is sold in large quantities. The most recent and very careful analyses of Dr. Hassall, which confirm the general results of the earlier ones, upon which some doubt had been thrown (670, 671, 768), prove that of 32 specimens of bread purchased in various parts of London, 17, or more than one half, contained alum; some of them in very large proportions. (766.)

There is no person in the trade better entitled to state the facts upon this subject than Mr. Purvis.

"504. When the Act passed 'for preventing the adulteration of articles of food or drink,' (23 & 24 Vict. c. 84, 6th August 1860,) there was an immediate apprehension among those bakers in the trade who adulterate their bread that they would be liable to have their bread frequently analysed, and their premises searched for alum or other things that they ought not to use. But when it was found that no sufficient means were provided by the Act to meet the expenses of this kind of active and constant supervision, (the purchaser having to pay the analyser,) they became confident again, and have resumed their practice of adulteration without any fear of detection. Here and there a case of detection may occur, but it is not sufficiently common to check the practice. Mixing up myself as I do with the trade, I know that some master bakers have had as much as a hundred weight of alum in their house at a time. Adulteration with this and other things is particularly common in poor neighbourhoods; the poor are the principal sufferers, but the rich do not escape. Rice is extensively used, and where this is the case more alum is rendered necessary to bind the dough; and the public, which believes it is buying fine wheaten bread because it

looks so white, is getting so much less nourishment for their money, and something very injurious to them in the alum."

Mr. T. K. Callard also, who was examined before the Adulteration of Food Committee, gave important evidence to the same effect (675-7. See also 164).

Although varieties of opinion with respect to the effect of alum in bread upon health were expressed before the Committee on the Adulteration of Food in 1855-6, and subsequently found expression in discussions before the Society of Arts,* it appears to be the general conclusion of the medical profession that alum, whether it be altered in character by the process of baking, as some maintain, or not, when taken day by day, even in small quantities, is highly injurious, especially to the young and to persons of weak constitutions. (572, 771, 821.)

As to the quantities discovered, Dr. Normandy stated, that he had frequently found 25 to 30 grains in the 4lb. loaf, more frequently smaller quantities. Dr. Chalice stated, that he had found "12 ozs. to 140 2-lb. loaves, as a minimum; "when the flour was bad there was double that proportion." Dr. Rogers, Analytical Chemist and Surgeon, St. George's Road, Pimlico, stated that he had found 8 ozs. to 2 lbs. to 116 loaves. (Adulteration of Food Committee of 1855-6, ss. 537, 1400, 3308.) Mr. W. Bastick, Analytical Chemist, stated that he had found generally from 1 lb. to 3 lbs. and 4 lbs. of alum per 100 loaves (887). The quantities per 4 lb. loaf found by Dr. Hassall, and published in the "Lancet" of 15th February last, show in many instances a much higher proportion than those above given; 12 out of the 17 cases analysed showing a proportion of from 17 to upwards of 30 grains per sack of flour made into 92 4 lb. loaves (766). From the care taken by Dr. Hassall in these analyses, as described by him (768), there can be no reasonable doubt of their general correctness.†

As to the injurious effects upon the system, of even the smallest quantity of alum found in bread, the following testimony of experienced medical men, given before the Committee on Adulteration of Food, cannot fail to carry great weight:—Dr. Carpenter, Professor of Medical Jurisprudence at the University of London, stated (2418) "that "alum in bread was extremely injurious." Dr. A. Normandy, M.D., stated that, in eating inferior or mixed bread, made to look like good bread by the use of alum, the poor

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* Journals of the Society of Arts for 9th April and 27th April 1860.

† The penalty for using alum in bread is, by 37 Geo. 3. c. 98. s. 21, "not more than 10*l.* nor less than 5*l.*"

man "not only loses the nourishment of good bread, but "gets also an enfeebled digestion, and therefore inferior "power of performing work, and a debased condition of "health." (537). Mr. Rodgers stated that "even the "smallest quantity is injurious ; a person eating a pound of "bread a day would eat eight grains of alum with the bread "containing the minimum quantity. Great gastric irrita- "tion would be produced. To young children it would be "especially injurious. The very general disease you have "in the nature of irritation about the stomach is to be "traced to the bread that is used. The minimum of "eight grains in the 4 lb. loaf would have a pernicious "effect on delicate persons." (3308.) To the same effect is the opinion of Dr. R. D. Thompson, Professor of Chemistry of St. Thomas's Hospital (1200), and of Dr. Chalice (1400.) The effect of alum in bread is also very clearly and fully described in the extract which I have given (771) from a report made by Dr. Septimus Gibbon, Medical Officer of Health for the Board of Works of the Holborn District, for the year 1857. He states that its effect is to confine the bowels, and subsequently to produce alternations of that and the contrary, and finally ulceration. Dr. Gibbon analyzed in that year 32 samples of bread, and detected alum in the whole of them. He had previously analyzed 10 specimens of flour, but found them all pure.

"The quantity of alum which I have generally met with in bread has been in the proportion of from half a drachm to one drachm in the 4 lb. loaf ; so that the man who consumes half a loaf a-day swallows every twenty-four hours from 15 to 30 grains of alum. Now it is found that even 12 grains per diem, taken by a healthy adult, will produce constipation. Its effects on children would of course be greater than on adults ; a smaller quantity would suffice to produce the diarrhœa and dysenteric symptoms, and they would appear sooner. Alum enters into chemical combination with the gluten of the flour, therefore I admit that its effects in bread are less active and injurious than when administered in its pure state. I have little hesitation, however, in assigning this impurity in the bread as the chief cause of the frequent constipation, headaches, liver derangements, &c., of those who are dependent on bakers for their bread. The fatal diarrhœa of infants under three years of age may also have arisen from or have been aggravated by this cause."* (771.)

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* The evidence given to the Adulteration of Food Committee as to the practice of adulterating flour in various parts of the country shows the extent to which it prevails out of London as well as in it. Mr. Wm. Emerson, the manager of the People's Flour Mill, Leeds, stated (1041) that this company was established in 1849, in consequence of the dearness and impurity of the flour ordinarily sold. The company consisted of 3,100 members, chiefly of the

But, in addition to alum, the evidence of several of the principal bakers shows that it is now a practice, in the lower branches of the baking trade, which the great competition above adverted to stimulates and increases, to use flour adulterated by an admixture of other meals besides wheaten meal, by which the public is defrauded in the nutritive qualities of the bread. The mixtures are of various kinds. It appears from the evidence of Mr. Canes, Corn Factor, before the Committee of 1815 (p. 34), that this practice had commenced even before the abolition of the assize. He states that "sharps, ground again, were mixed "with flour; the grinding softens it, and makes it appear "of a tolerable colour; but there is not a substance in it." Sir John Gordon, in his evidence before the Committee of 1855 on the Adulteration of Food, states that the "hulls of wheat, barley, and oats so admirably dressed "up as to have all the appearance of pure flour," had been imported into Cork from England, "so that the poor man "who lived on 2 lbs. of bread a-day did not take in one "fourth of that amount of nutrition." (s. 887, 891.) This so-called flour was sold at $10\frac{1}{2}d.$ per 7 lbs., while good flour was selling for 1*s.* Millet-seed was mixed with flour; and an Egyptian grain called "Dari," worth 6*l.* per ton, was ground and mixed up with wheaten flour worth nearly 18*l.* per ton, and imported from England. The impor-

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working classes, and the amount of business done was between 70,000*l.* and 80,000*l.* per annum. They ground 400 quarters of wheat per week, all made into pure genuine flour; not so white as what is generally sold by bakers, but more nutritious. "There are similar societies at Hull, Barnsley, Bradford, "Thirsk, Birstall, Keighly, Halifax, Rochdale, and elsewhere." He adds, "We could manufacture flour at $4\frac{3}{4}d.$ per stone less if we mixed it with barley," and "respectable millers are compelled to mix, to make flour as cheap as "others." (1143.)

Mr. J. Jackson, miller, Wakefield, said that "even alum cannot be inter-"mixed properly anywhere so well as the mill. If the mills could be made "pure, I am persuaded that the community could have a pure article. An "inferior class of wheat can be used where alum is ground with it much better "than when it is dissolved in water." (3716.)

Dr. C. W. Bingley, Professor of Chemistry to the Medical Institution, Sheffield, stated that "in several cases he had found flour adulterated with meal "not of wheat flour, and in three cases with gypsum, and one with gypsum and "bone dust." (4096.)

Mr. J. Portgill, recently Lecturer on Anatomy at Sydenham College, Birmingham, who originated the inquiry and suggested the appointment of public analysts to Town Councils and Magistrates (2100), stated that he "found in "London, plaster of Paris in flour; it was seized at a baker's." (4215.) At Scarborough he found the bread much adulterated, and producing a painful state of the stomach. (4221.) "He found alum in all the flour examined in "Birmingham, except in the samples of the Birmingham Flour Society." (1105.) Sir John Gordon, mayor of Cork, stated that a great deal of adulterated flour was made at Cork for the local market, (887, 961, 970,) and also imported from Liverpool. (972.)

tation of this deteriorated flour is a regular business. (915, 970, 971.) To the same effect is the evidence of Dr. Gibbon, who stated to me (769) that although he found no alum in the samples of flour he analyzed, he detected "in the weakest, by the microscope, the husks "of oats and rye, and also the presence of rice." Flour was also said, by Sir J. Gordon, to be frequently adulterated with the following grains:—Rice (547, 1420), Indian corn (2079), bean and pea meal (2114), lentils or "Grano Turco," largely imported from the Levant, and much worked up in flour, discovered by the microscope (49), barley (1041). "With barley at 40*s.* a quarter and "wheat at 70*s.*, one quarter of barley and three of wheat "will make a good flour, and lessen the price 3*d.* to 4*d.* per "stone; it is a very common adulteration." A considerable quantity of barley meal was sold for flour (4199).

But another article, not adverted to before the Committee on Adulteration of Food, although much used in adulterating bread, namely "Cones flour," remains to be mentioned. This article was referred to as a means of adulteration by one of the witnesses before the Committee of 1815, Mr. J. Moxey, Baker, Radcliffe Highway. He states (p. 78) that "he thought it was used to a great extent. "While wheat was from 65*s.* to 70*s.*, cones were 56*s.* "per quarter. But alum must be used with it, or it never "could bear the appearance it does with inferior flour."

"Cones flour" is described by Dr. Hassall, in his work "Adulterations Detected," (p. 277 of 2nd Edit., London, 1861), as made from a particular species of wheat called "Revet." It is used for "dusting" the dough, as it has the property of preventing the adhesion of the loaves. (p. 279.) Against its use, if in a pure state, mixed with better kinds of flour, in making the dough as well as dusting it, nothing could be said, inasmuch as it is a species of wheat, except that it lowers the nutritive quality of the loaf made in part with it. But it is liable to be greatly adulterated with other and inferior meals, and in that state it is the most common vehicle for the adulteration of the bread sold by the lower or least scrupulous class of bakers, under the pressure of the competition from which they suffer. Dr. Hassall states ("Adulteration Detected," p. 277) that in 1856 he examined with the microscope 22 samples of "Cones flour," procured chiefly in the metropolis. Of the 22 samples only four were genuine. Three were not cones flour at all, but consisted of rice, Indian corn, and beans, and rice and Indian corn. 13 were adulterated, seven very largely, with rye and rice,

rice and beans, rice alone, rice and Indian corn, barley and rice, and barley and alum.

It was stated to me in the course of the inquiry, by many persons in the baking trade, both masters and men, "that nothing was easier or more common than for the "master who wished to lower the cost to himself of the "bread he made, to order a portion of 'Cones' to be mixed "up in the trough with the rest of the flour, and that the "men would not know what they were mixing, as the dif-"ference in appearance was so trifling as not to attract "their notice." The proportion commonly used is about one fifth; in which case it would afford a gain to the baker of from 2*s.* to upwards of 3*s.* 6*d.* a sack. (776 and note, also 788.) To a baker doing a business of 10 or 12 sacks a week this would be an important consideration, and in the cases of severe competition so often occurring in almost every street in London, would, especially if in combination with a further saving in labour, make all the difference in being able to make a bare living, and absolute ruin. Again, if very inferior cones were used, a less proportion than one fifth would give an equal or greater gain; since with flour at 10*s.* a bushel, a compound of rice, rye, Indian corn, or barley flour would be of little more than half that price.* Dr. Hassall states, that of the several qualities of cones flour sold the best are nearly twice the price of the worst, and the adulteration is usually in proportion to the price. (p. 279.)

It is to be noted that many of the most respectable bakers do not use "Cones" at all, but dust their dough with the ordinary flour. (776.) Their use is therefore not essential.

The readiest way to abridge the hours of work would be to prevent the adulteration of bread.

Now it is the general opinion of the most intelligent persons in the baking trade, that the way "to strike at the "root" of the night work, combined with many additional hours of work by day, from which so large a proportion of the journeymen in the trade suffer, would be to make these various frauds and adulterations impossible, by rendering effectual the provisions of the Adulteration of Food Act.

The following is from the evidence of Mr. Cheeseman, who was a member of the Committee of the Bloomsbury Master Bakers Association.

"The great evil from which a large portion of the journeymen suffer is that of being confined for 16 or 18 hours in the bakehouses

* Present prices of "Town Households," 45*s.* to 51*s.*; country flour, 36*s.* to 39*s.*; best Cones, 35*s.* to 38*s.*; mixed Cones (Revets and Rice), 32*s.* to 34*s.*; inferior Cones, 28*s.* See also 788.

in the shops of the undersellers, who do not deliver their bread. I do not think that the way to meet that evil is by a high licence, as proposed (§§ 418–444 and 498–518); but the way to strike at the root of it would be to amend and make effectual the provisions of the Adulteration of Food Act. This would have the immediate effect of putting an end to the use of alum, and to the sale of bread made of various mixtures, and sold as pure wheaten bread. Yesterday I saw a label in a baker's shop advertising the 4-lb. loaf at $5\frac{1}{2}d.$ and $6\frac{1}{2}d.$ The present price of best flour, 'town households,' is 55*s.* per sack, and good 'seconds' is 48*s.* At this price he could not have repaid himself the cost of the flour had he been selling bread made of pure flour. A proper enforcement of the Adulteration of Food Act would put a stop to the system of 18 hours work in the bakehouses, by making it impossible for that class of undersellers, who employ their men those hours, to exist. They only exist now by first defrauding the public, and next getting 18 hours work out of their men for 12 hours wages." (479.)

Mr. Spiking of Dover Street, one of the principal members of the full-priced trade, and to whose evidence I beg to direct attention (678—684), states that the amendment of the Adulteration of Food Act, in the manner he points out, would be of great service to the trade, and to the journeymen in particular, "by checking "the production of adulterated or inferior bread, the sale "of which, among the labouring classes, is said to be sus- "tained to so great an extent by those long hours of work "(often 16 to 18 in the 24), which are among the principal "and most legitimate grievances of the journeymen." (684.)

To the same effect is also the opinion of Dr. Hassall, which takes the view of the question which is sustained by the evidence generally.

762. "My attention has been from time to time called to some of the questions affecting the general condition of the journeymen. Among those questions a very prominent one is the severe competition existing among the masters in the underselling branches of the trade. This severe competition has two consequences; one affecting the men, and the other affecting the public. It affects the men by causing a certain class of masters to keep the men at work for the greatest possible number of hours for the least amount of wages that they can find men to work for; and, unfortunately for those men, the redundancy of labour in their branch of the trade makes it possible for the masters to find men to do their work on those terms. It affects the public by constantly stimulating the production of adulterated and inferior bread. There are hundreds of bakers in London, in certain branches of the trade, who are continually underselling their neighbours; selling their bread at a price much lower than bread

made of good and pure flour can be sold for, and often at a loss to themselves, in the hope of destroying a competitor. The master bakers who suffer from this competition are greatly tempted to resort to inferior flour, mixed and adulterated so as to produce, when made into bread, a loaf which at least looks as well as one made of pure or really good flour. This leads again to others using a still more 'made up' and adulterated quality of flour, which they get at a still lower price, in order to be able to offer their bread for sale at a halfpenny a loaf under their neighbour, and thus sustain themselves in the contest of low prices, accompanied by a lower quality of the article produced.

763. "If anything could be done which would have the effect of producing greater uniformity in the price of bread, and therefore checking this race of competition, a great benefit would be conferred both upon the journeymen and the public.

764. "The great means by which this inferior bread is produced, and made to assume the appearance of good bread, consists in the use of alum.

765. "If any mode, therefore, could be devised by which the use of alum could be effectually kept in check, the most decisive blow would be struck against this injurious system of competition."

And also the clear and practical statements of Mr. Weston, master baker (772 et seq.) appear to be conclusive upon the point.

It is therefore strictly in the interests of the men that I have received the evidence that has been tendered to me in the course of this inquiry relative to the imperfection of the Adulteration of Food Act in its present state. If by making its provisions obligatory and more stringent, its action would have the effect of removing one of the principal causes of night-work followed by many hours of day-work, the result would be a benevolent and beneficial one to many thousands of journeymen in the baking trade, not only in the metropolis, but in other cities and towns in the kingdom. It is evident, also, that it would confer a great boon upon the public by greatly diminishing the production of inferior and adulterated bread. Whether the mode of amending the act, which the persons who expressed to me their opinion respecting it pointed out, is the right one, would be for the consideration of Parliament, should the question be again inquired into, as appears desirable.*

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* That mode is substantially the one pointed out by some of the witnesses before the Committee on Adulteration of Food (571, 2,126, 3,603, 4,344, 4,191, 4,196–7, 3,716, 1,168, 3,444), and is well expressed in the following statements made to me by Dr. Hassall (768) and Dr. Gibbon (770).

"There can, however, I think, now be little doubt that the mixture of alum with wheaten flour of an inferior quality, and with flour made up of mixtures

The word Mixed should be stamped on all bread made of mixed meals.

A branch of this subject has been prominently brought to my notice by some of the witnesses, which it is desirable to call attention to, as intimately connected with the matter in hand, and as one which would come under discussion in the event of any amendments being made in the adulteration of Food Act.

It is the opinion of many of the witnesses that Clause 12 in the Act which finally abolished the assize of bread in London (3 Geo. IV. c. cvi., 22d July 1822) should be made more effectual. That clause enacts "That every person who "shall make for sale, or sell, or expose for sale, within the "limits aforesaid, any bread made wholly or partially of "the meal or flour of any other sort of corn or grain than "wheat, or of the meal or flour of any peas or beans, shall "cause all such bread to be marked with a large Roman "'M.'" upon pain of forfeiting, upon conviction, the sum of "ten shillings for every pound weight made for sale or sold, "or exposed for sale, without being so marked."*

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of other meals besides wheat flour, in order to give the appearance of good bread to that which is in reality of less value as an article of nutrition, is very extensively carried on, and that it is the means of sustaining that system of competition in the inferior branches of the baking trade which leads to the palming off upon the working classes a vast quantity of mixed and inferior bread as good bread, and to the long hours of work which are so injurious to the journeymen in those branches of the trade. If, therefore, a system of inspection by skilled and competent persons, as recommended by millers and others in the evidence before the Adulteration of Food Committee, could be brought about, together with such an amendment of the Adulteration of Food Act as would provide adequately for the expenses of a certain number of analyses of different articles of food in each district, required to be made within a given period, I have no doubt that a most beneficial result would be produced, both to the public, the master bakers, and the journeymen." (768.)

"I am strongly of opinion that a systematic plan should be adopted, under the regulations of an Act of Parliament amending the Adulteration of Food Act, and making it compulsory, by which analyses of different kinds of food liable to be adulterated should be periodically made, and their results published. I am of opinion that that would be the only effectual way to put an end to these adulterations, which, I have no doubt, continue to take place in bread and in so many other articles. It should be a system prescribed by Act of Parliament, and containing the means by which the tradesmen would have due security that the articles taken for analyses were not tampered with, and that the statement of results should be, as far as possible, correct. I do not think that the expense to any district of such a system need be great. Not many analyses of any one article would be required. If, say, six per month of bread, that could be done in two days. The microscope can be used for that purpose in the case of a great number of articles, and in those the result can be ascertained with great rapidity. Again, the important aid of the recent great invention of the spectrascope might perhaps be available for all cases where the metallic bases are present, as in the case of aluminum in bread." (770.)

* Clause X. of the Act 6 & 7 W. 4. c. 37. (28 July 1836), which abolished the Assize of Bread "beyond the limits" of the Metropolis, is to the same effect.

The custom of marking bread is contemporary with all the other regulations relating to bread in this country A statute passed circa Henry III., (Statutes at Large, vol. i. p. 86), requires every baker to have his own mark upon every kind of bread he bakes.* The "Liber Albus," (supra p. xxvii, note,) quotes the following from the "Liber Custumarum," which was compiled about A.D. 1320. (14th Edward II.)

"That each baker shall have his own seal, as well for "brown bread as for white bread; that so it may be "better known whose bread it is. And that each alder- "man shall view the seals of the bakers in his ward * * "and that each baker shall show his seal at each ward- "mote, that so it may be known." Liber Albus, p. 228.†

By the 8th Anne, c. 18. s. 3. it is enacted, "That every "common baker shall fairly imprint or mark on every loaf "the sort, price, and weight of every such loaf;" and by section 8, that if any bread "shall be wanting in the due "weight, or shall not be duly marked according to the "directions of this Act," * * "it shall be lawful to seize "and take the bread so found."

The penalty for not marking bread was repealed by 1 Geo. I. c. 26, but was re-enacted by 22 Geo. II. c. 46. and the directions made more precise, as follows:—

"Whereas, it is often very difficult for the magistrates or "justices before whom bread is complained of to know

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* Et quilibet pistor habeat proprium signum super quodlibet genus panum suorum.

† By Stat. temp. Edw. I. to Edw. II. (A.D. 1291 to 1307) men were sworn "to make search that no one mixes putrid corn with good."

"And if any default shall be found in the bread of a baker of the City, the "first time, let him be drawn upon a hurdle from the Guildhall to his own "house, through the great streets where there may be most people assembled, "and through the great streets that are most dirty, with the faulty loaf "hanging from his neck. If a second time he shall be found committing "the same offence, let him be drawn from the Guildhall through the street "of Chepe, in manner aforesaid, to the pillory; and let him be set in the "pillory, and remain there at least one hour in the day. And the third time "such default shall be found, he shall be drawn, and his oven shall be "pulled down, and the baker made to forswear the trade within the City for "ever." (Liber Albus, p. 232.)

In the 22nd Edw. I. judgment was passed upon Alan de Padyngtone for selling light bread.

Between A.D. 1275 and A.D. 1313 it was enacted by the Ordinances of the City of London, "that the hurdles upon which the bakers were drawn shall be "abolished, and that from thenceforth bakers shall have the punishment of "the pillory." (p. 610.)

I am permitted by one of the City authorities to state that the last person on whom the punishment of the pillory was inflicted in London was a fraudulent miller.

" under what denomination the bread ought to be weighed," " * * " be it enacted, * * that every common baker * * " shall fairly imprint or mark on every loaf so by him " made or exposed for sale, upon white bread a large " Roman W, upon wheaten bread a large Roman W H,' " and upon household bread a large Roman H."

It appears that s. 12 of the Act 3 Geo. IV. c. cvi. above mentioned is not enforced, and has been so long neglected that comparatively few of the masters with whom I communicated had ever heard of it. One or two were able to inform me, from their own recollection, that one of the reasons why the public neglected it was, that the letter M. was so often read on the loaves upside down as the letter W. that its meaning was soon forgotten. (442, 613.) Many masters of influence in the trade are of opinion, that, with a view to more effectually putting an end to the sale of mixtures of meal, by which an inferior and less nutritious bread is produced, it would be desirable in any future Act relative to bread, to require that all bread made of mixed meals should have the word MIXED stamped in full upon it. (442, 720, 725.)

It is clear that the sale of bread made of mixed meals as pure bread is one of the principal means by which the severe competition already adverted to is maintained, and from which the public, no less than the journeymen, suffer. Even if the use of alum, by which the necessary whiteness is given to these mixtures, were effectually prevented, it does not follow that bread would cease to be made, as at present, of these mixtures. It is the opinion of Baron Liebig that lime-water can be used for the same purposes and to the same effect as alum, and if this be so it affords an answer to an objection that has been raised against any stringent measure which would entirely preclude the use of a small quantity of alum with flour made from sprouted wheat, of which there is sometimes a considerable quantity in the market after a bad harvest.*

* The following is abridged from the 4th edition of Dr. Liebig's Familiar Letters on Chemistry, (London, 1859), p. 526 :—

"It is well known that the gluten in cereals undergoes a change when moist. When fresh it is soft, elastic, and insoluble with water, but it loses those properties by long contact with water. Kept under water for some days * * it is finally converted into a slimy muddy fluid, which will no longer form dough with starch. The property of flour to form dough is essentially dependent on the power of the gluten to unite with water, and to transform it into the state in which it exists in animal membranes, in flesh, and in coagulated white of egg. * * By keeping flour in store, the gluten of the cereals undergoes a change similar to that occurring in a wet state, in consequence * * of its attracting moisture from the air. The flour gradually loses its property of forming dough, and the quality of the bread also deteriorates.

"About 24 years ago (see Kuhlmann, cxxi. s. 447) the Belgian bakers

But it is argued, on the other hand, that as the supply of wheat to this country is now derived from every quarter of the globe, flour from sprouted wheat could either have the gluten in which it is deficient, supplied by admixture with other wheats containing a much larger portion of gluten, or should be used for more appropriate purposes than for human food (548, 783.)

There can, at all events, be no doubt, that persons who eat bread composed in part of those mixtures, in the belief that they are eating pure wheaten bread, are defrauded. It is said, indeed, that the poor are very good judges of bread, and that they act upon the maxim, that "if bread is adver-"tised to be sold at a halfpenny below the price of pure and "good bread it is a penny worse." (Evidence of Mr. Hunts-

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employed means for communicating the quality of the freshest and best flour to damaged flour, which by itself would only have furnished a heavy and moist bread. These means consisted in the addition of sulphate of copper or alum, to the flour.

"The action of both substances in the preparation of bread depended on their forming, by heat, a chemical compound with the altered and soluble gluten, by which the latter recovered all its lost properties of insolubility, and its power to unite with water."

Professor Liebig proceeds to state that he was induced to make some experiments, with the object of replacing these two deleterious compounds by some other harmless substance with similar action. This substance is pure cold saturated *lime-water*.

"If the portion of the flour dissolved for the dough be made up with lime-water, and the leaven then added, and the whole left for some time, fermentation takes place just as if no lime-water had been used. On adding, at the proper time, the rest of the flour to the fermented dough, forming the loaf and baking as usual, there is obtained a beautiful, solid, elastic, highly porous bread, free from acidity or moisture, of most excellent flavour. * *

"The proportion of flour to lime-water is 19 to 5; that is, 100 lbs. of flour require 26 to 27 lbs. of lime-water. This quantity of lime-water is sufficient for the formation of the dough; common water must, therefore, be added in the proper proportions.

"As the acidity of the bread disappears, the quantity of salt must be increased, to render it palatable.

"With regard to the quantity of lime in the bread, we know that one pound of lime is sufficient for the preparation of more than six hundred pounds of lime-water; if, therefore, the bread be made with the above proportions, the amount of lime will be nearly the same as in an equal weight of the leguminous seeds.

* * "The full power of nutrition is not possessed by the flour of the cereals. * * The reason of it lies in the deficiency of the lime indispensable to the formation of bone. The seeds of the cereals contain sufficient phosphoric acid, but much less lime is present in them than in the leguminous plants. * * On this account the employment of lime-water merits the attention of physicians.

The quantity of bread yielded by the flour is probably increased, in consequence of the greater attraction for water. From 19 lbs. of flour without lime-water there were seldom obtained in my house more than 24½ lbs. of bread; but the same quantity of flour, with 5 lbs. of lime-water, gave 26 lbs. 6 oz. to 26 lbs. 10 oz. of good well-baked bread. Now as Heeren estimates the quantity of bread from the same amount of flour at 25 lbs. 1·6 oz it appears to me that the increase is undoubtedly due to the use of the lime-water.

man, Committee of 1824.) Doubtless among the most intelligent this is so; the maxim is acted upon by them provided they are able to buy their bread with ready money. But with that very large proportion of the labouring class, especially in the towns, who only pay for the week's supply to the family at the week's end, and frequently not then, it is a matter of necessity to take, from their baker, or from the chandler's shop, whatever bread may be offered to them; and it is notorious that bread composed of these mixtures is made expressly for sale in this manner. (437.)

This, therefore, is a subject worth the attention of the more respectable masters in the baking trade, of the journeymen, and the public; for if the production and sale of bread adulterated with alum and mixtures of meal, as above described, could be effectually put an end to, one great means would be suppressed by which the severe competition in the baking trade is maintained; as the severe competition is the principal cause of the long hours of work in the bakehouse in the large "underselling" branch of the baking trade, the journeymen would be immediate gainers; a large portion of the public, principally of the labouring class, would be relieved from the frauds now practised upon them in selling them adulterated instead of pure bread; and one half the population of the metropolis, according to the experiments recently made, would be exempted from the injuries to health now inflicted upon them by the use of alum in bread.

Origin of night-work and long hours of day-work.

The sale of adulterated bread, accompanied with long hours of work, is only another step in the process which began towards the latter end of the last century when the high allowance to bakers under the assize regulations led to the establishment of shops (at first a very few) in which bread was sold below the rates published by the Lord Mayor (Report of 1824, p. 5). The sale of "cheap bread" had made some progress at the close of the century, and was in 1815 declared to be considerable (Report of 1815, p. 92; see also 472 and 784). The long hours appear to have commenced and progressed *pari passu*.

What had been the precise hours of work previously to the introduction of the system of selling "cheap bread" in competition with those masters who adhered to the prices fixed by the assize I have not been able to ascertain. As far as I have been able to find among the records of the Bakers' Company, at their hall, which I was courteously permitted to refer to by their clerk, Henley Grose Smith, Esq., with the assistance of their beadle, Mr. Rice

(784), there are no entries in their books which throw any light on the subject of the employment of the journeymen. Their books are all of subsequent date to the fire of the city of London in which their ancient records were destroyed.

It is possible that the Statute 5 Eliz. c. 4, A.D. 1562 (which followed many statutes on the same subject since the first "Statute of Labourers" of 23 Edw. III. A.D.1349, and which does not appear, by any marginal annotation upon the statute book, to have been repealed), may have influenced to some extent the custom of artificers as to hours of work, up to the period in question. By that statute, which expressly included bakers, the hours were, between March and September, from 5 A.M. to between 7 and 8 P.M., with 2½ hours for meals, and between September and March "from spring of day" until "the night of the same day."*

Day-work only is there permitted. And although in all the ancient "allowances" under the assize the item "for candle" appears, it does not necessarily imply night-work, as candles must have been in frequent use for examining the state of the bread in the oven, as in towns gas is at present. But in 1804,

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* The Act 5 Eliz. c. 4. being "An Act containing divers Orders for "Artificers, Labourers, Servants of Husbandry, and Apprentices," recites that "Although there remain and stand in force presently a great number "of acts and statutes concerning the retaining, deporting, wages, and "orders of apprentices, servants, and labourers, as well in husbandry as in "divers other arts, mysteries, and occupations, yet partly from the proper "feeling and contrariety that is found and doth appear in sundry of such laws "* * chiefly for that the wages, allowances, &c. &c. are too small and "not answerable to this time," &c. certain alterations are made, in which, amongst others, bakers are included.

By s. 12. it is enacted that all *artificers* and labourers, being hired for wages by the day or week, shall, between the middle of the months of March and September, be and continue at their work at or before *five* of the clock in the morning, and continue at work and not depart until between *seven and eight* of the clock at night, except it be in the time of breakfast, dinner, or drinking, the which times at the most shall not exceed above two hours and a half in a day, that is to say, at every drinking one half hour, for his dinner one hour, and for his sleep, when he is allowed to sleep (the which is from the middle of May to the midst of August), half an hour at the most, and at every breakfast one half hour; and all the said artificers and labourers, between the midst of September and the midst of March, shall be and continue at their work from the spring of the day in the morning until the night of the same day, except it be in times before appointed for breakfast and dinner, upon pain to lose and forfeit one penny for every hour's absence, to be deducted and defaultred out of his wages that shall so offend.

By s. 15. wages of all kinds shall be assessed by the Justices of the Peace after Easter Sessions, which, on being allowed by the Lord Chancellor, &c. and certified to the Sheriffs, &c., shall be proclaimed on market days before Michaelmas.

Ss. 18. and 19. Punishment for him who gives and him who takes more or greater wages than shall be assessed or appointed by the said proclamation, 10 days' imprisonment.

the Clerk of the Bakers Company, in support of the application to Parliament for an increased allowance to bakers, in proving that all articles consumed in the trade had advanced in price, stated "he had been at the Tallow Chandlers Hall, and had procured the following rates of candles per dozen lbs. In 1797, 10*s.* 8*d.*; in 1803, 11*s.* 6*d.*; in 1804, 12*s.*" (p. 20.) This does appear to imply night-work, otherwise an increase of only 1*s.* 4*d.* upon a dozen lbs. could not have been of importance. And in 1824, a witness before the Committee relative to the country bakers, in answer to a question as to the price of candles, stated, "We do not work at night in the country; not in "Uxbridge. By this time a habit of night-work would seem to have been established in London.

In addition to the inducement to the sale of cheap bread held out by the high allowance of the assize, another cause began to operate at the same time, and which added greatly to the general prevalence of night-work, in the rise of a class of men between the millers and the bakers—the factors.

The cause of the rise of this class appears to date from about the time of Queen Anne, when the bakers ceased gradually to be the sole agents for the public for manufacturing wheat into bread. Previously to that period, the baker, as appears from the allowance under the assize, was the purchaser of the wheat, which he caused to be ground by the miller, but afterwards dressed into flour himself, according to the sorts of bread required to be made. By degrees the miller became both the purchaser of the wheat and the dresser of flour, with which he supplied the baker. Not being subject to the assize laws he dressed the flour as he pleased, and brought into use very fine and white flour, which gradually superseded the bread made of the whole meal, and for which he could obtain a higher price.

It has been already shown that under the assize laws the bakers had no interest in keeping down the price of flour; the millers' profits, therefore, became considerable.

The large profit thus obtained by the millers on their flour enabled them to establish the class of factors,—middle men between themselves and the bakers.

To these town factors the country millers allowed a large premium on the sale of their flour, and disposed of considerable quantities through their agency.

To this mode of obtaining a town sale for their flour the country millers proceeded, about the latter end of the last century, to add another. They became proprietors of

bakers' shops, into which they placed respectable journeymen as their agents, allowing them a small commission of from 5*s.* to 7*s.* per sack for their labour and charges. They also established the custom of sending out much of their bread to be retailed at chandlers' shops, which they supplied with bread at a rate below that fixed by the assize. This they were enabled to do, even if they used only good flour, on account of their receiving the profits both of the mealman and the baker.

The demand for their "cheap bread" increasing under this system, they were led to get out an additional batch or two per day.

Thence the rise of night-work, as well described by Mr George Read, author of the Practical Baker, &c., in a pamphlet on the History of the Baking Trade (Briggs, 421 Strand, 1848), of which the following is an extract (p. 16):—

"The journeymen hired to bake the bread on commission, used to give the workmen whom they employed, and who was generally an acquaintance, a dinner or something extra, if they would work longer than usual, and help to get out another batch, which they were enabled to dispose of at the chandler's shop. This system of the men helping their friends for a trifling remuneration gradually grew into a custom, and was at last enforced as a right, by those men in commission for the factors when they became proprietors (which in most cases they did) of the shops they were put in to superintend — they being bound to take flour from the factor of whom they had the shop until they had paid up the sum agreed on for the business, and being under obligations to the miller or factor were charged more for their flour in consequence, which left them little chance of getting out of debt.

"In 1824, Mr. Turner, of Bishopsgate Street, stated in evidence before a Committee of the House of Commons, that 'cheap bread 'baking did not exist previous to the year 1797, in anything like 'the degree which it has since existed, but the cheap bread baking 'was then confined to about one halfpenny, and there was not 'above two or three bakers who did it, but every increase of 'profit increased their number. He afterwards states how this 'difference in price was allowed. Those who required credit and 'their bread sent home were charged a halfpenny more than to 'those who fetched it and paid ready money.'

"In 1814 and 1815, Mr. Wright, the master of the Bakers Company, stated, 'That near one fourth of the trade are becoming un-'dersellers, and they are considerably on the increase; the trade 'in general is in the hands of flour factors or millers, and they 'were under the necessity of taking their flour from the flour 'factor with whom they deal, at the prices at which it was sent 'to them; and that it is the practice for flour factors to put per-'sons into shops for the purpose of taking flour off their hands;

'some factors had several shops—competition increased to such 'an extent, by this unfair manner of doing business, that the 'assize laws were abolished in consequence, and since that period 'the baking trade has got into a most deplorable condition, that 'three fourths or more of the trade are now become undersellers.' The unpaid labour of the men was before this time made the source whereby the competition was carried on, and continues so to this day." (See also 359).

Although it is stated in the above extract that the unpaid labour of the men was the source whereby the competition was carried on, it is, as has been seen, the opinion of many men of ability and experience in the trade, that the principal source is now the adulteration of the bread; and consequently, that if this could be put an end to, it would be the most direct means of abolishing night-work, save in exceptional cases, in the trade generally.

Other remedies not legislative.

Although legislative remedies can be applied to some only of the evils connected with the employment of the journeymen bakers of the metropolis, and can, I believe, be carried no further than I have above proposed, there are other remedies, the consideration of which seemed to me to be within the scope of this inquiry, and which can be applied with most salutary effect to some other of their causes of complaint.

These remedies are—

The introduction of machinery in the process of bread-making; and

Mutual concessions by the masters and the men, for the abolition, as far as possible, of night-work.

The introduction of machinery.

The introduction of machinery.—No one who has not witnessed it can form an adequate idea of the sort of processes which flour undergoes, in a London bakehouse, in the course of its being converted into bread. There is probably no art which, in a civilized country, has remained so long in a primitive state as that of bread-making. Even under the most favourable conditions of a large, well-ventilated, cool, and perfectly clean bakehouse, such as are some of those belonging both to the full-priced and to the underselling branches of the trade, most of the processes are such that no one would wish to witness them a second time. Granting the utmost cleanliness of person on the part of the foreman, who plunges his arms into the liquid which he prepares as the "ferment," and subsequently into the thin semi-liquid mass in the trough where he mixes, in due proportions, water and half the flour of which the batch is to be formed, with the ferment, which

is called "setting the sponge,"* the *modus operandi* cannot but suggest frequent impurities. But in the subsequent process of "making the dough," by the foreman and the men, it is highly probable that those impurities would be seen to be mixed with the dough on the very first opportunity that any one might have of being a spectator of the proceeding.

Very shortly after I entered upon this inquiry, two circumstances, among others, were stated to me by several of the witnesses, as calling for my attention: First, the fact that, in the process of making the dough in particular,—the work being so severe, the posture so disadvantageous, and the heat of the bakehouses so considerable,—it almost unavoidably happened that the perspiration dropped from the men's faces into the dough, and that their arms, immersed in the dough, were necessarily at the same time covered with perspiration. The second fact was, that during the process of making the dough, which usually lasts from half-an-hour to three-quarters of an hour, the men are inhaling the flour-dust, and the carbonic acid gas generated by the fermentation, and that this is a prolific cause of their being so liable to lung-disease. It was further stated to me, that by Mr. Stevens's dough-making machine, the only one in use in London, for bread-making in the ordinary way, both those disagreeable and injurious adjuncts to the making of bread were entirely obviated.

Mr. Stevens's dough-making machine.

It was urged to me, on the other hand, that Mr. Stevens's machine, although very ingenious, was difficult to work, that the men who had used it found the work more laborious than the old mode of dough-making, and that it did not produce good bread.

If the contrary was the case,—if it was practically successful in its mode of work and its results, — it was clear that the invention was one which would be of the greatest importance to the health of the men, and would

* The terms "ferment," "sponge," and several others used in the baking trade, have come down from the Roman times. Pliny speaks of the "spongeosa inanitas" of light bread. (Nat. Hist. Lib. XVIII. c. 27.) He describes the process of making the "ferment." "Nunc fermentum fit ex ipsâ farinâ, quæ "subigitur prius quam addatur sal, ad pultis modum decocta, et relicta donec "acescat. Vulgo vero * * tantum pridie asservatâ materiâ "utuntur." (c. 27.) He also estimated the value of wheaten flour according to its capacity for water. "Optimum frumentum esse quod in subactu congium "aquæ capiat," to the "modius." (c. 12.) Yeast made of "sweet wort" is also thus described: "Galliæ et Hispaniæ frumento in potum resoluto * * "spumâ ita concretâ pro fermento utuntur; quâ de causâ levior illis quam "cæteris panis est." (c. 12.) The term "seconds" is used by Pliny in speaking of coarse meal (cibarii) "quod secundarium vocant." (Lib. XVIII. c. 20.)

relieve the public, so far as it might come into use, from the disagreeable consciousness that the perspiration of the men employed in making their bread was mixed up with the dough of almost every batch made.*

It was with the utmost reluctance that I came to the conclusion,both from the unvarying testimony of a great number of witnesses, and from what I saw myself, that the latter assertion is correct; namely, that a batch of dough is rarely made without having more or less of the perspiration of the men who make it mixed up with it. The table of contents of the evidence will show the number and various character of those who bore testimony to this point. One of the occasions on which I witnessed it myself, as described in s. 236, is decisive. It was on a cold day in November, in a large bakehouse on the level in an open yard, and the bakehouse was cool; yet I saw perspiration dropping from the face of one of the men making the dough, who was standing within four feet of an open door. (See also s. 643.) The question naturally arises, what must be the state of the case in the small, close, hot, bakehouses underground, especially in warm weather?

There is as little doubt as to the quantity of flour-dust and carbonic acid gas inhaled by the men in the course of the process of making dough by their hands and arms, as will be seen by referring to the description I give of what I witnessed (643–4.) The quantity, indeed, of the best particles of the flour lost in this way with every batch is considerable (337.) And that the inhaling this dust and gas is, if not in itself a fertile cause of disease, at least a source of irritation and aggravation to disease already commenced, is the opinion of all who have given their attention to the subject (526, 755.) Any mechanical mode of mixing the dough which would relieve the men from inhaling that which clogs and irritates the lungs to so great an extent, would be an unquestionable boon to them. Mr. Stevens's machine is, without doubt, perfectly effectual in that respect,

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* Kneading machines of various kinds have been long before the public. The late M. Arago, at the sitting of the Institute of France on the 23rd Jan. 1850, recomended the kneading machine of M. Rolland, the "Pétrin mé chanique." (Ure, p. 409.) It is exhibited in the French Department of the International Exhibition, as is also the "Machine pétrisseuse" of M. Drouot (as to which see 834) and the "Pétrisseur méchanique" of M. Boland which was also exhibited in 1851. Messrs. Vicars exhibit a "Soft-bread, sponge, and dough mixer," invented about two years ago, and much approved of for bread-making on a large scale. Mr. Quintin, of Cheltenham, is the patentee of a bread-making machine, well spoken of by those who have used it. Other machines are in use in some of the towns in this country, and in Ireland. Mr. Stevens's is the only one I could hear of in use in London for making bread.

and is the only one in use up to this time in London for making fermented bread.

It is, therefore, an important matter, both for the men and for the public, to know whether Mr. Stevens's dough-making machine is one which, from its construction, its results, and its price, is likely to be brought into more general use in the baking trade.

The conflicting opinions which I found prevailing in the baking trade concerning it made it necessary for me to enter into the inquiry with great minuteness, and to see myself nearly all the machines which Mr. Stevens had supplied, both to public establishments and to the trade in all parts of London and its neighbourhood. The evidence relating to these will be found from s. 166 to 347. It establishes every point most conclusively in their favour, and by testimony entirely practical, very various, and perfectly independent.

The earliest machines made by Mr. Stevens about four years ago were undoubtedly rather hard to work by the same number of men as would have been employed at hand labour. But a multiplying power, and other improvements, having been added to all the more recent machines, that objection no longer applies. The labour with the more recent machines is greatly diminished; so that men expend, upon the whole, much less strength in making a batch of dough with the machine than they do when making it by the hands and arms. There is no possibility of any perspiration falling into the dough, or of any dust worth mentioning escaping, as the dough is made in a closed trough The men do their work at a great mechanical advantage, standing up and turning a handle; instead of at a great mechanical disadvantage, bending down over a low trough, with their hands and arms lower than their bodies, enveloped in a cloud of flour-dust, and taking that and a portion of carbonic acid gas into their lungs. There is also a saving of time in the process of bread-making.

The bread made by the machine is said, by competent judges, to be better made, to have lost less by fermentation, and therefore to be more nutritious, to keep longer moist, to have a thinner crust, and to be less liable to crumble (247, 251, 277–8).

There is one point connected with this machine, which, if fairly established, is of considerable importance both to the trade and to the public.

It was represented to me by Mr. Stevens, on the first occasion of my seeing one of his machines, that the machine produced a greater number of loaves from the same quantity

of flour than could be produced by hand labour. He accounted for this partly from the saving of those particles of the flour which were dispersed in the form of dust when bread was made by hand, and which are the finest portions of the flour, and partly by the more perfect action of the machine in mixing the flour with the liquid, by which the flour is enabled to absorb all the water which is due to its quality; and he stated that this increase might be fairly stated to be on an average three 4-lb. loaves per sack of flour.

This was a statement which demanded the narrowest investigation, because, if correct, it would afford a direct inducement to every baker to obtain one of these machines forthwith, inasmuch as it would repay its cost by this increase within a comparatively short period; and it would also be tantamount to an accession of food to the community to the extent of nearly three per cent. (on the moderate estimate of ninety 4-lb. loaves to the sack of flour) upon every sack of flour converted into bread by this machine.

On my asking why, if this were so, the bakers of London had not, long since, brought this machine into general use, Mr. Stevens's answer was, that he had invited them to inspect and judge of the machine, but that he had found very few who were disposed to free themselves from the prejudice which often interposes when something new is suggested which would tend to alter the usual habits of a trade. He at the same time referred me to one of the largest and most respectable master bakers in the neighbourhood of London, Mr. McCash, of Stratford, and to a few others in London itself, also to the many public establishments which had adopted the machine, for a confirmation of his statements.

The statements and calculations furnished to me by Mr. M'Cash and the other master bakers, and by the masters of the workhouses, prisons, and other public establishments. confirmed by the master bakers at each, and supported by extracts from the books of the establishments, showing the amount of bread with which they credit themselves, and proving distinctly that it amounts to an average of about three 4-lb. loaves more per sack than they obtained from hand labour, leave no doubt as to the perfect accuracy of the assertion.

It will naturally be asked, Is this increase a bonâ fide addition to the nourishment hitherto made available from the sack of flour, or is the additional weight of bread the result only of an addition of so much water to that previously used?

In so far as the saving is concerned of that portion of the

sack of flour which, by the hand process of bread-making, is dissipated in dust, the addition of weight to that extent is an unquestionable gain. And the evidence from various sources, as to the amount of "sweepings" of flour obtained in the course of bread-making by hand, shows that of the three additional 4-lb. loaves produced on an average by the machine, from one to one and a half may fairly be attributable to this source, and is the direct result of so much flour being saved by the machine for human use. (136, 140, 172, 337.)

The other loaf and a half, or two loaves, which make up the average of three loaves per sack, are attributable to the mixing power of the machine being so much greater than the human hand and arm.

The capacity of flour for water differs with its quality. Flour weak in gluten, and finely ground, will take up only nine or ten gallons of water per sack of 280 lbs. Flour rich in gluten, and coarsely ground, will take up from 14 to 20 lbs of water per sack. (244, 248–9, 283, 306, 657, 760.)* Again, the same quality of flour will take up more or less water according to whether it has been recently ground or not, and according also to the state of the atmosphere. (306, 760.) Flour put into a damp place will absorb 14 to 18 per cent. of water. (Dr. Normandy, evidence before Adulteration of Food Commissioners, 5, 558.) "The water added to every sack of flour is not a constant "quantity. You may have a varying quantity with almost "every loaf you eat." (Dr. Hassall, 760.)

As the capacity of flour for taking up water differs with different qualities and at different times, so the quantity that it will take up in the process of being made into bread depends upon the manner in which the given quantity of liquid is presented to it. If the water is imperfectly brought into contact with the whole mass of the flour, some portions of the flour will be saturated, the rest will be damped only, or will imbibe inadequately a portion of the liquid from the saturated portions near it. The resulting mass of dough will be smaller, because a portion of it has not had its fair opportunity of being distended by absorption of the liquid. The master baker of the Colney Hatch Lunatic Asylum represented to the visiting magistrates that at a large public establishment with which he was acquainted, under the same magistrates, where the bread was made by women from the same quality of contract

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* "Flour of good average quality will absorb 14 gallons of water to the sack "of 280 lbs." (Ure's Dict. of Arts, Manufactures, &c., p. 403.)

flour, and in the same manner, they got 30lb. of bread less out of the sack of flour than was obtained from the same quantity of flour by men's labour (331.) This example shows conclusively that given quantities of flour and water will produce very different quantities of bread, according to the more perfect or imperfect manner in which they are mixed together. Nothing can be more complete or effectual than the mixing power of Mr. Stevens's machine. It is a just conclusion, therefore, that the additional loaf and a half, or two loaves, due to that portion of the process, are the legitimate results of every particle of the flour having had the opportunity of taking up as much water as is properly due to its quality. (786.) Any attempt to make it take up more can only be successful by resorting to a mode of baking not practised by the fair trader (32), and certainly not by those public establishments on whose examples these deductions are founded, as there is no motive whatever in their case for any such dishonesty.

The bread baked at all these public establishments is of the same kind and form as that commonly made for sale in the shops, namely, "batch bread." The machine is, nevertheless, even better adapted to make the "tighter" dough required for the fancy kinds of bread; and has also the additional advantage, that if the dough should be made too "tight" it can readily be made weaker by the machine; an operation which cannot be effected without difficulty, if at all, by hand labour.

The whole argument is very clearly stated by Dr. Hassall, as follows :—

757. "Another important advantage claimed for the machine on behalf of the public, that of its producing a certain number more loaves from every sack of flour according to its quality, struck me at first as doubtful. That such a result would, if correct, recommend the machine to the baking-trade, is sufficiently obvious, and would manifestly tend to bring it rapidly into general use, inasmuch as it would soon pay its own cost, and be a permanent source of additional gain to the baker.

758. "But whether the production of that additional number of loaves per sack involves any corresponding disadvantage to the consumer is another question. The first impression would be that it did; that if a given quantity of flour, by the addition of a certain quantity of water, yielded more loaves, the total number of loaves produced would be, individually, of less value in a nutritive point of view, than a smaller number of loaves produced from the same quantity of flour.

759. "On investigation, however, I do not think that this is the case as regards the additional loaves stated to be produced by the ordinary and fair action of the machine; on the contrary, I

think that the form and action of the machine combined, produce from a given quantity of flour a legitimate and bonâ fide increase in the amount of nutriment, beyond what is obtained from the same quantity of flour when converted into dough by hand labour.

760. "In the first place, there is no waste of flour, such as obviously occurs when dough is made by hand, both in the form of dust, which consists of the finest particles of the flour, and from portions both of flour and dough often thrown over the trough in the hurry of making. In the next, the mixing power of the machine is so great, that the knobs of dry flour, so often found in hand-made bread, can scarcely ever occur in the dough made by the machine. But further, this mixing power is so effectual that it brings every particle of the flour into contact with the liquid, and enables the flour to take up as much as is due to its quality. If the flour takes up, as it does, more water than it would if mixed by hand, this is a proof that it requires more, in order to saturate properly its entire mass, and to place it in the condition to rise evenly and completely, and therefore to yield a more perfect description of bread. The baker cannot, by fair means, make it take up more than will form it into a certain consistency; if he does, he defeats his object, which is to produce a dough that will stand in the oven in a certain shape. The water added to every sack of flour is not a constant quantity. You may have a varying quantity with almost every loaf you eat; it depends upon the quality and condition of the flour, and the amount of baking, and may be affected by other circumstances, such as the treatment of the bread when it leaves the oven. Flour newly ground will take up less than old flour. This same flour will take up more after a time, which will vary with the temperature and the state of the atmosphere. Flour strong in gluten will take up more water than weaker flour.

761. "If, as is the case, every particle of flour in machine-made dough is properly and thoroughly saturated with the liquid, namely, the water and the ferment that is to make it light, it may be assumed as highly probable that the digestive organs will extract more nutriment from a given quantity of such bread, than they would have done from bread the particles of which had been in a less favourable condition to be acted upon by the agents of fermentation, even although that bread may have contained a fraction more flour per loaf. There is no doubt that if you make ninety-five 4-lb. loaves from a sack of flour by the machine, and only ninety-two by hand, the ninety-five will contain about one ounce and a half less flour per 4-lb. loaf than the ninety-two, supposing the entire 280 lbs. were applied to the making of the bread in each case. But it has been shown that much which is dissipated or lost in making the hand-kneaded dough is preserved, and goes to make up the ninety-five loaves produced from the machine-made dough; and while this may account for a loaf or a loaf and a half of the increase, the remainder may be fairly attributable to the natural yield of the flour when fully and fairly exposed to the action of the ferment by due saturation with

water ; in which state it becomes a better and a more nutritious article of food. I think, therefore, that the gain in quantity of bread per sack of flour is a legitimate one, and the machine consequently a decided source of benefit to the public, as well as to the baking trade and the journeymen."

The evidence also of Mr. M'Cash (237), Mr. Frances, master of the Holborn Union Workhouse (193), Mr. Hart, master baker, Lambeth Workhouse (195), Mr. Driscoll, master of the Hackney Union Workhouse (220), Mr. Painter, master of the Shoreditch Union Workhouse (266), Mr. Claridge, master baker of the Surrey House of Correction (279), Mr. Fillary, engineer, and Mr. Phelps, baker, Coldbath Fields Prison (299), and Mr. Clarke, master baker, Colney Hatch Lunatic Asylum (328), are particularly illustrative of this subject.

A gain of nearly three per cent. upon all the flour converted into bread by Mr. Stevens's machine is something considerable enough to make it a matter of public interest, independently of the benefits to the workmen which will unquestionably follow from the more general use of the machine in the trade.

Should any disinclination to the adoption of machinery remain in the minds of either masters or men, there is no one whose opinion is more likely to remove it than Dr. Guy, whose benevolent inquiries were mainly instrumental in drawing public attention to the evils under which the journeymen labour, and whose knowledge of the workings of the baking trade generally would prevent his being misled as to what would be to the advantage of both masters and men, as well as of the public. Dr. Guy's opinion is as follows:—

526. "I ought, however, to state, that though, in my opinion, the journeymen bakers and the public must look for effectual relief from existing evils to the legislature, they will derive no small advantage from the introduction of improved methods of mixing and baking bread. No one who has been accustomed to watch the course of events, and to observe the progress of man's ingenuity as applied to the industrial arts, could fail to anticipate that, before long, science and art combined would find out a way of manufacturing this most necessary article of our food, in a far better manner than by the rude process that has prevailed unaltered for centuries. The process of kneading bread being a simple mechanical process, conducted at present in a most objectionable and repulsive manner, was certain, sooner or later, to be performed by machinery. Accordingly there are already several such machines at work. I have seen that invented by Mr. Stevens at work ; and I highly approve of it, both on account of its cleanliness, economy, and wholesomeness. This

machine, or some similar one answering the same purpose, must by degrees come into general use for kneading bread fermented by the old process. This will prove a great benefit to the journeyman, by causing a more advantageous application of his labour, and to the public, by substituting a cleanly for a dirty mode of making their bread. But still, even when the kneading has been effected by machinery, a great deal remains for the human hand to do, and often with consequences by no means cleanly or agreeable to think of. In the case of unfermented bread, such as that made by Dr. Dauglish's process, the whole of the work is done by machinery. The human hand does not come into contact with the bread at all. This is of itself a very great advantage; and as the bread thus made is of excellent quality, and can be eaten with comfort by many persons with whom all fermented bread disagrees, it is sure to be consumed to such an extent as to have some effect in reducing the evils of the present system. I am myself in the habit of using the aërated bread in my family. I first obtained it from Dockhead, and I am now (January 1862) so unwilling to use any other that I am supplied by an agent of a person who manufactures it at Leeds, and who sends a quantity up nightly by the trains to London."

It is probable that the more the public become aware of the repulsive method of making bread in the old manner, the more, as regards fermented bread, will they show a preference for bread made by Mr. Stevens's machine or any other machine of a similar character which may come into common use.

Mr. Stevens enumerates some of the public and private establishments in which his machine has been adopted. (182.) To those master bakers in London who have adopted or ordered it may now be added Mr. Spiking, in Dover Street, (who supplies the Household at Buckingham Palace,) whose business is one of the largest in this part of London, and whose evidence, as well as that of his foreman, will be found of much general interest (678-692.)

Dr. Dauglish's aërated bread.

Fermented bread has been so long almost exclusively in use in this country that its hold upon the public taste is not likely to be at once materially lessened by any substitute, whatever its advantages. Nevertheless, the advantages, as partly indicated above by Dr. Guy, both to the workmen in the baking trade and to the public, connected with Dr. Dauglish's process of making what is called the aërated bread, are such as to be matter of great public importance. The whole of Dr. Dauglish's evidence concerning it (527–600) is highly interesting and instructive.

The aërated bread first came into use in London in March 1859. Certain difficulties, described by Dr. Dauglish (528), and arising chiefly from the large cost of distribution

from one centre at a remote part of the metropolis, caused the experiment at Bermondsey to be discontinued in the early part of 1861. The process has since been carried on successfully at Portsmouth, Dublin, Leeds, Coventry, and Bath. A model bakery on an improved plan is now completed at Islington (537), and will be followed by others in various parts of London, so that the bread will be delivered direct from the bakery, to be consumed, and at the usual hours.

Dr. Dauglish stated to me that his reason for inviting my attention to this new system was—

"That it is calculated to effect a radical change in the condition of the journeyman baker, by reducing the needful time for conducting the whole processes of bread making and baking to *less than two hours;* by greatly improving the mode in which his labour is applied, and the place in which his work will be carried on; and by relieving him from certain accessories to his work, as now conducted, which undermine and finally destroy his health. The tedious processes of bread-making by fermentation in the ordinary way, and by hand-kneading, occupying as they do so many hours (from 8 to 12 for each batch of bread, from the making of the dough to the taking the bread out of the oven), almost necessitate the very long hours of labour complained of by the journeymen bakers; and the ordinary disadvantages under which the journeyman labours, from inhaling the flour dust, and from the very common state of the bakehouses, are well known. The cost of the machinery and plant required to carry on the new process economically and satisfactorily having been so much reduced by me since the earliest experiments, few respectable bakers will be without the means to erect small bakeries, and carry on the process with their own capital. The benefit, therefore, of the change of system, will be widely diffused without difficulty. One of the great obstacles to the improvement of the condition of the journeyman baker, under the present circumstances of the trade, is, that the baking business is one which can be entered upon with a very small amount of capital; and under existing circumstances it has been difficult to obtain a satisfactory return for large capitals invested in that branch of business. It has, therefore, remained, with few exceptions, in the condition of a handicraft carried on under circumstances most injurious to the health of the men engaged in it, and in a manner which cannot fail to create disgust in anyone witnessing it. The advantage of my process to the journeymen will be, that it *will erect the baking business into a manufacture;* and the result will be what it has been after the application of capital on a large scale to other species of manufactures, namely, the improved prosperity and well-being of the workmen." (538.)

If there were no other features in this system of bread-making by Dr. Dauglish than two of those above enumerated,—namely, that it reduces the needful time for con-

ducting the whole process of bread-making from eight or twelve to only two hours, and that is capable of erecting the baking business into a manufacture, instead of its remaining in the condition of a handicraft, "carried on "under circumstances most injurious to the health of the men engaged in it,"—it would be worthy of the most earnest consideration both of the journeymen, the masters, and the public.

As regards the latter point, the expectation of the Committee of the House of Commons, of 1815, which recommended the abolition of the assize of bread in London, would then be realized, and the advantages to the men and to the public which they anticipated from the change would be obtained. As regards the first point,—the reduction of the process of bread-making to two hours,—if it did not necessarily lead to the abolition of night-work, it would materially facilitate the reduction of the hours of work, and the placing them under specific regulations by agreement between the men and their employers.

But the process would be also beneficial to the men in two other important particulars. It would effectually and entirely relieve them from inhaling the flour-dust and the carbonic acid gas given off by fermentation. It would also give them roomy, cool, and well-ventilated bakehouses to work in, instead of the hot, close, and small places underground in which it is their common fate in London to pass so large a portion of their lives.

The influence of the heat upon their health, in the present close and small bakehouses, does not appear to have been sufficiently appreciated by the journeymen. According to the authorities quoted by Mr. C. Turner Thackrah, in his work on the "Effects of Arts, Trades, and Professions on Health and Longevity," (Longman, 1832, 2nd ed.,) the debility produced by the great heat in which bakers habitually work is one of the principal causes of the greater mortality among them. It is stated that in the plague of Venice, bakers and other persons in similar employments suffered most. During the plague of Marseilles, 1720, all the bakers died. In the Report of a Hamburgh institution, it appears that rheumatic fever seized one-half of the bakers, and but 1-14th of the cabinet makers, and 1-15th of the tailors. (Dictionaire des Sciences Medicales. Ramazzini De Morbis Artificum.*) Night-work alone does not seem

* The subject of the "accidents, injuries, and diseases which attach to "industrial occupations, and the means for prevention and relief," has long attracted special attention. In the year 1713 Ramazzini, Professor of

to be the cause of disease. (Thrackrah, p. 138.) Therefore, in introducing a system which necessitates the use of well-constructed, roomy, cool bakehouses above ground, Dr. Dauglish, Mr. Nevill, and others who carry on the baking business on a large scale, confer a great benefit on those whom they employ.

Further, and in a public point of view, the economic and dietetic qualities of the aërated bread are those which give the process of Dr. Dauglish its great value. The former are thus described by Dr. Dauglish (534, 536):—

534. "By the new process there is a clear extra yield of five 4-lb. loaves for every sack of flour more than the same flour would

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Practical Medicine at the University of Padua, published his work "De "Morbis Artificum." It was translated into French in 1778, and was re-published in Paris in 1841, in the "Encyclopédie des Sciences Medicales." 7me Division. Auteurs Classiques. Among other trades he treats of the diseases of miners, weavers, potters, workers in glass and metal, painters, printers, confectioners, millers, and bakers. As to bakers he says that "many arts are burdensome and injurious to those who exercise them, but "agreeable and useful to those who have need of them. The art of the "baker is certainly among that number. In reality what art is more useful "and indeed more necessary to the life of man than the art of bread making, "and what trade is more injurious to those who are engaged in it? . . All "have to encounter different diseases produced by their course of labour. "*Bakers are for the most part workers by night.*" . . It was so even in the Roman times. Martial says, "Arise from your beds, already the baker is "selling the breakfast rolls, and the cock is announcing the day."

"Surgite, jam vendit pueris jentacula pistor,
Cristatæque sonant undique lucis aves."—*Mart.* l. xiv., Ep. 223.

"These rolls had been made and cooked during the night Now, also, "with the first dawn of light, when other workmen are going to their "labour the bread must be ready." He then speaks of the effect of the flour-dust in producing disease of the lungs in various degrees of intensity, and adds, "I avow frankly that I know no precaution which can gua-"rantee them from this evil. . . The custom, indeed, of attaching a "handkerchief to the face when the baker is making the bread is a very "ancient one, but it is certain that it was rather to prevent the sweat "from dropping into the dough than for any other reason." He then comments on the baker's liability to cold and rheumatism from his not taking proper precautions when going suddenly out of the hot bakehouse into the cold air; and on the swollen and painful state of their hands produced by the labour of kneading and the stoppage of the pores of the skin by the particles of flour forced into them. And he adds, "I have observed that the "bakers are more often ill than other workmen in the large towns, where the "labouring class can buy their bread cheaper than they can make it, which is "not the case in the country and in the smaller towns."

Among the most recent works upon the subject in France is "Hygiène "physique et morale de l'ouvrier dans les grandes villes en general, et dans la "ville de Lyon en particulier. Par le Dr. A. L. Fonteret. 18mo. 3 f. Paris, "1858." And in Germany, "Die Krankheiten welche verschidenen Ständen, "Altern, und Geschlechtern eigenthümlich sind, populär medicinish darge-"stellt. 8vo., 6 vols. Ulm 1860."

A Committee of the Society of Arts was appointed in 1854, at the suggestion of Mr. Twining, to consider the subject of "Industrial Pathology." A list of the documents it has collected is given in the "Handbook of Economic "Literature," being the catalogue of the library of the "Twickenham Eco-"nomic Museum." Whiting, Strand, 1862.

yield by fermentation. This, when bread is selling at 6*d.* per 4 lbs., will be equal to 2*s.* 6*d.* per sack. This arises in consequence of the new process causing no degradation or injury to the flour, similar to what takes place in the process of fermentation, and no loss of flour as in the process of kneading.

535. "There is then the further fact, that the flour for the aërated bread is ground and dressed coarser than ordinary flour. The quality or alimentary value is therefore also improved to the extent of from three to four shillings per sack.

536. "If the American process of preparing the flour be practised, then there will be a gain beyond that resulting from coarse grinding and dressing equal to 2*s.* per sack. Making a total gain by the new process of 7*s.* 6*d.* per sack."

Dr. Dauglish describes in his evidence 542 to 549, the chemical changes in the substance of the dough which it is the object of the baker to effect, the difficulties and liabilities to derangement in which have, together with others which he points out, been the obstacles which have hitherto prevented bread-making "becoming an extensive manu-
" facture in large establishments, employing large capitals,
" and deriving the pecular profits arising out of the sub-
" division of labour." (549.)

These difficulties and disadvantages his process obviates:—

550. "(1.) It does away entirely with fermentation, and with all those chemical changes in the constituents of the flour which are consequent upon it.

"(2.) It avoids the loss consequent upon the decomposition of the portion of starch or glucose consumed in the process of fermentation, estimated at from 3 to 6 per cent. This loss may be estimated at about at least 1,500,000*l.* sterling in the total quantity of bread made annually in the United Kingdom.

"(3.) It reduces the time requisite to prepare a batch of dough for the oven from a period of from 8 to 12 hours to less than 30 minutes.

"(4.) Its results are absolutely certain and uniform.

"(5.) It does away with the necessity for the use of alum with poor flour, and the temptation which bakers are under to use it with all.

"(6.) It has the recommendation of absolute and entire cleanliness, the human hand not touching the dough or the bread from the beginning of the process to the end. Even in weighing the dough, if a piece must be added to turn the scale, it is added by the use of a knife and fork.

"(7.) The journeymen are relieved from a circumstance most destructive to their health, that of inhaling the flour dust in the process of kneading. Their places of work also, with my process, will always be above ground and well ventilated; and their hours of work need never be more than the usual hours in ordinary occupations, with the recognised hours for meals. Or where

a business may be done so large as to necessitate night work there will be separate sets of hands for day and for night work; and each set of hands will be able to change from night to day work in alternate weeks, as is done in some other trades and occupations.

"(8.) It will produce a healthier condition of the baking trade, and thereby diminish to a great extent the inducements which lead to the extensive system of fraud now practised upon the public by the production of adulterated and inferior bread.

"(9.) It will effect an immense saving in the material from another source, namely, by preventing the sacrifice of at least 10 per cent. in the nutritive portion of the grain, hitherto lost as human food by the method of grinding and dressing necessary in the preparation of flour for making white bread by fermentation.

"(10.) Together with the preservation of this large proportion of the entire quantity of wheat converted into flour, there is also the important result of the proportion preserved (the cerealine) being a most powerful agent in promoting the easy and healthy digestion of food. This agent is retained uninjured by the aërated bread process, but is destroyed by the process of panary fermentation."

The history of this saving, to so large an extent, of what was hitherto lost as human food by the ordinary mode of grinding and dressing wheat for making white bread, is thus given by Dr. Dauglish (559, 564, see also 794).

"About 1846 Mr. Bentz, an American invented a machine for removing the outer seed-coat of the wheat grain (previous to grinding), without injuring the grain itself, by which he proposed to save that highly nutritious portion of the internal coat of the grain, which, adhering to the bran, in the ordinary process of grinding is torn away and lost to human consumption. It is stated that by this means ninety per cent. of fine white flour was obtained from the grain, instead of about seventy-four or seventy-five, as by the old method. The invention was brought under the notice of the French Emperor, who caused some experiments to be made in one of the Government bakeries, to test its value. The experiments were perfectly satisfactory, so far as the making of the extra quantity of fine flour was concerned; but when this flour was subjected to the ordinary process of fermentation, and made into bread, much to the astonishment of the parties conducting the experiments and of the inventor himself, the bread was brown instead of white. The consequence of course has been, that the invention has never been brought into practical operation. But about four years ago a French chemist, M. Mége Mouriès, directed his attention to the subject of utilising, for the purpose of white bread making, the nutritious substances ordinarily thrown away with the bran, and the results of his inquiries were communicated in a memoir to the Academy of Sciences, on the 9th June 1856, and have since been reported on by MM. Dumas, Pelouze, Payen, Peligot, and Chevreul.

" 560. These results explain most satisfactorily the cause of failure of the flour prepared by the American method to make white bread.

" 561. Before the publication of M. Mouriès' researches, the nutritious substance attached to the bran was considered by chemists to be a portion of the gluten of the grain, but it now proves not to be gluten at all, but chiefly a new nitrogenous body, analogous to gluten, which the discoverer has named 'cerealine, with a portion of another well-known nitrogenous body,—'vegetable caseine.'

" 562. Among the properties of this body, cerealine, M. Mouriès gives the following :—

" It is soluble in water, and insoluble in alcohol. It acts as a ferment on starch, dextrine, glucose, or grape sugar. It alters gluten extremely, and gives to the altered matter a brown colour. Its peculiar action, when brought into contact, in the process of fermentation, with the ordinary constituents of fine white flour, is the true cause of the dark brown colour imparted to the bread made from flour in which the cerealine was retained.

" 563. M. Mouriès, having satisfied himself as to the properties of cerealine, adopted a method by which its peculiar action was neutralised, and then made bread by the ordinary process of fermentation, in which the whole of the bran contained in the internal coat of the grain was allowed to remain. The result was a loaf having merely an orange colour, but none of that dark brown colour which always results when the bran contained in the internal coat of the grain is used in bread made by the ordinary method.

" 564. In like manner, by my process, in which the fermentative changes are never allowed to take place, bread made from wheaten meal, from which only the coarsest bran has been separated, is so free from the dark brown colour that it is difficult to pursuade people that it is made from wheaten meal at all."

The leading feature, therefore, of Dr. Dauglish's process, in relation to the large amount of saving which is capable of being effected by it, is, that it enables white bread to be made from what, when ground and made into bread in the ordinary way, will only make brown bread, and that of a dark colour, such as the public in general will not eat, for good and sufficient reasons. (598, 9.)

The national gain which would result from that saving, on the supposition that the whole of the bread of England was made by his process, Dr. Dauglish states, on apparently good grounds, at 8,000,000*l.* per annum. (567, 569.)

The alimentary value of the portion of the wheaten grain thus saved for human food is described by Dr. Dauglish as follows :—" By the method of grinding and dressing neces-
" sary in the preparation of flour for making white bread by
" fermentation, about 13½ per cent. are thrown off in the form

" of bran, pollard, &c., (365–6,) and therefore lost as human " food." About one-fourth of this consists of the hard siliceous external coat of the grain, which is wholly indigestible, and therefore not a desirable substance to retain as food. The remaining three-fourths consist of the internal coat ; this, however, instead of being indigestible, proves to be the most alimentary substance in the whole grain.

" 571. The investigations of M. Mouriès have demonstrated that the internal coat of the wheaten grain is an infinitely more important alimentary substance than its mere bulk would indicate. It had been long known to be exceedingly rich in plastic or tissue-forming elements, and these were supposed to be chiefly gluten ; but it appears that they are almost entirely in the form of a substance possessing properties hitherto unsuspected. It belongs to a class of bodies known as catalytic agents (solvents), which, by simple contact, have the power of determining definite chemical changes. The substance, named by its discoverer ' cerealine,' has a most powerful solvent action, in the presence of warmth and moisture, or gluten and starch, and promotes the easy and healthy digestion of those matters when taken as food. It is the true solvent prepared by nature for the gluten of wheat for its assimilation in the system. It is to be found in minute particles in most flours, small quantities of it becoming detached from the coating of the grain in the process of grinding and dressing in the ordinary way for the preparation of fine flour. But the aërated bread process affords the means of incorporating the whole of it, and of thus securing the whole nutritive and chemical value of the wheaten grain. That bread made by this process possesses all the properties which theory leads us to expect, is established beyond doubt by the experience of nearly three years, and by the testimony of some of the most eminent men in the medical profession, who have had opportunities of watching its effects as an article of diet. Wherever it has been introduced into the nursery its effects have been most marked. Its action upon the adult must be, and is, in like manner beneficial ; but in this case its effects cannot be so easily or so specially noted, because there are generally several causes of derangement of digestion in adults besides that of fermented bread, the withdrawal of which alone will not effect an improvement."

The investigations of M. Mouriès have received a further confirmation after an elaborate inquiry, as will appear from the following extract from the " Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences, par MM. les Secrétaries Perpétuels ; tome LIV. No. 7. 24 Février 1862, p. 445. Mémoire presenté, Du froment et du pain de froment : Par M. Mege Mouriès." In this Mémoir M. Mouriès states, that a Report made by M. le Colonel Favé, in the name of a Commission issued by the

Minister of Commerce, confirms, after the most exact experiments, the deductions previously laid before the Academy by M. Mouriès, relative to the extra available produce of flour from wheat, resulting from the process of grinding above described. Subsequently to this Report, the new process was, by order of the Préfet of the Seine, tried in the "Boulangerie de Scipion," in which the bread is made for the hospitals of Paris, the result of which was the conclusion that it would effect a saving of no less than 45 days consumption, if generally in use throughout France. "Ces advantages, on le sait, équivalent à quarante-cinq jours de consommation en France." (p. 147.)

M. Chevreul, on presenting the Mémoire to the Academie, gave the following table as embodying the results established by M. Mouriès :—

Rendement de la farine de froment pour 100 de froment.	Rendement en pain des farines obtenues par les procédés ci-contre.
1° Par le procédé de Mège Mouriès - - - 82	Pain de première qualité 109 à 110
2° Par le procédé ordinaire, au plus - - - 70	Pain de première qualité 92
3° Par le procédé donnant le pain réglementaire 75	Pain réglementaire, inférieur aux deux précédents - - - - 100

In further confirmation of the above, if it could be needed, it may be stated that, for several months past, the Messrs. Hadley, the proprietors of the "City Flour Mills," Upper Thames Street, (by far the largest millers in the world,) have been carrying on experiments with the view of testing the possibility of applying successfully, in a commercial point of view, the American process for "unbranning" wheat, invented by Mr. Bentz, and above adverted to. Messrs. Hadley's statement to me (794), made on the 12th of this month (June), shows that these experiments, just terminated, have been successful, and that consequently the national gain that would result from the general application (if possible) of this new process would amount, at a very moderate estimate, to upwards of 10 per cent. upon the quantity of wheat converted into flour for the purposes of bread in this kingdom. (799. 800.)

Another advantage, as far as the public is concerned, from the process of Dr. Dauglish is, that it is incompatible with the use of alum (572, 587). The small master

baker, now often driven to the use of alum by the force of competition, as has been shown above, would, if his trade should be affected by the sale of the aërated bread, become "a bread seller instead of a bread baker," much, in the great majority of cases, to his advantage (588); while the benefits to the journeyman, of employment under this system as contrasted with the old, would be very great, as already demonstrated.

Mutual concessions for the abolition of night-work.

Mutual concessions possible, by masters and men, for the abolition of night-work.—One of the principal objects which the men had in view in bringing their case to the notice of Parliament, both in 1848 and last year, was the abolishing of night-work. This was a point which the House of Commons promptly determined, in 1848, that they could not entertain. And there is nothing in the case of the journeymen bakers which can lead to its being considered in any degree exceptional. The general principle, therefore, applies strictly to their case, namely, that it is inexpedient for Parliament to interfere with adult male labour in regard to any matter in dispute between the men and their employers.

The object, however, of this inquiry would not have been attained had I not given a full opportunity to both the men and the masters to state their experience, their opinions, and their wishes as regards the important question of the hours of work in the trade. In a matter which has been so long in controversy between them, and which is surrounded with so many difficulties, I cannot expect that any opinion I may express, on a review of the various and complicated circumstances of the case, will have much weight towards bringing about a satisfactory arrangement, or indeed any arrangement at all. Nevertheless, as it has been intimated to me that it would be acceptable to both parties that I should express an opinion, the only value I can claim for it is that of its being an impartial one.

The master bakers of the metropolis are divided into two classes, the full-priced and the under-sellers; and this latter class is subdivided into those who endeavour to maintain a fair price for a good article, and those who, by "cutting" down the price against the class above them and against each other, and being consequently unable without ruin to continue to sell pure bread, sustain themselves for a time by the sale of bread adulterated with alum and other mixtures.

As stated by Mr. Bennett, at that time the secretary of the London Operative Bakers Association,—

22. "The difference in the mode in which these two classes of masters conduct their business causes a great difference to the men in regard to their hours of work.

23. "The full-priced masters employ their men a part of their time in serving their customers, sending them out to deliver the bread. The men thus have more fresh air; but still they are laboriously employed, carrying the heavy baskets or wheeling the hand-barrows or trucks for several hours of the day, after having been engaged many hours of the night (generally from 11 P.M. or earlier to about 7 A.M.) in making bread. The actual number of hours varies according to the season of the year. During what is called "the London season," the operatives belonging to the "full-priced" bakers at the West End of the town generally begin work at 11 P.M., and are engaged in making the bread, with one or two short (sometimes very short) intervals of rest, up to 8 oclock the next morning, according to the amount of business of the employer. They are then engaged all day long, up to 4, 5, 6, and as late as late as 7 o'clock in the evening, carrying out bread, or sometimes in the afternoon in the bake-house again, assisting in the biscuit-baking. They may have, after they have done their work, sometimes five or six, sometimes only four or five hours sleep before they begin again. On Fridays they always begin sooner,—some about 10 o'clock, and continue, in some cases, at work either in making or delivering the bread, up to 8 P.M. on Saturday night, but more generally up to 4 or 5 o'clock, in which cases the biscuit-making is omitted on the Saturday. On Sundays the men must attend twice or three times during the day for an hour or two, to make preparations for the next day's bread (by putting in the "ferment," or putting in the "sponge"). Also in some full-priced shops they have to attend to Sunday bakings, which alone will occupy four or five hours. This, however, is gradually going out in the full-priced shops.

24. "The men employed by the under-selling masters have not only to work on the average longer hours, but their work is almost entirely confined to the bake-bouse. The under-selling masters generally sell their bread to their customers in the shop. If they send it out, which is not common, except as supplying chandlers' shops, they usually employ other hands for that purpose. It is not their practice to deliver bread from house to house.

25. "Towards the end of the week the work becomes much more severe. It is the most ordinary practice in the underselling trade for the men to begin on Thursday night at 10 o'clock, and continue on, with only slight intermissions, until late on Saturday evening. Nearly all the underselling trade does Sunday baking, and the men are in some cases kept at work, weighing flour for shop sale in small bags, besides preparing for the

next day's bread. The places of work of the under-sellers are not, as a rule, worse than those of the full-priced bakers.

26. "Of the 3,000 master bakers in the trade it is estimated that perhaps three fourths are under-sellers.

27. "The under-seller makes a portion of his profits by getting a larger quantity of bread turned out by a given number of men, in consequence of his not employing any portion of their time in delivering the bread, and the hours of work also being generally longer. Where three men in a full-priced shop would turn out two batches of bread in what is called a day, the same number of men in an under-seller's shop will turn out four or five batches. Again the wages paid by the under-seller are as a rule lower than what is paid by the full-priced baker. The reason is, that a large number of those employed by the under-sellers are foreigners, and youths and others, who are obliged to accept almost any wages they can obtain, otherwise they would not submit to those long hours."

The whole of Mr. Bennett's evidence is very interesting, and gives, I believe, a perfectly accurate picture of the state of the baking trade, and the life of the journeyman baker in London. I have submitted Mr. Bennett's evidence to several of the principal master bakers, none of whom have taken any exceptions to its general accuracy in regard to facts. The Thursday's work, however, appears to be less than it was.

The question is, can this night-work, and, in addition to that, the long hours of day-work, be put an end to, and a more reasonable and satisfactory arrangement of hours substituted for them, by mutual arrangement?

The night-work and long hours of day-work in the full-priced branch of the trade (now only about one fourth in the whole) arise from one principal cause,—the fact that the process of making the bread takes up only about six hours of a man's time. What is to be done with the other six hours? The bread must be distributed to the customers. Will the man who makes it consent to do that only,—to live upon the wages of six hours' work, and to allow the distribution to be made by a distinct set of hands employed for the other six or more hours, and receiving themselves only half wages? (695.)

At the West End of the town, to which the principal portion of the full-priced business is confined, the journeyman, during the "slack" time of the year, gets over the distribution of the bread by one, two, or three o'clock, according to the extent of his master's business. Between those hours and 11 P.M. he has nothing to do. He has had several hours work in the open air, and has the rest of the day for rest

and sleep. When the "season" commences, his work of distribution increases; but if it becomes more than he can reasonably accomplish, either the master hires another man to assist him, or he goes to an easier place. Where the master is satisfied with his services, the former is almost sure to be the alternative adopted, as it is very disadvantageous to the master to part with a man who knows the residences and the wants of all his customers, and is steady, attentive, and trustworthy. (646.)

The journeyman thus employed is paid at the same rate all the year round; loses no time or wages on account of weather; is at no expense for tools; and, taking wages and allowances together, earns enough to enable him, if prudent, to save money. By degrees he becomes a foreman, if he has character and ability; and from thence the step is very common, by the aid of the miller or factor, to becoming himself a master. With few exceptions the whole of the masters in both branches of the trade have worked their own way upwards into the class of masters in this manner. In the course of the inquiry I have come into contact with a considerable number both of masters and men. I have the greatest pleasure in recording the impression they made upon me. I believe it would be difficult to find in any trade in the kingdom men of greater intelligence and uprightness of mind than the great majority of those with whom the various purposes and accidents of the inquiry brought me into communication.

But there is, unfortunately, another and by no means creditable reason why many, at least among the journeymen in the full-priced trade, would be unwilling to give up the distribution of bread; namely, the irregular gains they make from it. The process is described in a pamphlet by Mr. Chalice, clerk of Mr. Spiking, Dover Street, who directed my attention to it, and who has given the substance of it in his evidence (680). "It consists in entering in their "books more bread to customers than they have de-"livered." The pamphlet states that "of the heads of "small families not one in ten escapes paying for a half-"quartern loaf per week above their household consumption;" and with regard to the larger families, that amount is greatly exceeded. Accordingly, "men whose wages are 18*s*. "a-week really make their place worth 30*s*. by this mode "of dishonesty." Mr. Spiking mentions that this practice is "a great source of anxiety and annoyance to the master," and that he has taken the best and apparently effectual means to put an end to it. That it is a very common

practice, I have, from the information I received respecting it, no doubt; and it is one which no addition to wages, that can be looked to in the trade generally, can be effectual to cure, as is manifest from the amount of the dishonest gains above stated (12*s.* a-week). It can only be put an end to by greater vigilance on the part of the public. (615.)

Such being the case, the distribution of the bread is not, under present arrangements, to be separated entirely from the making of it; and accordingly no alteration of hours in the full-priced business can be expected from that source.

In the underselling trade the night-work and long hours arise from a different cause. The underseller does not, as a rule, deliver bread, except to chandlers' shops, and his aim is to obtain a large sale for ready money. He therefore "brings out" more batches of bread than the full-priced baker; sometimes five or six batches in the twenty-four hours. His power of doing this, however, and the time it will take, depends, to a great extent, on the number of ovens and other accommodation which he possesses. If he has a considerable amount of "oven accommodation," he can bring out a large quantity of bread in twelve hours; but if, as is usually the case, his oven accommodation is restricted, it will require more hours, and will take him, on the whole, sixteen or eighteen hours to get through the "day's" work. (89, 107, 412, 456, 612.)

Is there any prospect that this system of supplying London with bread can be altered? It is argued, on behalf of the men, that although a certain large proportion of the ovens in London are occupied in baking bread for eighteen hours a day, a large proportion of the rest are so occupied for only six hours in the twenty-four; and that therefore no more ovens would be required if the whole were reduced to twelve hours. But those ovens, although not occupied with baking bread, are employed in baking something else,—biscuits, confectionery, dinners, &c. It is therefore highly probable that a twelve-hour system would render an addition to the number of ovens in London necessary. If so, whence is the capital to come from; and, if found, would the returns yield a fair rate of interest?

The large number of failures in the baking trade, alleged, by those most conversant with it, to have been going on for many years, and to be still continuing, (430–443,) do not seem to give much encouragement for further investments of capital in it. But it is asserted that those failures took place, for the most part, in the lower grades of the trade, among those who are ruining each other by the

unreasonable competition which has been already described, and which leads to the production of such a large amount of adulterated bread. It is believed that if the state of the law were such as to prevent the production and sale of this kind of bread, the number of masters in the trade would be much reduced, and their place immediately taken by the men of capital and higher position in the trade; and that, consequently, the price of bread would be more uniform, the quality of that portion of it sold chiefly among the labouring classes good, and the remuneration of capital satisfactory. That being so, any additional amount of oven accommodation that might be required to maintain a twelve-hour system of work would be readily supplied.

There is a great probability that this would be the result to the baking trade of placing the law in regard to the adulteration of food in a satisfactory state. It has been truly said (9) that "the men's wages are a mere fraction in "the cost of the manufacture of bread." The only way, as has been shown (p. xxxiv), in which a "cheap article" can be produced below the cost of pure bread, is by supplying an impure and adulterated one. If the means of doing this with impunity were taken away, the trade would fall into the hands of the more respectable members of it, who would supply good bread at a fairly remunerative price; and the public would have the benefit of their enterprise, intelligence, and capital. These men,—the full-priced bakers and the higher grades of the under-sellers,—would be more likely to fall into any reasonable and practicable arrangement of the hours of work, that after due deliberation may be found not inconsistent with the very various requirements of the trade and of the public in London.

As a proof of this, the attempts at accommodation made a few years ago, both in the East of London, in the City, and at the West End of London, may be referred to.

In 1859, the Eastern Unity Master Bakers Society made a very favourable report upon the claims of the Operative Bakers' Association, relative to adopting the hours of 4 A.M. to 4 P.M. as the ordinary day's work (20). The committee of the Society was composed of some of the most intelligent men in the trade in that part of London. Their evidence as to the causes of the failure of the attempt at arrangement at that time will be found from sections 348 to 405. But an opinion was expressed by some of the witnesses (387–395), which I subsequently found to be a very common one, namely, that in the present state of the competition kept on foot by the lower branches of the trade, no arrangement

would be permanent, there being always certain individuals in the trade who would be tempted by their necessities to break through it.

The evidence of Mr. Robertson and Mr. D'Ossell, chairman and secretary of the Eastern Unity Master Bakers' Society, that of Mr. Webster (456), and Mr. Dwarber (418), chairman and deputy-chairman of the City Master Bakers' Association, that of Mr. Bonthron (643), Mr. Callard (659), and Mr. Cheeseman (478), members of the Bloomsbury Master Bakers' Society, acting for the West End bakers in general, together with that of the other members of those societies, whose evidence is given, is very interesting and instructive upon all the points in controversy. All exhibit a most hearty sympathy with the real wants and grievances of the men, and an earnest desire to do their part towards meeting and correcting them. All agree also as to the principal cause of the failure of the negociation. Their respective statements are as follows :—

Mr. Robertson, Salmon's Lane, Limehouse.

348. "Was chairman of the 'Eastern Unity Master Bakers Society,' which was formed in 1859 to consider the claims of the 'Operative Bakers' Association,' the object of which was to diminish the hours of labour, and to confine them to the hours between 4 A.M. and 4 P.M. The committee recommended the adoption of that system ; but as some persons in the trade desired an extension of the hours on Saturdays, which the Operative Bakers' Committee refused to accede to, the proposition fell to the ground.

349. "Mr. Robertson stated to me that his opinion remained unchanged as to the desirableness of adopting those hours, both in the interest of the men and the masters, but he saw no prospect of agreement upon the subject, and he considered any attempt to enforce it by Act of Parliament out of the question.

Mr. Dosell, Brook Street, Stepney.

392. "I was honorary secretary of the 'Eastern Unity Master Bakers' Society,' formed in 1859, and comprising Limehouse, Stepney, Radcliffe, Shadwell, the Commercial Road, and the adjoining localities (Wapping, &c.) In 1859 the master bakers of this part of London had come to an understanding to adopt the hours from 4 A.M. to 4 P.M. with the exception of Saturday, on which day they wanted the men to work, when required, an hour or two or even three hours, overtime, which was to be paid for. The representatives of the men refused. Generally speaking, the overtime would have amounted to about three hours, depending somewhat upon the weather—the fermentation coming on quicker in warm weather. In summer we can get two batches of bread out in a third less time. If we let it go over the time, vinous fermentation very rapidly sets in.

393. "The argument of the men was, that for those extra hours on Saturday extra men could be taken on, there being, according to them, a large number of men always out of employ. But we represented to them, that just double the number of journeymen would be required, and all to be kept simply to do those few hours extra work on the Saturdays.

394. "There is also a business reason for not employing 'jobbers' unacquainted with the nature of the oven and the bakehouse. If a man does not know it well there would be a great chance of his spoiling a batch of bread.

395. "Then again, who is to go and find those men? Would they always be ready to our hand, waiting at the shop door to come in? Then, if so many journeymen are to be in readiness for that extra work, what is to prevent wages going down in proportion? Industrious and careful master bakers would not expose themselves to these risks; and indeed, if the average work proposed, from 4 A.M. to 4 P.M. had been adopted, it would not, I fear, have been adhered to long in consequence of there being so many small masters in the trade who would have been under a great temptation to improve their business by getting their rolls and batch bread ready before their neighbours."

Mr. JOHN C. DWARBER, 28, Fetter Lane, Fleet Street.

418. "I have been in the baking trade 30 years, 25 years of it in this lane, and 15 years a master baker. I was a member and occasionally occupied the chair of the City Master Bakers' Association, which was formed about two years ago, to take into consideration the statements of the men relative to their alleged grievances, especially the night work. Mr. Webster, of Coleman Street, was our chairman. I believe that there is a large proportion of masters in the trade who consider their men, and would be most willing to adopt any arrangements that would be to their advantage, consistently with the proper carrying on of their own business. We were very desirous to meet the wishes of the men in regard to the hours of work, but when we came to discuss it with them we found that their demands were such that we could not accede to them. They insisted on the strict limitation of 12 hours, except in cases where the state of the temperature or other accidental causes prevented the work being finished, in which cases they would consent to go on for another hour, but in no case beyond it. The hours of the baking trade must differ according to the different nature of the business, and no master could consent to be tied down in this manner. Ours is a trade in which we cannot work by rote; we cannot take up the work and put it down at pleasure; it must be done at the right time, or not at all."

And the following was the answer of the master bakers of the West End of London. (478).

"As a sub-committee of an association of master bakers carrying on business in the West End of London, we feel called upon to state that we sympathize most heartily with the men in their

attempt to abridge the hours of labour, and so far as practicable to abolish night-work. In proof of this we may state that many members of of this association have been among the first to try the plan proposed by the operatives bakers, but have been unable to carry it out in its present form. The proposition is the total abolition of night-work, and the limitation of the duration of labour to 12 hours per day, by commencing work at 4 A.M. and ending at 4 A.M.

"In reply to this, a meeting of our association was held Sept. 21st, 1859, when the following resolutions were passed and forwarded to the council of the operative bakers :—

"1. 'In the opinion of this meeting, twelve hours' labour is sufficient for a day's work.

"2. 'That while this meeting is of opinion that twelve hours' labour is sufficient, the exigencies of the baking trade require that the men should work longer on the Saturday in order to provide for the Sabbath.

"3. 'That, recognizing the principle of twelve hours' labour, this meeting is of opinion that the time of commencing work must be left to the necessities of each particular business.'

"The reasons which led the meeting to adopt these resolutions were the following :—

"1st. That, from the nature of the trade, it is impossible, in many businesses, for all the men to commence at 4 o'clock, or at any other given hour, some requiring to commence a considerable time before the others. We are yet quite willing that those who begin first shonld leave off at a corresponding early hour, endeavouring to make it as near as possible to 4 o'clock.

"2dly. That if twelve hours are really employed five days in the week in providing for each day's consumption, it is obviously impossible that the necessary quantity of bread for Saturday and Sunday can be produced in the same time. Experience shows us that two or three extra hours of labour are required on the Saturday (as in every other provision trade), and to employ a seperate staff of men for those hours would be altogether unreasonable."

After the failure of their endeavours at a general arrangement, the hours from 4 A.M. to 4 P.M. were tried by several most respectable master bakers, both in the East and West of London, with an undoubted desire on their part that they should be successful. The only cases that were successful, as far as I have been able to learn, were those in which the foreman and sometimes all the journeymen slept on the premises (601, 618, 629, 634). In the two most successful instances, those of Mr. Miller, Duke Street, Grosvenor Square (601), and Mr. H. Laws, Queen's Row, Pimlico, there were also other favourable circumstances, not usual in the trade. In the first there were two ovens, and only one batch of bread a day ; in the second, neither the hot rolls

and fancy-bread, nor the batch-bread, were wanted to be ready for delivery as early as at most other places. Mr. Laws also has two ovens; "but," he adds, "numbers of bakers "in London doing a large business,—three or four batches "a day,—have but one. They could not get through that "number of batches in 12 hours without giving up their "dinner bakings; and many make a good deal of money "by their dinner bakings." (631)

Mr. Hue, Pont Street, "enlarged his bakehouse, at an expense of 200*l*., in order to try day-work" (from 4 A.M. to 4 P.M.), but after four months trial in the summer of 1860 he found himself obliged to return to the old system, from the reasons which he fully describes (646–9). Mr. Thompson, Upper Berkeley Street, "put up another oven at a very considerable expense" in order to prepare for day-work if his neighbours adopted it. "But very few could have had the same opportunity" (623). Mr. Thompson well describes the difficulties in the way (622–4), but does not think them insuperable. In the event of the want of "oven accommodation" being eventually got over, the principal obstacle to a general adoption of the hours from 4 A.M. to 4 P.M. would, according to the almost universal experience of those masters who made the trial in 1859-60, be the irregularity with which the men would come to their work at that time in the morning. "The impossibility of making the men regular and punctual in their attendance at that hour" was the reason given by every witness who had tried it and been obliged to give it up. Mr. Mules, William Street, St. George's in the East, gives the following account of his experiment:—

405. "I was a member of the committee of the 'Eastern Unity Master Bakers' Society' in 1859.

406. "After the failure of the attempt to adopt the 12 hours generally, I was the first to give a trial to the hours between four and four, and I carried it on for 12 months. I found it answered very well as long as the men would work steadily, but after a time I found that instead of setting to work when they came at 4 A.M. they would go to sleep, and then again, instead of staying till 4 P.M. they were anxious to get away at the hour they had been accustomed to, from twelve to two. I therefore returned to the old hour 11 P.M. We average about 16 batches a week; the men get away between twelve and two every day except Saturday, and on that day at about five.

407. "The men did not like to get up at that time of the morning, 4 A.M., they wanted me to begin at six. But in that case I could not have got my first batch until 10 o'clock. If any of my neighbours got hot bread before that hour they would have carried away my trade. I serve chandlers' shops; they would

have said, if I cannot get my bread by half past eight I must go somewhere else."

Mr. Burnell, Leadenhall Market (411), Mrs. Jones, Eccleston Street (626), and several others, gave it up for similar reasons.

That the master of the house should get up at 4 o'clock to let the men in, and stay up until they were all in, was a necessary consequence of that arrangement of hours. That it should, in many cases, have been so long persevered in by the masters, was a proof of the sincerity of their desire to introduce a system more advantageous to the men than the old one. But the impossibility of depending upon the punctual arrival of the men, and the large pecuniary risk attending their non-arrival, were fatal to the continuance of the experiment.

The hours from 5 A.M. to 5 P.M. would probably have succeeded better; but in those instances only in which a small quantity of fancy bread was required, or none at all. Many of the men have to come from some distance to their work. If obliged to get up at four or half past four, they would nevertheless have had time for a full night's rest, and would be more likely to be at their work punctually. If any one should be unpunctual, or should absent himself, it would be easier at 5 A.M. than at 4 to send for another man, and to find one ready.

But the circumstances of the different masters all over London are so various, and the requirements of their business so different, that it would be highly unjust and inexpedient to attempt to impose upon them any general and unvarying rule as to the hours between which they shall employ their men. A strict and uniform rule may be very suitable where the baking-trade is carried on on a large scale, and on the principles of a manufacture. But where, as in London, its condition is, with very few exceptions, that of a small handicraft, where the extent and kind of business varies so much, and where the amount of oven and other accommodation in proportion to the business which different individuals have made for themselves is in most cases so small, and so difficult to enlarge in consequence of the great value of space in the more crowded and favourite quarters of the metropolis, exact uniformity in the hours of work is impossible without such an arbitrary interference with honest industry and enterprise as would be a greater evil than what is sought to be cured.

No one can read the fair, straightforward, clear, and able statements of all the masters of every grade in the trade

whose opinions I have collected,— some of them well known to be men of the highest respectability, and the best entitled to speak the sentiments of the trade of any men in London, others whom I selected by chance,—without coming to the above conclusion.

The masters have already expressed a readiness to admit the principle of 12 hours' work, coupled with a rule to give and take an hour or so each way, as the necessities of trade or the peculiarities of the material might require.

This is an important point gained, and I believe the men are now not indisposed to assent to it, with the condition, however, attached, of being paid for this over-time.

Whether they will obtain this, will depend upon the state of the labour market. But unless it alters very considerably from its present state of redundancy, the form only and not the total amount of payment would be changed. It is even possible that in some, and not very few, cases, the wages paid to the journeyman would be less. The full-priced masters, who deliver bread, would, under the 12 hours' system, be obliged, according to recent experience, to hire another lad to help in the distribution. Again, the under-seller, if his business requires him to bring out more batches than can be brought out, with the accommodation he possesses, in 12 hours, must hire an extra hand. Would the wages of these extra hands fall upon the master, or would the present total amount of wages be only distributed among more hands? The result may, possibly, be in favour of the men as a consequence of the legislative measures which have been above recommended. But the facility with which almost any one can enter the lower grades of the baking trade as a journeyman must be expected to have its effect in keeping up the redundancy of labour in the trade as long as the wages are sufficient, as they have hitherto proved to be, to attract men into it notwithstanding all its disadvantages. And it must be remembered that if its disadvantages are reduced by the legislature, the tendency to enter the trade will be increased.

The actual amount of wages earned in the baking trade, notwithstanding its disadvantages, is considerable; and its remaining at its present average amount, in spite of the redundancy of labour in the trade, is a proof that wages are at a point below which men will not, as matters are at present, consent to work in it. (718.)

The sub-committee of the Bloomsbury Master Baker's Society, stated in March 1860 (478) that "wages varied from 14*s.* to 32*s.*, exclusive of bread, flour, and lodging."

The evidence of Mr. Bremner (469, 477), of Mr. Cheeseman (479), of Mr. Bonthron (697), and of Mr. Spiking (680), is very instructive on this point. Mr. Cheeseman states that he considers his foreman's place worth 34*s.* a week, his second hand's place worth 26*s.*, his third 23*s.*, and his fourth 15*s.* This is made up of money and money's worth, in bread, flour, potatoes, lodgings, and perquisites. This may be taken fairly to represent the wages usually paid in the full-priced branch of the trade. The money wages of the foreman are 28*s.* a week, second hand 18*s.*, third 16*s.*, fourth 12*s.* As a rule, the wages in the under-selling branches are below those rates, but to no great extent. (29. 421. 430. 446.)

On comparing those wages with what were earned in the baking trade in times past, it is very satisfactory to discover that they are higher at the present day than at the beginning of this century.

The master of the Baker's Company, Mr. Joseph Vere, stated to the Committee of the House of Commons in 1804, that the money wages of a foreman were 19*s.* a week, of the second hand 15*s.*, third hand, who was an apprentice, and was found in board and lodging, clothing and pocket-money, equal to 15*s.* a week; and that these had been the rates since 1797.

In 1824, Mr. G. F. Turner, master baker, Bishopsgate Street, stated to the Committee of the House of Commons of that year (p. 4 of Evidence), that "the journeymen were, half of "them, boarded in the house, and half not; that the 'general "wages were, of the foreman 32*s.* to 42*s.* and allowances; "and that the second hand stood him in, all included, 30*s.* "a week; and that those had been the rates since 1815." He then added (p. 5), "Some are at 14*s.* a week, and are "glad to come for anything. I had not a man with me in "1814 who was working for less than 1*l.* 1*s.* per week. The "foreman's wages increase, the jobbing men's get less.

Considering the reduced prices of nearly all articles of consumption at the present time, it would appear that the inferior journeymen are, generally speaking, better off now than they were in 1824, and both journeymen and foremen far better than they were in 1804. (See also 792.)

The evidence of William Bond, foreman of Mr. Spiking, Dover Street, is very instructive as to the question of the hours of work; and while it points out a mode, well worthy of general consideration, by which a system of day-work could be reconciled with public convenience, nevertheless plainly shows the difficulties in the way, under present cir-

cumstances, of a system entirely uniform. After admitting the necessity of a great latitude, in such a large business as that of Mr. Spiking, during some weeks in the year (687), which would amount to a return to night-work during that time, he admits also that in many shops, both small and large, "they make the men both make the bread and deliver "it; and if they did not, the masters could not exist. "They, in fact, support their business by getting 18 hours' "labour out of the men for 12 hours' pay." (688.)

His only remedy is "a union among the men, to prevent men working those long hours." (688.)

There are three distinct objections to such a course :—

First, it is a well-known fact that nearly all the masters in the trade have, notwithstanding this system of night-work and of long hours, risen up from the ranks, and taken their place among the class of masters, by taking advantage of the opportunity of saving money which the rate of wages affords; and by prudent and steady habits the greatest proportion of them have preserved their health, and many among them possess well-cultivated minds, and are as well entitled to respect as any similar class of society. Most of them have acted on the principle described by a witness before the Committee of the House of Commons in 1815, already quoted (page xxxiii) :—When a young man begins first to work at this business, "being young and strong, he works "day and night to double his weekly wages. I did so "myself when I began business ; I did two or three men's "work." Thus it is that men of prudence, perseverance, and energy, accumulate a little capital, "and if they are "clever and successful they get up to be great men." If those who might have the direction of a "union" of journeymen bakers in London were to say to the careful and well-instructed Scotch youth, or to the educated, thrifty, and laborious German, or to the enterprizing English lad from the country, or to the best-disposed of their own class in London, that he shall not earn beyond a certain rate, or work more than a certain number of hours, what, they may be asked, is this but a return to the obsolete principle of the first "Statute of Labourers" (23 Edw. 3. c. 1. A.D. 1349). by which a certain rate of wages was fixed for all operatives, and every one was liable to punishment who either paid or received "more than the fixed rate, and he who "receiveth shall pay the surplusage to the town where he "dwelleth ;" or to the Statute of 2 Hen. 6. c. 14. A. D. 1423, by which the justices are required to punish servants, masons, carpenters, tailors, cordwainers, tanners, butchers,

and all other artificers and victuallers, for taking "unreasonable wages." These and the many other Statutes of Labourers, which introduced even more minute regulations, as to diet and clothing, &c., have very properly given place to the freedom from all legislative interference in the arrangements between workmen and employers of the present day; and modern experience affords no encouragement for the revival of those principles in the less responsible form in which they often appear.

Secondly, if it should be contemplated to endeavour to enforce the decisions of a union by a "strike," it should be considered that, although the public may look patiently upon such a proceeding in any ordinary trade, it would be extremely difficult, when the "daily bread" of three millions of men, women, and children is concerned, to controul the irritation of a hungry people against those who, from whatever cause, withheld the daily supply at the accustomed hour.

Thirdly, I have shown above (page xxv–lii) that there is reason for believing that a reduction of the present hours to twelve, or thereabouts, may be brought about, if at all, by means which will benefit not only the men but the public.

There can be no doubt that the effect of the present system of beginning work at eleven o'clock at night, and continuing it late into the following day, has disadvantages in both branches of the trade, and is especially injurious in its effects upon large numbers of the journeymen in the under-selling branch of it. Upon some, the moral effects, as described by the first witness, Mr. Bennett (79), are greater than the physical ones; upon others the effects are both morally and physically injurious. It is a system which, as has been amply proved, the great body of the more respectable masters in the trade are perfectly ready and willing to do all that can be reasonably required of them to put an end to. They would be aided by the legislation which has been suggested. But they also require the co-operation of the public, in allowing them as great a latitude as possible in regard to the hours of delivering not only the hot rolls and fancy bread in the morning, but the household bread in the middle of day. (464, 616, 617, 623, 667.) And when the state of the case becomes generally known, it may be anticipated that heads of families will give such directions to their servants as may relieve the baker, as far as possible, from the necessity of crowding his deliveries of all kinds of bread into the early parts of the day. (601, 623, 627,

646.) The instances in which this has been already done in London are sufficient to prove that there is no real obstacle to its being done much more generally. (601, 628, 636.) The example of Scotland, referred to by Mr. Bennett (2–9), is argued by Mr. Callard (667), and by Mr. Bonthron (705),—than whom there are no two master bakers better qualified to speak the opinions of the London masters,—not to be applicable to London.

That night-work, alone, need not be injurious, is proved by the evidence of Mr. Nevill's men (650–658). But their hours of work are limited to twelve. It is argued also, by some of the masters, that other men besides journeymen bakers do night-work without complaint (420, 432, 464, 403). The injury, as it seems to me, principally arises when their employment is in the bakehouse exclusively, as in the under-selling trade, and comprises both night and day work too. (388, 403, 421, 432, 446, 456, 464, 498–518, 777, 778, 789–793, 817.) The exhaustion leads to a craving for stimulants and for excitement, and to irregularity of habits of various kinds, as described by those who represent the mode of life and the feelings of a large class of men in the trade (86, 106, 139).

Without doubt the adoption of a twelve-hour system as a rule, with a latitude according to the requirements of any individual business, would be a great boon to the men, both in a physical and in a moral point of view. If at the same time the bakehouses were placed under inspection, and, as a consequence, judiciously supplied with pure air, kept perfectly clean, and otherwise improved as described,—if the sleeping places in them, having no communication with the external air, were abolished,—if, supposing night-work to continue, youths under 18 were not allowed to work in the bakehouse before five in the morning, or after nine at night, —and if the introduction of machinery should relieve the men from inhaling the flour-dust, and from the other injuries to their health consequent on the present rude and laborious process of kneading,—should these alterations take place, there would seem no reason why, after a time, the journeymen bakers should be in any way behind any other class of labouring men, in physical well-being, in good conduct, or in intelligence.

You were pleased, some months ago, to communicate to me your wish that this inquiry should be extended to the country, and to Scotland and Ireland. The presentation to Parliament of this Report and the Evidence will enable those interested in the question, beyond the limits of the

Metropolis, to form an opinion as to whether the circumstances of the baking trade elsewhere differ, in any important particular, from what has been here described in regard to London. From the communications which I have received from various quarters, I infer that they do not; and that the exclusion of youths under 18 from night-work, and the inspection of bakehouses, as herein proposed, are the only two measures which the Legislature would be called upon to entertain, either in regard to the Metropolis or to any other portion of the kingdom, with the exception, perhaps, of a small addition as regards Ireland.

Should this be their opinion, on considering the Evidence and the recommendations of this Report, no further inquiry, or a very short one, would be nccessary.

I have the honour to be,
Sir,
Your obedient servant,
HUGH SEYMOUR TREMENHEERE.

P.S.—Since I received Secretary Sir George Lewis's instructions in April of last year (p. v), I have been unable to give my undivided attention to this subject, as I have been occupied in the earlier and in the latter part of the time that has since elapsed with other public duties. Thence the delay in the presentation of this Report.

APPENDIX.

ABSTRACT OF EVIDENCE.

Mr. John Bennett.

1. Secretary of the London Operative Bakers' Association.

2. London hours of work, 18 to 20 hours a-day; the same in Scotland until 1846. Reduced to 12 hours in Scotland in that year, and so continue. The short hours most advantageous to both masters and men.

7. Apprentices worked the same long hours as the men.

9. Price of bread not raised by shortening the hours. Opinions of masters and men relative to shortening the hours.

13. Meeting in Exeter Hall, and Conferences, in 1860.

17. None of the facts disputed.

19. Memorial of Eastern Unity Master Bakers' Society in 1859, in favour of short hours.

21. Masters divided into two classes: the full-priced; the undersellers. Hours equally long at both. Journeymen of full-priced masters are more in the open air. Differences in the mode of work.

57. Mode of work in Scotland. Could be just as easily adopted in London.

71. Difference in quality of bread, and price, &c., between full-priced and undersellers.

76. Causes of the great competition in the trade, both among masters and men.

79. Discomfort and and immoralities occasioned by the long hours. Many hundreds always out of work. The Germans in the trade.

81. How they and others get into business in the trade.

86. The public house the journeyman's home.

88. The full-priced baker can easily adopt the short hours, the undersellers not so easily.

90. Tendency in Scotland, since 1846, for baking trade to get into the hands of capitalists. Consequent benefit to journeymen.

91. Witness's opinion unfavourable to use of machinery, but his experience limited. No objection to it on the part of workmen.

94. Inspection of bakehouses desirable.

95. "Sweepings." Loss of flour by hand-kneading and night-work.

William Peacock.

96. Length of hours and night work in London.
100. Dirty condition and heat of bakehouses.
101-2. Expenses of day-work and short hours.
105. Perspiration in dough, from hand-kneading.
106. Injurious results of the long hours.
107. How the difficulty of adopting short hours can be removed.

Benjamin Snow.

108-9. His experience in the country and in London. Journeymen begin nightwork at the age of 15 or 16. Health ruined by it.
110. Unhealthy bakehouses in London near the river.

Gilbert Crever.

112. The different kinds of yeast used.
114. Advantages of day work.

Henry Webb.

117. Experience in the country and in London. Bad state of places of work.
133. Advantages of adopting daywork.
136. "Sweepings."
137. Arms washed in pail of water, and sediment used with next batch, by many small masters.
138. Thinks that nearly all the journeymen in the trade began night work long before they were eighteen years of age. Injurious effect of, on health.
139. Injurious moral effects of night work.

James Reilly.

140. "Sweepings."
141. Sediment from washing of arms. Value of "sweepings" saved, and "washings" prevented by Mr. Stevens's dough making machine.

Henry Scott.

145. Began work as a journeyman at 14. Hours of work in Nottingham and Leicestershire from four A.M. to four P.M.; too early.
146. Prefers Mr. Stevens's machine to the old mode of making dough.

John Wells.

147. Began work at 13; hours from 11 P. M. to 3 P.M. This practice very common in the trade. The mode of making dough easier with Mr. Stevens's machine.

JAMES MILLS.

152. Began night-work at 16. Prefers Mr. Stevens's machine for making dough, to hand-work.

153–157. Description of the working of Mr. Stevens's machine at his bakery. Carbonic acid gas in dough; effects of, upon the men in hand-kneading. Health of journeymen improved by not inhaling gas or flour-dust.

Mr. NEVILL.

158. The largest establishment in London.

160. Hours of work; night-work not injurious.

164. Tried the hours from 4 A.M. to 4 P.M. The men did not like them. Youths under 18 should not work at night. Bake-houses and mills should be inspected.

165. Willing to adopt machinery if proved useful. Much of his bread not distributed before 5 P.M. His customers do not object.

Mr. EBENEZER STEVENS.

166. Inventor of the patent dough-making machine.

168. Description of.

169. Advantages of.

177. Different sizes of machine.

182. Where they are in operation.

183. Testimonials relating to.

Mrs. LANE, Assistant Matron of Cripples' Home.

186–9. Advantages of Mr. Stevens's machine.

Mr. COOPER, Master of the Marylebone Workhouse.

190. Advantages of Mr. Stevens's machine.

Mr. FREDERICK BRACKER, Master Baker, Marylebone Workhouse.

191. Details as to working Mr. Stevens's machine. Although it is one of the first made, without the subsequent improvements, it is easy for the men to work with two sacks of flour in it. Time saved as compared with hand-kneading. Position in which work is done, much better for the workmen. No flour-dust inhaled, and therefore better for the health of the men. No perspiration dropping into the dough, as would be the case with hand-kneading.

192. No waste; and the machine makes better bread and more of it.

Mr. William Frances, Master of the Holborn Union Workhouse.

193. Has one of Mr. Stevens's improved machines. One man (70 years of age) and three boys (from 12 to 14) can work easily upwards of two sacks of flour in a batch. Saving arising from use of machine.

Mr. J. Hart, Master Baker, Lambeth Workhouse.

195. Has used Mr. Stevens's machine for three years.
202. Saving from.
203. Advantages of machine as to cleanliness, &c.;
204. And in saving time, and the health of the men.
206–7. Youths under 18 employed at night-work; consequent injury to their health and morals.
208–11. Saving from and advantages of the machine.
212. By addition of two ovens we dispensed with night-work.
213. Bad effects of night-work.

Mr. George Day, Master of the Union Workhouse, Lambeth.

214 Advantages of Mr. Stevens's machine. It has fully repaid the parish for the outlay.

Mr. Heney James, Master Baker, Hackney Union.

215. Attributes improvement of his health to the introduction of Mr. Stevens's machine.
216. Increase in quantity of loaves per sack, by the machine, and quality better. No perspiration can drop into the dough as in hand-kneading.
217. State of bakehouses in London. Inspection desirable; even more so than for slaughter-houses.
218. Gain from the use of the machine.

Mr. Driscoll, Master of the Hackney Union Workhouse.

220 Bread made by the machine in 18 months 5,514 cwt. 3 qrs., or 96 4-lb. loaves per sack. Previous average with hand-kneading 93 loaves. Gain in loaves in 18 months 4,827. Gain in money in 18 months, beyond the cost of the machine, 24*l.* 13*s.* 6*d.*
221–2. Other advantages of the machine.

Mr. H. Elkerton, Master of the Mount Street Workhouse, St. George's, Hanover Square.

225. Increase of bread from Mr. Stevens's machine 8 lbs. per sack of flour, on previous average of 12 months.
226. No perspiration mixed with dough. Advantages to health of journeymen.

Mr. DAVID WATTS, Master Baker, St. George's, Hanover Square, Workhouse.

227–8. Advantages of Mr. Stevens's machine.

230. Many youths begin night-work at 16. Injury to them.

231–2. Perspiration dropping into dough, especially in ill-ventilated bakehouses.

Mr. ENGLEFIELD, Overseer of Parish of St. George's, Hanover Square.

233. By trade a confectioner. Bad ventilation of many bakehouses. What should be done to improve them. Benefits of Mr. Stevens's machine. Adulteration of bread and confectionery. Adulteration of Food Act should be amended.

236. [Perspiration dropping into dough in a cool bakehouse above ground, on a frosty day. H.S.T.]

Mr. MCCASH, Master Baker, Broadway, Stratford.

237. Experienced night-work and long hours when a journeyman.

238. Youths under 18 should not be employed in night-work.

239. Difficulties in the way of the general adoption of day-work. A large number of masters might contrive it, and the public ought to support them.

241. Many bakehouses neglected, to the injury of the health of the men. Inspection would lead to great improvements.

242. Has used one of Mr. Stevens's machines for a year and a half.

243. Advantages to health and strength of the men.

244. Advantages as to cleanliness.

245. Advantages as to gain in number of loaves and quality of bread. Additional quantity of water taken up.

252. Mistake of public in insisting upon having their bread so white.

253. Cannot dispense with night-work.

A. B., Journeyman to Mr. McCash.

254. Work with the machine much easier than hand-kneading, and better for health.

Mr. TURNER, Master Baker, Peckham Rye.

256. Used Mr. Stevens's machine for two years. Health improved by it. Why he gave it up.

Mr. DAWSON, Master Baker, Wandsworth and Clapham Union Workhouse.

257–263. Has used one of Mr. Stevens's machines for about a year. Increase, a loaf and a half per sack. Other advantages of the machine.

264. Inspection of bakehouses desirable.
265. Many youths under 18 employed at night-work.

Mr. Painter, Master of Shoreditch Union Workhouse.

266. Tested Mr. Stevens's machine against hand-labour. Increase by machine three loaves per sack, and bread better. If quality of flour weak, the increase is only two loaves, or one and a half.
267. Our bakers could not resist the facts; and they also find it better for their health.
268–70. Other advantages of the machine.
271. Perspiration dropping into dough, with hand-kneading. The machine prevents the inhaling carbonic acid gas.
274. Careful trials of the machine against hand-kneading. Gain by the machine safely stated at $2\frac{1}{2}$ 4-lb. loaves per sack, with ordinary contract flour.

Mr. Slater, Assistant Master, Shoreditch Union.

277. Receives the bread into stock. Mode by which he ascertains exact produce in loaves, per sack of flour.
278. Diminished waste of machine-made bread, and it keeps moist longer.

Mr. Claridge, Master Baker, Surrey House of Correction.

279–281. Has one of Mr. Stevens's improved machines. Labour easier than by hand-kneading, and no flour-dust inhaled.
282. Extra quantity of loaves obtained depends on quality of flour.
284. Perfect cleanliness of mode of making dough by machine. Statements as to the disgusting consequences of making dough by hand not exaggerated. Bakehouses should be inspected.
285. Injury by night-work to youths under 18.
286. To what kind of business the machine is suitable.
287. Advantages of, in regulating the fermentation.
288–291. Bad state of many London bakehouses, and consequences of to journeyman.

The Rev. G. J. Bellard, St. Philip's Orphanage, West Brompton.

294. Testimony in favour of Mr. Stevens's machine.
295. Opinion of Master of Croydon Union Workhouse in favour of Mr. Stevens's machine. Increase of loaves produced by, three per sack.
298. Baker's health improved by use of machine.

Mr. Fillary, County Prison, Cold Bath Fields.

300. Uses one of Mr. Stevens's machines, with an improvement.

302. Increase of loaves, three per sack.
303. Advantages in point of cleanliness, and healthiness of process.

Mr. Phelps, Master Baker, County Prison, Cold Bath Fields.

306. Increase of three loaves per sack fully proved; quality of flour good.
307. Time saved by the machine.
309. Cleanliness of process; perspiration dropping into dough with hand-kneading.
311. Estimate of saving by machine, by the Governor of Cold Bath Fields Prison.

Mr. Norman, Master Baker, Marlborough Terrace.

312–314 Has one of Mr. Stevens's machines. The men prefer it. Advantage of machine.
315. Began night-work at 17; it undermined his health. Many youths under 18 doing night-work.

Mr. R. Emberson, Master Baker, Kentish Town.

316. Has one of Mr. Stevens's machines. Advantages of, although one of the unimproved kind.
318–321. Ventilation of bakehouse.

Mr. C. Emberson, Highbury.

322–325. Has one of Mr. Stevens's new machines. Advantages of. Much easier work than hand-kneading.
326. Evidence of one of Mr. C. Emberson's workmen.

Mr. Clarke, Master Baker, Colney Hatch Lunatic Asylum.

328. Has one of Mr. Stevens's double action machines turned by steam power.
331. At a public establishment, where bread made by women, 30 lbs. of bread less is made from a sack of flour than is obtained from men's labour.
332–333. The machine mixes more perfectly than men, and consequently makes more bread.
334–340. Consumption of flour at the asylum. Various items of saving from use of machine.
341–42. Estimated amount of saving at the asylum, 236*l.* 5*s.* per annum.
343. No difficulty in keeping troughs clean.
346. Perfect cleanliness of process. Impossible to prevent perspiration falling into dough, with hand-kneading, even in a cool bakehouse.

Mr. Robertson, Salmon's Lane, Limehouse, Chairman of the Eastern Unity Master Bakers' Society.

348. Why the proposed arrangement in 1859, between the masters and the men to work from 4 A.M. to 4 P.M. failed. Youths under 18 should be restrained from working at night. Sees no objection to inspection of bakehouses.

Mr. Heiser, Master Baker, John Street, Limehouse.

353. Lads under 18 should not do night-work. Habits of journeymen bakers. Steady habits of Germans in the trade. Bakehouses should be inspected.

359. Competition of masters prevents the abolition of night-work by mutual arrangement.

360. Thinks Parliament might interfere.

361. The nature of work prevents a strict limitation of hours.

G. Knight, Foreman to Mr. March, 3, Colt Street, Limehouse.

363. As to state of many bakehouses in which he has worked, and the necessity of inspection. Youths under 18 should not do night-work.

364. As to perspiration dropping into dough.

Mr. North, Master Baker, 3, Colt Street, Limehouse.

367. Was on the committe of the Eastern Unity Master Bakers' Society. Failure of attempted arrangement in 1859.

368. His hours of work favourable for the men.

Mr. Gilrush, Master Baker, White Horse Street, Stepney.

372. Was on the committee of the Eastern Unity Master Bakers' Society. Failure of attempted arrangement of 1859.

373. Objection to alteration of hours.

374. Advantages and disadvantages of forbidding lads under 18 working at night.

375. Inspection of bakehouses desirable.

376. As to perspiration falling into the dough.

Mr. Goymer, Master Baker, Cable Street, Royal Mint Street.

379. Situation of bakehouse. Hours of work. Hot rolls wanted at 6 A.M.

Mr. Mackness, Master Baker, Cable Street, Royal Mint Street.

381. Situation of bakehouse. Hours.

Mr. Mackness, High Street, Shadwell.

382. Hours of work. Germans. Difficulty in adopting 12 hours' system. Inspection of bakehouses.

Mr. Connell, Master Baker, Royal Mint Street.

386. Inspection of bakehouses.

Mr. Baker, Master Baker, High Street, Shadwell.

387. If proposed arrangement in 1859 had been made it would not have been permanent.
388. Present hours not necessarily injurious to the men.
389. Inspection of bakehouses.
391. Lads under 18.

Mr. Dosell, Master Baker, Brook Street, Stepney.

392. Was Honorary Secretary of the Eastern Unity Master Bakers' Society in 1859; parishes, &c. over which it extended. Causes of failure of proposed arrangement.
397. Why the poor prefer hot bread.
398. Another reason why limitation of hours could not always be adhered to.
400. Youths under 18.
402. Another difficulty in the way of adhering to the hours from 4 A.M. to 4 P.M.
403. Night-work not necessarily injurious to the men in all cases.
404. Bakehouses should be inspected and licensed.

Mr. Mules, William Street, Cannon Street, St. George's-in-the-East.

405. Was on the committee of the Eastern Unity Master Bakers' Society.
406. Tried the hours from 4 A.M. to 4 P.M. for 12 months.
407. Why it failed.
408. Why the poor prefer hot bread.
409. As to youths under 18.
410. Bakehouses should be inspected and licensed.

Mr. Burnell, Master Baker, Leadenhall Market.

411. Tried day-work for a month.
413. Inspection desirable.
415. Night-work,—difficulty of abolishing by legislation.
416. Ought to be effected by mutual agreement.

Mr. Eames, High Street, St. Giles, Bloomsbury.

417. Hours from 12 night to 12 noon.

Mr. J. C. Dwarber, Fetter Lane, Fleet Street.

418. Occasional chairman of the City Master Bakers' Association.
419. Causes of failure of attempt to adopt day-work in 1859. Alleged grievances of men exaggerated.
420. Difference in hours of work in wealthier or poorer quarters of London. Considers night-work a necessity in the baking trade.
421. Wages and perquisites of foremen and journeymen bakers.
422–3. Inspection of bakehouses desirable. They should be licensed.

426. Boys under 18 should be prevented doing night-work.

427. Perspiration falling into the dough.

429. Answers to points in Mr. John Bennett's evidence.

430. The precise relations of the "Undersellers" to the rest of the trade.

431. Condition of journeymen improved since 1834–5–6. Night-work not necessarily morally injurious.

433. Bakehouses should be licensed, and licence liable to be suspended in certain cases.

435–441. Amount of licence-fee. A great many manufacturers and sellers of bread would prefer a high licence fee. Reasons why a high licence-fee (10 guineas) would be most conducive to the interests both of the trade and the public.

442. French law for Paris bakers. Act of Parliament requiring the letter M (mixed) to be imprinted on bread containing any mixtures of meal with wheaten flour should be amended and enforced.

443. Temptation supplied by competition, to sell bread made of inferior or mixed flour. Much of this sold at chandlers' shops.

Mr. Brown, Gray's Inn Lane.

445. Endeavoured to agree with the men as to abolishing night-work. Thinks the case the men attempt to make out exaggerated.

447. Youths under 18 should be prevented from working before 4 A.M. Bakehouses should be inspected.

Mr. Ware, Ivy Lane, Newgate Street.

448. Great decrease of bakehouses in the city. Bakehouses should be licensed. Inferior bread at chandlers' shops. Poor defrauded in quality and weight.

Mr. G. Smith, Whitechapel Road.

452. Bakehouses should be inspected. Many youths under 18 do night-work.

454. G. Knowles, aged 17, had been doing night-work (beginning between 11 P.M. and 12 o'clock) for more than two years.

Mr. Webster, Coleman Street.

456. Was Chairman of the City Master Bakers' Association. All the respectable masters in the trade consult the comforts and interests of their men. Baking trade need not be injurious to health or morals. The masters would have made a trial of day-work in substitution for night-work, but for the unreasonable demands of those who represented the men.

458–463. Uncertainties incident to the making of bread.

464. Reasons why batch-bread must be sent out early in the city. Night-work a necessity, unless you can alter people's habits and the course of business. If the men would do justice to themselves, night-work need not be injurious to them. Has a youth at work, aged 16; his work begins between 3 and 4 A.M.

Mr. HARWOOD, 256, Strand.

467. Tried hours from 3½ A.M. to 3½ P.M., but was obliged to give it up and return to night-work. Has a youth under 18 at night-work.

Mr. BREMNER, Warren Street, Fitzroy Square.

468. Did very severe night-work, but became a master baker in six years.

469. Wages and privileges of journeymen. Consequences of abolishing the assize of bread; injurious to the journeyman. Cry for cheap bread met by furnishing an inferior article and less weight. This inferior bread soon gets sour; one of the reasons why the labouring classes eat new bread.

472. Advantages of the assize of bread.

474. Many youths under 18 doing night-work.

475. Ordinary state of bakehouses.

476–7. Why the labour market is overstocked with journeymen bakers. Nevertheless there is no trade in which steady and prudent men can so easily put by money. The large number of respectable men in the trade, both journeymen and masters, proves that the evils are not inseparable from it. The advocates of the men endeavour to make it appear that their descriptions apply to the whole trade.

Mr. CHEESEMAN, Store Street.

478. Was a member of a Sub-Committee of Masters of the Bloomsbury Master Bakers' Society, 1859–60. Letter from that Sub-Committee to Council of Operative Bakers. Masters willing to adopt 12 hours, but the time of commencing work must be regulated by each individual master.

479. Details as to wages and privileges of journeyman, and hours of work. A very large proportion of the master bakers at the West End of the town do all they can to make their men comfortable and contented. If anything can be done for youths under 18, or by inspection and licensing of bakehouses, the trade would support it.

482. Salesman, New Cut, Blackfriars Road. Many youths under 18 doing night-work on Surrey side of London.

483. Joseph Ball, Lambeth Walk; has been a baker 40 years; has known hundreds of lads doing night-work with the men. One great cause of their losing their health is their beginning night-work so young.

486. State of bakehouses.

487–497. OBSERVATIONS MADE AT SOME OF THE BAKEHOUSES VISITED.

Mr. W. PURVIS, Blackfriars Road.

498. Has been a master baker 33 years. Is chairman of the South Metropolitan Master Bakers' Society. We cannot see

our way to the abolition of night-work. Reasons why. Night-work not necessarily injurious, except to youths under 18. But competition among journeymen leads them to accept places where they have night-work and day-work too. Mr. Purvis is one of the largest master bakers in London in the regular trade.

501. State of his bakehouses.

502. Public has a right to demand that the places where their bread is made should be clean and well ventilated. Bakehouses should be inspected and licensed.

503–518. As to amount of licence fee.

Dr. Wm. A. Guy, M.B., Physician to King's College Hospital.

519–525. His evidence in 1848 respecting the injurious influence of long hours of work, and the bad state of bakehouses, on the physical and moral condition of the journeyman bakers. The facts not disputed. They remain the same. Statement of them. Bakehouses should be inspected. Youths under 18 should be forbidden to work at night.

526. The present rude process of making bread should be superseded by the use of machinery. Highly approves of Mr. Stevens's machine. Dr. Dauglish's aërated bread. Great advantages of the process both to workmen and to the public.

Dr. Dauglish.

527. Inventor of the new process of bread manufacture, by which what is termed the "aërated bread" is made. First introduced in 1859, at Dockhead, Bermondsey. It came extensively into use.

528–537. Causes why manufacture then discontinued. Process in operation in other parts of the kingdom. About to be renewed at Model Bakery, Islington. Clear extra yield of five 4lb. loaves per sack, more than obtained by fermentation; or in value 2*s*. 6*d*. per sack. Alimentary value also improved from 3*s*. to 4*s*. per sack more, by coarse dressing. Also if American process of grinding used, a further increase in value of 2*s*. per sack; total increase of value 7*s*. 6*d*. per sack.

538. Bearing of this invention on the condition of the journeyman baker.

539. Details proving the positions above stated, and the general advantages of the process both to the workman and to the public.

585. Time of making a batch of bread reduced from 8 or 12 hours to 40 minutes.

586. Will bread be cheaper?

587. Weak flour will by this process make perfectly good bread without the use of any corrective agent, such as alum, &c.

588. Effect of the general adoption of the process on the class of master bakers.

589. No truth in the assertion that arsenic can get into the bread through the process. Impossible that it should be so.

590. All the loaves are crusted all over; therefore more easily digested.

591–4. Commercial advantages of the process.

595. Dr. Dauglish does not lay claim to be the first to call attention to this mode of making bread. Illustrations of the subject from Professor Johnson's pamphlet.

600. By the American process of preparing flour, and by the aërated process combined, white bread can, for the first time, be made of "whole meal" (which heretofore has only yielded brown bread), and a great addition thus made to human food.

Mr. Miller, Duke Street, Grosvenor Square.

601. Began to work day-work instead of night-work in 1859 and has continued it ever since.

602. Mode of proceeding, and results. Only makes one batch a day and has two ovens. All the men sleep in the house.

607. Difficulty of general application of the plan.

608. Youths under 18. Knows a lad at 15 who begins work at 12 at night.

609. Bakehouses should be inspected. Bad state of many.

610. Dissents from opinions of Mr. Purvis and Mr. Dwarber as to licence-fee for selling bread.

611. Working classes cheated in the weight of their loaf at certain shops.

612. Different modes of manufacturing bread. Underseller must work more than 12 hours.

613. As to stamping loaf made of mixtures of meal with the letter M, (v. 3 Geo. 4. c. 106, s. 12). Quantity of water per sack. Use of potatoes as a ferment.

614. Numbers of the working classes pay full price for their bread.

615. Night-work alleged by journeymen as their excuse for cheating customers in the delivery of bread.

616–617. Many persons object to receive bread after a certain hour. Difficulty not insurmountable.

Mr. M'Ewen, Great Portland Street.

618. Adopted the hours from 4 A.M. to 4 P.M. two years ago. Finds no difficulty. His men all sleep in the house. Difficulties of general adoption of those hours. Youths under 18.

519 Many bakehouses very injurious to health.

Mr. Cook, Duke Street, Manchester Square.

620. Both Mr. Cook and his men consider the hours from 4 to 4 impracticable. All his men sleep out of the house.

Mr. Thompson, Upper Berkeley Street.

622. In some shops at West End of town night-work is an absolute necessity, as they cannot enlarge their premises. The men wanted too strict a rule as to hours.

623. Added an oven here at a very considerable expense in order to prepare for day-work, if others adopted it; but very few could have done as I did. Difficulties of day-work; but if public

would second us they might be overcome. Has known many bakehouses excessively dirty.

Mrs. Jones, Eccleston Street.

626–627. Tried day-work, but the men begged to return to the old system. Difficulties in the way. The youths under 18 in her employ begin work at 5 A.M.

Mr. H. Laws, Queen's Row, Pimlico.

628–631. Abandoned night-work two years ago. Foreman sleeps on the premises. Difficulties in the way of general adoption of day-work.

632. Youths under 18.

633. Inspection of bakehouses.

Mr. Costiff, Sussex Street, South Belgravia.

634. Has two shops. Has adopted day-work in one. Advantages and disadvantages of. His customers do not want their bread as early as some do.

637. In his other shop cannot adopt it, as his neighbours do not. Hours of work exaggerated. A rigid rule as to time impossible.

638. The worst men are in the worst places. Youths under 18 need not begin work before 4 A.M.

640. Large proportion of bakehouses in London in a very disgraceful state. Bedrooms partitioned off from bakehouses; state of. All should be obliged to have a window or other communication with the open air. Fifteen out of twenty have not in the east and south of London. Many at the West End very bad.

Mr. Morse, Ebury Street.

641. Tried day-work two years ago, but could not make it answer. Reasons. Night-work was not injurious to him. Why. Inspection of bakehouses. Youths under 18.

Mrs. Mason, Chapel Street, Belgrave Square.

642. Tried day-work, but it did not answer. Difficulties. Youths under 18.

643. [Process of making a batch of dough in a well-ventilated bakehouse. Effect of thoroughly working the dough; it turns out more bread; no dry flour in it. Carbonic acid gas in dough.]

Mrs. Bruce, Albany Street.

645. Adopted day-work, but discontinued it after a month's trial. Why.

Mr. Hue, Pont Street.

646. Enlarged his bakehouse at an outlay of 200*l.* in order to try day-work. After four months obliged to return to the old system. Difficulties of day-work, especially in a mixed business.

648. Has four youths under or about 18, employed from 6 A.M. to 9 P.M. Many take to night-work at 16. It should be prevented.

Mr. Nevill's Men.

650. Night-work alone not injurious.
651. Out of 25 men, only 5 were 18 and upwards when they began night-work.
652. Learnt to mould in six weeks.
653. "Sweepings."
655. Disadvantage of the hours from 4 A.M.
656. "Sweepings."
657. Water taken up by flour of different qualities.
658. Alum in flour.

Mr. Callard, Blenheim Terrace, St. John's Wood.

659. Tried day-work. Reasons against it.
661. Hours of work suitable to his business.
667. Twelve hours should be adopted as the rule of the trade, but the selection should be left to the individual masters. As to day-work in Scotland.
668. Peculiarities of the baking trade in regard to hours of work.
670–7. Adulteration of Food Act should be made effectual.

Mr. Spiking, Dover Street.

678. Tried day-work; was obliged to abandon it.
680. Illegitimate gains by journeymen from the delivery of bread.
681. Sleeping places for the men. Approves of Mr. Stevens's dough-making machine.
682. Unsatisfactory state of the law under the Adulteration of Food Act.
684. Alteration required.

Wm. Bond (Foreman to Mr. Spiking.)

685–8. Day-work ought to be tried again. Public ought to co-operate.
689. Saving from day-work.
691. Hours under the day system.

Mr. Bonthron, Regent Street.

693. Hours of work. Wages.
699. Tried the day system. Reasons against it.
703. No saving in day-work, except in gas.
704. Youths under 18. Inspection of bakehouses.
705. The day-work in Scotland not applicable to London.

Mr. Squire, Jermyn Street.

706–8. Tried day-work. Obliged to return to the old system.
710. No saving from it.

Mr. Marshall, Hungerford Street.

711. Could not adopt day-work.
714. Youths under 18. Inspection of bakehouses.

Mr. Elphinstone, Regent Street.

716–9. The question of day-work. Competition in the under-selling branches of the baking trade the cause of the long hours.
720–22. The Act requiring bread to be stamped. Should be improved and enforced.
724. Differences of price of flour.

Mr. Robb, St. Martin's Lane.

725. Concurs in Mr. Elphinstone's evidence.

Mr. Hill, Bishopgate Street.

727–9. His men not unanimous as to day-work. Difficulties of.

Dr. Aldis, M.D.

732–36. Medical Officer of Health. In 1860, visited 53 bake-houses in Belgravia. His colleague, Dr. Druitt, visited 25 in the Hanover Square and May Fair district. Results.
737–41. Bakehouses should be inspected by authority.

Mr. Grant, Sanitary Inspector.

742. Visited 85 bakehouses in the parish of St. George, Hanover Square. Results.
743. Opinion as to bakehouses in the Metropolis.
744–51. Authority wanted for inspection of bakehouses. Nature of.

Dr. Ballard, M.D., Islington.

752. Medical Officer of Health. Sanitary condition of bake-houses. Sanitary supervision. Adulteration of bread. Act should be amended.

Dr. Hassall, M.D., Wimpole Street.

753. Author of "Food and its Adulterations, &c. &c.
754.-61. Approves of Mr. Stevens's dough-making machine. Advantages of.
762–66. Adulteration of bread caused by competition in the baking trade. Frequency of the use of alum in bread.
768. Facts not disputed. Adulteration of Food Act should be amended.

Dr. Gibbon, A.B. and M.B.

769. Medical Officer of Health. Alum in bread. Husks of oats and rye, and also rice, in flour.
770–1. Adulteration of Food Act should be amended. Bake-houses should be inspected. Extracts from Dr. Gibbon's report on the subject of alum in bread.

Mr. Wm. Weston.

772–7. Adulteration of bread caused by competition.
778. Twelve hours' movement.
780. Impure flour.
781. Adulteration of Food Act should be made more effectual.
782. Small profits of an under-seller.
783. All flour fit for human food could be used without alum.

Mr. Rice.

784. Effect of abolition of assize.
788. Specimen of an "assize of bread."

Mr. Stewart.

789. Tried night-work, but gave it up.
793. Adulteration of Food Act should be enforced.

Messrs. Hadley.

794. Results of experiments in "unbranning" wheat.
801. Statement of practical baker as to profits in different branches of the trade.
813. Memorial of master bakers of Edinburgh, Leith, and Glasgow.
816. Account MS. Poem by a baker.

Mr. Franey.

818. Did not try day-work, as others had failed. Day-work would entail a higher price for bread.
821. Communication from Dr. Miller, Professor of Chemistry at King's College, on a new mode of detecting alum in bread.

Mr. Dodson.

822. Patentee of the unfermented bread.

Mr. E. T. Jobbins.

823. Could not carry on the day-system until he built an additional oven.

Mr. Simpson.

827. Could not enlarge his premises, and therefore could not adopt the day-system.

Robert Wighton.

828. Why the day-system failed when tried by Mr. Duer.

Mr. Joseph Warren.

829. The expense of the day-system, if it became general, would fall upon the public.
831. Certain evidence not printed.
832. Extracts from Dr. Ure's Dictionary of Arts, &c., as to "patent yeast."
833. Account of the progress of the art of baking.
The restrictive system in France.
834. M. Drouot's Kneading Machine.

EVIDENCE.

Mr. John Bennett.

1. I am Secretary of the London Operative Bakers Association, and have been so for two years. I came to London from Glasgow, at the request of the journeymen bakers of London, in July 1859, for the purpose of aiding them in obtaining the abolition of night-work and the reduction of the hours of labour. I have worked as an operative baker upwards of 30 years, chiefly in Edinburgh and Glasgow. I have been a foreman for the last 24 years, having the charge of both small and large businesses, in Edinburgh, Glasgow, and elsewhere. I have been only in three situations for the last 20 years. I was 10 years and three months foreman to Mr. James Swan, Broughton Street, Edinburgh ; I removed from thence to Mr. Thompson's, Crossmyloof, near Glasgow, perhaps the largest baking establishment in the world, employing 80 men, and where I have seen 800 sacks of flour used per week. I was there 7 years. I was then 3 years with the English Baking Company, Portland Street, Glasgow.

2. Until the year 1846 the usual hours of work of the operative bakers in Scotland were similar to what those in London now are, namely from 12 to 18 hours a day for six days in the week, a large proportion of them working 18 hours, and in some cases up to 20 hours a day for some days together. In that year an agitation commenced for the reduction of the hours to 12 per day, between 5 a.m. and 5 p.m., taking meals as opportunity offered. The agitation arose when the Factory Bill was under re-consideration, and we thought that the same principle might be applied to our trade. The masters and men in our trade had meetings together and discussed the question, and the result was that the masters agreed to give the system of 12 hours work a trial. It turned out most successfully, to the benefit both of the masters and the men ; so much so that 13 years afterwards, namely in 1859, a memorial was almost universally signed by the master-bakers of Edinburgh and other places, to the master-bakers of London, urging them to adopt the same system. (See 813.)

3. I worked under that short-time system from its commencement, and there can be no doubt that it is much more economical than the old system of long hours. The economy is produced in various ways. The work is better done, and there is less

liability to loss. When men are overtired, they are apt to go to sleep over their work, and allow the dough to ferment too long, by which it becomes sour, or leave the loaves too long in the oven, so that they are over baked.

4. Those hours, from 5 a.m. to 5 p.m. by the system as practised in Scotland, are perfectly sufficient to satisfy all the requirements of the public.

5. The public require hot rolls by 7 o'clock in the morning. The preparation for these can be made before 5 o'clock p.m. of the previous day, all the year round, except when the weather is very hot, when half an hour's work, in ordinary cases, at say 7, 8, or 9 o'clock, p.m., is sufficient for the purpose.

6. The 12 hours system has extended to nearly all the principal towns in Scotland. The 12 hours include the processes of making the bread and delivering it to customers where the journeymen are required to do so. Some masters deliver the bread by a separate class of men or boys employed for that particular purpose.

7. Apprentices are very generally employed by the master-bakers in Scotland. They go to the trade at from 12 to 14 years of age, and are bound for a period of from 4 to 5 years. While the long hours continued in Scotland these lads worked the same hours as the men. In the course of my experience I saw numerous instances in which the health of these youths was materially affected by the long hours, and I have known many sink under it. Their mental improvement was at the same time completely neglected. The long hours led to their having a desire for stimulants and acquiring a taste for exciting amusements, often of a vicious kind. My observation also as to the health of the men was that a great many of them broke down, and died at an early age.

8. The places of work in Edinburgh and Glasgow are generally speaking superior to those in London, both as regards size, light, and ventilation.

9. Before 1846 the wages of journeymen bakers in London were higher than in Scotland. After we got the short hours in Scotland our wages rose 30. per cent. and remain to this time better than the average London wages. The reduction of the hours caused a greater demand for efficient workmen. The price of bread was not at all increased by it. The men's wages are a mere fraction in the cost of the manufacture of bread. There never was a farthing put upon the price of the loaf in consequence of the reduction of the hours. Many masters allow that in consequence of the work being better done, and that nearly as much work is got out of a man in the short hours as in the long and unlimited hours, they are not out of pocket by the change.

10. The reasons why so many journeymen bakers come up from Scotland to London altho' the wages in Scotland are higher than here, are several. First, the desire to see a little more of the world has a good deal to do with it. Secondly, having served an apprenticeship in Scotland, they are better qualified after a short time to do general work as bread and biscuit bakers.

Thirdly, they have a wider field, and a better chance of becoming foremen and ultimately employers.

11. The largest proportion of journeymen bakers in London are English ; the next greatest number are Scotch ; the next are Germans and other foreigners. There are about 14,000 journeymen bakers in the metropolis, according to the census of this year. It is estimated that about 2,000 of these are under 18 years of age.

12. The number of master-bakers in the Metropolis is estimated to be somewhat under 3,000. Of these we have ascertained that a considerable proportion are desirous of a change in the working hours, but many of them consider that any voluntary arrangement for the purpose, between the masters and the men, is impracticable, and they think that the change can only be arrived at by a legislative enactment. Others on the contrary think that there is no difficulty in bringing about the same change here that was brought about in Scotland, by voluntary arrangement. The men are divided upon the subject. Some think that it could be arrived at by a general strike. Others think it would be impossible to unite all the men for that purpose.

13. In March 1860 we had a large meeting upon the subject in Exeter Hall, Lord Shaftesbury being in the chair. There were, I believe, nearly 1,000 masters present at that meeting, and the feeling was entirely in favour of reducing the hours and putting an end to night-work.

14. A short time after that, there was a conference between seven of the masters, and seven of the men. Lord Shaftesbury presided at it for a portion of the time, and Lord Ebury for the rest. These masters were Mr. Spiking, Dover Street, baker to Her Majesty, Mr. Bonthron, Regent Street, Mr. Miller, Duke Street, Grosvenor Square (who has been working for many years on the 12 hours plan), Mr. Law, Queen's Row, Pimlico, also working on the 12 hours plan for the last 18 months), Mr. Callard, St. John's Wood, Mr. Cameron, Tooley Street, Mr. Ayton, Nelson Street, Long Lane, Bermondsey.

16. Soon after that conference a circular was sent to all the masters in the trade inviting them to a meeting at the London Tavern. Between 400 and 500 were present. They all agreed, with one or two exceptions only, that it was highly desirable that the change should be brought about ; the only difference of opinion being as to the mode of effecting it,—whether by voluntary arrangement or by Act of Parliament.

17. None of the facts were disputed at these meetings, as to the injury to the health of the men, arising from the long and late hours, and the unhealthy state of many of the bake-houses.

18. Among the masters who attended the above meetings were a great many of those who are the most influential in the trade, from all parts of the metropolis.

19. About 18 months ago a report was drawn up by the Eastern Unity Master Bakers Society. Mr. Dossell, 36, Brook Street, Radcliffe, was secretary of the society. He is one of the most influential masters in the east end of London. The

following is a copy of the report addressed to the master bakers of the east of London :—

20. " The under-mentioned having been deputed as a sub-committee to report on the subject matters brought under their notice at a meeting of the Eastern Unity Master Bakers' Society, held on the 27th of September last, to consider the claims of the Operative Bakers' Association, having for its object a diminution of the hours of labour ; viz., from 4 A.M. to 4 P.M.

" 1st. Your committee, having carefully and conscientiously considered the subject of restricting the hours of labour to 12 per day, have arrived at the conviction that the claim is based on a just and equitable foundation, alike conducive to the best interests of the employer and employed, there existing no precedent in sacred or profane history warranting the employer in taxing the operative baker beyond those of workmen engaged in other branches of industry.

" 2nd. The total abolition of night employment is considered to be desirable, inasmuch as the unfortunate established practice of the baking trade in London tends to debase, debilitate, and degrade the operatives, in being deprived of their natural rest. It is also detrimental to the best interests of the employers, much gas being consumed and wasted, with other incidental expenses in like ratio, estimated in the aggregate to amount to full 10 per cent. on the expense of manufacture.

" 3rd. Your committee having arrived at the foregoing conclusions, after the most careful and diligent consideration of the whole question, do recommend the adoption of the 12 hours' system, commencing at 4 A.M. to 4 P.M., and further advise its commencement as soon as practicable, which may be speedily accomplished by each individual member of the trade consulting his neighbours.

" In conclusion, your committee are unanimously of opinion that the advantages to be derived by the alteration of the present pernicious system will tend to a more reciprocal feeling than at present exists between employer and employed, which must be considered the greatest of all desiderata ; and we are firmly of opinion, that with the adoption of the proposed system the development of the moral and intellectual faculties, combined with the social enjoyments, will tend to elevate the operative baker in the social scale second to none in the United Kingdom.

" CHAIRMAN.

Mr. ROBERTSON, Salmon's Lane, Limehouse.

SUB-COMMITTEE.

Mr. NORTH, Three Colt Street, Limehouse.
Mr. GILRUTH, White Horse Street, Stepney.
Mr. MORRIS, Rhodeswell Road, Stepney.
Mr. FARTHING, Old Road, Stepney.
Mr. MULES, William Street, Cannon Street, Radcliffe Highway.
Mr. NICHOL, Commercial Road East.
Mr. CLARK, Poplar.
Mr. DOSELL, Brook Street, Ratcliff, *Hon. Sec.*

" 5th Oct. 1859."

The masters generally not agreeing to these proposals no arrangement was come to.

21. The masters in the metropolis may be said to be divided into two classes: the "full-priced" and the "under-selling."

22. The difference in the mode in which these two classes of masters conduct their business causes a great difference to the men in regard to their hours of work.

23. The full-priced masters employ their men a part of their time in serving their customers, sending them out to deliver the bread. The men thus have more fresh air; but still they are laboriously employed, carrying the heavy baskets or wheeling the hand-barrows or trucks for several hours of the day, after having been engaged many hours of the night (generally from 11 p.m. or earlier to about 7 a.m.) in making bread. The actual number of hours varies according to the season of the year. During what is called "the London season," the operatives belonging to the "full-priced" bakers at the west end of the town generally begin work at 11 p.m., and are engaged in making the bread, with one or two short (sometimes very short) intervals of rest, up to 8 o'clock the next morning, according to the amount of business of the employer. They are then engaged all day long, up to 4, 5, 6, and as late as 7 o'clock in the evening, carrying out bread, or sometimes in the afternoon in the bakehouse again, assisting in the biscuit-baking. They may have, after they have done their work, sometimes five or six, sometimes only four or five hours sleep before they begin again. On Fridays they always begin sooner,—some about 10 o'clock, and continue, in some cases, at work either in making or delivering the bread, up to 8 p.m. on Saturday night, but more generally up to 4 or 5 o'clock, in which cases the biscuit-making is omitted on the Saturday. On Sundays the men must attend twice or three times during the day for an hour or two, to make preparations for the next day's bread (by putting in the "ferment," or putting in the "sponge"). Also, in some full-priced shops they have to attend to Sunday bakings, which alone will occupy four or five hours. This, however, is gradually going out in the full-priced shops.

24. The men employed by the under-selling masters have not only to work on the average longer hours, but their work is almost entirely confined to the bakehouse. The under-selling masters generally sell their bread to their customers in the shop. If they send it out, which is not common, except as supplying chandlers' shops, they usually employ other hands for that purpose. It is not their practice to deliver bread from house to house.

25. Towards the end of the week the work becomes much more severe. It is the most ordinary practice in the under-selling trade for the men to begin on Thursday night at 10 o'clock, and continue on, with only slight intermissions, until late on Saturday evening. Nearly all the underselling trade does Sunday baking, and the men are in some cases kept at work, weighing flour for shop sale in small bags, besides

preparing for the next day's bread. The places of work of the under-sellers are not, as a rule, worse than those of the full-priced bakers.

26. Of the 3,000 master bakers in the trade it is estimated that perhaps three fourths are under-sellers.

27. The under-seller makes a portion of his profits by getting a larger quantity of bread turned out by a given number of men, in consequence of his not employing any portion of their time in delivering the bread, and the hours of work also being generally longer. Where three men, in a full-priced shop, would turn out two batches of bread in what is called a day, the same number of men, in an under-seller's shop, will turn out four or five batches. Again, the wages paid by the under-seller are as a rule lower than what is paid by the full-priced baker. The reason is, that a large number of those employed by the under-sellers are foreigners, and youths, and others, who are obliged to accept almost any wages they can obtain, otherwise they would not submit to those long hours.

28. The number of loaves in a batch of bread depends upon the size of the oven. It varies from about 120 to 180 4lb. loaves. There is no material difference between the ovens of either class of masters.

29. The full-priced masters command the market for the best hands. There are some first-class workmen in the under-selling trade, but they do not, as a rule, obtain as good wages.

30. The difference is considerable between the kind of work done in a full-priced shop and in an underseller's.

31. The aim of the full-priced bakers and of some of the under-sellers is, to produce the best kind of bread without reference to any particular show with a view to attract attention.

32. The ordinary underseller endeavours to attract attention by making his loaves more bulky in appearance, and more "clear;" that is, whiter. It is made to look more bulky by making the dough weaker, by its taking a greater quantity of water in it. The weaker the dough is the whiter it is. The natural colour of bread made from the best flour is not quite white. Bread made of inferior flour is naturally of a darker tinge. It may make wholesome bread, and is much used by those who cannot afford the best quality; and its colour is improved, partly by adding water to it, partly by other contrivances. Alum was, undoubtedly, much used to whiten this kind of flour until the recent Act passed causing scientific persons to be appointed to detect adulterations, which has done something to check it. The sack of good flour is reckoned to produce 90 or 91 loaves, to weigh 4 lbs. when baked, and after 12 hours' standing. During the whole time that I was employed in the great baking establishments in Glasgow we never took more than 91 loaves out of the sack of flour, and it was generally a fraction under. The underseller will get 94 to 96 loaves, sometimes more, out of a sack, but the dough will have been weighed 4lb. 4oz. to the loaf, whereas the full-priced baker weighs his dough 4lb. 6oz. to 4lb. 8oz., consequently the under-

seller's loaf, after standing a few hours, when all the steam is out of it, must be under 4 lbs., and therefore, when put into the scale, and found under weight, the weight is made up by pieces cut off another loaf. The gain arises in two ways: first, customers who are served out of doors, *i.e.* to whom the bread is delivered at their houses, do not have it weighed; secondly, if a loaf is weighed, and found to be light, the weight is made up by a piece of a stale loaf, and that is a way to get off the stale bread. Again, the underseller makes a profit by not baking his loaves their full time. A full-priced baker bakes his loaves thoroughly,—say for an hour and three quarters to two hours; whereas an underseller will only bake his for an hour and a half, or even for an hour and 20 minutes, whereby the bread comes out heavier.

33. To make it plain how it happens that the men are kept, under the present system, so many hours on the premises, I will describe the whole process as it goes on in London.

34. The first process in making bread in London with thick yeast is to prepare a mixture of potatoes and yeast and flour, by which the process of fermentation is to be produced in the dough.

35. This mixture is made as follows:—Potatoes, in the proportion of 1½ lb. to the bushel of flour, or 9 lbs. to the sack (of six bushels, or 280 lbs.), are first boiled, and then mashed in a tub; two quarts of hot water are then added, and the mash stirred together; then cold water is added, according to quantity of bread intended to be made.

36. The cold water generally brings the mixture down to the proper temperature, which is never above 80° Fahr. where thick yeast is to be added; but it must be from 90° to 100° with patent yeast.

37. The yeast is mixed up with the mash in the tub, and about 2 lbs. of flour are added, either at the time of mashing or after; it is then covered over, and allowed to stand. In the course of a few hours, according to the nature of the yeast, the mixture will have completed its fermentation, and be ready for use. The mixture itself is called "the ferment."

38. In London, according to the present hours, the "ferment" is made at from 11 to 2 o'clock in the day; it takes about 10 minutes. Then, at about 5 or 6 P.M., it is ready to be mixed with the flour. This is done with the arms, water being added sufficient to make "the sponge." If one sack of flour is being used, it would take one man from a quarter of an hour to 20 minutes. Two men would do two sacks in about half an hour, or three sacks in about three quarters of an hour. It is very hard work. This process is called "putting in the sponge."

39. The sponge then remains from 5 or 6 P.M. to 11 or 12 P.M., to go through the process of fermentation. It rises the first time in about four hours, and the second time about three quarters of an hour to an hour after. According to the hours of work in London, these hours, from 5 or 6 P.M. to 11 or 12 P.M., form the longest period of rest for the journeymen. They go to bed within those hours.

40. They must be up and ready to take the sponge in hand, and commence the kneading, as soon as the sponge is ready. The term used in the trade is not "kneading," but "making the dough;" it is, however, in point of fact, kneading. It takes one man about three quarters of an hour to make a sack of five bushels into dough; and it takes two men not much longer to make three sacks into dough, because they can work to each other. This is the hardest work which the journeyman has to do. Flour of good quality will take nearly 16 gallons of water to the sack of 280 lbs. That would turn out 91 loaves, to weigh 4 lbs. after standing 24 hours.

41. The only processes to which, as far as I know, it has been attempted to apply mechanical power, with a view to facilitate labour, have been these two,—*i.e.* the "putting in the sponge," which occupies, by hand, from half an hour to three quarters of an hour, and the "making the dough," which occupies, according to the quantity, usually from three quarters of an hour to an hour.

42. After the dough is made it stands, according to the kind of yeast used, or whether the weather is hot or cold, from half an hour to two hours.

43. During this interval, which in London is between 12 at night and 2 A.M., the journeymen first take some refreshment which they call their breakfast, and then lie down in their clothes upon the boards. They spread a sack or two upon the boards, and put a tin under their heads for a pillow, sometimes with a sack folded upon it, sometimes without. These "boards" are the boards on which the dough is weighed off, and then moulded into the form of the loaf. The boards are scraped and brushed every time they are used, and some masters have th em washed once a week; but the moisture left from washing has, in the opinion of some masters, a tendency to make bread sour.

44. The journeymen, when they get up from the boards at about 2 A.M., proceed then to weigh off the pieces of dough, which are put aside as weighed. When all the dough is thus weighed off the process of moulding the loaves commences, and they are put into the oven as fast as they are moulded. The process of weighing and moulding and putting into the oven will take about two hours, or say, in London, from 2 to 4 A.M.

45. At 4 A.M. the journeymen in London begin to prepare to make the fancy bread and rolls. This is hard work also, and takes from 4 to 5 A.M. or later, according to the quantity wanted.

46. Between 5 and 6 A.M. the loaf bread is ready to come out of the oven, and accordingly the journeymen take it out, and bring it up into the shop. This is heavy work.

47. The temperature of bakehouses in general is between 80 and 90 Fahr., but at the time when the "batch bread" comes out of the oven, in bakehouses where there is little ventilation, it is very hot; I have seen it much above 90.

48. The foreman takes the loaves out of the oven, and the journeyman takes them upstairs.

49. In many establishments, both of full-priced and under-sellers, the men are locked in, and cannot take the bread up through the shop until the master comes down in the morning and lets them out. The heat is therefore increased by the hot loaves being kept in the bakehouse. It sometimes happens that the journeymen are kept down in this way for an hour and a half.

50. It requires about ¼ of an hour to 20 minutes to get a batch of loaves out of the oven. The oven is then prepared again for the fancy bread and rolls, which takes half an hour. The rolls are then got into the oven and baked, in half an hour, so that they are in the shop by eight o'clock; in some shops, in particular parts of the town, before that time.

51. After this the journeymen, in full priced shops, have to deliver the bread, rolls, &c. to customers, or make buns, biscuits, cakes, &c. They have previously got some refreshment, which may be called a second breakfast, as they could.

52. In the underseller's shops the journeymen are set to work making more batches of bread as soon as the first batch is sent into the shop, and they continue on all day until 4, 5, or 6 P. M.

53. There is no obstacle whatever to all this work being done in the 12 hours between 4 or 5 A. M. and 4 or 5 P. M., and many first-class masters have done and continue to do it, to their own benefit and that of their workmen, as they are willing to testify.

54. At Mrs. Thomson's bakery at Crossmyloof the work is so arranged; four or five men working together, each journeyman will make two sacks of flour into bread in the 12 hours from 5 A. M. to 5 P. M., deducting 1½ to 2 hours for meals; therefore in about 10 hours of actual work each man will produce 182 loaves, either 4lb. or 2lb. loaves. This result is produced by combination of labour in a large establishment.

55. In London under the long hour and night work system, and small establishments, a journeyman, even working with an underseller where he has not to deliver the bread, but is engaged nearly all his time in making it, will work into bread, with the help of the foreman, three sacks, and this will require near 20 hours work; three sacks at 91 loaves per sack will yield 271 loaves, which divided between the two men, give only 132 loaves per man.

56. The short hour system, with a combination of labour in a large establishment, is therefore by far the most advantageous for the master. But it is found to answer in the small establishments also, although not to the same extent.

57. The mode of making bread in Scotland is different from that of London; indeed there are different modes in different parts of Scotland.

58. The original system of making bread in Glasgow, is what is called putting in quarter sponges at night, these lie 12 or 14 hours, and then can be made into half sponges. That half sponge, after lying an hour and a half or two hours, is made into dough, and prepared to go into the oven.

59. This I do not consider a good system; the bread has a tendency to get sour by it.

60. The better system is where the whole sponge is put in at night and made into dough in the morning.

61. Both these systems answer very well as regards the hours of work for the men, as both enable them to obtain their night's rest.

62. The system of the quarter sponges prevails in the West of Scotland, and the other system more in the East, North, and South of Scotland.

63. The system of putting in the whole sponge at night is the one adopted at the great baking establishment of Crossmyloff in Glasgow. Wherever this system is adopted it is only necessary to vary it in hot weather by putting in the sponge from one to three or four hours later according to the heat of the weather.

64. As a rule, the London system of using "ferments" with the sponge is not adopted in Scotland. The fermentation is produced in Scotland simply by mixing yeast with the flour, chiefly patent yeast, or yeast made by the baker himself from hops and flour. My opinion is, that as sweet bread can be made by the Scotch as by the London system; but the ferments are required in London in consequence of the more general use of brewers' yeast, which will not work sufficiently without them. The patent yeast also used in London, requires the aid of ferments.

65. When the fermentation is complete, the work of making the dough commences. It is very hard labour; it takes three men half an hour to make three sacks or eighteen bushels of flour into dough. It is necessary that the work should be done as quickly as possible, otherwise it gathers into hard lumps, and becomes "scrappy" as we call it. Three sacks a day for making bread (exclusive of biscuits) is a good trade in London. It takes three men and a boy on an average, in the full priced shops. The undersellers very often do it with fewer hands, but they do only a sack and a half at a time. Those with smaller baking accommodation (only one oven) are obliged to make more batches of it, baking three or four in the day.

66. 67. The weighing off into 4lb. or 2lb. loaves, or other sizes that are wanted is also hard work. After that it is "moulded" *i. e.* put into form to go to the oven. The moulding is also hard work. The weighing and moulding the dough from 3 sacks of flour, if all made into loaves, and putting it into the oven as fast as it is moulded, would take three men with one pair of scales, the usual custom in London, upwards of two hours.

68. Where fancy bread and hot rolls are made (whioh is almost universal), this is set about in London as soon as the loaves are in the oven, and requires steady work and great attention, and occupies the time when the "batch bread" is in the oven. The fancy bread, &c. generally comes out of the oven from 7 to 8 o'clock, but in many places earlier.

69. The great difference between the London and the Scotch system is this,—that in London the loaf bread is made in the night before the fancy bread and rolls, whereas in Scotland they begin

at 5 in the morning making the ancy bread, &c., and have them ready for the public at the same hour as in London ; after which they make the loaf bread. This is got out of the oven by 9 or 10 A.M. or a little later, and is delivered to the customers in the course of the day. The bread in London comes out of the oven about 6 or ½ past 6, consequently the Scotch bread when consumed the next day is only three or four hours newer than the English.

70. It takes in Scotland say from 5 A.M. to ¼ to 6 to make the fancy bread, &c.; if a large quantity, longer. Then, in consequence of the ovens in Scotland being made of stone, full a foot thick, instead of tiles 2½ inch thick as in England, the baking can be done in Scotland with greater rapidity ; so that in the four hours from say ½ past 6 to ½ past 10 A.M., a batch of bread can be made and baked ; more hands are employed in Scotland. They would have four men for a batch of eighteen bushels of flour or 3 sacks, instead of 3 men and a boy as in London. The difference in cost between a man and a boy's wages is amply made up to the Scotch bakers by having the work got through in the day instead of the night.

71. It will appear from statements which you will be able to obtain in detail from the master bakers that the difference in prices between the higher priced bakers and the undersellers is considerable, but probably not more than is justifiable, considering the higher rents and higher wages paid by the makers of first class bread, the credit given, and the better flour used.

72. While the assize of bread lasted (it was put an end to in 1822 by the Act 4 Geo. 4. c. cvi.) the Lord Mayor allowed 13*s.* 4*d.* as profit upon the manufacture of the sack of flour.

73. The profits of the first class bakers at the west end of the town will probably appear to be about 13*s.* 4*d.* per sack, upon flour costing say 50*s.* per sack, and with bread sold at 9*d.* per loaf. (803.)

74. The profits of the underseller will probably be ascertained to be about 10*s.* per sack of flour costing him 42*s.*, and his selling price per loaf being 6½*d.* ; and the fact is that these legitimate profits are all to be still further reduced by a system of "cutting" as it is called,—*i.e.* by masters in the same neighbourhood reducing their prices against each other, so as to contribute to each other's ruin. Large numbers of these are frequently failing in consequence.

75. Again the underseller considers that he makes his rent by his Sunday bakings and the other dinner bakings during the week. If he has say 80 Sunday bakings at 2*d.*, it produces 13*s.* 4*d.* The first class baker seldom does any Sunday bakings, but makes a large addition to his profits upon loaf bread, by making buns, biscuits, and cakes during the week.

76. The great competition arises from the circumstance that it requires but little capital to get into the trade, and there is a continual effort made by the journeymen to become masters at any risk, in order to escape from the tremendous pressure of the work imposed upon them under the present system.

77. It would be clearly therefore for the interest of the masters, from this as well as from the other points of view above adverted to, that the shorter hours should be adopted.

78. The long hours also contribute greatly in another way to increase this competition to get into the class of masters.

79. While the long hours remain the system will continue of obliging the journeymen to lodge under the roof of the master. As a rule they are locked in at 11 at night. The journeyman has no home except in his master's house, and his sleeping place, especially in the east end of the town, and in some at the west end also, is of the worst description, frequently in the basement of the building, and under the stairs; plenty of them have no bed except in the bakehouse itself, and upon the sacks laid on the boards, having no bedding at all. Some who have bedding prefer to lie on the boards, as the bedding is so bad and the places so damp and cold. In order to get men who will conform to this, the masters give a preference to unmarried men, as they will more readily consent to live upon the premises. Men are, hundreds of times, refused situations because they are married. This naturally leads in the first place to great immoralities; and in the next, when a man wishes to get married, his great object is to set up in trade, and he will consent to live upon the smallest possible profits in order to effect this. I have scores of times heard journeymen who have been masters say that if they had had the comforts and enjoyments of other working men, they never would have thought of going into business.

80. Of the estimated number of 13,000 journeymen bakers in London, many hundreds are continually without regular work. Those without regular work may get one or two days employment at the latter end of the week, or take the places for a time of men who have become sick, of whom there are constantly a great many. The surplus labour in the loaf bread trade in London arises from its being so comparatively easy to learn it. A lad coming from another trade can learn to be a tolerably good hand in a year or two.

81. The Germans, who are very numerous in the trade, come over with passports for four years, and finding it difficult perhaps to get employment in the trade to which they may have been brought up, offer themselves to the master bakers without knowing anything of the trade, and will work for very little money, in a boy's place, just to obtain a living and to acquire the language. They can seldom save money enough to go home after their four years, and if they do not, they are punishable should they return afterwards, for not taking their turn of drill under the regulations of their conscription for the army. They therefore remain here, and swell the numbers of our trade.

82. They have a curious custom among themselves of forming clubs, with the object of becoming masters. When the contributions to the club are sufficient, they draw lots, and the successful one obtains money enough to set up a baker's shop. This is never practised among our own journeymen. I know a great many instances of Germans becoming master bakers in this way.

83. The way that nine men out of every ten get into business in London is that they scrape together, say about 100*l.* or 200*l.*, and the miller advances the rest of the money,—say 300*l.* or 400*l.*,—and retains the lease until he is paid.

84. Some businesses are worth from 1,000*l.* to 3 or 4,000*l.*, and a few much beyond that.

85. Formerly, when the baking business was better in London, the custom was, in calculating the value of a business, to estimate it at 100*l.* for every sack done per week ; i.e. for a considerable business, 2,000*l.* for one where 20 sacks were done per week. The value of a business is now much below that, in consequence of the great competition in the trade. The adoption of the short hours, by lessening the competition to get into the trade, would add to the value of the existing businesses.

86. The public house in London is, in most cases, the baker's home ; it is so for all the young men. When a young man comes to London he goes to one of the houses of call, which are always public houses, for the purpose of getting employment. The owner of the public house keeps a certain number of beds at the disposal of the journeymen bakers who frequent his house, enough to provide with beds the average number who are out of employ. They pay 2*s.* to 2*s.* 6*d.* per week. Also, as the places where many of the journeymen sleep, who are at work, are so bad that they cannot keep their clothes there, they keep their boxes at one of these public houses ; and therefore if he dresses there, he is expected to spend money. Then all the sick clubs hold their meetings at public houses ; they meet every Saturday night for the purposes of the club, or of amusement. They meet at about 9 o'clock at night: they cannot usually get there before. This naturally leads to much drinking and dissipation.

87. About two months since we began an attempt to get up a reading room and library, and central register office, for the purpose of accommodating journeymen bakers, where they could come, if out of employment, to hear of situations, and to which masters might send for men. It would be a place where men out of employment could go instead of going to a public house. If day instead of night work was adopted, the club meetings could also be held there. We have commenced a subscription towards it, to which journeymen, master bakers, millers, and noblemen and gentlemen have contributed ; and we have nearly 100 vols. of books from the Society for promoting Christian Knowledge. We have got about 50*l.* ; we should require 300*l.* to start and furnish such a place, and we should require many such places in different parts of the Metropolis.

88. The full-priced baker can easily accommodate himself to the short hours, as he has, on Saturdays, only to omit his biscuit making, and to distribute over the rest of the week (which is easily done) the quantity formerly made on Saturdays. The London bakers who adopted the short hours followed this plan, and the men got their work done on Saturdays earlier than on any other day.

89. It is difficult for the under seller to conform to the short

hours, because he, as a rule, does not make biscuits; therefore, if he has to make a double quantity of bread on the Saturday, he must have additional ovens and employ more labour. But as the underseller has generally the least amount of capital, it is plainly not so easy for him to command these additional facilities.

90. In Scotland, since 1846, when the short hours were adopted, the tendency has been to throw the baking trade more and more into the hands of capitalists. Mr. Thompson, of Crossmyloof, Glasgow, has 38 ovens; Mr. Dewer has 20; Mr. Hamilton has 10; Mr. Pettigreen has 12. The same thing has taken place in Edinburgh, though not to the same extent. In Glasgow bread making has become more of a manufacture on a great scale, and the workmen are better off in consequence. The places of work are generally much more airy and healthy, and the wages are better than under the old plan, and the price of bread has never varied; on the contrary, where large quantities of bread are made and flour bought wholesale, smaller profits pay better, and the bread can be sold cheaper.

91. It has been thought by many persons that the operative bakers' condition might be improved by the adoption of machinery for "putting in the sponge" and "making the dough." As far as I have known and heard, none of the machines yet produced for this purpose have answered. I saw one of Mr. Stevens' machines on trial at Crossmyloof, upwards of two years ago, but it did not then answer. (But see § 178.) There has never been any agitation among the men, that I am aware of, against the introduction of machines. Any machine that could be introduced for the abridgment of labour would be hailed as a boon by the workmen, especially if it tended, as has been alleged, to preserve their health by preventing the flour getting into their lungs. Some masters in Edinburgh adopted Mr. Stevens' machine, but I understand have since abandoned it. (But see § 178.)

92. It has been before the public upwards of threeyears, and I think that, if it possessed the qualities alleged, the master bakers generally would have adopted it by this time.

93. I have read the testimonials which Mr. Stevens circulates with his prospectus, and they seem to me to be quite consistent with what I have stated, as they in the great majority of cases come from persons who are able to employ extensive labour,—such as masters of union workhouses, captains of ships, managers of public establishments, and private gentlemen. Those which come from master bakers must be inquired into, to verify the circumstances, and to ascertain whether they continue to use them. (See §§ 214, 231, 283, 287, 292.)

94. I am of opinion that the inspection of bakehouses by a sanitary commissioner, appointed by the Government, is a measure much wanted, not only in London, but in all the large towns. There are about 3,000 bakehouses in London. The liability to be inspected at any time, and to have their actual state reported upon if dirty or unwholesome, would act as a great

stimulus to all the masters to keep them in a proper state. Very many in London are in a shockingly filthy state, arising from imperfect sewerage, bad ventilation, and neglect ; and the bread must, during the process of fermentation, get impregnated with the noxious gases surrounding it. I have given you a list of near 30 such in the west as well as the east end of the town, and I could point out a vast number more that are as bad, or nearly so. Many journeymen bakers in London sleep under the pavement, in the bakehouse. Nine-tenths of the ovens in London are under the pavement, and the room or rooms in which the processes of making the bread are carried on are in the basement of the building, sometimes extending under the street. In my opinion, it is as essential to the public health that bakehouses should be subject to inspection, to ensure clean and wholesome bread, as that butchers' shops should be inspected, as they are, to prevent the sale of unwholesome meat. Again, inspectors of weights and measures have the right of going into private houses ; and it is certainly of greater importance to the public that their bread should be wholesome, than even that it shall be sold at full weight. The dirty, close, and unhealthy places of work have a direct tendency to produce unwholesome bread in another way ; for they incapacitate a man from paying proper attention to the most critical part of the process of bread-making, namely, the fermentation ; and if this goes on too long, sour bread is produced, which is eaten by somebody; if not by the usual customers, by people living in a poorer neighbourhood ; and, being unwholesome, it must have influence in producing disease, especially among the young and the delicate. If the inspection of bakehouses will check this, as it undoubtedly would, I think the public has a right to demand it, and it would be a great public benefit.

95. At Crossmyloof, where we were doing 140 sacks per day, I have never seen a full sack of sweepings per day ; it was always something under a sack. But at Crossmyloof there are always first-rate workmen, most careful superintendence, and all day-work. I consider this as a decided argument in favour of day-work. The flour may cost, say 50*s.* per sack, and the sweepings are sold for perhaps 16*s.* per sack, if very clean, for manufacturing purposes. But in London they are not sold for more than 10*s.* per sack, on an average, and are used for feeding pigs. There is no doubt about the fact that the sweepings are the best part of the flour, *i.e.*, the finest part. The loss at Crossmyloof is, say, 34*s.* on 140 sacks, or about 3*d.* per sack ; but where the sweepings are a whole sack upon 80 sacks, as in many places, and they only sell for 10*s.* a sack (costing 50*s.*), there is a loss of 40*s.* upon 80 sacks, or 6*d.* per sack.

William Peacock.

96. I am 38 years of age. I began to work in a bakehouse at 12 years of age. I commenced work at 11 p.m. and continued until 6 p.m. of the next day, except on Saturday nights, when

I did not stop work till 10 at night. This was in Northumberland Street, Strand. There was only one man and myself employed besides the master who worked with us, though not quite as many hours. I do not think that either then or ever since I have been in the baking business I ever had more, under the old system, than four hours in bed out of the 24 hours. Recently I have been at work on the day system. The effect of these long hours has been to injure my health to a great degree.

97. I have had a few places where the work was lighter, but upon the whole I think I have worked these long hours for 20 years of the 26 that I have been in the trade.

98. In some places the work was even more continuous than I have described above. In one place where I was for 3 or 4 years I worked from Thursday night at 11 to Saturday afternoon at 6, with only a few intervals, when I used to sleep for an hour or two on the boards, very seldom getting into bed.

99. I am now a foreman, and have been so for about 12 years. With few exceptions my employments have been in London. I am therefore thoroughly acquainted with the practice of the trade in London. I have worked in full-priced as well as underselling shops. I am able to say that what I have described has been the general practice of the trade. I could mention many much worse cases as to hours of work than I have mentioned.

100. The places of work have almost always been arches under the ground, with no means of ventilation except through the doors. They are therefore generally fearfully hot, and many of them infested with vermin, such as black beetles. There are very few bakehouses that are not overrun with black beetles in great numbers, and it is almost impossible to keep them out of the bread. You could gather a quart pot full in ten minutes. The bakehouses are also often so close to the drains that they smell very bad. It is a common practice to lock the bakehouse at night while the men are at work, and where there is no ventilation except through the doors it is very stifling, and very apt to ruin men's health altogether.

101. For the last three months the master with whom I am working now, Mr. Costiff, 15, Sussex Street, Pimlico, has adopted the hours from 4 a.m. to 4 p.m. or 6 p.m., according to the work required. I, as foreman, can get my work done by 4 p.m. ; the two men and a boy under me have generally done by 6 p.m.

102. The work is better done, the bread is better made now than it was when we worked the long hours. We are now able to watch the dough without interruption, and prevent its being over fermented, and consequently getting sour. We are much more sure of making the bread always sweet under the present plan, especially in warm weather. If the bread is not perfectly well made, we run the risk of losing customers, and that risk is much reduced by the short hours, as they enable so much better attention to be given to the different processes by the men, their faculties being quite alive by their having their proper night's rest.

My master has been obliged to employ a boy as an extra hand since we shortened the hours, to leave all the men at liberty for

delivering the bread. The wages of this boy may be about 2*s.* 6*d.* a week and his food, not lodging.

103. The third hand has 14*s.* a week, the second hand 18*s.*, and I, as foreman, 31*s.* a week. The additional cost of the boy is a mere fraction upon the total amount of wages, and ought to be more than saved by the reduction of the gas consumed, the less quantity of coal used, and the greater certainty of the bread being well made. (See Mr. Costiff's evidence, § 635.)

104. We are doing, I believe, over 20 sacks a week. For 5 days in the week we do about 3 sacks a day; this is within the mark. On Saturdays we begin at 3 a.m., and by not making biscuits on that day, and by employing an extra hand, we get done about the same time as on other days. We always did employ an extra hand on Saturdays. They are always to be had, there being so many men in the trade always seeking employment.

105. The kneading is done by hand in the troughs. The places of work being so hot, of course the men are always in a state of perspiration. As a rule I think the journeymen bakers pay great attention to cleanliness, and being so constantly in great heat they are so much reduced that they do not perspire as men would who were unaccustomed to the work. Nevertheless it must be confessed that many men do perspire very much, and that, considering that their hands are covered with the dough in making it, they cannot wipe it off from the face, and it must often get into the dough, especially in hot weather, but not from the body, as men generally wear some shirt or other. It has been said that in some bakehouses men knead with their feet. This, I believe, is very rarely done, though I must confess that I have occasionally, in former times, unknown to my master, done it myself. If it is ever done, it is done in making fancy bread, the dough for which requires to be very stiff, and is consequently hard to work. The fancy bread includes cottage loaves, bricks, twists, &c. As far as I know the trade, I believe it to be a rare thing for the feet to be used even for this kind of bread, at least in London.

106. I should be exceedingly glad to see the short hours adapted for the whole trade, as the effect of the long hours is most injurious to the morals of the journeymen. It is impossible that they can have any time to improve themselves in any way, and scores abandon themselves to all kinds of immorality in consequence of the craving for excitement which their exhausting labour gives rise to.

107. The only difficulty in the way of the general adoption of the short hours that I can see, arises from the want of accommodation in the bakehouses. Many masters have only one oven, and have not space to put in another. In such a case the journeymen might be employed in this way, say, for six hours in making the bread, and six hours in delivering it; and if it could not all be delivered by the men, the master would have to employ a boy to help in the delivery, and also to help in the bakehouse in doing odd jobs, such as fetching in the coals, cleaning the tins, the windows, and the bakehouse, and various other things, such

as taking out things ordered. The wages of such a boy would not be more than what I have stated above, namely, about 2*s.* 6*d.* or 3*s.* with food, or 7*s.* or 8*s.* a week without his food.

Benjamin Snow.

108. I am 23 years of age. I commenced in the baking-trade at Tiverton, when I was a little over 13 years of age. I was there about 15 months. We used to begin work at 5 a.m., and work on till about 8 p.m. From thence I went to Bristol, where I was for about 18 months. The hours were about the same. I was about 16 when I came to London. In the first place I had, I used to begin at 11 p.m. and worked on, taking a little sleep occasionally on the boards, or on a flock-bed in the bake-house, till 6, 7, or 8 p.m. the next day. I went, after six months, to a contract shop (of which there are many in London and the great towns where bread is made for hospitals and other public institutions, and where the hours are generally longer) where the hours were from 10 p.m. on Sunday night to 8 p.m. on Monday night; and in again at 11 p.m. that night, until about 7 p.m. on Tuesday; and so on till Thursday night, when we used to begin at 10 p.m. and work till 8 p.m. on Friday night; begin at 11 p.m., and work till after 12 on Saturday night. I worked six months at that shop, when I was obliged to give it up and go to the hospital, and I have never been quite well since; I have suffered from a tightness on my chest, a difficulty of breathing, which I am feeling now, though able to work. My general hours since have been from 11 p.m. until 2 to 4 p.m. the next day, and about an hour longer on Saturdays. I never was at one place where I had not to attend to Sunday bakings; I am generally employed from 9 a.m. to 2 p.m. on Sundays, and on alternate Sundays, again in the evening, for about half-an-hour. I came to London in 1854, and have during that time been acquainted with a good many young men in the trade. It is a general thing for them all to begin about the age that I did, and to work pretty much as I have done. A lad generally begins to work as a journeyman when about 15 or 16; and then he works the same number of hours, and does the same kind of hard work, as the men. I have known a great many young men whose health has entirely given way under the work, and who have been obliged to give up the trade altogether. In most cases the younger journeyman has a longer time to stop than others, as he has to clean tins, fetch coals, clean up the place, &c., unless a boy is kept for the purpose, which is seldom the case, except in the first-rate shops.

109. The boys under 15 or 16 have scarcely less work than the men; on an average they are on their legs 16 or 17 hours a day. They get more sleep than the men, but not much; they do not average more than six hours a night. In a great many shops the boys go to bed at 11 p.m. when the men get up, and sleep till 4 or 5 the next morning; they get into the men's beds when they leave them. This is the case in a great many shops.

110. There are many bakehouses in the streets near the river, the floors of which are covered several inches deep in water at every tide, or when much rain falls; and, at spring-tides, a foot or more. I have worked in one of those places, Mr. Orams's, Charing Cross. The walls are there quite damp, and the place was very unhealthy. I was taken ill there, and obliged to leave it.

111. I have heard what William Peacock has stated, and I agree with what he has said as to all the points he has mentioned relating to our trade.

GILBERT CRERAR.

112. Agreeing, in all points, with the previous witnesses as to the importance to the journeyman baker of adopting, if possible, day work instead of night-work, and believing that it would also be best for the masters and for the public, I wish to add a few words upon a particular point or two bearing upon the value of day-work.

113. There are various kinds of yeast used, and the mode of making and using them differs very much in the trade; there are some shops in which the masters prefer using half patent yeast and half brewers' yeast mixed together. The patent yeast gives bulk to the bread, and the brewers' gives flavour. When these yeasts are worked together, unless there is a great excess of the brewers' yeast (or thick yeast, as it is called) there is a danger in working it of making the bread sour. If the sponge is carelessly stirred, or if it is not taken at the proper time, it is liable to get sour. The proper time is when the sponge drops the second time. It ought not to work more than 7 hours before it drops the first time, and then from three quarters of an hour to an hour and a quarter it will drop the second time. But if patent yeast is used alone, the time is shorter, say 4 hours for the first, and half-an-hour for the second dropping. This applies to the summer time. In winter, the time is pretty nearly the same for the mixed yeast, but about two hours longer for the patent yeast alone.

114. In full-priced shops thick or brewers' yeast is principally used, because it makes the bread sweeter, and of nicer flavour. Where the flour is good, and the thick yeast also good, the sponge will take no injury although not taken immediately after the second drop. It will stand a couple of hours without material injury.

115. On the other hand, when patent yeast is used, either by itself, or mixed with brewers' yeast, the sponge becomes rapidly sour after the second drop; it will become sour in 5 minutes, with any description of flour. Hence the necessity of watching the dough carefully, as alluded to by William Peacock (102.), and one of the consequent advantages of day work as opposed to night work.

116. The patent yeast is used principally in the under-selling shops, especially at the east end of the metropolis.

HENRY WEBB.

117. I am 35 years of age, and am much reduced by the hard work. I began the baking trade at the age of 10, at Ottery St. Mary, Devonshire. My hours of work there were from 4 a.m. to 3 or 4 p.m. I worked next at Cullompton, Devonshire. The hours there were from 3 a.m. to 7 or 8 p.m. I went next to Sidmouth. The hours there were only from 6 a.m. to about 3 or 4 pm. The reason was, that the master worked as a foreman, as most of the other masters in Sidmouth did. I have been there within the last three years, and found they worked the same hours. The public got their hot rolls by ½ past 7, as we made the rolls before the bread. There is nothing to prevent the same thing being done in London.

118. On leaving Sidmouth, I came to London, 17 years ago. I have been very temperate, and never smoked, and therefore have preserved my health better than most others in the trade; but I have been twice seriously ill from the amount of work, and am not well now. I have greatly lost weight since I came to London. I was a strong man when I came to London. The first bad effect produced upon me was from the flour dust getting into my lungs, and the close atmosphere in which I have always worked.

119. I am on the committee of the Operative Bakers' Association, and have been since its commencement in March 1859.

120. When I first came to London in March 1844 I was just 18 years old. I worked in Ave-Maria Lane. The hours were from 3 a.m. to 8 p.m. We had all good beds at the top of the house. The place of work was clean and tolerably airy. Three men were employed.

121. I worked next in Smithfield. The hours were from 11 p.m. to 6 p.m. the next day. I slept in the bakehouse. There was no bed; I slept upon the sacks. It was a single-handed place. The place of work was very bad; very dirty and close, and full of vermin.

122. I then worked in Newgate Market. The hours were from 11 p.m. to 6 p.m. the next day. I slept three nights in a week in the bakehouse, and three in a bed at the top of the house. I was glad to sleep anywhere I could the other nights. The bakehouse was above ground, and tolerably healthy. Two men were employed.

123. I went after that to Radcliffe Highway. The hours were from 11 p.m. to 7 p.m. the next day. I had a bed upstairs; but when I got up, a servant of the house went into the same bed. On Saturdays I was obliged to sleep where I could. The place of work was tolerably wholesome. It was a single-handed place.

124. From thence I went to Mr. Spiking's, Dover Street. I went there as an extra hand during one season. It was in 1848. The hours were from 11 p.m. to 6½ p.m. of the next day. Mr. Spiking was the purveyor of oat-cake to Her Majesty. Nine hands were employed. Five of us slept in beds on three bed-

steads resting on the top of one of the two ovens. There was no floor between. One of the ovens projected into the yard. The heat of the oven on which these beds stood was very oppressive. The foreman slept out of the house ; the second hand slept in a bed over the coal-cellar, on a floor, but not entirely separated from the bakehouse. One of the two other hands slept at their own homes, and the boy also, who came at 7 a.m. ; he was about 12 years old. [Mr. Spiking's bakehouse and the sleeping-places for the men have been greatly improved since that time. A double floor has been put in, and air-shafts constructed. See Mr. Spiking's Evidence, 678.—H.S.T.]

126. From Mr. Spiking's, I went to Mr. Squire, Jermyn Street, one of Her Majesty's bakers. I used to deliver at Buckingham Palace daily while I was with Mr. Squire. I went there on a job, until I could suit myself. The hours there were, for the men in constant employ, from 11 P.M. to half-past 2 P.M. the next day for the foreman, but the other man worked until 6 P.M. The foreman slept out. The other man and I slept in a bed in the bakehouse. There were two ovens, under the street. The place of work was clean; but it was a very small place, very close, and very ill ventilated. [Much improved since and perfectly clean. See Mr. Squire's Evidence, § 706.—H.S.T.]

127. I went from thence to a place near the Monument. The hours were from 11 P.M. to 6 P.M. the next day. It was a very small and unwholesome place of work. The bed-place was rather better than at Mr. Spiking's. There was a foreman and myself ; the foreman slept out. There was no flooring to the bakehouse, and it was not a clean place.

128. I went then to Mr. Norringham's, who had removed to South Street, Manchester Square. The hours were from 11 P.M. to 6 P.M. the next day. There was a foreman and myself. I had a good bed there, at the top of the house. The bakehouse was tolerably wholesome, far better than a great many.

129. I went then to Mr. Robb's, the great biscuit baker, St. Martin's Lane. I was there about two years. There were eight men and boys employed. The bakehouse was a very airy place.

130. I went next to Mr. Marshall's, in Hungerford Street, Strand. I was there about two years. The hours were from 12 P.M. to 3 P.M. the next day. On Saturdays we used to leave off at 3 P.M. We used to begin at 8 P.M. on Friday night ; but as we made but few biscuits on Saturday, we made a double quantity of bread by 3 P.M. We used to make the quantity of biscuits that we should otherwise have made on Saturdays in portions throughout the week. (See 712.)

131. I then went into business for myself, and continued a master baker for two years. It did not answer, and I returned to journeyman's work at a place in the Strand. It was an unwholesome place, and I only stayed there seven weeks. I had to go in at 8 P.M., and I was never away until 3 P.M. the next afternoon. I was foreman there. The place was much infested with vermin.

132. I went then to Mr. Worrall's, Hanwell Street, Pentonville; I was there about four years altogether. The first year and a half our hours of work were from 11 P.M. to 6 the next evening; but, after that, I showed Mr. Worrall that the work could be equally well got through by beginning at 4 A.M., and he, and the two masters who succeeded him in the business, allowed me to continue in the same way. I was foreman there the whole time. We used to leave off about 4 o'clock in the afternoon, or just 12 hours. I had only one man under me, who worked the same hours. I gave satisfaction to all the three masters with these hours. I was not discharged, but the present master wished to act as his own foreman. It was a wholesome place to work in. I was then married, and slept at home. The man sleeps at the top of the house. I left this place 10 weeks ago. (Mr. Worrall has left London.)

133. In every shop that I have worked in in London the whole of the work could have been got through in the same 12 hours, without the slightest difficulty, with the same number of hands, except in such large establishments as Mr. Spiking's Mr. Robb's, and Mr. Marshall's, and even they would save in gas and coal, and in avoiding the spoiling of batches of bread. Also, in the small establishments, if the hours of work were from morning to night, instead of night-work, many small masters would be their own foremen, by which they would save at least 25*s.* a week, or say half a sack in eight sacks a week, which is about what many of the small bakers do.

134. I went, after leaving Hanwell Street, to a place in Finsbury. I was there nine weeks. I was rheumatic, and otherwise unwell, and obliged to leave. The system of working there was to begin at 1 A.M., and to go on till 6 P.M. of the next evening, except Tuesdays and Thursdays, which were several hours easier.

135. The short hours would enable all the dinner-bakings also to be properly superintended, and got through as wanted by the public. If the public were told that dinner-bakings could not be done after say 5 P.M., everything would be sent in time for that hour, and nothing is ever wanted after that hour.

136. According to my experience, I should say, that if the men are careful, the amount of sweepings in a business doing 30 sacks per week ought not to be as much as half a sack; but considering that many men are careless, and that the long hours make them less able to attend carefully to what they are about, I should say that on an average in London, the sweepings would amount to more than half a sack a week in a business doing 30 sacks, and in a smaller proportion where the business was smaller or greater.

137. In all the *small* shops in which I have worked it is the universal custom for the man who stirs the sponge to wash his arms in a pail of water, and leave it standing until the next dough is made; it is then thrown in among the dough. It may be worth a halfpenny, at the most. No careful master, in a small way, will allow this to be thrown away. It is hard work, stirring

the sponge, and a man will perspire a good deal in doing it, as the bakehouse is always hot; it takes, on an average, half an hour for one man to stir a sponge of five bushels of flour (one sack), the usual size. If four batches a day are baked, that would amount to 2*d.* per day. But in the small undersellers' shops, where they make the batches fast one after the other, and the master is particular as to saving, there would be washings also after the dough was made; and if three men are employed, that would be 12 halfpence or 6*d.* per day, besides the washings after the sponge; in all, 8*d.* a day, or 4*s.* a week. There are plenty of small bakers who would think a saving of 4*s.* a week a matter of importance. When I was a master baker I would not allow any of this to be wasted.

138. From my knowledge of men in the baking trade I am able to say with certainty that nearly all the journeymen in the trade began to work night work long before eighteen years of age. I have not the slightest doubt that this is one of the great causes of their breaking down in health.

139. As a class I believe that the journeymen bakers are the most ignorant of any class of labouring men; it cannot be otherwise as long as they work as they do at present; and on Saturday night they are like wild animals let loose; and on Sundays they lie about, mostly without cleaning themselves, and very seldom enter a place of worship; in point of morality there can be no doubt that they are very low indeed. Many of them have to go on with Sunday bakings as well, and I can say that they are so tired that they have no heart to improve themselves in any way.

James Reily.

140. I am a clerk of Mr. E. Stevens, the inventor of the patent dough-making machine. I was a master baker for six years. Among the advantages of Mr. Stevens's machine, I consider the following to be considerable ones; namely, that there is no loss of flour in the form of dust, and no possibility of giving occasion to the practice resorted to by many small masters of mixing what is washed from the men's arms with the dough. I did when I was in business about twelve sacks a week. I used to make about a sack of "sweepings" from the flour-dust in about six weeks. It would fetch about 10*s.* per sack. It is always sold to the "pig jobbers," men who feed pigs, of which there are many in the neighbourhood of London. With flour at 50*s.* a sack, that gave a loss of 6*s.* 8*d.* a week upon the quantity of flour used by me. It was a loss of one sack upon 72 sacks, or nearly 7*d.* per sack.

141. After the dough is made, the journeymen first "rub their arms out" *i.e.* get off all the dough they can by rubbing, and using dry flour to get off what adheres; after that they wash off the rest in a pail. If they are not looked after they will throw this away; but a careful master keeps it and compels them to use it with the next batch, with the rest of the water used in making the dough. As much as from two or three ounces to a

pound of flour per man will thus be washed off, amounting to from 2*d.* or 3*d.* per man per batch. A batch may consist of one sack, or two, or three; but there is no more waste from the three sacks than from the one, as it is all made at one time, and there is but one washing. The saving usually is 2*d.* or 3*d.* per man upon three sacks of flour worth 50*s.* or more per sack. If there are two men to the batch it will be 4*d.* to 6*d.*, if three 6*d.* to 9*d.*

142. If a baker does twenty batches per week there will be forty washings, with two men to each batch; this at 2*d.* to each washing will come to 6*s.* 8*d.* per man per week, an important saving to a small baker.

143. This is what a baker is often content with as profit on a sack of flour; 10*s.* per sack is considered a good living profit.

144. All these washings are avoided by the use of Mr. Stevens's machine, and also the sweepings, because there is no dust.

Henry Scott.

145. I am in the employ of Mr. E. Stevens. I began as a journeyman baker at the age of fourteen at Nottingham. I am 39. The hours at Nottingham and all over that county and Leicestershire are from 4 A.M. to 4 P.M. I think this too early as it often obliges men to be called at three. I think five early enough, and it enables the public to have hot rolls by seven. It is rare that they want hot quarterns in the morning; generally speaking the public consume the bread of the day before.

146. I very much prefer Mr. Stevens's machine to the old mode of making the dough by the hands and arms. It is much less labour on the whole.

John Wells.

147. I began to work as a journeyman baker at 13, my hours were from 11 P.M. to 3 P.M. the next day. I continued at this for many years. I am 36 years of age, and have always worked in London, except for a few months. I had to leave the bakery business for 4 or 5 years in consequence of its having injured my health. The work of making dough with Mr. Stevens's machine is much easier on the whole than the old mode of making it.

148. I have known and still know scores of men who began as early as myself and worked those long hours, and I have known great numbers who have been injured in consequence.

149. I have worked at harder places for several years; I have worked continuously from Thursday night up to 11 P.M. on Saturday night; I have done that for months together until I was worn out.

150. I have a cousin who is about 20, who I don't think has more than 10 years more life in him; he began at about 12, and has continued at the night and day work ever since.

151. Young men who come out of the country, at about 17 to 18, soon begin to suffer for their night work.

JAMES MILLS.

152. I am in the employ of Mr. E. Stevens. I am 40. I began work at Bristol when I was 16. We used to begin at 9 P.M. and we used to go bed at 10, and rise at 2 to 3 A.M., and continued at work till 6 or 7 the next day. Bristol was then noted for long hours. I hear they have adopted the shorter hours during the last 3 or 4 months. I much prefer Mr. Stevens's machine to making dough by hand.

153. [Oct. 25, 1861, I again visited Mr. Stevens's bakery, 5, 6, and 7, Cambridge Road, N.E. Two men were working one of his machines, having in it a "batch" of about 2½ sacks of flour, which, according to the men, would turn out, at 94 loaves to the sack, 235 loaves. The machine was being turned by two men, one very slight and far from strong. They made the sponge into dough in 14 minutes without difficulty, and without exerting their full strength, except in about three turns out of eight in the last five minutes. They stated that it was a very tight dough; it is for cottage bread, much tighter than it would have been for common household bread.

154. When the dough was made, one of the men at my request cut a deep gash in it, and on a candle being placed in it, about an inch below the level of the dough, it went out in about eight seconds. Another gash being cut, and the candle being held in it in the same manner, but a little lower, it went out in about five seconds.

155. One of the men, stated that, in "breaking up the sponge" by hand in the old way, it was a common thing for him to be obliged to lift up his head from hanging over the trough, being almost suffocated by the gas. The two others stated that this had frequently happened to themselves.

156. One of the men, Henry Smith, said "I have been a baker 14 years. I have been here only three weeks. I had had for a long time a wheezing at the chest. It is now gone. I can only attribute this to my not breathing the gas and the flour-dust, as a man does when he works in the old way."

157. Another of Mr. Stevens's men, Henry Griffin, said, "I have been a baker nine years. I have only worked night-work for the last two years. Before that I worked at Cheltenham; none of the bakers there work before midnight; they begin between 3 and 4 a.m. and leave off at eight p.m.; the biscuit-makers leave off at 6 p.m. I much prefer the machine to hand labour; the work on the whole is a great deal easier, and the position so much better for a man to do his work in, standing up, instead of leaning forward, with the head down over the trough."–H.S.T.]

Mr. H. W. NEVILL, 37, Bingfield Street, Caledonian Road, N.

158. I have been in the baking trade about twenty-two years. About thirteen years ago I adopted the process of baking by ovens heated by hot water, patented by Mr. Perkins, of Francis Street, Regent's Square, King's Cross; I began with two ovens. My establishment, which was at first in Holborn, and was moved

to this place in 1853, has grown gradually until I have at present eight ovens at work, and four new ones nearly completed. It is by far the largest establishment in London. I took an active part in the endeavours in 1849–50, in conjunction with Lord Robert Grosvenor, Dr. Guy, and others, in the endeavour to bring about the abolition of the system of work usually adopted in the trade (beginning at 11 P.M. and going on until late the next afternoon.)

159. As success in my case depends upon my being able to distribute my bread to my customers economically, and at the most convenient hours, the manufacture of the bread must, I find, be conducted at night.

160. The work begins at 8 P.M. and ends about 8 A.M. At 6 P.M. the men begin to make dough; at 8 P.M. they begin to mould and set the batches. The men who begin at 6 P.M. one night begin at 8 P.M. the next. They all have intervals of rest while the batches are baking, at least every two hours during the night. They go to their homes when they leave off work in the morning, and we see nothing of them until the evening, with the exception of a small portion of them who come to set the sponge; this they take alternately. We have four sets of men, each under a foreman; one or two of each gang takes this work in turn. On Fridays our hours are from 6 P.M. to 12 the next day, and we have a few extra hands. I employ in the bakehouse 29 men. Although the night-work is continuous, I never hear any of them complain that it is injurious to them, as they have ample time for sleep and recreation during the day, as well as the intervals of work during the night above alluded to. [See examination of Mr. Nevill's men, § 650–653.]

161. The sponge is sometimes set before the men leave in the morning, but in warm weather it is done in the middle of the day. Only one foreman and one man are required for this, so that it does not come to their turn very often.

162. In consequence of the arrangement and management of the business, and of our having our ovens always at one heat, we are able to turn out many more loaves per man than can be done at an ordinary small bakehouse.

163. All the ovens are above ground, in large rooms of good height, well lighted, and with large windows which when fully open admit an ample supply of air.

164. Considering the regularity of the hours of work and of rest, and the large, open, and well-ventilated places of work which my men have the benefit of in this establishment, I do not think that the baking trade could be carried on on a large scale under conditions much more favourable to the journeymen than they are here. I have questioned many of my men upon the subject, and I find they all prefer this system to any other they have worked under. I, myself, tried the day-work from 4 A.M. some time ago, when my business was much smaller than it now is, but I was obliged to abandon it, as there was so much uncertainty as to getting the men in at the proper time. Many times I had to go after some of my men at that hour of the

morning. I have one of the men still with me, who will tell you how it worked. On several occasions my batch was spoiled, in consequence of one or more of the men being late, and the bread was sold to those who retailed it at a low rate to poor families. It was sour and must have been injurious to any who bought it, who were at all delicate. Night-work should be abolished for youths under 18 ; that would be a great service to them ; and, as a practical baker of some experience, I am convinced it could be done without any countervailing disadvantage to the trade. I am a member of the Islington Vestry and on the Sanitary Committee, and am of opinion that it would be of much benefit to the men, and to the public, that the bakehouses should be licensed by the magistrates the same as the slaughter-houses. These latter are inspected half-yearly by the Sanitary Inspectors, and certified by the Medical Officer of Health to be in a proper state : if otherwise, the licence is refused. I have known many bakehouses in a shocking state as places of work, and most injurious to the men, and so infested with rats, beetles, cock-roaches, &c., and so full of noxious smells, that it must infect the bread. No doubt, many have been improved of late years, but a large number are still very bad. No new bakehouse should in future be opened until it has been certified by the district surveyor to be provided with proper means of ventilation in proportion to the number of ovens it contains, to keep a good supply of pure air, and to carry off the sulphur. There should also be some satisfactory mode adopted by which analyses of bread should be made in every district. The millers, also, ought to be included, and some system adopted which would protect the respectable baker from having flour sent to him without his knowledge with alum mixed with it, and also otherwise adulterated. At present, no baker is safe from such adulterations, although he may purchase of millers of repute in the trade. They are tempted occasionally to mix alum with flour to make it ready for immediate use, instead of keeping it a few weeks to dry. The practice of adulterating bread with alum and other substances has greatly decreased in London within my experience. It nevertheless still continues to an extent to make active efforts for its suppression very desirable, in the interests both of the public and of the baker who supplies pure bread. It would be necessary, however, to provide for certain cases. For instance, in a year when much corn has been got in in a bad state, a good deal of flour could not be made into bread without the addition of a small quantity of alum, or a small quantity of bean or pea meal. It might be provided that no one should be punishable for using either if he could show to the satisfaction of the magistrates that the flour he was using absolutely required it, and that the quantity of alum or bean or pea meal did not exceed, say, five per cent.

165. You may perceive that great pains are taken to keep every thing as clean as possible in my bakehouses. The kneading is done by hand, but I should have no difficulty in introducing machinery as soon as I am satisfied that any machine has been sufficiently perfected to answer the purpose. The early

machines of Mr. Stevens were, according to what I have heard from my men, objectionable, as they were so hard to work. In so large an establishment as this, economy, whether of production or distribution, is the first condition of success; and if machinery can aid me I shall be most willing to adopt it. The costs of distribution have, in my case, been brought down to a reasonable amount: I employ seventeen one-horse carts, with twenty-three men to drive, serve the customers, and look after the horses. To create depôts or find agents in all parts of London, and to obtain a sale for my bread among customers so scattered, has been a work of great difficulty. All my bread is delivered to shops, and none to private customers. My bread is delivered between 8 A.M. and 3 P.M.; on Saturdays later, up to 6 or 7 P.M.; but this is a second delivery. Many of the small shops to which I deliver my bread for sale are chandlers' shops, some of which take as few as three or four 4lb. loaves, and many from that to ten or a dozen. According to Mr. Dwarber's and Mr. Purvis's suggestions, §§ 434 and 503, I should lose those customers, as they could not afford to pay the high licence they propose. I do not see that there would be any benefit to the trade from such a licence, or that the public have any justification for imposing it. To take away the chandlers' shop trade from the bakers would be a great injury to many masters, as they depend on them to sell a full batch. In a very few cases is bread made expressly for the chandlers' shop; mostly, they are supplied with a part of a batch; the other part is put on the shelves in the baker's shop. The poorer classes find great accommodation in having credit given them at the chandler's shop, where they deal for their tea, bacon, butter, bread, and many other articles, for which they pay weekly.

MR. EBENEZER STEVENS, 5, 6, & 7 Cambridge Road, N.E.

166. I am the inventor of the Patent Dough Making Machine. The Patent is dated February, 1858. I had the first which I made, in use in my own bakehouse at that date. I have been in the baking trade 15 years, as a master-baker, the whole time at my present place of business. I was brought-up as an apprentice to a cook and confectioner, in Hackney. In the course of my work in the latter branch, I felt the disadvantages and inconveniences of the common mode of mixing the flour by hand, and having had a tolerably good education, I turned my thoughts to the possibility of applying machinery to those purposes. I had been somewhat conversant with machinery, as my father had a large engineering establishment at Harwich.

167. The machines I now sell only differ from the original one in having some improved mechanical arrangements, which are chiefly applied to the larger class of machines.

168. The machine consists of the following parts:

The mixer, which can be used alone, and is used alone, in the smallest class of machine;

The feeder and duster,

The scoop,

the two latter being used with the machines doing from one sack up to six sacks at one mixing. The ordinary quantity mixed by hand labour is from one to two sacks.

169. The advantages resulting from the use of the machine, are :—

The cleanliness of the process,
The prevention of all waste,
The more healthy nature of the work for the journeymen,
The saving of time in the process of bread-making.

170. First, as to the cleanliness of the process. From the setting of the sponge, the breaking it up, and kneading the dough, to the moulding the bread previously to its being put into the oven, the hand does not touch it. It is equally applicable to all kinds of bread,—common household as well as fancy bread of every description.

171. Secondly, the prevention of all waste. By the ordinary process of mixing and kneading, a great-deal of the flour flies about the bakehouse as dust. These are the finest particles of the flour, and are described by men of science as being the most nourishing. While the mixing and kneading by hand are going on, the men are quite enveloped in this dust, and become powdered all over with it. Every bakehouse is swept after the work is done, and the sweepings are put into a sack and sold when the sack is full, to the feeders of pigs.

172. It may be stated that where a trade is done of 30 to 40 sacks of flour a week, they will yield about half a sack of sweepings. The sack of sweepings will sell for 10*s*., and consequently if the flour has cost 50*s*. a very fair average, there is a loss of 40*s*. upon about 60 sacks, or 8*d*. per sack. The loss will be greater or less in proportion to the care and attention of the men in mixing and kneading. If the loss is one sack in sixty, it amounts to a loaf and a half, in round numbers, in every sack of flour. If the hours of work were by day the loss would be less, as the master is about, and the men are able to give better attention to their work. But by my machine there is no loss at all. I have two ovens, employing five hands, and I do about 80 sacks per week, but my sweepings are next to nothing.

173. But in addition to the saving produced by the absence of waste, my machine causes a greater number of loaves to be made from the same quantity of flour. This arises from the more perfect mixing of the dough, every particle of flour being brought into contact with the ferment and the water, of which the more perfect mixing causes it to take up a greater quantity ; whereas in hand-mixed dough, numberless particles of the flour can be discovered quite dry ; another consequence of which is a thicker crust and much tendency to crumble. The dough made by my machine yields on an average about three 4-lb. loaves more per sack of flour than hand-made dough, which is about a loaf and a half more than is due to the saving of waste above mentoned ; it also gives the bread a thin top and bottom crust, which makes every loaf go further ; and there are no crumbs.

174. A saving of three quartern loaves upon a sack of flour, at the cost price of, say 6½*d.* per quartern, with flour at an average of 50*s.* per sack, would be 1*s.* 7½*d.* per sack.

175. Thirdly, it is manifestly more healthy for the journeymen, as all the injurious consequences arising from the flour getting into their lungs are avoided. Also it relieves them of the very severe labour they undergo in the process of hand-mixing and kneading. The work of turning the machine is very light during nearly the whole of the process, and it is only as hard as hand kneading during the last five minutes of making a batch.

176. Fourthly, the saving of time in the process of bread making. An ordinary batch of bread consists of from one to two sacks of flour. Nineteen out of twenty bakers in and about London have ovens which hold 10 bushels of bread; that is, the bread made from about 9 bushels of flour. At 16 quartern loaves to the bushel of bread, each batch will consist of about 160 quartern loaves. To set the sponge and break it up, and knead the dough, from 9 bushels of flour, with two men, would take generally an hour and a half altogether, the processes being separated from each other by seven or eight hours. By those of my machines which are fitted with the feeder, these processes can be done in half the time; and with the cheaper machines without the feeder, in about an hour. As the great majority of bakers are on a very small scale, employing only from one to two or three men, the introduction of my machine would not lead in those cases to fewer men being employed, or indeed in any other cases except in the very rare ones of large establishments, where ten men and upwards are employed. The result in all the smaller establishments, as regards labour, would only be that the men would get through their work in a shorter time, with less fatigue, and if the day work system was adopted would be dismissed sooner, or if the night work system continued they would have longer intervals of rest. The reason why fewer men would not be required in the smaller establishments is, that there must always be men enough, in proportion to the business, to mould the bread and put it into the oven. On the other hand, in the largest establishments, say those which employ 25 hands, they might do with two men less. I do not think there are more than half a dozen bakers in London who employ above six men.

177. My machines vary in size, and are applicable to the smallest class of bakehouses as well as to the largest establishments.

178. The smallest machines used in private families make as small a quantity as from two to eight 2-lb. loaves; their cost is 1*l.* 15*s.*; their size is about a foot square. The next size will make from two to twelve 2-lb. loaves; cost 2*l.*; size 15 inches square. The third size will make from 10 to 30 2-lb. loaves; cost 2*l.* 10*s.*; size about 18 inches square.

179. The next size is the smallest "trade-size," but most suitable for schools, clubhouses, hotels, or small public institutions. But those most generally useful in the trade are the three next sizes, for mixing one, two, and three sacks of flour respectively,

and costing 25*l*., 30*l*., and 35*l*. All these machines are so compact that they can be used on very small premises ; the first can be worked in a space of 4 ft. × 6 × 3 ; the second 6ft. × 4 ; the third, 7 ft. × 5 ; the fourth, 8 ft. × 6 ; the fifth, 10 ft. × 8. Two feet more in length are required for the largest class of machines to work in.

180. The machines are either "attached," *i.e.* have the motive power attached to them and are worked by hand ; or "detached," *i.e.* have a distinct cast-iron framework, to which steam or water power can be attached. The latter are in use where a large trade is done, or in large institutions, such as union workhouses, prisons, &c. ; and both kinds have as many additional moveable troughs as may be required in proportion to the amount of work required to done. The prices of these large machines vary from 50*l*. to 100*l*. The large machines are fitted with a self-acting feeder, duster, and chucker out or scoop, which save a great deal of time and labour.

181. One of the advantages of the machines is that by reason of their having a double bottom, for containing hot or cold water, or to which a jet of gas can be applied, the temperature of the dough can be regulated, and the fermentation forced on or retarded, as the weather or other circumstances may require ; and also the temperature of the bakehouse can consequently be often kept more healthy for the men. Further, by means of the scoop the machine can be emptied perfectly clean of the dough in a few minutes, without the hand touching it.

182. The machines are in operation at Aldershot, Woolmer, the Curragh, Gibraltar, Malta, by the Commissariat officers at Calcutta and Kurrachee ; they were in use with the China expedition, and are used at Barbadoes and other places abroad. At home they are in use at Greenwich Hospital, the Cremorne Gardens, the Holborn, Croydon, Hackney, Wandsworth, Clapham, Marylebone, Lambeth, Shoreditch, and other union workhouses, the Houses of Correction of Wandsworth and Coldbath Fields, the Colney Hatch Lunatic Asylum, the Kent County Lunatic Asylum, the West Derby Lunatic Asylum Liverpool, the Great Eastern Steamship, by the ships of the Peninsular and Oriental Steam Packet Company, the Royal Mail Steam Packet Company, and in several other merchant vessels ; at various places in Australia, North and South America, and the West India Islands. The small establishments in which they are in use are the Cripples' Home, Hill Street, Dorset Square, (for females), St. Philip's Orphanage, West Brompton, and by numerous master bakers in England, Scotland, Wales, and the Channel Islands.

183. The testimonials which I have received from all quarters where my machines have been used, are expressed in terms of the most cordial approval, and are to the effect that the machines save time in the processes of mixing and kneading, do the work with the utmost cleanliness, and effect a considerable saving ; and many state specifically that they produce on an average about three quartern loaves more from each sack of flour than are pro-

duced by hand-kneading. They are printed at length in the pamphlet containing the prospectus of my machines.*

184. In reference to the statements in Sections 91 and 93, I have to say that, at Crossmyloof, thinking I saw a disposition not to give the machine a fair trial, I withdrew it; and that I have never heard of the use of the machine having been abandoned by the master bakers of Edinburgh.

Mrs. Lane.

Cripples' Home,
Hill Street, Dorset Square.

185. I am Assistant Matron at this establishment for young female cripples, and for training poor girls in household work. Miss Plomer, the Matron, is not at this moment at home.

186. We have had one of Mr. Stevens's machines for about a year, and value it very much; we could not possibly bake our own bread without it. It will turn out 55 loaves at a batch. The work is exceedingly easy, except for the last 12 turns, when it is a little harder, but nothing to speak of. The machine is turned by two of our "Refuge" girls, whose turn it is to do the household work in the kitchen; they are generally girls from 10 to 16 years of age.

187. The work is so easy that one can turn it for the first process, that of setting the sponge, and two for the second process, which completes the dough. Some of our cripples (girls of the above ages,) often volunteer to turn the machine, although they do not take their turn in the kitchen; and two of them have no difficulty in turning it even for the last twelve turns. Four of our girls can, with the machine, make the bread for the whole of our establishment, which now consists of 70.

188. The machine causes a considerable saving both in labour and flour, and the bread is both lighter and whiter than when made by the ordinary process. Before we had this machine the bread-making was a great labour and loss, and we could not, with our present large establishment, make our own bread without it. The bread bakes much quicker. It used, after the hand-kneading, to take full an hour to bake; now it is done in 40 to 45 minutes. We save, therefore, in gas, with which the oven is heated, a quarter of an hour at least with every baking.

189. The machine is not fixed to the floor but stands by itself, and is sufficiently steadied by hand.

Mr. Cooper.

190. I am Master of the Marylebone Workhouse. We have had one of Stevens's machines at work upwards of 2½ years. It was one of the first made. It is a great advantage in every

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* The originals of many of these testimonials have been shown to me; I have no doubt of their authenticity, and they are to the effect above stated by Mr. Stevens. Since the date of the above, Mr. Stevens has submitted to me a large number of other testimonials from public establishments and from individuals, including master bakers, all equally satisfactory.

respect. The labour to the men is much less than in hand-kneading ; it saves their strength, and also their health, as there is no dust to inhale as there is in hand-kneading. To the establishment the saving effected is considerable, as, from the absence of waste and the more perfect mixing, two loaves more are produced from each sack of flour than can be got by hand-labour. The bread is also always light and good. As to cleanliness, I need only say that, in hand-kneading, the men get into a violent perspiration, and if you watch them you will find that profuse perspiration continues to drop into the dough all the time the men are engaged in kneading it. This is entirely obviated by the machine.

FREDERICK BRAKER, Master Baker, Marylebone Workhouse.

191. I have been Baker at this establishment nearly 16 years. We have had Stevens's machine at work for about 2½ years. It was one of the first made by Mr. Stevens for any public establishment. It has not got the multiplying power of the newer machines. It is large enough to make upwards of 3 sacks of flour into dough, but we generally use only 2½ sacks at a batch. I have with me two of the inmates, both weakly men. I consider these two about equal to one strong man. Two men of ordinary strength can work the machine with 2 sacks of flour in it easily. With 2½ sacks it is hard for two men for the last 5 or 10 minutes. It takes 25 minutes to work a batch of 2½ sacks. The one we are now finishing has taken just that time. It would have taken three quarters of an hour by hand-kneading. Until just at the last it is much easier than hand-kneading, for the last 5 or 10 minutes it is about the same; but the position in which the work is done is much better than with hand-kneading. In hand-kneading you are bending down into the trough, and pulling about the dough, and it is hard work the whole time, and the dust is flying up and getting into your lungs. With the machine you stand up and turn the handle, and there is no dust. We expend much less of our strength in working a batch with the machine, and there is no perspiration dropping into the flour. In working this quantity of flour with hand-labour a great deal of perspiration must drop into the flour, particularly in hot weather ; it is impossible to prevent it. With hand-kneading two men would have to do this quantity, and the perspiration would be dropping from them for the greater part of three quarters of an hour. The weight of flour and liquid which we are moving now is 1044 lbs. It is made up thus,—

2½ sacks of flour at 280 lbs. per sack	-	700 lbs.
Potatoes, water, and yeast (in ferment)	-	50
33 gallons of water, at 9 lbs. to the gallon	-	297
		1044 lbs.

192. In mixing this with the machine there is no waste, the cover over the machine prevents it ; this and because the

machine mixes the flour better, are the reasons why we get from 2 to 2½ quartern loaves or from 8 to 10 lbs. of bread more out of the machine than we can by hand-kneading ; and the bread is lighter and better. The machine has cost only 5*s.* to repair within the last 12 months.

Mr. Wm. Frances, Master of the Holborn Union Workhouse.

193. We have had one of Stevens's machines about nine months. It has four cog-wheels on each side. It is capable of doing upwards of two sacks of flour at a batch. Our usual quantity is two sacks. It is worked by the master baker (a man of 70 years of age,) and three boys of from 12 to 14 years of age. It is perfectly easy work. There can be no doubt of the advantages of the machine. In the first place it is perfectly cleanly, and in the next it saves the wages of the journeyman baker whom we employed when we made our bread by hand-kneading, amounting to 17*s.* 6*d.* per week. We now can use the labour of our boys from the school so it is a great advantage to them, as they are so well instructed in bread-making, that they are sought for for situations ; I cannot get them ready fast enough. As there is no waste, and as the flour is so perfectly mixed, the machine produces from two to three more loaves per sack of flour; I have ascertained this by many trials. Even at two loaves per sack the saving is considerable ; at 6*d.* per quartern loaf, when we are baking our smallest quantity of 15 sacks per week, there is a saving of 15*s.* a week. This added to the journeyman's wages saved makes something considerable in the course of the year. The cost of the machine was 84*l.* It will therefore pay itself at this establishment in at furthest 15 months. It is in as good order now as when I first had it ; it is so simple that it can seldom get out of order, and if it does a common smith can repair it. I keep my books in such a way that I ascertain the exact quantity of bread made from the sack of flour, and the profit and loss is made up every week and every quarter.

194. It appears from the baking account now submitted to you, and which goes before the Guardians on board-days weekly, and before the Poor Law Auditor every six months, that I have credited myself with 96 4-lb. loaves per sack of flour for the last six months, the flour being of fair average quality ; contract price 48*s.* per sack. Last week we produced 5,821 lbs. of bread, for consumption in the house and in out-door relief; that is about our weekly average. The weekly stock account shows the number of sacks of flour consumed. I test the quantity of bread produced by what ought to be produced according to the assumption, founded on many trials, of a turn out of 96 loaves per sack, and I find they agree to a fraction. I try it by two calculations which check each other. While we made bread by hand I used to charge myself with an average of from 92 to 94 loaves per sack. The machine certainly causes the flour to take up more water, but the quantity taken up is not more than is

properly due to the quality of the flour; and the proof is that the loaf of machine-made bread retains its weight after standing 12 hours, just as the hand-kneaded bread did. The quantity of water taken up by flour not only varies with the quality of the flour, but the same flour will take up more on some days than on others; very dry or very damp weather will affect it decidedly.

Mr. J. HART, Lambeth Workhouse.

195. I have been Master Baker of this workhouse for eight years. In November 1858 we first used Mr. Stevens's kneading machine; from that time to this I have been perfectly satisfied with its performance.

196. In March 1860 I stated that it produced a saving of upwards of 80*l.* a year in the establishment. I arrived at this result after several careful trials. I have made several trials since. The trials have been made with one, two, three, and up to ten sacks, and I found invariably that three quartern loaves more per sack were produced than could be got by hand-kneading. I kept on trying it at one time for two months, with various quantities, and always with the same results.

197. I have examined machine-made and hand-made bread through a microscope, and I found in the latter thousands of small particles of flour that had never been wetted at all. In the machine-made bread there were none of these; every particle had been brought into contact with the liquid, and the whole had risen uniformly. Bread made in the machine takes up about two gallons more water to every sack than hand-kneaded bread.

198. The flour we use is of excellent quality, known as the "best household's;" it consequently takes up more water than flour of an inferior quality. Our batch is 2½ sacks. We use 7½ to 8 pails, of 2½ gallons each, per sack, according as we find the flour; this is at the rate of 19 to 20 gallons of water to the sack. When I was making the trials of the machine against hand-kneading, I found that flour of similar quality and condition took up, with hand-kneading, from 17 to 18 gallons of water to the sack.

199. In making bread by hand a great quantity of the finest particles of flour is lost in the form of dust. All this is prevented by the machine. This also goes a great way towards producing the extra three loaves per sack.

200. There is also a gain in cutting up the bread; there is far less waste by crumbling. The dry particles of flour in the hand-made bread cause it to crumble in cutting up. Again there is a saving in the crust being so much thinner.

201. The greater thinness of the crus tarises from the moisture in the perfectly mixed dough resisting better the action of the oven.

202. Taking therefore the above saving both to the producer and the consumer, the saving arising from the machine is much more than three loaves per sack.

203. I have been in the baking trade in London 22 years next March. I was a journeyman until I came here as master baker. If I were to set up for myself to-morrow I should immediately have one of these machines ; not only on account of the saving above mentioned, but because I believe I should greatly extend my trade by using one, as the public will probably soon come to know how perfectly cleanly this mode of making bread is. It is almost incredible that the public can go on being satisfied with the old mode of making bread. It is impossible to avoid a great deal of dirty impurity getting into the bread by the hand-kneading. No hand-kneading bread is ever made without a certain amount of perspiration getting into it, and sometimes in hot weather a great deal. The position in which the men are when at work, the heat, with the hard labour, speak for themselves as to that matter. Then a great many journeymen have skin diseases, for which they must use external applications. The places of work too are often incredibly dirty.

204. There is a saving of time by using the machine. A common business in London is at the rate of 3 sacks a day. A master baker using the machine would save half an hour per day in labour (ten minutes with each batch), and the work to the men is much lighter. He would have three men working at the same time with a machine, and would not displace labour.

205. Considering the diminution of physical force required, and the absence of dust, the machine, wherever used, would greatly benefit the health of the men.

206. In the course of my experience in London, I have known a great number of young lads under 18 employed at night work the same as the men. I have known many much injured in their health in consequence, one of my own brothers even among them.

207. I was apprenticed at Peterborough ; we never did night-work there. We began at 5 or 6 A.M. and finished by 7 or 8 P.M. I would never bring up a son of mine to the baking trade in London, while night-work lasted. I should consider it would be almost certain to ruin his constitution, and I have no doubt also of the bad effect of night-work and long hours upon the morals of the young men in the trade.

208. The machine we have here was the second on a large scale made by Mr. Stevens. It has only two wheels on each side. The additional power in his new machines greatly reduces the labour ; but even with the one we have it is only somewhat hard work when the dough is nearly made. Two men work it for half the time of the dough being made, then two more in addition for the last 15 minutes ; it is only really stiff for the last 5 or 10 minutes.

209. Before we had the machine I have employed as many as 8 journeymen ; never fewer than 5. Men's wages were 18*s.* and their rations per week. With the machine I only have one paid man ; sometimes two ; the inmates of the house turn the machine and very soon learn to mould the bread. We save therefore to the establishment in wages, by the use of the machine

at least four men's wages at an average of 74*s.* per week. I took the average last year of the sacks we used per week; it was 78 sacks. At three loaves at 6*d.* per loaf (the price last year), the saving would be 1*s.* 6*d.* per sack; this, upon 78 sacks. is 5*l.* 14*s.* per week, and upon the year 296*l.* 8*s.*

210. If to this be added the saving of wages at the rate of 3*l.* 14*s.* per week, or 192*l.* per annum, an annual saving arising from this machine is shown of 488*l.* 8*s.*, irrespective of the saving arising from less waste in cutting up (wherever the bread is cut up) and the thinness of the crust.

211. I confess that at first I was prejudiced, as most bakers are, against the machine. But it fairly convinced me after the trials I gave it as against hand-kneading. The machine is perfectly strong, and in as good order as when first used. The knives only have been strengthened.

212. Before we had the machine, the hours in the bakery here were the same as in London generally; that is, we did night-work. I represented that by the addition of two ovens we could dispense with night-work. Our hours are now from 5½ A.M., to about 5½ P.M.; except that about 11 P.M. we set the sponge, which only takes a short time.

213. I have no doubt that the night-work is the cause of the general unhealthiness and immorality of the journeymen; and that this, and their exhausted state, are the causes why so many neglect to keep themselves clean. They have no energy left for it. I have known many to have lice about them, and in one case to such a disgusting extent, that I wonder he could sleep at all. It was only the great fatigue that enabled him to do so. As soon as I found it out I made him go and get cured.

214. [Mr. George Day, Master of the Union Workhouse, Lambeth, stated to me that he considered Mr. Stevens's machine a most useful invention, both as regards the health of the men, the increased quantity of bread produced, and the perfect cleanliness of the process as compared with hand-kneading; and that the bread was decidedly better. The machine has fully repaid the parish for the outlay.—H.S.T.]

Henry James, Master Baker, Hackney Union.

215. I am 47 years of age. I was apprenticed at 14 in London. I have been here 5 years. Before that I was at work under the League Bread Company which is now broken up. They used to have two sets of hands, working 12 hours each; they did not change from night to day work; some men preferred the night work. We introduced Mr. Stevens's machine here last April twelve months; neither Mr. Driscoll the Master of the Workhouse nor myself, liked the idea of giving up hand-kneading at first, but I certainly like the machine best now. I must say my health is the better for it, it was failing before we had it. There is no flour gets upon your chest, and the labour is less.

216. We made several trials and found we got 96 4-lb. loaves to the sack with the machine and only 93 by hand labour. The

bread is better, it is finer and smoother in the crumb, and there are no lumps in it, which cannot be avoided particularly with large batches, when the flour is kneaded by hand ; every dry lump is so much waste. If it had been wetted it would have made so much more bread. In hand-kneading there is a deal of flour flying about, a very little only comes from the machine. It is also so clean. You cannot avoid the perspiration getting into the trough when you are hanging over it, kneading with your arms ; there is none of that with the machine. In hot weather there is a great quantity of perspiration dropping into every batch, especially in the small bakehouses.

217. I have worked in a great number of bakehouses in London, and some very small and always at night work. Small and large are many times very dirty. Some masters are very particular, and will have their places kept clean, but many others neglect it very much and the places of work are very dirty. If they were inspected it would be the means of their being kept much better fit for a man to work in, and better ventilated if it was possible, which would be more than half the point for the journeymen. It is more desirable that bakehouses should be inspected than slaughter houses, because there is so much water thrown about in slaughter houses which must keep them sweet, but the bottom of a bakehouse often gets clogged up with sweepings and all sorts of dirt, and some are not washed from year's end to year's end, which must be very unhealthy for the men ; there is a smell arising which shows it must be.

218. We are doing 20 sacks a week here, the quartern loaf now is reckoned at 6*d.*; as we gain by the machine 3 loaves per sack we are gaining per week 30*s.*

219. I have with me a second hand and a boy, we do the work on ordinary days in about eight hours.

Mr. Joseph Driscoll, Master of the Hackney Union Workhouse.

220. My opinion of the advantages of Mr. Stevens's machine is as follows (Nov. 5th, 1861) :—

In order to be correct I have gone through my books for 18 months, during which time we have had the machine, and I find we have used 1,609 sacks of flour, which have produced 5,514 cwts. 3 qrs. of bread, or 96 4-lb. loaves per sack ; while previously, the average was 93 loaves, or thereabouts. The increase is entirely owing to the use of the machine, and amounts to 4,827 loaves, which, at 6*d.* per loaf (and bread has not been so low as 6*d.* during that period), gives a saving of 120*l.* 15*s.* Now, the machine cost 96*l.* altogether, and the expense of repairing has been 1*s.* 6*d.*, making a total of 96*l.* 1*s.* 6*d.*; which leaves a balance over the cost of the machine of 24*l.* 13*s.* 6*d.* in 18 months.

221. As to the quality of the bread, it is free from those small lumps of flour we so often see in bread, and does not crumble so much. I do not say the bread is perceptibly better, but I can

depend on it much more than before ; that is, I now seldom or ever find it heavy. I have no doubt that the amount of loss, estimated by the quantity of sweepings made, is much less than we used to have when the dough was made by hand-kneading, but as it was then all taken to feed the pigs we did not take accurate notice of the quantity.

222. I believe it better for the health of the bakers, for it is reasonable that when there is no necessity for the men to lean over a trough, inhaling dry flour, it must be better. I can, however, say positively that it is a much cleaner way of making dough. I very much objected to having the machine at first, and it was not until I saw the droppings from the baker's nose fall into the dough while kneading that I felt compelled to like it.

(Feb. 12, 1862.)

223. We take stock generally twice a quarter. On making up the account for the quarter ending at Christmas last, I found that we had consumed 924 cwt. of bread, from 264 sacks of flour ; but according to the baker's account-book, in which he debited himself with a produce of 96 4-lb. loaves per sack, it amounted to only 904 cwt. 1 qr., showing a production of 20 cwt. less than we had actually consumed. The baker was therefore required to amend his account, and by estimating the produce at 98 loaves per sack, the 264 sacks of flour would produce exactly the quantity we had consumed. This must be correct because we had no stock to commence with at the beginning of the quarter. We think also, that some of the difference between this produce and that from flour used previously to our having the machine may be accounted for by the superior quality of the flour, but nothing like to the extent of the total increase.

224. [Mr. Driscoll had 28 loaves, 24 hours old, taken from the shelf as they stood in the bread-room, weighed in my presence ; they weighed exactly 1 cwt., being precisely at the rate of 4 lbs. per loaf ($28 \times 4 = 112$ lb.)—H.S.T.]

Mr. H. Elkerton, Master of Mount Street Workhouse, St. George's, Hanover Square.

225. Mr. Elkerton states (Nov. 6th 1861) that during the six months that Mr. Stevens's machine had been in operation in that workhouse he had been perfectly satisfied with it. It had made 8 lbs. of bread per sack more than was produced before its introduction, taking the average for 12 months previously. The dough is more thoroughly mixed, and consequently produces a better loaf.

226. One of its strongest recommendations is, that the dough is not mixed up with the sweat of the baker. Those who have witnessed the usual mode of making dough must have seen the perspiration drop from the operator into the trough. I have no doubt its use would contribute very materially to the general health of bakers. It is not likely to get out of order for many years, if properly used.

Mr. DAVID WATTS, Master Baker, St. George's Hanover Square Workhouse, Mount Street.

227. We have had one of Mr. Stevens's new machines since 1860. Our usual batch is two sacks and a bushel (making 14 bushels of bread) ; we work it with great ease with three men, but as they are all inmates of the house they are only equal to two men. It takes them half an hour ; it is made well in that time, much better than it could have been done by hand labour ; it makes the dough much finer and better. Since we have used the machine there has been next to no flour-dust flying about, and I have felt the benefit of that in my breathing ; before, I had begun to suffer from inhaling the dust. I have felt no inconvenience since.

228. The saving of waste is great. Before we had the machine we used to make a sack of sweepings for about every 84 sacks of flour ; now we do not make a bushel in a month. When I was at work at Mr. Franey's in South Audley Street, where I was three years, our sweepings used to be one sack in 60. We made less sweepings here than at Mr. Franey's on account of all the work here being done between 6 A.M. and 6 P.M.

229. As to the additional quantity of water used with the machine I have not taken notice.

230. I know a great many young men who are doing night work with the men, under the age of 18 ; they are generally sent for from the country, at about the age of 16, when they commence making dough. This must be a great injury to any man.

231. In making dough by hand it is necessary to do the work quick, in order to prevent the dough getting cold; this causes men who are inclined to perspire at all to get into a very great heat, and the perspiration naturally drops into the dough. I don't believe that a batch of bread is anywhere made without some perspiration dropping into the dough. I am 34 years of age, and have been in the trade since I was 10 years old, when I used to help to make dough in the country, beginning work at 5 A.M. I worked with a man in a small way.

232. Many of the bakehouses I have seen in London are such small places that you have hardly room to turn, and being so hot and ill-ventilated that it makes the men perspire more.

Mr. ENGLEFIELD, 11 Lower Eaton Street, Pimlico.

233. I am one of the overseers of the St. George's Hanover Square Workhouse. I am by occupation a pastrycook and confectioner, and have been in the trade for the last 50 years. I was apprenticed to the trade, and worked at it as a journeyman and foreman for many years. We have always had a great deal of nightwork, and some very unhealthy places to work in. In one place the only means of ventilation were through five panes of glass in a frame under the shop-window ; at the back of the bakehouse was a water-closet ; there was neither ven-

tilation nor light at the back of the bakehouse. That place remains the same to this day; and I know many nearly as bad. It would be very desirable to arm the medical officers of health with power to cause all bakehouses to be sufficiently ventilated and kept clean; and no sleeping places should be permitted in the bakehouses underground, or in any bakehouse without sufficient provision for light and air; also no privy or water-closet should be allowed to be in a bakehouse. I have been a member of the sanitary committee appointed by the vestry under the Metropolitan Management Act since the commencement, and have taken an active part in carrying it into effect; and we have effected vast improvements, as far as the powers of the Act extended; but I do not think the Act sufficient to deal entirely with the question of the bakehouses. We should want some more specific powers.

234. We now make our bread in the workhouse by machinery. I was at first difficult to be persuaded of the value of the machine, and so was our baker, but experience, and watching it very narrowly as I have done, has convinced me that by producing a better bread and an increase of two loaves per sack (which has been continuous since we first had the machine from the same quality of flour, which is "best household's"), the guardians have benefited by the machine. The men working it have been benefited too, by being prevented from inhaling the flour-dust and the gas; and one of its great recommendations is that the perspiration which often pours from the men in great abundance when making dough by hand is entirely superseded. The whole process is perfectly cleanly.

235. My knowledge of what goes on in the baking and cheap confectionery trade enables me to say that a great quantity of adulterated articles are produced in both. The Adulteration of Food Prevention Act is almost a dead letter. The cost of making the analyses ought to be provided for; a sum should be provided which would pay the cost, which is often considerable.

236. [Nov. 16th, 1861. I visited a large well-ventilated bakehouse, in a court-yard, by invitation of the owner, to see a batch of dough made by hand-kneading; hour, 11 A M.; temperature of the air a sharp frost; two ovens; large windows, with ample means of admitting air; two doors at opposite angles of bakehouse. The trough was described as more favourable for the men to work in than is usual, being narrow and shallow, so that they could get nearer their work; temperature of bakehouse about 70°. Two men set to work to make into dough somewhat less than three sacks of flour. They accomplished it in their usual time, about 26 minutes. They were described as very skilful hands. At the end of 15 minutes they were visibly heated, and I saw perspiration dropping from the nose of the man who was doing his work within four feet of one of the doors, which stood open the whole time. He brushed the perspiration from his nose with his hand, and replunged his hand immediately into the dough. The work requires the exertion of a man's whole force, especially as the dough becomes stiff; and it is performed with great

rapidity, one man working to the other. Neither, therefore, has the inclination to stop, even for a moment, as by so doing he would delay the other.—H.S.T.]

Mr. W. McCash, Broadway, Stratford E.

237. I have been a master baker for 30 years. If the shortening of the hours and the abolition of night work, which the journeymen desire, could be brought about, it would be a great advantage to them and to the public. When I was a journeyman, I have been at times so exhausted by the long hours that I could not walk up stairs to my bed, but have been obliged to crawl on my hands and knees; and after three hours in bed have been obliged to get up again. I consider that I owe the preservation of my health to temperate habits and a strong constitution. Unfortunately many of the journeymen fly to stimulants; their exhausting labour also preventing many from being as careful as they ought to be, of bodily cleanliness.

238. There are in the trade a great many young men, between 16 and 18, who do night work with the men. Loss of rest and hard work must be particularly injurious to the constitution at that time of life, and it would be a great benefit to them if Parliament could interfere in their case.

239. As regards the general adoption of day work, according to the wishes of the men, I see great difficulties in the way in London. It can only be done voluntarily, and there are many master bakers, whose premises are so small that they can only get through all their work by baking several hours at night, more or less according to the amount of business and accommodation to do it in. Their business requires them to do so many batches of bread, and they cannot extend their premises, so as to obtain more oven and other accommodation; which would be necessary, if they are to do the same work in shorter time. But doubtless a large number of masters in the trade, in London and the neighbourhood, might contrive it, and the public ought to support them if they did.

240. Many master bakers take great pains in keeping their bakeries as clean and well ventilated as possible, but there are a great many, in which both cleanliness and ventilation are greatly neglected, and in which the health of the men suffers in consequence. I see no reason why there should not be an inspection of bakehouses, as there is of other places which are nuisances likely to be injurious to health. I do not think that bakers whose premises were in good order could object to it, as they would have nothing to conceal; and many very respectable master bakers would be glad to have any defects brought to their notice. It often happens now that things are allowed to go on for years just because nobody has ever noticed them. If an Inspector was to say "this place ought to be kept cleaner," or "you could greatly improve the ventilation and keep down the temperature, by doing this or that," it would be done, as

I believe that masters generally care for the welfare of their men. I have a great advantage here, as my premises are all above ground, and I have been able to extend them as my business increased. I employ twelve men. I have one of the largest establishments in or about London.

241. I have used one of Mr. Stevens's machines for about a year and a half. I wrote the testimonial printed in his prospectus, in August 1860. I continue of the same opinion as to the great advantages arising both to the baker and to the public from its use.

242. It is a "two-sack machine," but three sacks can be done in it at a batch. To do two sacks by hand-kneading would take two men half an hour, with hard labour all the time. To do the same quantity with the machine, one man only is required to turn it for the first quarter of an hour, and it goes quite easily; for the remaining quarter of an hour it takes both the men, and for the last ten minutes or so it is stiff work, but not harder than hand-kneading. There is therefore a considerably less expenditure of strength in the course of the process; and besides the labour is applied more easily, the position being the natural one of standing up, and turning a handle; whereas the labour of hand-kneading is applied in a constrained position, and bending down. Then, with the machine, there is next to no dust; whereas in hand-kneading a great quantity of flour dust is raised, and gets into the men's lungs.

243. As to the cleanliness of the process there is no question. With hand-kneading it is almost impossible to prevent perspiration dropping into the bread in hot weather, or where the bake-house is close, as is so often the case. There can be nothing of this with the machine.

244. As to the gain in the number of loaves my experience is this; with hand-kneeding I used to produce 94 to 95 4-lb. loaves per sack, whereas the same quantity of good flour yields by the machine six per cent more bread to the public than they would otherwise obtain. I use good and strong flour, which yields more loaves to the sack than the inferior and weak flour; with the machine I have produced 100 4-lb. loaves, weighed after they were cold. These were all cottage loaves. If they had been batch bread the produce would have been greater by at least two 4-lb. loaves. I tried it often, the one against the other, and I have no doubt about it; I in fact get daily, from superior flour, 100 loaves per sack; consequently I have a clear gain of six loaves per sack. When I have my steam-engine fixed to drive the machine (which will relieve the men of the more laborious part of their work) I hope to produce even more loaves per sack. My selling price at present is 7½*d.* and 8½*d.* per loaf. Taking the loaf only at 7*d.*, I have a clear gain of 3*s.* 6*d.* per sack for the six additional loaves.

245. I am doing 70 sacks per week; sixty of which are made into bread, part by the machine and part by hand; 60 times 3*s.* 6*d.* is 10*l.* 10*s.*; 52 times 10*l.* 10*s.* is 546*l.* which is the rate per year which this superior flour yields me more than I should

get by the old process of hand-kneading. The gain to the public would be enormous if the machine was in general use. In my case, with that flour, it would amount to 360 loaves per week ($60 \times 6 = 360$), or to the surprising number of 18,720 loaves per annum ($360 \times 52 = 18{,}720$), not one of which would have had any existence but for the machine.

246. I consider the increased number a real and substantial addition to the food of the country. It arises first from all the particles of the flour swelling properly by being brought into contact with the water, no flour being left dry or only partially and insufficiently wetted ; 2dly, from the preservation of that large quantity of the finest parts of the flour which in hand-kneading flies off in dust.

247. Besides all this there is a decided saving to the consumer from the absence of crumbling and from the thinness of the crust, and the bread is undoubtedly lighter and sweeter.

248. The additional water taken up by the flour when worked by the machines is no more than each particle is capable of absorbing consistently with making the dough of the proper tightness. The action of the machine enables you to mix more water with it, and yet to bring it up to the proper tightness, which you could not do by hand. The reason is that the machine brings the water into contact with every particle of flour in a manner that hand-kneading cannot do. And the quality of dough thereby produced prevents the bread crumbling.

249. If machine-made dough takes up from three quarts to two gallons more water per sack of flour than hand-made dough, and gives an increase of, say, three 4-lb. loaves only per sack, or 12 lbs. of bread, (as with ordinary flour,) the result upon the total number of loaves made (if 98 to the sack instead of 95) will be nearly as follows. It would take about 9 lbs. of flour to make those 12 loaves. This would show about one ounce and a half of flour less per 4-lb. loaf in the 98 than in the 95 ; but in reality it is flour that would have been otherwise lost in dust, or left dry or nearly so from imperfect mixing. The additional quantity of water is what is required to convert this flour into dough. My "sweepings" per week since I have had the machine amount to upwards of a quarter of a sack less than they did before. This, at present prices, is equivalent to a saving of upwards of 10*s*. a week.

250. Since I have had the machine my business has increased by ten sacks per week. I attribute this to the preference shown by the public to the machine-made bread.

251. The machine made bread is sweeter because it requires to be fermented less. When bread is kneaded by hand the labour is so great that the men are glad to leave some of the work of mixing to be done by the process of fermentation. As the dough rises the particles of flour not already brought inot contact with the moisture become so, but the greater the fermentation the more the saccharine matter in the flour is consumed, and as a consequence the less nutritious the bread. The

machine mixes so perfectly that all the needless fermentation is saved.

252. The public make a great mistake in insisting upon having their bread so white. Home-made bread is never nearly so white as baker's bread, and is proverbially sweeter and better, it is in fact less fermented. The more the dough is fermented the whiter the bread, but it looses its nourishing power in proportion. I make for some customers what is called "home-made bread," and they greatly prefer it. It is not so white, but they know it is all the better for that, and more of my customers are beginning to ask for it.

253. I have four ovens, but my business is so extensive that I cannot dispense altogether with night work. Instead however of beginning at 11 P.M., as is the common custom in London, our first set of men come on at 2 A.M. and the second at ½ past 3 to 4 A.M., but neither set has more than 10 hours of actual work in the 24. The men who go out with the carts have generally done between 4 and 5 P.M., and have from that time till 3 or 4 A.M. to themselves. I think it a great mistake for a master not to study the health and comfort of his workmen. I do all I can to keep their places of work and sleeping clean and cool, and I have a separate place for the bread to be placed on shelves to cool after it comes out of the oven, which relieves the temperature of the bakehouses.

254. I have introduced an improvement into the mode of feeding the machine which Mr. Stevens has adopted. It lets the flour gradually down into the machine by which the mixing becomes more complete and no flour-dust can escape. I am about to have a steam engine fixed to drive the machine, and expect to have it in action in a week or two.

Richard Walker.

255. I am a journeyman in Mr. M'Cash's employ. I would not be without the machine. With a batch in it it goes easily with one man for the first quarter of an hour, and for the last quarter it takes both of us and is rather stiff work just at the last, but on the whole, in making a batch there is much less strength taken out of us than by the hand-kneading, and there is no dust to get into the lungs and injure the health.

Mr. Hy. Turner, Peckham Rye.

256. I have one of Mr. Stevens's machines. It is one of the first made by him, having only two wheels on each side. It is a 2½ sack machine. When I first had it it did very well, as I was doing about 1½ sacks per batch, and two on the Friday night, the quantity kept it warm; but my business fell off and then with the smaller quantity (under a sack per batch) it would not answer. It was too large for the smaller quantity, and I have consequently discontinued using it. I worked the machine

myself with another man for two years. I found my health greatly improved by it. I had for many years a kind of asthma, but from the time that I had the machine it improved, and I got quite stout in comparison. I believe the improvement arose from my not inhaling the flour dust, which I was always doing while making the dough by hand. Since I left off using the machine I have not worked much at the hand work. My bake-house is behind my shop, on the level.

Mr. Dawson, Wandsworth and Clapham Union Workhouse.

257. I have been 23 years here as master baker. We have had one of Mr. Stevens's machines here for about a year. My experience as to the amount gained per sack differs from that of others, as I do not get more than an increase of a loaf and a half per sack; but there is no doubt of the advantage of the machine in point of cleanliness, and it makes the bread cleaner and better. We do about two sacks at a batch, and our quantity is 17½ sacks per week now, but in winter from 20 to 30. The machine is turned by four of the inmates of the house, who also assist in the other operations. If I had not had the machine we should have had to employ paid labour last summer.

258. The machine is suitable for any large business where several hands are employed, but it would not answer for the small masters who do their work themselves and with only one boy or man. Great numbers of small bakers in the trade have only the amount of business requiring two or three hands.

259. The general use of the machine would be a great public benefit in one respect, that of cleanliness. No doubt there must be much perspiration mixed up with the bread, chiefly from the arms, according to my experience; but numbers of journeymen have diseases of various kinds, skin diseases, and many the itch, and their habits are often very dirty, and they must all come into contact with the dough.

260. Even at an increase of a loaf and a half per sack the gain for the machine is such in the course of the year that it will not be long paying for itself.

261. We rate the cost of one loaf at 6*d.* at present, it has been that price for two or three years.

262. Our average consumption is difficult to be stated, it has been up to 67 sacks in one week. It may amount to 20 sacks per week per annum; that is about the average. If the increase is a loaf and a half per sack this will give 30 loaves per week, which at 6*d.* will be 15*s.* a week gain.

263. The machine cost a little under 100*l.*

264. What the Government might do a great deal of good in, is the inspection of bakehouses. Many of them are in a shocking state; I have worked in such when I was a journey-man. From dirt and want of ventilation they breed diseases. Even here, where everything is above ground, there was such a want of ventilation for some time that I got the typhus fever, and

then I asked the guardians to improve it, and they gave me two feet more of opening in the gratings.

265. All about here there are numbers of lads under 18 employed by bakers; as nearly all are small masters many have only themselves and a boy; in that case the boy does the night-work with the master. Where two men are employed the boy gets up at 4 a.m.

Mr. George Painter, Master of the Shoreditch Union Workhouse.

266. In January 1860 I sent a testimonial to Mr. Stevens, relative to his machine; I stated that I had thoroughly tested it. The test I gave it was that I had the bread made for one week by the machine, and the next week by hand, and I found that the machine gave us three more loaves per sack, and the bread better, and with less waste. I was determined that the trial should be an accurate one, and either myself or the assistant-master was present the whole time for both weeks. Our experience has continued the same, with the exeeption that if the quality of the flour is weaker, we get an increase of only two, or two and a half loaves per sack.

267. Our bakers were very much prejudiced against the machine at first, and were averse to testing it, but they could not resist the facts, and they are satisfied that it is also much better for their health.

268. The first machine we had, was one of Mr. Stevens's earliest, but we have since adopted some of his improvements, and are quite satisfied with it. The machine has been in constant use for two years, and is in as good repair now as it was the day it was put up.

269. One of the great advantages of the machine in a public establishment like this, is that if at any time we are pressed for an additional quantity of bread, we can procure it with unskilled labour. The regular hands may be moulding a batch, while two fresh hands are turning the machine and making the dough for another.

270. It is a two sack or ten bushel machine. Ours is a ten bushel oven. One man will set the sponge and do the early kneading of the dough very comfortably, then two turn the machine, and just at the last, when the dough is nearly made, the third hand gives a few turns by way of assistance.

271. I have been in employment under the Poor Law upwards of 20 years as Relieving Officer and Master of Union Workhouses, and it has been my business frequently to come in contact with the bakers to look after their work; and I state confidently, that I may say hundreds of times I have seen the perspiration dropping off men's foreheads into the dough, and their arms all covered with perspiration; the very cleanliest of them cannot help this, their exertion being so great, and their movements so quick. Therefore on this ground alone I think the machine a very great boon; it is unmistakeable. It is

obvious to me that the health and strength of the men in the bakehouse have greatly improved since we had the machine.

272. There is another important consideration in regard to the health of the men, in favour of the machine. When a man is bending over the dough trough, he is inhaling an unhealthy atmosphere ; that is to say a gas that proceeds from the dough in a state of fermentation ; you may see what sort of atmosphere it is by trying it with a candle. If you separate two masses of dough in a trough, and put a candle down between them, it will go out as soon as it comes down to a level with the dough. I have seen this done two or three times.

273. This I think must be one reason why journeymen bakers are even more liable to affections of the lungs than millers ; both inhale flour dust, but the baker inhales also this gas.

274. The reason why either I myself, or the assistant-master was present during the fortnight's trial, between the machine and hand labour, was, that there had been a great doubt expressed as to a trial of the machine, and a difficulty of believing all that had been said in its favour. From what I had heard of it, I was desirous that it should have a fair and full trial as, if it was successful, I saw it would be of much benefit to the establishment. I was determined therefore to be able to answer before the world from personal observation as to the facts as they might turn out on trial.

275. Our 4lb. loaf stands us now at $5\frac{1}{2}d.$ The average contract price of our flour being 40*s.* 6*d.* per sack for households and best seconds, the cost of the flour, with the addition of the proportion of cost for coals, potatoes, yeast, salt, gas, and wages, gives the above result of $5\frac{1}{2}d.$ per loaf. I make this out in detail with every contract taken, to submit to the Board.

276. Our average consumption per week will be for this quarter 30 sacks. During the spring of last year, in the severe weather, we averaged 70 sacks per week. The average of the whole year would not be under 30 sacks per week. Our gain by this machine with our ordinary contract flour may be safely stated at $2\frac{1}{2}$ loaves per sack ; or in money value at the present cost, in round numbers 1*s.* 2*d.* per sack. This is 35*s.* per week at the least. Three of our guardians are bakers, and I have their permission to state that they, as well as the Board generally, are satisfied with the machine.

Mr. W. J. Slater, Assistant Master, Shoreditch Union.

277. I receive the bread into stock, and deducting the quantity of flour used for puddings and for the officers, I then divide the number of loaves by the quantity of flour used, and I find that for the last three quarters of a year the flour has yielded a fraction more than 95 loaves per sack. While we made the bread by hand the produce was $92\frac{1}{2}$, and we could not always depend upon that.

278. The diminished waste arising from the bread made by the machine is proved by the fact that while we made bread by

hand, we filled a box with waste morning and evening, from about 130 loaves, 5 times a week. The contents of these boxes are reserved for the casual poor or vagrants. Now, in order to supply the same quantity, we are obliged to cut up 5 loaves a day. The two other days are soup days, when we cut up 160 loaves. The bread also keeps better. This bread, cut up on the second and served out on the third day, is as moist as most baker's bread would be on the second day.

Mr. Thomas W. Claridge, Master Baker of the Surrey House of Correction, Wandsworth Common.

279. I have been master baker here for about 2½ years. Previously to my appointment the bread was supplied by contract. Soon after I came one of Mr. Stevens's machines was ordered ; it was one of the earliest made. After a short trial I stated it as my opinion that it was a very valuable invention in many respects, and in that opinion the Governor, Mr. Richard Onslow, concurred.

280. As it was known that Mr. Stevens had introduced several improvements the Magistrates ordered one of his more recently constructed machines. I have had it in use since.

281. It is of the sort most generally useful, being capable of doing 2½ to 3 sacks ; but we do most commonly about 2 sacks at a batch. The improvements are as follows : a lever on one side changes it with great ease from the quick to the slow motion. Another lever on the other side detaches the axle on which the knives turn, to enable them to be taken out, and the one on which the scoop (called by Mr. Stevens "the chucker-out") is fixed, to be substituted. The feeder above the machine is also an improvement, but it is capable of being still further improved, by a contrivance to enable the board to be drawn over the trough while the feeder is acting, so as entirely to prevent the escape of flour-dust. I hear that Mr. Stevens is likely to adopt this improvement. The escape through the bearings, while the dough is thin, is very slight, not half a pint ; we catch it in a vessel below. The bearing of the axle on each side is so placed, that no oil can by any possibility get mixed with the dough.

282. The quantity of flour we make into bread is about 18 sacks per week. I have four men under me ; they are all men under punishment. Out of the large number of men in the house (varying from 700 to occasionally 1,000) there are always some who know something about baking ; but without the machine I could not always do without one or two paid journeymen. In making a batch it is easy work for two men for the first half of the time while the quick motion is on, but for the last ten minutes or so, when the slow motion with increased power is required, three strong men can do it, but having labour at command we use four. The men say they prefer the machine to kneading a batch by hand, they think the labour on the whole easier, and in saving them from inhaling the flour dust the benefit to their health cannot be doubted.

283. The extra number of loaves obtained from the machine beyond what can be got from hand-kneading depends upon the quality of the flour. The higher the quality of flour, dressed in the ordinary way, the greater the number of extra loaves which will be produced by the machine. We turn out 98 4-lb. loaves to the sack, and have done so ever since we had the machine. The flour we use is "meal flour," *i. e.*, it has only the coarse bran taken out of it. It takes up more water than white flour. The quantity of water we use per sack is about 18 gallons. If we were using white flour of average quality we should use 2½ gallons less. In consequence of our using meal-flour I only obtain four extra pounds of bread per sack. But the perfect mixing produces a lighter loaf than I could get by hand. We estimate the cost price of the four pound loaf at 5½*d.* At an average of 18 sacks per week the extra number of loaves may be valued at about 20*l.* per annum; in addition to which I do not require hired labour, and we have better bread.

284. But one of the great recommendations of the machine is its perfect cleanliness. I have read many statements of the dirty and disgusting circumstances so often attending the making of bread in the ordinary way, and they are not in the least exaggerated. I have worked as a journeyman both in the country and in London and I have witnessed things that take place in the making of bread that would disgust any one, and I am sure that people even at the west end of London little know what goes on in some places while their bread is being made. As for perspiration dropping into the bread from the face, I have seen it so often that it is hardly noticed; when men are bending down with their heads in the troughs working away upon the heavy doughs it is impossible to prevent it; some men perspire more than others, and is not to be expected that when they are doing their work as quick as they can they will stop and wipe their faces, even if they have anything at hand to wipe them with. Then with many men the arms are all covered with perspiration which all the time is getting mixed up with the dough. Then I have often seen men with the itch working at the dough; and with the long hours they are so wearied that scores neglect to keep themselves clean in their persons, and the places they work and sleep in are so hot and close that they have no fair opportunity of doing so. The Government would do a good thing if they could set the Sanitary Commissioners to inspect the bake-houses, they would find many in a frightful state for men to work in.

285. The long hours and night work do a great injury to the young lads in the trade. There are a great many in the trade under 18. There are continually advertisements in the paper, by bakers for a lad who can mould; lads do this by the time they are 16, sometimes earlier. When they can do this they will begin to work at say 4 A.M., and will have no more sleep, in bed at least, until 9 the next evening. I myself worked in that way when I was 16, and continued it until I began to assist in the making the dough, when I went to work at 11 P.M., like the

rest; I used to think myself very unfortunate that I had not been brought up to some other trade, like my brothers; and if I had continued longer at that night work I am sure it would have ruined my health altogether.

286. I consider Mr. Stevens's machine of the size we have here, which is capable of mixing from one to three sacks of flour, a very valuable one for a master baker in pretty good business, doing, say, 20 sacks per week; he would have men enough to turn it. It costs about 80*l*. If a master baker had capital enough to buy one he would do well to get one, as the extra loaves produced would repay him in a reasonable time, and it seems to me certain that the public would give a preference to any man who was known to make his bread by the machine. But for the smaller bakers I do not think it would be so much advantage. There would be a risk in it. If they got one of the smaller machines and their business afterwards increased, it would be of no use; besides which a small master having only a man or boy besides himself, would find it hard work to turn the machine towards the last when the dough gets stiff. But if the men of capital got the machine they would in very many cases carry off the business from the small masters, as soon as the public knew they had the machine and the others had not; this applies more particularly to the town than to the country, as generally speaking the country bakehouses are above ground and more clean and airy; but nevertheless there must always be, even in the country, the perspiration getting into the bread, and always will be as long as the dough is kneaded by hand.

287. The machines are constructed with moveable troughs, so that one machine can be used with any number of troughs in succession according to the quantity of dough required to be made; each trough is capable of mixing 2½ sacks or any smaller quantity. The troughs are constructed with a chamber at bottom and mid way up the sides, to contain hot or cold water to enable the baker to regulate the fermentation of his sponges or doughs. This is a great advantage to the baker as his operations in cold weather are often delayed by his sponge being too slow. By the old method he has no remedy but to wait. By the machine he can force his sponge with hot water, and thereby save time. The machine will make dough far better than it is possible to do by hand.

288. Too much in condemnation cannot be said of the London bakehouses, they are in nearly every instance situated underground, the ovens extend under the pavement in close proximity with sewers, gas pipes, and the like, by their heat smells are attracted which poison the atmosphere in which the baker has to work so many hours, and in which the bread for the public is made.

289. I knew one bakehouse in London where a large trade was done, employing nine men and boys. The bakehouse in this case was on the level. The men's bed room was over the bakehouse, and was reached by a ladder through the floor, on a part of which the stock of flour was kept. The bedroom contained

three beds for the use of these nine persons, some of whom got up at 11 P.M., the others at 2 A.M. Those who went to work at 11 P.M. went to bed about 8 P.M., and those who rose at 2 A.M. took the places of those in bed who got up at 11 P.M. The beds were not re-made, nor were they allowed to get cool ere they were tenanted again. The beetles and crickets were very numerous in the room, the floor and bed clothes were very dusty from the dust that arose from the bakehouse below. The gases from the fermentations, &c., rendered the air of the room very impure, so as to make it entirely unfit for the sleeping place of any human being.

290. There are many places in worse condition than the one I have stated, where the men sleep in beds—if they may be so called—made up by themselves in the underground places in which they work, and some have no bed at all, although they pass their night and day in those places. All the sleep they get is on the boards on which the dough is prepared ; one or two sacks rolled up serve as a pillow and another for a covering. But little covering is required by these unfortunates, as the place is warm and they do not take off their clothes. Thus they spend their time from week to week, except on Saturday nights, the only nights when they are allowed to sleep out, when they find a bed at a public house, or are more fortunate to have a friend to indulge them with one.

291. Some of the underground bakehouses are filthy. One I knew was situated in the back basement and close by the Thames. Three men were employed and slept on the premises, and their bed was on the same floor on which they worked. Being so close to the river the walls were constantly damp, and dripped on the men's bed, and at some high tides the water found its way into their sleeping place ankle deep.

292. Bakehouses are generally infested with a great many rats and mice ; being neglected dirty places, and close to drains they have every encouragement to visit the bakehouse to find their food.

293. The condition of the baker is bad—bad in every particular. He experiences none of the comforts which help the commonest labourer on in his toils. He cannot look forward with any hope of a good night's rest or a meal properly prepared after his labour. He has no home comforts. If he has an hour to spare in which to seek a little change from the bakehouse, he has no place but the public house. He has no place to keep a suit of clothes in in which to appear on a Sunday, if he should happen to be so fortunate as to get one to spend as a holiday. In fact his condition is so bad that he loses all self respect, all hope, and feels that he has but little to live for.

294. The Rev. G. J. Bellard, M.A., St. Phillip's Orphanage, West Brompton, stated to me (Oct. 15, 1861), that the testimony he bore in favour of Mr. Stevens's machine in January of this year had been entirely confirmed by subsequent experience. The machine turned out 60 loaves at a batch. It was worked by two of the boys of the Orphanage from 12 to 15 years old without any

difficulty. Without the machine it would have been impossible to make their own bread at the Orphanage, and the bread was pronounced to be "better than any other."

295. [I have permission to state the opinion of the Master of the Croydon Union Workhouse, Mr. Th. C. Greyle, dated November 5th 1861. "Mr. Stevens's machine has been in full work here since July 1860. Our consumption during that period has been about 10 sacks per week, and the yield has been 95 4lb. loaves to the sack, 3 more than was made by hand labour.

296. The bread is infinitely better, and the crust much thinner, thereby less waste is caused by cutting up the allowances for the inmates.

297. The value of the extra number of loaves for one year is as follows; from 520 sacks used during 52 weeks, an increase of 3 loaves to the sack gives 1,560 loaves; this at $6\frac{1}{2}d.$ per loaf amounts to 42*l.* 5*s.* The cost of the machine was 50*l.*

298. The baker informs me that his health is much better than it used to be before the machine was introduced. It is in perfect order, and has not been out of repair since it was fixed.—H.S.T.]

Middlesex County Prison, Cold Bath Fields.

299. Mr. Fillary.—I have been the resident engineer at this prison for the last 27 years. I have under my care all the machinery belonging to the treadwheel, the mill for grinding the corn, and other purposes. The whole of the corn for all the prisons under the Middlesex magistrates is ground by this treadwheel, on which 80 men are at a time; we grind enough for 5,000 men. We make all the bread used in the prison.

300. About two years ago the magistrates determined to erect one of Mr. Stevens's machines with an improvement which I suggested. When such a large quantity of flour has to be kneaded as we use daily, Mr. Stevens's machine did not work at the advantage it was capable of in cases where there is a sufficient command of power. In his ordinary machines the knives are during some revolutions out of the dough, as they work upon a bent axle. While out of the dough their action is lost. This forms no objection or defect in his common machines, as with ordinary hand labour it is hard enough work to turn the machine when the knives are in the dough and the dough is nearly made. But here, where we can use whatever labour we require, I have doubled the action of Mr. Stevens's machine, having placed two troughs together, and so arranged the knives on the axles of each that when one set is out of the dough the other set is in. The work done is thus made uniform in both troughs, and with five men at the handles we can knead five and a quarter sacks of flour in from 18 to 20 minutes.

301. [At the time when Mr. Fillary was making this statement to me the five men were at work; I observed them during its progress, and when they had ceased they were neither hot nor out of breath.—H.S.T.]

302. In grinding we only take out of the flour the bran and the coarse pollard. The bread which we make is consequently genuine brown bread. It is pronounced by the authorities to be the most wholesome and nutritious kind of bread. The effect of the machine in increasing the number of loaves per sack is without doubt very satisfactory. Although ours is brown bread, nevertheless the quality of the wheat being good and the flour perfectly pure, the increase of loaves is three upon every sack of flour, beyond what we used to get from hand kneading. The machine cost the magistrates 208*l.*, every shilling of which was repaid in the first 12 months by the increased quantity of bread. We estimate the increase at 1*s.* 6*d.* per sack.

303. As to the greater cleanliness and healthiness of the process, it speaks for itself. In hand kneading a man is smothered with the flour ; and it must happen, as I have myself frequently seen, that the perspiration drops into the dough, and many other impurities.

304. In my opinion it would not be difficult to apply machinery to the making of bread, so that the hand should not touch the dough at all. You would only have to contrive a mode of turning out the contents of Mr. Stevens's troughs upon a board where the dough would be caught by a roller, and the 2-lb. or 4-lb. pieces cut or squeezed off, and these again compressed into shape and carried by trays on rollers into the oven, in a manner somewhat similar to the machinery for making biscuits. It could not be an impossible problem to adapt that machinery to bread making on a large scale if any individual or company would make a trial.

Mr. Phelps, Master Baker, Middlesex County Prison, Cold Bath Fields.

305. I have been connected with the baking business for 35 years. I was 12 years Master Baker at Lambeth Workhouse. I was in the Crimea under the Commissariat. For the last four years I have been Master Baker at this prison.

306. If I was to become Master Baker again on my own account, I should adopt Mr. Stevens's machine. It is quite proved here that it produces at least three 4-lb. loaves more per sack of flour. We estimate the loaves at 6*d.* per 4-lb. loaf ; that is the cost to us, buying our own wheat and grinding it here by the prisoners, and having the labour of prisoners as bakers. The flour is of good quality, and the brown bread we make excellent. We make a small quantity less brown, approaching white, for the sick. We are, (as appears from this paper delivered weekly to the storekeeper,) running at present 98 loaves per sack on the average of the week. We have gone to 100 quartern loaves per sack with superior flour. Our weekly average from hand-kneading was 94 or 95. [On a subsequent visit Mr. Phelps stated "the flour we are using is turning out 98½ 4-lb. loaves per sack. The quantity of water used per sack varies with the quality and condition of the flour. The flour which we are now using,

which was only ground last week, is taking up two gallons of water per sack less than the flour we used before, and will take up the two gallons more after it is a little older. As near as I can judge, (although I have not tried it accurately,) the machine makes flour take up about two gallons more water per sack than it will with hand-kneading. This is 18 lbs. of water. Three 4-lb. loaves are 12 lbs. of bread. Allowing for evaporation this is about the weight gained. On 98 loaves it amounts to about three quarters of an ounce more water for every pound of bread."—H.S.T.]

307. Five men have made these $5\frac{1}{4}$ sacks (now in the troughs) into dough in 20 minutes. It is generally done in 18 to 20 minutes.

308. To make two and a half sacks into dough by hand would have taken three men half an hour. Five men therefore do more in 20 minutes than six men could have done in half an hour by hand-kneading. The labour too is much more convenient to the men, and better for their health in every way.

309. In point of cleanliness also there is a great difference. Nothing can be cleaner than this process with the machine ; but when men are bending down over the heavy dough, perspiration must drop into it ; let the weather be hot or cold, men must perspire, some more than others, but strong or weak the perspiration will drop from them.

310. The bread made by the machine does not crumble like hand-kneaded bread.

311. [In a letter dated 4th November, 1861, Captain Colvill the Governor of the Middlesex House of Correction, Cold Bath Fields states. "We have had one of Mr. Stevens's machines in constant use since July, 1860, and it gives great satisfaction, and has not required repair. It is a double machine and can make five sacks of flour into bread at one time. The saving is at present about 1*s.* 6*d.* per sack, and the bread is better than could be made by hand. The consumption of flour here is about 50 sacks. a week, so there is a saving of nearly 200*l.* a year. I have no doubt that the machine is better for the health of the men employed and no skill is required to work it."—H.S.T.]

Mr. Norman, Marlboro' Terrace, Old Kent Road.

312. I employ two men and a boy. I have one of Mr. Stevens's machines, it is a one sack machine. The men like it very much. It certainly makes the bread better than it can be made by hand, and my trade has decidedly increased since I have had it. My premises are new and very roomy and airy. The bakehouse is 18 feet × 16, and 8 high ; and the lights are two feet high, and run nearly the whole length of the bakehouse. The centre one opens as a fan-light about one third of the length, and there is ventilation through the door of the "trap," but it might be improved, as the heat is considerable near the ovens. I might put a ventilator through the wall near them.

313. The machine will make 7 bushels of flour into dough, although it is called a one sack machine. I have an extra trough, so that when one batch is made we can begin another directly. I have two ovens, each calculated for eight bushels of bread, the produce of the 7 bushels of flour. I have not taken any particular note of the additional quantity of water used.

314. The advantage of the machine in point of cleanliness is undeniable. When men are bending over a trough and working hard in the hot close places such as most of them are, it is impossible to prevent the perspiration falling into the dough.

315. I began to work night work at 17, in making dough as well as moulding, and I believe it undermined my health, for I have never been strong since; I was strong when I came up from the country, I had never known what it was to be ill. I have known a great many lads under 18 working night work.

Mr. R. Emberson, 48, Torriano Terrace, Kentish Town.

316. I have had one of Mr. Stevens's machines about 12 months. In making a trial with it as against hand-kneading, I used six sacks with one and six with the other, in batches of about a sack each; the flour being all of the same load. The trial was made without the knowledge of the foreman, as I was determined that it should be a perfectly fair one. The result was that, I got a little under $2\frac{1}{2}$ loaves per sack more from the machine than from hand-labour. I reckoned, therefore, that the gain, with the business I did, would be about 7*s.* per week. I did not take any particular note of the additional quantity of water used with the machine. We made the dough with the machine too tight during the trials, and, I believe, it would have taken a gallon more water, and have given a larger return of loaves. If we had the feeder attached to the machine we could have regulated the quantity of flour exactly. This is one of Mr. Stevens's oldest machines, and being "attached," *i.e.*, having no extra moveable troughs, I cannot make all the dough I require, and am obliged to use the old mode of kneading daily. I cannot, therefore, compare my "sweepings" with what they used to be before I had the machine. Even with this old machine, which goes very hard at the last, I feel the labour of making dough less than I do when I help to make it by hand. I believe, from my own experience, that if the "sweepings" amounted to one sack per 120 sacks of flour, it would show carelessness somewhere. Mine never amounted to that, but as they are taken away by a milkman from time to time, I do not know the exact quantity. The machine saves me from breathing the gas which I feel very much in my lungs when breaking up the sponge in making dough.

Charles Little.

317. I am foreman to Mr. R. Emberson. The work with this machine is very hard for the last 10 minutes. If it had the

multiplying power of Mr. Stevens's new machines I should very much prefer it in every way to hand labour. It cannot but be much better for our health, as there is no dust, and the position in doing the work is better. In breaking up the sponge with the hand you cannot avoid breathing the gas as well as the flour dust, and more especially where patent yeast is used, which is what bakers in general use in London ; the German yeast is the next worst for that; brewer's yeast gives out less gas than either of the others. Many a time I have been obliged to raise my head out of the troughs on account of the suffocating feeling, as though I could not get my breath at all.

318. [The original bakehouse in these premises was a kind of back kitchen below the level of the street, about 15 feet long, 6½ broad at its narrowest part near the oven, and under 6 feet high ; at its broadest part it was 9 feet, and its highest part about 6¼ feet. The light was admitted through a flat glass over the small portion near the oven, and the air through a small aperture at one corner. In this confined space two men worked habitually, the master helping when required, and three on Fridays.

319. About 3 years ago, Mr. Emberson raised the lights to an upright position, and placed a slanting roof over the space near the oven, (about 4 feet) admitting air through a large fanlight.

320. Even with this improvement, Mrs. Emberson stated that the sulphurous vapour from the oven and the steam from the bread made their way up to the top rooms of the house, and affected the health of her children. Two relatives also who had come to stay with them had been much affected by it, and could not stay.

321. To admit Mr. Stevens's machine, a front kitchen was added to the bakehouse, 9 feet and 12 × 6, well lighted and ventilated by a large window in the area, so that thorough ventilation is now effected by the windows in front and behind. The bakehouse is perfectly clean.—H.S.T.]

Mr. C. Emberson, 25, St. Paul's Road, Highbury.

322. I have been in the baking trade 28 years. I have had one of Mr. Stevens's machines about nine months ; it is one of his new machines. It works very easily. In about 20 to 25 minutes my two lads, one 16 the other 19, can make into dough upwards of one sack of flour, turning out 120 loaves. These two lads could have made the dough by hand in about the same time, but not so well. The machine makes the dough clearer, *i. e.*, entirely without knobs of flour, and it makes it spongier also, that is, lighter. If I had several shops I should have a machine in each. I make all my bread with the machine, and I find it gives an increase of about two loaves per sack. I have never compared accurately the additional quantity of water it takes up. The advantage of the machine to the men in preventing their breathing the flour-dust is great.

323. I cannot help saying, that one of the great advantages of the machine is the cleanliness of the process ; there can be no

perspiration dropping into it. Many a time I have taken a dislike to eat of a batch of bread which I have seen made in my own bakehouse, and I have even got my wife to make me a loaf or two for my own eating; she has done it times upon times for me. Some men do not perspire at all; but in close places there is not one out of a hundred who will not have perspiration dropping from him in making the dough; and I know many men whose arms are so full of humour (baker's itch) that they are ashamed to turn their sleeves up.

324. We never begin work before 4 A.M.; my business does not require it. My lads have generally done by 1 P.M., or at latest 3 P.M.

325. I use nothing but the best flour and brewer's yeast. There is a great quantity of bread sold in London at a price which must be a loss if the flour was not adulterated. If anything could be done to prevent this underselling, by which those who supply a pure article are so much injured in their trade, it would be a great benefit.

W. Boltwood.

326. I work for Mr. Emberson. I am 19 years of age. I was 16 when I first made dough. That was in the country. I began work at 3 A.M. Here we set the sponge at about 8 in summer, and about 6 in winter. I get to bed at 8 P.M. at latest, and begin to work at about 4 A.M. The machine is much easier work than hand-kneading.

327. [There are here two ovens. To make room for the machine the kitchen was added to the bakehouse. The entire space is now about 20 feet × 9 × 6, with a small place on one side for washing. Ventilation ample through windows and doors, affording, when needed, a thorough draft. Bakehouse perfectly clean. Business increased since machine used. Machine occupies about 9 feet × $3\frac{1}{2}$ × 6 high with feeder, 4 feet high without.—H.S.T.]

Mr. Clarke, Master Baker, Colney Hatch Lunatic Asylum.

328. I have been master baker of this establishment five years. I was seven years master baker of the Hants County Prison, Winchester. Previously to that I was in the trade as a master baker for two and a half years.

329. We have set up in this bakehouse one of Mr. Stevens's double action machines, which we turn by steam power. It has been in use three months (Feb. 21st, 1862). It has entirely answered all the expectations I had formed of it.

330. I was led to the opinion that it would be profitable to apply machinery to making the dough by the following considerations:

331. I called the attention of the magistrates to the fact that in a large public establishment with which I am acquainted, where the bread is made by women, they got 30 lbs. of bread

(seven and a half quartern loaves) less out of the sack of flour than we did from the same quantity of flour by men's labour.

332. This I knew must arise from the more perfect mixing of the dough by the superior physical strength and skill of the men; as I knew that a good journeyman is of so much greater value to a master baker, both in producing a greater quantity of bread and also in saving flour in the dusting the loaves when moulded and ready to place in the oven. The better the dough is made the less dusting they require.

333. I had heard of Mr. Stevens's machine, and I accordingly went to see it at work at Coldbath Fields Prison, at the Lambeth Workhouse, and at Wandsworth Prison. I went many times to Coldbath Fields to see them setting the sponge and making the dough, and I satisfied myself that the saving resulting from the use of the machine was so great as to make it very desirable that we should have one here.

334. We have in this asylum 1,800 patients and 200 officers and servants. We make into bread 43 sacks of flour per week. We do our work in 11 hours including one and a half hours for meals; we begin at seven A. M. I have one paid journeyman; the rest are patients.

335. I was perfectly satisfied from what I saw at Coldbath Fields, that the extra loaves produced by the machine were on an average more than three 4-lb. loaves per sack. With the flour now in use I am making $3\frac{1}{2}$ 4-lb. loaves more per sack than I made by hand labour. As I have had flour from different contracts since we have had the machine, I consider I have arrived at a fair average. The increase has been from all the same, $3\frac{1}{2}$ loaves per sack.

336. The extra quantity arises partly from the more perfect mixing of the dough, and partly from the prevention of the loss of flour which takes place in the form of dust in hand-kneading.

337. The quantity of flour-dust collected daily in this bakehouse while we were making dough by hand labour was 19 lbs; our consumption of flour being seven sacks a day. This amounted to a loss of 2 lbs. 11 oz. of flour per sack. 2lb. 11oz. of flour, of a quality that would yield 94 4lb. loaves from a sack of 280lbs. would make into 3lbs. $9\frac{3}{4}$oz. of bread. The total loss in dust amounted to 25 sacks per annum; which at 40*s*. per sack, is worth 50*l*. per annum. We made one sack of sweepings for every 100 sacks of flour used. This bakehouse is 40 feet × 60, and 30 feet high; probably one of the finest in the kingdom.

338. This flour dust is the finest part of the flour; the finer it is the more liquor it absorbs, consequently the more bread it makes. The dust in the bakehouses at Coldbath Fields and the other places above named is also very trifling.

339. Then, as to the gain by the more perfect mixing, if you take a piece of dough made by hand labour and pull it open, you will find particles of dry flour in it; you can see them with the naked eye. But with machine-made dough you cannot find anything of the kind with the most powerful glass. I tried that myself at Coldbath Fields; I tried it with a large hand glass.

340. Another saving arises from the machine-made dough requiring less dusting as said before in "moulding in." The dough is clearer and tougher than can be produced by hand labour. Dough badly mixed requires more dusting, and a master baker considers as waste all dust used after the dough has passed the scale. I believe the saving from this is at least two lbs. in every sack of flour. We use for dusting the same flour as for making the bread. A fair average price for a quartern, or seven lbs., of flour being 1*s.* 2*d.*, this shows a gain of 4*d.* per sack. As we use 43 sacks a week there is 172 pence or 14*s.* 4*d.* per week = 38*l.* 2*s.* per annum.

341. An average addition of three 4-lb. loaves per sack gives on 43 sacks 129 loaves per week, which at 6*d.* per loaf amounts in value to 3*l.* 4*s.* 6*d.* per week, or 166*l.* 4*s.* per annum.

342. Adding these sums together, my calculation is that our saving from the machine (50*l.* + 38*l.* 2*s.* + 166*l.* 4*s.*) will amount to 254*l.* 6*s.* We had already sufficient steam-power. The machine with its appliances cost 350*l.*

343. There is no difficulty whatever in keeping the troughs perfectly clean. The mixer comes out quite clean. A minute or two is sufficient to remove any small pieces of flour still adhering to the trough, after each batch is made.

344. The application of steam power to the machine does not, I think, cause the dough to be made any better than it is in the machines turned by hand, it only economizes labour.

345. Ours is a double machine, but we work with one or two troughs as we may require. The action of the regulator in the flour-box (the feeder) keeps the motion of the dough-mixer steady. With the double action we make six sacks at a time into dough; it takes us twenty-five minutes. Whereas with the old hand-and-arm system it used to take us an hour to make half the quantity. I am making 100½ (one hundred and a half) 4-lb. loaves per sack, and have been ever since we had the machine; the books show this; the average before was 97. The contract price of our flour averages about 40*s.* The loaves will weigh 4 lbs. after 12 hours standing. I have not measured accurately the additional quantity of water we now use, but it does not amount to anything like two gallons (18 pounds) per sack. We give it more water, as that is required by the quantity of flour saved, as shown above (2 lb. 11 oz. per sack), and by all the particles of flour which remain dry with hand-kneading, and which are by the machine brought into contact with the moisture; and we bring the dough to the same consistency as we did when we made it by hand. We judge of this by the eye.

346. A very great feature in favour of the machine is the perfect cleanliness it ensures in making the dough. Even in such a large, airy, cool bakehouse as this, it was impossible, while we made dough by hand, to prevent the men being in a perspiration when at their work, even before they began making the dough. Then with their arms and face and whole body warm, they began to mix the dough, and the labour being great, the thing being done so quickly, the dough could not be made

without the perspiration falling into it ; it was a common occurrence.

347. I began to work as a journeyman baker at Southampton. I was 14 when I began to work night-work like the men. We began at 12 at night, and our usual day's work was 17½ hours, sometimes 19 hours. The masters insisted on getting a day and and a half's work out of us for one day's pay. Competition among the masters is the cause of it. The men go away to places where the work is less as soon as they can.

Mr. Robertson, Salmon's Lane, Limehouse.

348. Was chairman of the "Eastern Unity Master-bakers Society," which was formed in 1859 to consider the claims of the "Operative Bakers' Association," the object of which was to diminish the hours of labour, and to confine them to the hours between 4 A.M. and 4 P.M. The committee recommended the adoption of that system ; but as some persons in the trade desired an extension of the hours on Saturdays, which the Operative Bakers' Committee refused to accede to, the proposition tell to the ground.

349. Mr. Robertson stated to me that his opinion remained unchanged, as to the desirableness of adopting those hours, both in the interests of the men and the masters, but he saw no prospect of agreement upon the subject, and he considered any attempt of enforce it by Act of Parliament out of the question.

350. His men come at 12 at night, make a batch of dough in an hour, or less, and lie down until 4 in the morning. They have done all their work by half past four in the day, and sometimes earlier. The foreman is obliged to come at 7 or 8 P.M. to set the sponge, he goes to bed at half past eight. The two men probably go to bed at 6 or 7 P.M. and can sleep until near 12. The foreman has a rest also in the afternoon.

351. Mr. Robertson thinks that there could be no objection to restraining youths under 18 from working as they do now ; that it would be a step in the right direction. He sees no objection to the inspection of bakehouses, with the view of suggesting improvements in ventilation and cleanliness. He frequently tells his men that they ought not to allow dust, &c. to accumulate, but they are dilatory in attending to it. The sulphur from the ovens and the steam from the bread often pervades the whole house. Suggestions might lead to this being obviated.

352. Bakehouse 18 feet × 20 × 7 ; underground ; formerly a kitchen and back-kitchen. Two ovens. Occupied by Mr. Robertson for the last 17 years. Window behind, improved and enlarged a year ago. Twelve years ago an opening made in front, to admit more air. Ventilation now sufficient. Cannot lower the floor on account of the drains.

Mr. Heiser, John Street, Limehouse.

353. My father began business here about 40 years ago Space was not so valuable then, and the bakehouse was built in

the garden. I succeeded my father here. It is a great advantage to have the bakehouse, as mine is, away from the house. No sulphur from the coals can come up and pervade the whole house, as is so often the case in the ordinary bakehouses below the level of the street.

354. That lads under 18 should do nightwork is a crying evil, and ought to be put down at once.

355. I don't know a journeyman baker, nor have I, during all my experience, who ever goes to a place of worship. The long hours and the night work drive them to drink and to all sorts of immoralities; and as they are partly engaged on the Sunday from 8 A.M. to 1½ for the Sunday bakings, and at 7 P.M. one out of two or three men have to come in and set the sponge, (the rest coming at 11 P.M. or 12 to make the bread,) it is not surprising that few ever go to a place of worship.

356. By far the steadiest men we have in the trade are the Germans. Most of them save money, and get into the trade. Very few are addicted to drinking habits. The conscription in Germany drives so many of them over here, they are fast supplanting the English journeymen, who are so uneducated; whereas every German is educated to some extent, and has much more self respect. But with this night-work and long hours, and going into the trade so early, it cannot be expected that the English journeymen can be otherwise than they are.

357. It would not be out of the province of Government to interfere to see that the bakehouses were proper places to work in. If the journeymen saw that the Government were solicitous for their welfare, it would make them better disposed to look to themselves.

358. I should be most willing to adopt day work, if every one else was to do so too; but if I was to do so, and others in the trade not, I should lose my trade. People will go where they can get hot bread at the hour they have been accustomed to get it.

359. The competition among the master bakers is the cause of the difficulty in getting rid of night work. An underseller, who sells his bread below the cost price, according to the price of flour, must make it up, by getting more out of the labour of his men. The men are kept at work bringing out batch after batch during almost the whole 24 hours, without receiving more in wages. If I got only 12 hours work out of my men, and my neighbour got 18 or 20, he must beat me in the selling price. If the men could insist on payment for over work, this would be set right; but there are so many men always wanting employment, that the thing cannot be done. Every other labourer but the journeyman baker is paid for over-time.

360. I do not see why Parliament should not go a step further than they have done, in protecting journeyman bakers in their hours of work. On the grounds of religion, they have been limited in their hours of work on Sunday, for dinner bakings, also no baker is allowed to bake bread on a Sunday. It would be only another step in the same direction, to enact, on the

grounds of morality, religion, and the intellectual and physical benefit of the journeymen, that no baker should be allowed to carry on his trade before or after certain hours of the night.

361. There would be a great difficulty about the Saturday's work. On ordinary days, the work begins at 11 P.M. My foreman has done by 1 P.M. the next day. My 2nd and 3rd hands, who take out the bread, are seldom wanted after 5 P.M. We do two batches a day; if we do a third batch, the foreman and all the the others are at work till 6 o'clock. On Saturdays it is much heavier; they do not get away till 7 P.M. The work is continuous from Friday night at 11 to 7 P.M. on Saturday. If Parliament was to say that no work should be done, except setting the sponge, earlier than 4 A.M. or later than 8 P.M., it would answer very well for every day but Saturday. One great difficulty we have in adhering to stated hours, is that our material is such that we cannot work by the clock. The state of the dough varies with the weather. We might lose a batch, if we could not take it in hand at the right moment. It is said that the Scotch make their bread within the 12 hours; but they don't mind how sour the sponge is. The people of London would not eat the common household bread used in some places in Scotland.

362. I believe it is only since the assize was taken off bread, that the unlimited hours have arisen. Bakers used to do less trade, and the hours were shorter.

G. Knight.

363. I am foreman to Mr. Marsh, 11, Three Colt Street, Limehouse. I have worked in the baking trade 32 years. I have been a foreman 20 years. I have subscribed for a long time to support the movement for day instead of night work. I should be glad if Parliament could help us. This bakehouse is well ventilated compared with many. I have worked in many that are unfit for men to work in, and ruin their health. It would be a good thing if they could be inspected. Also, if lads under 18 could be stopped from doing night work, it would be a great benefit to them; many a one has died young, from doing this night work.

364. It takes two men about 40 minutes or $\frac{3}{4}$ of an hour to make a batch of dough of two sacks. You would have to be doubly careful if you wanted to prevent the perspiration dripping down into the dough. If we are pressed for time, having to get a batch of dough made by drawing time, where there are two ovens, there is no time then to wipe off the perspiration, and it goes right down upon the dough. If Stevens's machine prevented that, the public would like it, if they knew of it, but in many of the under-ground bakehouses there is not room for it. This bakehouse was whitewashed last year, but some where I have worked never see any whitewash at all. If you see some of those in Whitechapel you will see what a good many are like.

365. There are two ovens here, and we get three batches a day out of them. There are two men and myself. Our hours

are the usual night ones from 11 o'clock P.M., and I have also to come at 6½ P.M. and stay till 8. I leave at 2 P.M. and get a little sleep between that and 6½, and again between 8½ and 11 P.M. On Sundays I come at 9½ A.M. and stay till 1½, and I come again at 6 and stay till 7. The second hand comes on Sundays at 9 A.M. and again on Sunday night at 11.

366. Many lads begin to work nightwork as early as 15. It ruins their health; there is the sulphur from the furnace, and the spirit from the bread, especially in the small close bakehouses, which injures the health and injures the eyes. It has injured mine, I know; I am suffering from it now. There are many bakehouses in which you must be either perished by the draughts and get rheumatism, or be suffocated. No doubt many such places could be improved in ventilation by a little contrivance, if the attention of the master was called to it.

Mr. NORTH, Three Colts Street, Limehouse.

367. I have been a master baker here 8½ years. I was on the Committee of the Eastern Unity Master Bakers Society, and I was anxious for the 12 hours system, but in order to carry it out it would be necessary for the men to work overtime on Saturdays. I made a proposition in the committee that the men should be paid for that overtime, but when it was put to the men they refused. Unless overtime was worked on Saturday it would have been impossible for me, or for any one doing a large business, to carry it on. I have sometimes as many as 6 or 7 batches on Saturday of 11 bushels each. It takes from 11 P.M. on Friday till ½ past 5 or 6 P.M. on Saturday afternoon to get through this work, with four men, and one interval of two hours rest, if they like, from a little after four on Friday night.

368. My usual course of work differs from that of the West End. I allow my men to do their work, 4 batches, one after the other, so that the foreman and 3 hands can go home at 1 P.M. or a little after; the second hand who serves customers is detained a little longer. At the West End the men are, in many places, kept hanging about the bakehouse in order that a batch may be got out at 6 o'clock in the evening. This was the custom, and I believe it is still.

369. At 6½ to 7, according to the weather, the foreman sets the sponge. At 11 they all come in, and I then go to bed. If the hours of 4 A.M. to 4 P.M. which the men proposed were adopted, it would oblige every master whose men slept out of the house to get up at 4 o'clock to let them in.

370. This would have been unpleasant, but we were willing to adopt it.

371. I take in no bakings on Sundays, or any other day. My men work hard on the Saturday, and I give them their Sundays rest. The Sunday bakings, if I was to do them, would pay my rent.

Mr. Gilrush, White Horse Street, Stepney.

372. I was an active member of the committee of master bakers of this district for shortening the hours. The masters were all ready, with very few exceptions only, to adopt the hours between 4 A.M. and about 4 P.M. except on Saturdays, when we required 14 hours work. The deputation of men refused. If the men had come in to our views, the short time would have been adopted in the whole of the district from Whitechapel to Blackwall.

373. In my own case my men never begin work before 2 A.M., and many masters in the neighbourhood do the same. It is so far inconvenient to the masters that their night's rest is broken to let the men in, unless they sleep on the premises, as mine do; but when they slept out I have let them in myself.

374. I do not think there are many lads under 18, now in the trade, in this part of London, doing nightwork, but if there are it would be an advantage to them as to their health to prevent their working at night, but it would keep them back in their trade. If the lads were forbidden to work nightwork before 18 they would not be so likely to get into drinking and smoking and other vicious habits, thinking themselves men too soon, as they do now.

375. My bakehouse is in the yard, it is amply ventilated. [Very clean, lath and plaster ceiling, whitewashed; no cobwebs or other dirt.] My opinion is that if bakehouses were inspected by some sanitary officer, many close and unwholesome places (such as many in which I myself have worked) would be made clean and healthy.

376. I have had 28 years experience in all sorts of places of work, and I think that what the men say generally as to the perspiration falling into the dough is exaggerated. Where men are skilled and know their trade, and work to each other's hands, they need not be more than 30 minutes making a batch of two sacks of flour; they can do this without being in a profuse perspiration. But there are hundreds of men in the trade who know little or nothing about it, inferior hands, and if there is any truth in regard to the perspiration dropping into the dough, it must be in regard to these hands, men who make it labour to themselves.

377. If a baker has a well ventilated bakehouse, and one kept clean like this, and has skilled hands, the bread can be and is made as clean as it ever can be by any machine.

378. There must be a difficulty at the West End in the way of adopting 12 hours, on account of the quantity of small bread during the season wanted at an early hour, by 7 A.M.

Mr. Goymer, Cable Street, Royal Mint Street.

379. Bakehouse under parlour; oven under the shop; thorough draft from openings under ceiling; dimensions about 16 feet × 19 × 6, larger than ordinary premises so situated. Hours of work for the two men: sponge set at 8 P.M; making of dough

begins about 12 ; three days in the week they leave at 1 P.M, two days at about 4 P.M., and on Saturdays always away at 6 P.M. Errand boys hours from 6 A.M. to evening as required.

380. Hot rolls wanted not later than 6 A.M. for men going to work on or about the river, and about the railways, and for market-men, &c.

Mr. MACKNESS' Shop, Cable Street, Royal Mint Street.

381. Bakehouse under shop and parlour ; one oven under the yard. Ventilation through openings under ceiling before and behind ; men complain of thorough draft. The salesman stated that he had worked at the baking trade 24 years, and that it would save many a lad's health if they were all forbidden to work night-work; and if the bakehouses were inspected it would put an end to a good deal of the dirt and filth you find in many places. We have two other bakehouses, one in High Street Shadwell, the other in Three Colt Street, Limehouse, as clean and healthy places as you would wish to see.

Mr. MACKNESS, High Street, Shadwell.

382. I have here one oven, and do three batches of bread daily. My men must come at 11 P.M. ; it takes them an hour to make the dough, and they can then sleep on the boards till three; they can always get away (except on Saturdays) by 4 P.M., and by five they will have had their tea and might go to bed. On Saturdays they have done at 5 P.M.

383. Out of the nine working men which I have in my three shops, six are Germans. The Germans are fast superseding the English workmen in the baking trade ; the English workmen are so unsteady, and so given to drink.

384. I have only one oven in each of my three shops ; it is therefore more difficult for me, doing a good business, and for all those situated like me, to adopt the 12 hours' system. I could not do my work at all on that plan.

385. My bakehouse here, although underground, is very large, and has large fan-lights at the back, and ventilation right through. I whitewash twice a year, spring and fall. My bakehouse in Limehouse is on the level. At my place in Cable Street, which was rather close, I put in a zinc plate behind, and made an opening in front, and there is a flap also in the passage. I have no doubt that if a Sanitary Commissioner had power to go and look into the bakehouses, a great many would be vastly improved.

Mr. CONNELL, Royal Mint Street.

386. I enlarged this bakehouse, and it now extends under this and the adjourning house, and has plenty of air. I have it whitewashed, and the rafters swept and cleaned twice a year, at Christmas and Midsummer, but there is so much dust about, that the

cobwebs soon collect again. Some bakehouses are very different from this, and I believe that inspection would do much good in having them swept clean.

Mr. Baker, High Street, Shadwell.

387. I was in favour of the movement in 1859, for adopting the day work, and if the men would have conceded the point about being paid for extra work on Saturdays, the whole of the masterbakers of this part of London would have agreed to the day-work as the men proposed. Nevertheless I do not think that the arrangement, if it had been made, would have lasted six months, as there are always men in the trade, who would be tempted to get out the hot bread and rolls earlier than others, for the sake of drawing off the custom from other masters, and that would have caused dissatisfaction, and both masters and journeymen would have been ready to fall back to the old hours.

388. I do not think that the present hours are necessarily injurious to the men, except in particular cases. The hours of work generally allow the men to go away from 12 to 2 in the day, and they need not come back till between 11 and 12 at night; sometimes earlier and sometimes later, according to the weather. If the men would be more careful in their habits, there is no reason why they should not be better off in the baking than in any other trade. They lose no time for wet days, and are at no expense for tools.

389. My bakehouse is well ventilated, and it is whitewashed once a year.

390. I should think there could be no objection to inspection of bakehouses; it would lead to improvements, ventilation, and cleanliness.

391. I was 14 years of age, when I first began to do night-work. [His foreman stated that he began between 13 and 14.] I have always been a man of temperate habits, and the night-work has not hurt me, neither has it injured my foreman. But many lads, beginning so young, are led into bad habits by the men, and I consider that the night-work for youths under 18 ought to be put a stop to.

Mr. Dosell, Brook Street, Stepney.

392. I was honorary secretary of the "Eastern Unity Master Bakers' Society," formed in 1859, and comprising Limehouse, Stepney, Radcliffe, Shadwell, the Commercial Road, and the adjoining localities (Wapping, &c.) In 1859 the master bakers of this part of London had come to an understanding to adopt the hours from 4 A.M. to 4 P.M., with the exception of Saturday, on which day they wanted the men to work, when required, an hour or two or even three hours overtime, which was to be paid for. The representatives of the men refused. Generally speaking, the overtime would have amounted to about three hours, depending somewhat upon the weather—the fermentation coming on

quicker in warm weather. In summer we can get two batches of bread out in a third less time. If we let it go over the time, vinous fermentation very rapidly sets in.

393. The argument of the men was, that for those extra hours on Saturday, extra men could be taken on, there being, according to them, a large number of men always out of employ. But we represented to them, that just double the number of journeymen would be required, and all to be kept simply to do those few hours extra work on the Saturdays.

394. There is also a business reason for not employing "jobbers" unacquainted with the nature of the oven and the bakehouse. If a man does not know it well there would be a great chance of his spoiling a batch of bread.

395. Then again, who is to go and find those men? Would they always be ready to our hand, waiting at the shop door to come in? Then, if so many journeymen are to be in readiness for that extra work, what is to prevent wages going down in proportion? Industrious and careful master bakers would not expose themselves to these risks; and indeed, if the average work proposed, from 4 A.M. to 4 P.M., had been adopted, it would not, I fear, have been adhered to long in consequence of there being so many small masters in the trade who would have been under a great temptation to improve their business by getting their rolls and batch bread ready before their neighbours.

396. For instance, if I supplied five or six shops, and could not, by working from 4 to 4, get the bread out until 10 or 11, and a neighbour, by working nightwork, or even beginning at 2 A.M., could supply them by 8 A.M., the poor who are always anxious for hot bread, would go to his shop and leave those I supplied. They will send a considerable distance, a quarter of a mile, for hot bread rather than not have it.

397. I believe the poor have three reasons for preferring hot bread, though it does not go so far as stale. First, it supplies the place to them of hot dishes which other people can afford, they have not often the means of cooking or preparing anything hot for themselves; next they say that the children don't want so much butter with it, they will waste the stale bread while they will eat all the new. Then again, it is, as they term is, "more filling," that is, it takes longer to digest, they do not feel hungry again so soon.

398. There is another very important reason why the hours from 4 to 4 can never be rigidly adhered to under all circumstances.

399. It sometimes happens, as it did last winter when potatoes and all other vegetables were dear, that in poor neighbourhoods like this, the whole of the bread in all the bakers' shops around would be sold on the Saturday night. The same thing would occur in nearly the whole of the metropolis. If we could not begin to make dough again until 4 A.M. on Monday morning and the weather was cold, we could not get our bread into the shop until 11 or 12 o'clock; people would have to go without their bread until that hour; this point we urged upon the men, but

they would not listen to it. In my own case I have sold every loaf on Saturday night several times during last winter, and it is the case every winter more or less.

400. There are a great many young men under 18 at work with the men in different parts of London. It would be a good thing to forbid them being employed at nightwork.

401. My men go to work at 2 A.M. and have invariably done by two in the day.

402. There is another difficulty about the hours from four to four. The men must depend upon somebody to call them; it is generally the policeman; but he may have had to take some one into custody, or he may have gone to a fire, or something may have called him or detained him; and then your business suffers. If this was to occur in summer, half an hour would make a batch of bread sour, and consequently unsaleable. With flour at 60*s.* a sack, and a sack and a half in a batch, there would be a loss of 5*l.*, manufacturing expenses included.

403. If the men's habits were steadier they need not suffer as they do from nightwork. Where the business is a moderate one of two batches a day, 12 hours would suffice for it, they can get home at 11 or 12 in the day, except on Saturdays, when three batches take till 4½ or 5; three batches are enough on Saturdays, as there is stale bread from the day before, and less bread is, as a rule, used on Sundays, in consequence of the greater consumption of meat and pies and puddings on that day.

404. I think that the inspection of bakehouses would do good, so many of the underground ones being too close and confined, and the men are so apt to neglect keeping them clean. I think the majority of masters lime-wash their bakehouses once a year at least, but plenty let them go many years without any cleaning at all. If the men do not attend to it of their own accord the master does not like to interfere with them. Some of the small bakehouses which I have seen are exceedingly neglected, and must injure the health of the men, and tend to throw them upon the public for support.

Mr. MULES, William Street, Cannon Street, Saint George's in the East.

405. I was a member of the committee of the "Eastern Unity Master Baker's Society" in 1859.

406. After the failure of the attempt to adopt the 12 hours generally, I was the first to give a trial to the hours between four and four, and I carried it on for 12 months. I found it answered very well as long as the men would work steadily, but after a time I found that instead of setting to work when they came at 4 A.M. they would go to sleep, and then again, instead of staying till 4 P.M. they were anxious to get away at the hour they had been accustomed to, from twelve to two. I therefore returned to the old hour 11 P.M. We average about 16 batches a week; the men get away between twelve and two every day except Saturday, and on that day at about five.

407. The men did not like to get up at that time of the morning, 4 A.M., they wanted me to begin at six. But in that case I could not have got my first batch until 10 o'clock. If any of my neighbours got hot bread before that hour they would have carried away my trade. I serve chandlers shops, they would have said, if I cannot get my bread by half past eight I must go somewhere else.

408. The labouring classes will have hot bread for all their meals as a general rule ; they say their children like it best, and it serves them as a hot meal, and it is more satisfying. Thousands of them cannot afford the time to cook if they had the means.

409. I have been here 24 years. Lads under 18 are rarely employed at nightwork in this part of London. I commenced, myself, to work nightwork at 16. I was called up at 4 A.M. to help to mould. There is no question that Parliament would do good by preventing lads under 18 working like the men, beginning at 11 P.M. They might safely be allowed to begin at 4 P.M., when their work would be to assist in the moulding, in cleaning the bakehouse or the tins, &c. ; lads of that age almost invariably sleep in the house. Only a few of my neighbours tried the hours from four to four, but they have given it up.

410. There is no question about it that it would be right to have the bakehouses inspected and licensed like the slaughter-houses. I have a licensed slaughter-house, and no doubt it keeps the master up to the mark in keeping things clean. Many bakehouses are really not fit for men to work in. The Inspector ought to be able to make them keep those dirty places clean, and give them so many days to do it in, under a small penalty, or refusal by the vestry to renew their licence.

Mr. Burnell, Master Baker, Leadenhall Market.

411. I have had 20 years experience in the baking trade. I am an advocate for the total abolition of night-work, and tried it here for a month, beginning at 4 A.M. It answered admirably as long as the men went to work punctually ; but I could not induce them to do so ; they would go to lie down as usual after coming in. Instead of going to bed as early as they might have done, they idled a great part of the night away at their houses of call, and when they came here they were "beaten," and wanted rest. Commencing 4 hours later they nevertheless got away only an hour and a half later than when they came at 12 at night ; which proves that they could do the work in the shorter time.

412. It was much more difficult for me to adopt these hours as I have only one oven, and I am obliged to have my hot rolls for the market people at 6 A.M. The abolition of night-work is quite easy for all who have got two ovens, as that enables them to get through all their work in about 12 hours, Saturdays excepted. But the great difficulty is to bring all the masters to an agreement upon the subject, and to keep them to it. If

a few broke it we should all have to go back, or run the risk of losing our trade.

413. [Bakehouse under shop; ceiling 8 feet high and plastered; well ventilated and clean.] I take care once a week to see that the bakehouse is perfectly swept out and cleaned in all parts of it. I whitewash it twice a year. No doubt the journeymen suffer in many places from the want of proper ventilation and cleanliness, and my opinion is, that inspection would be very desirable, for the sake of bringing many masters to their senses, who entirely neglect these things, and do great injury to the health of their men. In many places, the cobwebs hang so thick between the rafters over the troughs, that if a man was to stamp on the shop floor, there would be pieces of cobweb and dust dropping into the dough, and the men not notice it. Many of the undersellers employ boys as men, for the sake of saving wages, and undersell their neighbours. These boys do the work of men, beginning at 10 P.M. It is dreadfully hard work for lads.

414. The only way to abolish night-work would be for Parliament to say that no dough should be made or bread baked in the night, that is before 4 A.M. or after 6 P.M. It never need be later than 6, even to draw four batches out of one oven. The putting in of the sponge is not reckoned in the time at all. This is the foreman's work. He will come to do this at the right time according to the season, say at 10 P.M. before he goes to bed; he does it in ½ an hour. They always reckon that the sponge must be put in six hours, more or less, previously to making the dough; in summer 4 hours, in winter 6 hours.

415. There are so many practical difficulties in the way of legislation on this night-work question, that it seems unlikely that it can be effected in that manner. But if the men were unanimous, they might abolish it themselves at once. They ought not however to be unreasonable in desiring to limit the work strictly to 12 hours. We are so dependent on the temperature that we cannot say to half an hour when a batch would be finished, and the men must not be allowed to go and leave a quantity of bread half done. Again there must be, of necessity, a longer day's work on Saturdays.

416. If again, eight tenths of the masters were to agree, the few dissentients would be beaten, as they would not get good hands. The good men would not be allured away by a few shillings a week more wages, if they were to lose their night's rest. Other masters of experience, however, think otherwise.

Mr. EAMES, High Street, St. Giles's, Bloomsbury.

417. Stated that he had been in favour of day-work for the men if it could be accomplished; but his men do not complain of the hours. They begin at 12 at night, and have generally done by 12 in the day, except Saturdays, when they go on till six. Mr. Eames's bakehouse is large and very light and well venti-

lated ; on the level in the court behind ; ceiling plastered, and the whole quite clean.

Mr. John C. Dwarber, 28, Fetter Lane, Fleet Street.

418. I have been in the baking trade 30 years, 25 years of it in this lane, and 15 years a master baker. I was a member and occasionally occupied the chair of the City Master Bakers' Association, which was formed about two years ago, to take into consideration the statements of the men relative to their alleged grievances, especially the nightwork. Mr. Webster, of Coleman Street, was our chairman. I believe that there is a large proportion of masters in the trade who consider their men, and would be most willing to adopt any arrangements that would be to their advantage, consistently with the proper carrying on of their own business. We were very desirous to meet the wishes of the men in regard to the hours of work, but when we came to discuss it with them we found that their demands were such that we could not accede to them. They insisted on the strict limitation of 12 hours, except in cases where the state of the temperature or other accidental causes prevented the work being finished, in which cases they would consent to go on for another hour, but in no case beyond it. The hours of the baking trade must differ according to the different nature of the business, and no master could consent to be tied down in this manner. Ours is a trade in which we cannot work by rote ; we cannot take up the work and put it down at pleasure ; it must be done at the right time or not at all.

419. No man has given more, or I believe more impartial, consideration to the subject of the alleged grievances of the men than I have. For my own part I do what I can to make my place a good one, and I consequently get a good class of men, and there are a great many masters in the trade who do the same. I consider that upon the whole the case the men attempt to make out is in many respects exaggerated. No doubt there are many places where they work, not only for small masters but large, where they have much to complain of. In such the bakehouses are much neglected, being both very ill ventilated and very dirty, and their sleeping places such as no respectable man ought to allow himself to be put into. Both the men and the masters are much to blame for this. A respectable master ought to insist on his men keeping the bakehouse clean, or he ought to get it done by someone else. However, do what you will, you can never be sure that you will not have beetles, ants, and other vermin in such hot places as bakehouses ; but there is no excuse for the masters or the men letting the cobwebs hang between the rafters, or the whole place to be filthy as so many are, with bad smells showing how much dirt there is about, and the drains, &c. neglected.

420. If you take London through it may be said that there are a great number of journeymen bakers and foremen whose places, although they do nightwork, men in many other trades may

envy. As a rule there is this difference in their hours between those who work in the wealthier quarters of London and those who work in the poorer : in the wealthier, a large proportion of the bread made is delivered at the doors ; in the poorer 80 or 90 per cent. is sold over the counter. In my case, doing a large business, and serving all sorts of customers, from the banks in Fleet Street to the sellers of lucifer matches in the courts, I sell 90 per cent. of my bread across the counter. My men come at 12 at night, and they leave by half-past 1 in the day (having the usual intervals of rest during the night); they can then go home and go to bed, and in the afternoon have a few hours to go about and enjoy themselves. But where the bread is chiefly delivered at the houses, numbers of the journeymen who have begun work at 11 or 12 the previous night have to be about all day with the bread until 5 or 6 o'clock. They then want a little recreation like other people, and do not like going to bed at that hour ; consequently when they come to work at 11 P.M. or 12, after only two or three hours in bed, they are exhausted. Nightwork is, I consider, a necessity in our trade. There are many other occupations in a city like London where men are required at nightwork ; the gasworks, waterworks, markets, and others. On Saturdays my men leave at 5 P.M.

421. The wages and privileges of the foremen and journeymen in the baking trade where a good business is done are, generally speaking, for steady hands who know their business, so good (25*s.* to 30*s.* per week for foremen, 18*s.* to 1*l.* 1*s.* for second hand, and 14*s.* to 16*s.* for third hand, with in all cases bread and an allowance of flour and potatoes,) that a man of steady habits need not be injured by the nightwork, unless his place of work is a bad one and he delivers bread as well as makes it. A steady man in this trade has many advantages over men in other trades ; he is at no expense for tools ; he has no short time ; he is paid as much in summer when business is slack, as in winter ; never loses a day on account of weather, and his wages and perquisites enable him to lay by money and become a master baker himself. The foreman, besides the allowances above mentioned, has "sack money," and an allowance from the yeast brewer of 6*d.* or 8*d.* per gallon, and three gallons or more may be used per week. Altogether his place may be worth not far short of 40*s.* per week in a good many instances. Of course with the smaller masters it is much less. Where the master takes a part himself in the making of the bread, the first hand will only get as wages 1*l.* 1*s.* a week ; the other perquisites will be the same in proportion to the amount of business done.

422. I always endeavour to have good men, and I think it my duty to consider their comfort and convenience. I do not let my foreman come every evening to set the sponge ; the second hand takes it in turn with him ; this gives the foreman some evenings in the week to himself. I should not be ashamed for any one to see the room in which my third hand sleeps. I stay up till 12 at night and let the men in, so that they have an additional hour in bed ; and by regulating the work with my

two ovens properly during the day, I enable them to get away by noon or about one o'clock. They have then the whole of the rest of the day to themselves. Numbers of masters do the same, but you do not hear of this at the meetings of the men.

423. The most practical point which they have taken up is that of the inspection of bakehouses. No reasonable man ought to object to their being inspected and licensed, and if they are not found to be in a proper state the licences should be refused. Many bakehouses are so situated, and so confined in point of space, that it is difficult to keep them properly ventilated, but there is no reason why they should not be kept clean and sweet, and the masters would benefit by it in their article as much as the men would in their health. If the ventilation is good, the process of fermentation is equalized; where it is not, in hot weather it is often driven on too fast and a batch spoiled, or it is delayed in cold weather. Again, the flour gets spilt; water drops upon it; mouldiness and fungus are produced; flour-dust, coal-dust, cobwebs, the dirt of all sorts of vermin, accumulate, and the exhalations from them must, one would suppose, more or less be absorbed by the dough, as well as the dust and dirt often get into it unseen by the men. The public have a right to be assured that their bread is not made in such places as these and exposed to be contaminated in this manner.

424. Many masters do what they can to keep their bakehouses supplied with fresh air, and many have gone to much expense about it; but very often it is done in such a way as to produce draughts directly down upon the men, and the consequence is they shut it off; and mostly the men work in cold weather with doors and windows closed. A Sanitary Inspector who understood these things would often be able to suggest a mode of ventilating such a place which would enable the men always to have much purer air than they get now. If three batches of bread are baked in the day, the men are exposed for those hours to breathe the sulphurous vapour that makes its way out of the oven. Nothing is more likely to affect their health, and finally to bring them on the rates; so that the public would be consulting their own interests by removing this cause of disease. The sulphur will make its way out. I have had two new ovens put up here, with the ordinary means of letting the sulphur off into the flue, but the space gets choked and the sulphur escapes through the door into the bakehouse. To carry it off I have had a window with a fan light fixed above each oven, which can be opened from one to nine inches, as the men find best. I have the place whitewashed twice a year, and as soon as I see any cobwebs or dust collecting between the rafters I have it swept away.

425. I have the great advantage of having my bakehouse on the level, and I have a flour loft above it. Over the troughs I have a flour bin large enough to contain upwards of 30 sacks of flour. Two men can fill it in 30 minutes, while I mix up with a rake the different qualities of flour as I order them to be put in. I can thus regulate exactly the mixture of flour, and

save materially by the process. By the old and common mode of emptying parts of sacks into the trough, each time, there is great uncertainty, and too much of one sort or other is often poured out. By my method of mixing the quality of bread is always uniform. My bakehouse is 20 feet × 20 × 10, and the ovens project beyond it. I have a space of 100 feet by 33 behind my house, which enabled me to build this new bakehouse, &c. Before this, the bakehouse was underground.

426. As regards boys under 18, I do not think there are many in this part of London who do nightwork, *i.e.* who begin before 5 A.M., but if they do it must be a cause of undermining their health, and there would be no objection to Parliament interfering to prevent it.

427. [One of Mr. Dwarber's men stated to me that he began to work at 11 P.M. when he was 14 years old, and the two others stated they were under 18 when they began.]

428. Much is said about the perspiration falling into the trough while the men are making the dough. It cannot be denied that in the nature of things, this must often be so ; but are there not things that are done in preparing other articles of food that it is as well not to inquire into ?

429. Having, by your permission, read the evidence of Mr. John Bennett (ss. 1 to 95.) I as a master baker am glad to perceive that his statements are much softened as compared to some which he formerly addressed to public meetings ; and I consider that the general current of the evidence you have obtained refutes many of his allegations. One or two points I wish to notice. Mr. Bennett says (s. 5) "the preparation for rolls can be made before 5 P. M. the previous day, excepting in very hot weather, when a half hour's work at 7, 8, or 9 P M. will suffice." But I would ask how if the hours from 4 A. M. to 4 P. M., are to be compulsory, as the representatives of the workmen insisted, this labour is to be performed ? Again, in reference to s. 13, I assert that the friendly feeling of the masters at the conference at Exeter Hall extended only to limiting or reducing the hours of labour, and not absolutely to the putting an end to night work, unless it could be proved to them, which it was not, that it could be effected consistently with the exigencies of the trade.

430. As the term "underseller" occurs so often in the evidence, I wish to put on record its exact meaning, and to show the precise relations of the undersellers to the rest of the trade.

Some years ago the greater portion of the London trade was in the hands of a comparative few. Large trades (rarely to be met with now) were done, and with, as I think, the advantages and protection afforded by the assize, large profits were won. The master baker of that period was a different person entirely from the master baker of the present day. At that time he moved in the upper ranks of his class, was generally a man of substance, was able to support his family, and educate his children liberally; while at the present time, in the majority of instances, he is a bare remove in position from the man whom he employs.

The state of things to which I have drawn your attention induced many to compete at lower prices. Patent yeast was introduced, and shops in good positions were opened avowedly for the purpose of supplying the public at lower prices for ready money. Bakers hitherto had been enabled to give great accommodation, in the shape of credit, to their customers. Even working people were given a latitude of credit unknown at the present day. The new men, as we may call them, impressed upon the public generally that a good loaf could be sold to them for ready money much cheaper than they were being served; and so no doubt it could, seeing that 1*d.* for manufacture and 1*d.* for profit was the legal scale according to the assize. Such competition naturally engendered much animosity in the trade, and the old style of men, in the bitterness of their hearts, stigmatised the new men as *undersellers*. In order to carry out more effectually their new style of trade the undersellers, as we may now describe them, commenced to ticket their bread, to display in large figures the price of their article, a practice unknown up to that time. By this means people were fairly charged one price for the same article. Shops on this plan increased, the old quartern loaf was abolished, the 4-pound loaf established by law, the assize done away with, and free trade in bread the order of the day. The public supported some of these shops to such an extent that enormous amounts of trade were done. Then, indeed, was the case of the journeyman baker one deserving of sympathy and amelioration. I will pass that by now, and briefly trace the working of the baking trade in the hands of the full-price and the undersellers. The latter so effectually staggered the former that, so far as the trade went, they got it nearly half into their own hands. This was the first step towards that which has all but rendered the full-price bakers a traditionary class. In the West End of London, in the City, and here and there in the suburbs, a few emulate the old style, but many among them are glad to cater for the public in both phases. The trade, after a very few years, entered into another transition period. The undersellers, in their turn, had to meet an increase of competition they never calculated on. Population increasing rapidly, new neighbourhoods arising as if by magic, shops accumulating in large numbers,—this indeed was an era for the baking trade of an insanity of competition unexampled in any other trade. I say unexampled, because a baker sells but one article, and if he sell too low, or is compelled to sell at a loss, ruin would soon stare him in the face. Many other purveyors, selling miscellaneous stock, can and do often ticket a leading article at a low figure, under a hope of drawing notice to other things, and often find a profit on the general stock by so doing. This increase of bakers' shops very soon over-ran the demand for them; the proprietors, in order to get trade, sent bread out to families after the fashion of their full-priced brethren. This led to credit. Thus one, and the most important, of the principles, namely, ready money, was lost sight of; they found they could not give credit, quality, and equal lowness of price with men who took nothing but ready money; but they had embarked

and must proceed. The struggling for trade has been going on from that time to the present, and I believe must continue until this great metropolis and its suburbs shall become fairly and fully developed.

But has this ordeal through which the trade has passed been beneficial to anybody? Substantially I think not. Better bread was never made in London than under the old full-price régime. I need not say to you, sir, that while healthy and honest competition elevates those who practise it, unfair and dishonest competition necessarily enervates and degrades all within the pale of its influence. Among the evils consequent on reckless trading we may name that craving of the general public for low-priced articles miscalled cheap. Bankrupt and insolvent courts, their respective staffs and accessories, have fattened by it; many thousands have been pauperised by it, tens of thousands of tradesmen's children have been thrown on the world to win the right to live, through it; and those traders who maintain a foothold in this Babel are they respected? Often are their names associated with some trickery in trade, some dereliction of duty, that however fashionable and politic it may be in trades to wink at, or, worse, pretend ignorance of, leaves each destitute of the richest treasures of life—the confidence and respect of their fellow man,—the very food they eat often embittered by the conviction that they live on "sufferance." But with regard to the baking trade, competition such as I have noticed has, among other evils, brought about a class of shops which we do not call undersellers, but halfpenny under shops—"cutting" shops in regard to the question of price. They bear the same comparison to the underseller as the so-called underseller bore to the old full-price. They cannot injure the underseller in the same degree that he injured the full-priced man, because the price charged, though low, is as much as the article they sell is worth, the quality being such that only a very needy or a very mean class of people purchase it. The bread manufactured in London at the present time is four-sixths made by those called undersellers. I give one-sixth to the old full-price school, the other portion to the lower, namely, the halfpenny under and cutting men. I consider that the so-called undersellers have won and maintained the position of "the bakers of London," that it is they whose influence is felt, and whose combined action would constitute the strength of the trade in any matter which might call forth unity of action. I therefore object to the term underseller as now implying inferiority of position in the trade.

I beg to call your attention to a discrepancy as regards the hours of labour in the full-price and underselling shop. Mr. Bennett says, the under-price work longer hours than the full-price; yet in a former part of his evidence he says the full-price men begin work at 11 P.M. or earlier, and are engaged all day long even up sometimes to 7 P.M. the next day. In fact the men who deliver the bread from the full-priced shops work the longest in the trade.

As regards sections 84 and 85, I believe the sums stated are exaggerated. I do not think any baker's shop in London would realize 4,000*l.* Even where 1,000*l.* to 2,000*l.* value is put upon a

shop it is by the miller who puts on a figure of a nominal value he is seldom paid, but is content to put in his nominee, pocketing the interest on the sum named, and selling to the party as much of the flour he uses as possible. Such shops are generally in the hands of millers. Shops generally are of too slight account to fetch much in the market. 500*l.* is a good price for a tidy shop, and there are more go for 300*l.* or less.

431. Looking at the evidence given on behalf of the men, I wish to record my belief that since the agitation on their behalf in 1834–5–6 the condition of the journeymen generally has been more considered by the masters, and in many instances been materially improved.

432. As regards Mr. Heiser's evidence, I am happy to say that I do know a great many journeymen who go to church. I belonged to a club when I worked as a journeyman consisting of 31 members; during the 5 years I belonged to it at least 50 men had belonged to it. I am able to say of my own knowledge that 9 out of 10 did attend pretty regularly a place of worship at least once on the Sabbath. We never raised the coward cry—Night work and long hours debase us, so we cannot do this or that like other men. Query, if George Stephenson had reasoned thus, what then?

433. Bakehouses should be licensed, and it should be enacted that if a bakehouse is found to be in such a state as to be unwholesome for want of proper ventilation, or so dirty as to expose the bread made in it to be contaminated, the licence should be suspended; also it might be suspended if any youth under 18 was employed after 6 P.M. or before 4 A. M.

434. The question, what should be the amount of the licence fee is one of much interest and importance in many points of view. I believe that a high fee (say ten guineas) would be most conducive to the interests both of the trade and the public. I have given the subject a good deal of consideration, and I am aware that first impressions would be against the policy of imposing a licence of any amount upon the trade of a manufacturer or seller of such an article as bread; and that impression would be likely to be increased by the fact that the manufacturers and sellers of bread, or at all events a large number of them in this metropolis, and I believe elsewhere, are the persons to propose a high licence fee upon their own trade. The public would at first sight very naturally incline to the conclusion that we had some selfish or sinister object in view, such as a desire to create a sort of monopoly for ourselves, or in some manner to restrict the supply for our own benefit. We are, however, actuated by no such motives; and if we were, the licence fee of the above amount would have no effect in support of them. Our bonâ fide object is to put an end to, as far as possible, the manufacture and sale of an immense amount of adulterated bread which is now daily produced, by which the public is defrauded, the lower classes especially, and the dealer in good, pure, and wholesome bread injured. Mr. Purvis in his evidence (478 to 498), which I have read carefully, has put the whole case very

fairly and clearly, and I have only a few remarks which I should wish to add to what he says.

435. The sale of bread at chandlers shops being at the root of the mischief, as Mr. Purvis clearly shows, I wish to make an addition to his argument, which will go to show still more distinctly that the amount of the licence fee would be saved by the bakers who supply them in a very few weeks, and that consequently it would be paid by them, not only without their feeling it at all, but with a result of positive and considerable gain at the end of the year.

436. Every baker who supplies a chandler's shop makes an allowance to him of $\frac{1}{2}d.$ a loaf. This is so much detracted from the baker's profit, and indeed very often not only absorbs the whole profit, but occasions a loss. In the most favourable case of its only detracting from the baker's profit, a $\frac{1}{2}d.$ a loaf upon every 92 loaves (the assumed ordinary produce of a sack of flour) amounts to 3*s.* 10*d.* If a baker was selling the produce of one sack of flour only per day through the agency of these chandlers' shops, this at 3*s.* 10*d.* per day would amount to 1*l.* 3*s.* per week. If, therefore, instead of selling that number of loaves by agency in, say, four or five shops (which is a common case), he sold them in his own shop where he manufactured it, or in a branch shop, commonly called a bread shop, he would, in a little more than eight weeks save in agency what would pay his ten guinea licence fee, and his account at the end of the year upon the sale of 92 loaves a day would stand thus, in the two methods of sale by agency, or in his own shop :

	£	s.
Total assumed profit of 1*d.* per loaf upon 92 loaves per day = 2*l.* 6*s.* per week, or per year -	119	12
Deduct profit of $\frac{1}{2}d.$ per loaf allowed for bread sold by agency at chandlers shops - - -	59	16
Profit to baker -	59	16

	£	s.
Total assumed profit as above - - -	119	12
Deduct cost of selling in licensed shop :—		
Licence - - - £10 10		
Rent of shop - - - 20 0		
Salary of woman or young man as salesman - - 30 0		
	60	10
	59	2

437. The profit would therefore be in figures the same within only a few shillings, at the rent and amount of salary assumed for the sake of illustration, but practically the result would be better for the baker, inasmuch as he would avoid, what so often happens, being obliged to sell his bread to the chandler below cost price,

the competition engendered by that mode of retailing bread being so great as very often to oblige the baker to resort to that mode of retaining custom to his own great loss, and ultimately in a great number of instances (as well explained by Mr. Purvis) to the injury and the defrauding of the public, by leading to the production of a vast quantity of adulterated and inferior bread in the endeavour to avoid ruin through the enforced lowering of price.

438. As to the number of chandlers' shops in the metropolis and their average sale of bread, I think Mr. Purvis's estimate is a close approximation to the truth. I know many which take as few as 2 or 3 up to 5 loaves only, daily ; others take from that to a bushel of bread (16 loaves) ; others up to 30 loaves ; a smaller number 50 and upwards.

439. In sending out loaves to chandlers' shops the usual practice, I believe, is to send 21 loaves for 20, to those who take that or above that number ; this is to allow for deficient weight; but in fact as regards selling by weight, I believe that, although the law requires it, one half of the chandlers shops do not weigh the bread to their customers; they evade it where they can; in that way also the poor are the chief sufferers by this mode of sale, as well as in the adulteration and in the inferior and consequently comparatively innutritious quality. It is of the first importance to the labouring man that the quality of his bread should be good. This licence fee would have an immediate effect in checking the manufacture of bread composed of mixtures which lower its quality and often are most injurious to health.

440. As to weight, the respectable baker who makes bread for out-door customers weighs his dough 4 lb. 5 oz. or 4 lb. 6 oz. for the 4 lb. loaf. He takes care that there shall be no reasonable complaint as to the bread, when delivered, being under weight. There is a sufficient allowance made in weighing the dough, and he does not attempt to gain weight improperly by under-baking. Those who wish to take an advantage weigh their dough one or two ounces lighter, and under-bake their bread, and consequently when sold without being weighed the customer is cheated with every loaf.

441. It may be worthy of consideration, with the view of obviating possible objections to so large a licence fee in all cases, whether a difference might not be made between the fee to be paid by the manufacturer and that to be paid by the mere seller of bread ; for instance, that " the seller of bread not manufactured upon the premises " should pay a fee of 5*l*. 5*s*. instead of 10*l*. 10*s*. But this requires further consideration with a view to determining whether it might not have the effect of defeating the object in view.

442. I do not know whether the baking trade is conversant with the French law for the Paris bakers. The more I think of the matter the more I feel convinced that if that part, namely, the baker electing what quality he would make, were adopted as one of the conditions of his licence, it would prove a boon to the baker and a protection to the public. Also, it ought to be con-

sidered whether the Act of Parliament (3 Geo. 4. c. 106, s. 12,) which requires the letter M (mixed) to be stamped on all bread containing any mixtures of meal with wheaten flour, should not be amended with a view to its being strictly enforced. The public soon forgot what M meant; it was often read upside-down as a W. The word "mixed" ought to be stamped at full length, and the Inspectors among their other duties as to analysing bread, &c., ought to look to this.

443. To show how the system of selling through chandlers' shops causes bread to be sold at a loss, I will mention to you a case with which I am conversant at the present moment. The average cost of the flour now used by the baker in question is 50*s.* add to this the cost of manufacture, 4*s.* per sack, 54*s.* At 90 loaves (his average produce), and at his present selling price of 7½*d.*, he obtains 56*s.* 3*d.*, or a profit of only 2*s.* 3*d.* per sack. But he supplies a chandler's shop, and the owner tells him that unless he can sell his bread at 7½*d.* he shall lose his custom; accordingly 3*s.* 9*d.* (the amount of the ½*d.* per loaf commission) must be taken off the return upon every 90 loaves supplied to him; making a loss to the baker of 1*s.* 6*d.* per sack, the difference between 3*s.* 9*d.* and 2*s.* 3*d.* The baker is too high principled to resort to inferior or mixed flour, to enable him to meet his competitors on equal terms, as many in the trade do, and abides by his loss, hoping that the competition may cease.

This is one of the consequences of the reckless trading so frequent in the baking trade. I assert without fear of contradiction that no class of purveyors have so much money pass through their hands with so little profit as a baker. I may here call your attention to another fact: the chandlers' shops profit is very often alluded to as being small; true, but it is certain under all circumstances, ½*d.* a loaf. I have known keen men keeping chandlers' shops introduce inferior bread at a cheaper figure for the sake of selling a greater number of loaves, and so increase their profits. This has very often been the means of bakers falling into such errors of competition as alluded to by Mr. Purvis (475). The licence fee of ten guineas, by putting an end to the sale of bread in all but the most respectable of the chandlers' shops, would effectually put a stop to this mode of getting a sale for adulterated bread.

444. If the object of protecting the public could be attained with a lower licence fee, it would of course be less likely to excite objection on the ground of a possible limitation of the convenience of supply. (*See* Mr. Purvis's evidence, 498.)

Mr. Brown, Corner of Gray's Inn Lane, Holborn.

445. I have been 19 years in the baking trade; seven years as a journeyman, and 12 as a master. I am doing a considerable business. I was desirous to meet the men's wishes as to night-work, but I could not agree to what they proposed; it would have prevented my carrying on my business to the extent I require. I have only two ovens, and to obtain proper space for

these I was obliged to get possession of the underground part of the adjoining house. With only two ovens, and no means of further enlarging my premises, I could not have got through all the work required in the 12 hours. I offered to engage extra hands for the night-work, but this was objected to by the representatives of the men.

446. I think the case which the men attempt to make out exaggerated. There are large numbers in the trade who are very well off, both as to wages and accommodation, and there is a large proportion of bakehouses well ventilated and kept clean. I think the master bakers, as a class, are as much entitled as any other part of the community to claim credit for caring for their men, and they provide those who sleep under their roof with the best accommodation in their power. Those whom I have in my house are as well accommodated in every respect as we are ourselves. It is so clearly the interest of the master to obtain and to keep good men that he will do all he can to make them comfortable. No doubt in many places, especially where the upper parts of the house are valuable for lodgings, the men have to put up with inferior and sometimes very bad accommodation; but good men need not remain in such places. Good men obtain such wages as, together with their perquisites, enable them to save enough in the course of a few years to become masters, if their habits are steady and temperate. My foreman has in money 26*s.* per week, with bread, flour, and potatoes, sack and yeast-money, and sugar; altogether his place is worth 35*s.* per week. The wages of the second hand are 19*s.*, and of the third hand 14*s.* per week, with perquisites, which add several shillings a week more.

447. I think no reasonable man can object to preventing lads under 18 working before 4 A.M., and I have no doubt that an inspection of bakehouses is very desirable, and would cause better ventilation and cleanliness to prevail where they are much wanted.

Mr. Ware, Ivy Lane, Newgate Street.

448. I have been 17 years a master baker. I came to London in 1831, and at the age of 16 I worked night-work with the men; at 17 I was earning men's wages. I do a large business here. [Bakehouse below the level of the street, but exceedingly clean. Rafters boarded over and whitewashed, the whole scraped and whitewashed three times a year.]

449. The number of bakehouses in the city has greatly decreased within the last 20 years by, I should say, from 30 to 50 per cent. The reasons are that many more people now live in the outskirts; also the improvements which have caused many small houses to be pulled down and more extensive ones erected, make the rents too high for a baker's shop. There is only one bakehouse between this and the Mansion House on the left side, and only two on the left; eight have disappeared in the last 17 years. I believe the public is better served now in the quality

of the article, and at the fair price for it according to the price of flour. To secure cleanliness I am strongly of opinion that all bakehouses should be licensed.

450. I supply a great many customers all round this neighbourhood and round St. Paul's. A business like mine can only be maintained by supplying first-class bread. The poor are even better judges of good bread than the rich, and when they can pay ready money they will come for it; when they cannot, or will not, they go to the chandlers' shops, where they often get bread of inferior quality, and also they often lose in weight; for a great deal of bread is sold in chandlers shops without being weighed. Bread is sold in the chandlers' shops to attract customers. From the bread sold the profit is very small; it is indeed often sold at a loss, for the sake of leading to a custom for other articles.

Mr. G. Smith, 101, Whitechapel Road.

451. Bakehouse on level behind shop; very clean and well ventilated.

452. Mr. Smith stated, that it is difficult in many cases to get the men to keep the bakehouse clean; it depends a good deal on the foreman. Thinks that the only way to have them all kept clean and properly ventilated would be to have them inspected, and thinks it would be a very good thing to do so. Knows that there are many youths under 18 doing men's work, beginning work at 11 P.M. nominally, but in reality, as in the case of the lad working here, not much before 12.

453. G. Knowles, working for Mr. G. Smith, said he was turned 17. Had been doing night-work as at present for more than two years. [He looked very pale and thin.]

454. Mr. Negus's bakehouse, 158, Bishopsgate Street; small, underground, but very clean; lime-washed twice a year. Ventilation as good as practicable.

Mr. Webster, Coleman Street, City.

455. I was Chairman of the City Master Bakers' Association in 1859, the object of which was to take into consideration the wishes communicated to us on the part of the journeymen, to substitute day-work for night-work.

456. I have been upwards of 35 years a master baker, and I am tolerably well acquainted with the opinions of the principal master bakers in this part of London, and I feel justified in saying that they have every wish to promote the welfare of their journeymen in everything that is reasonable and practicable. There is a great desire among all the respectable masters in the trade to consult the comforts and interests of their men; to give them the best sleeping places in their house, if they sleep on the premises; to study the means of ventilating the places of work properly, in order that they may not be injurious to their health; and to arrange the hours of work, so that they may, if they will

take advantage of it, have as much time as possible for rest and recreation. We know that this is the readiest way to get good men, and to attach them to us; and a good many of us are successful in so doing, as we keep our men many years with us, and many of them get on to be masters. I do not see, myself, that the baking trade need be an injurious one to a man's health or morals. I see a good many very healthy journeymen in the trade, and healthy-looking masters who have been for many years journeymen ; and it appears to me that the condemnation of the trade by those who speak for the men, has been a good deal too sweeping. Doubtless among the under-sellers, and among those who do a large business with only one oven, there is often hard work and long hours, and sometimes, when an extra demand exists, in the best regulated shops ; but the men know they are liable to this, and no Act of Parliament can prevent it. The bakers are not the only men who are required to do night-work, and if a man regulates himself properly there is no reason why it should be injurious to him as carried on in the baking trade. The work is not continuous; he has frequent intervals of rest; and I do not believe he can be said to be in actual work, as a general rule more than nine hours of the 12 to 15 that he may be in attendance. Then he is, in winter, in a comfortably warm place; and in summer, if it is properly ventilated, it is not over hot. A man labouring in a hot sun probably finds it quite as hot, if not hotter, than one who is working at the same time in a bakehouse ; indeed, the bakehouse is often much cooler in hot weather than any other place in the house. It is to be remembered also, that the hardest work of a baker is generally at night, and in the early hours of the morning, when in summer it is so much cooler.

457. As to substituting day-work for night-work, we maturely considered it, and should probably have given it a trial, had it not been that those who represented the men were so unreasonable, peremptorily refusing to work more than 12 or at most 13 hours under any circumstances, even on Saturdays. To this it was impossible for the masters to submit.

458. I will give you an idea of the uncertainty which belongs to the work of making bread, by describing what occurred in this bakehouse in the last two nights.

459. The night before last was a very close, warm night. In the course of the evening, on watching the sponge, as I always do, I found it was coming on so fast that it was necessary to open the windows, and lift the lid of the trough, and keep it open for three hours ; the fermentation was thus kept back, and the sponge was ready at the right time, — about a quarter past eleven, P.M.

460. Last night it was frosty, and although I closed both the windows and doors, and dropped the damper of the oven, and opened the oven door so as to let in as much warmth as possible, the sponge was not ready until quarter to two, a.m.

461. If I had not been there to alter the temperature of the bakehouse as required on the first night, the sponge would have worked itself too much, and we should have had indifferent bread, (and if the weather had been warm, the bread would have been

sour,) and on the second night the fermentation would have been so long delayed that we should have had the bread not as light as it should be. These are very common causes of indifferent bread. The master baker who wishes to preserve his custom, and to extend his trade, endeavours to avoid all complaints, and that his bread should be uniformly good.

462. You may as well tell a brewer or a distiller to go away, or leave his worts to work as it likes, as to tell a baker he may leave his sponge. We cannot be tied to time, as the men proposed.

463. Another circumstance is to be considered. The consumption of bread varies according to the weather. Supposing the fermentation to be checked as it was yesterday, and I wished to provide an additional quantity of bread for the day's consumption, how am I to do it if I am tied to the same hours in cold as in warm weather?

464. Again, there is a great peculiarity in this part of London (the centre of the City), as to the supply of bread. Every one knows that some 200,000 persons are said to come daily into the City for business purposes. The preparation for luncheon for a vast number of these, and for dinner for considerable numbers, obliges the bakers to have their batch bread, and also all the various descriptions of fancy bread, ready at an early hour. The bread which is sent to the banks, and other great houses, must be there at or soon after 9; they do not like to have a baker's boy about later; the servants have other things to attend to. Also many shops which have not private doors will have the bread delivered before the shop is set out. Besides this, the preparations of fancy bread for luncheons is on a very great scale, and it must be delivered early. One establishment which I serve, cuts up twenty tin quartern loaves in sandwiches; they must have them early, to get all this ready in time. Then the numerous luncheon-bars, taverns, &c., like to have them "set out" not later than 9, as many persons who come up from the country drop in much before the usual luncheon hour. Hot rolls must be ready by 8 or earlier. Our batch-bread must be out of the oven at 7, some of it earlier; we are then continuously either preparing the oven, or baking fancy bread, until ½ past 9. After that the luncheon and dinner bakings begin, and sometimes we have a hundredweight of meat and upwards to bake before 12. It may be all very well to say that you may bake your fancy bread first, and your batch bread afterwards, and that people should be content to receive their household bread a few hours later, and not to be able to have new bread, except reeking hot, before the afternoon; but people's habits cannot be altered in this way, and in the case of houses of business and shops it is not reasonable to expect that they should be obliged to receive their bread at an inconvenient time. Night-work, therefore, must always be a necessity in our trade; and all the men have to do is to make the best of it, by doing justice to themselves in regard to their own habits; not wasting their time, doing their work steadily, and then taking their rest. This will give them time for recreation, and they may do as many master bakers have done before

them,—preserve their health and prosper. A large proportion of the men in the trade have the opportunity to do this. I do not mean to say that a great many are not badly situated, working for masters who keep them at work a great number of hours; having very badly ventilated and very dirty places to work in. But these ought to be looked after by a system of inspection.

465. I have a lad at work here with the men; he says he is 16; he has been here six months; he begins work between 3 and 4. If there are many in the trade who do night-work as the men, it would be right and proper to put an end to it.

466. My foreman and second hand, being married men, come in at 11 o'clock P.M.; they go to bed, and I call them when the work is ready, usually from half-past 12 to half-past 1 P.M. The foreman generally finishes his work a little after 1 o'clock P.M.; the second hand as soon after as convenient, but never later than 2 o'clock on a Saturday. I do not open on a Sunday.

Mr. Harwood, 256, Strand.

467. I tried an alteration of hours of work some time ago; my men began at 3½ A.M., and left off at about 3½ P.M. I could not, under this plan, deliver hot rolls before 9. The coffee-houses which I serve wanted them earlier and complained; and as my neighbours in the trade adhered to the old hours, I was obliged to return to them. One of my hands, working the same hours as the men, is under 18.

Mr. Bremner, Warren Street, Fitzroy Square.

468. I have been 27 years a master baker. I was six years as apprentice and journeyman in Aberdeen. On coming to London I took a fourth hand's place; in eight months I became a foreman. As I had received a good education at the parish school, and as my habits were steady, I saved enough in six years to begin business for myself, with the help of a friend who lent me what I required. The hours of work at Aberdeen when I left it were much longer than even in London, so that I found London work easy in comparison. It is a common thing for millers, when they find that a man has shown, by his having saved some money, that his character is a steady one, and likely to be depended on, to help to set him up in a shop. If a man has saved 150*l.* or 200*l.*, the miller will find the rest to purchase the lease and good-will of a business, say 500*l.* or 600*l.* more.

469. I am in the full-priced trade, and have a fair connexion all round this neighbourhood. I do not think the men have much to complain of in this branch of the trade. A single man who is a foreman may easily save from 15*s.* to 20*s.* a week, in consequence of his privileges in bread, flour, potatoes, means of cooking, sack-money, and other things; and his situation is better than that of many small masters; he is without risk or anxiety. The men also have nearly the same privileges, and I consider them better off than many other classes of workmen. And as

to hours of work, my men can go to bed at 6 P.M., or they may, if they like, sit up till 7. I call them at 12; they then make the dough, and lie down again, as usual, for an hour and a half or two hours, according to the temperature. From 8 A.M. they are engaged in delivering the rolls, bread, &c., and on two days of the week they have done at 3, the other days not later than 4 or 5, having had an hour for dinner. Indeed, if they did not loiter, they might get over their work earlier than they do. I have no Sunday work, so they have their Sundays entirely to themselves. My men are well lodged, and everything is kept clean and comfortable for them.

470. It is in the underselling trade, as a rule, where the journeymen bakers are in a bad state, if at all. No doubt in that branch of the trade numbers of journeymen have to put up with bad accommodation, and are driven to public houses. Since the assize of bread was put an end to, the undersellers have greatly increased, and a different class of men have been brought into the trade as bakers. There was a cry for cheap bread, and it has been met by the millers and bakers furnishing an inferior article and less weight. I believe all the masters in the full-priced trade weigh off 4½ lbs. of dough for our 4 lb. loaves. The underseller often weighs off only 4¼ lbs., and then by baking it for twenty minutes to half an hour less he makes up the same weight. The last quarter of an hour or twenty minutes the loaf bakes so much more, and if this is stopped there is so much more moisture left in it. Then the underseller often uses an inferior kind of yeast (composition yeast, made of malt and hops) which costs one half less than brewers' yeast. Again, he uses inferior flour; and this yeast, and perhaps some alum, whitens it, and it is passed off for good bread.

471. All this gives him the means of selling his bread under the price of those who do not adopt those modes of proceeding. Besides this, the underseller, who does not deliver his bread except to chandlers' shops, but sells it over the counter, besides being at no expense for trucks, baskets, baise, perhaps a horse and cart, may get out three or four batches a day, and yet pay his men no more than those who only get out two batches. It is clear, therefore, that if he gets several hours more work out of his men for the same wages, he has another advantage over the full-priced baker. The underseller's bread, made in the way above described, will not keep sweet more than two days. That is one of the reasons why the labouring classes will have new bread. If they do not consume it at once it has a tendency to become sour.

472. There were certainly some disadvantages and annoyances to the bakers when the assize of bread existed, which raised a cry for putting an end to it; but it kept the bread up to a proper quality. When the millers had to send in a return of the price of flour, and the Lord Mayor fixed the selling price of bread, allowing 1*d.* per loaf for cost of manufacture, and 1*d.* profit upon 80 quartern loaves (of 4 lbs. 5½ oz.) per sack, the public knew that an article sold at a lower rate was very likely to be an inferior one.

473. Now, in the full-priced trade, the profit is so small upon the bread, that if money is made, it is by buying flour judiciously, taking advantage of the turn of the market.

474. There are, I believe, many lads under 18 doing night-work with the men. In some instances a father and son work together, where the business done is but small. There can be no doubt that it is injurious to a growing youth to begin his work at 11 or 12 at night.

475. As to the state of bakehouses, I have no objection to any of my customers coming and looking at mine at all times; it is well ventilated and clean ; but as much cannot be said of a great many in the trade, chiefly those of bakers doing business in small and confined premises.

476. At many undersellers, the journeymen begin at midnight, and if a large business is done they may not be able to leave the bakehouse until 6 or 7 P.M. or later. All this work they do for the same wages as men who leave off at 12 or 1 in the day. The reason why men can be found to submit to this amount of work is, that they are seldom fit for anything else. Many journeymen are mere labourers, with no practical knowledge of the trade.

477. Under a good foreman, a man will learn in a month or two to do the work required,—so little skill is wanted. Beyond the foreman and second hand, in a considerable business, it does not much matter what the men are. The labour market is therefore easily overstocked; and this became notoriously so from the time of the strike about 20 years ago; the Scotch bakers got a number of hands from Scotland, but more particularly the Germans from Germany ; and there are constantly young men coming into the trade, and it is so easy to learn, and requires no tools, and very little expense in clothes. But even under the most unfavourable circumstances as to work and wages, if a young man is steady and prudent, he can soon get a better place ; and there is no trade where he can more easily put by money than in ours. The advocates of the men do not put this part of the case fairly, but endeavour to make it appear that the descriptions they give apply to the whole trade, and that the evils are inseparable from it. The large number of respectable men in it, both journeymen and masters, proves the contrary.

MR. CHEESEMAN, Store Street, Tottenham Court Road.

478. I was a member of the sub-committee of masters appointed by the Bloomsbury Master-Bakers Society in 1859-60, to take into consideration the wishes of the men relative to substituting day for night work. My sentiments, together with those of a large proportion of the master bakers at the West-end of the Metropolis, are embodied in the following letter signed by myself and the other members of the sub-committee, and which was made public at the time.

"To the Editor of 'The Daily Telegraph.'

"SIR,—From the tone of the large and important meeting of the operative bakers held at Exeter Hall, on Wednesday, the 7th

instant, and presided over by the Right Hon. Earl Shaftesbury, it would very naturally be inferred by the public, that the men are likely to have a struggle with their employers to bring about an amelioration of their condition. As a sub-committee of an association of master bakers carrying on business in the west-end of London, we feel called upon to state that we sympathize most heartily with the men in their attempt to abridge the hours of labour, and so far as practicable to abolish night-work. In proof of this we may state that many members of this association have been among the first to try the plan proposed by the operative bakers, but have been unable to carry it out in its present form. The proposition is the total abolition of night-work, and the limitation of the duration of labour to 12 hours per day, by commencing work at 4 A.M. and ending at 4 A.M.

"In reply to this, a meeting of our association was held Sept. 21st, 1859, when the following resolutions were passed and forwarded to the council of the operative bakers :—

"1. 'In the opinion of this meeting, twelve hours' labour is sufficient for a day's work.

"2. 'That while this meeting is of opinion that twelve hours' labour is sufficient, the exigencies of the baking trade require that the men should work longer on the Saturday in order to provide for the Sabbath.

"3. 'That, recognizing the principle of twelve hours' labour, this meeting is of opinion that the time of commencing work must be left to the necessities of each particular business.'

"The reasons which led the meeting to adopt these resolutions were the following :—

"1st. That, from the nature of the trade, it is impossible, in many businesses, for all the men to commence at 4 o'clock, or at any other given hour, some requiring to commence a considerable time before the others. We are yet quite willing that those who begin first should leave off at a corresponding early hour, endeavouring to make it as near as possible to 4 o'clock.

"2dly. That if twelve hours are really employed five days in the week in providing for each day's consumption, it is obviously impossible that the necessary quantity of bread for Saturday and Sunday can be produced in the same time. Experience shows us that two or three extra hours of labour are required on the Saturday (as in every other provision trade), and to employ a separate staff of men for those hours would be altogether unreasonable.

"These views are corroborated by the fact that the only master baker who advocated the plan at the meeting, and represented those who were said to have adopted it, himself confessed that he did not do complete work in the twelve hours, and therefore, we presume, he is unable.

"As an association, we beg to correct the statement of the noble Earl, that the journeymen bakers, as a class, are so badly paid, and also the assertion of Mr. Lilwall, in his pamphlet quoted at the meeting, that the wages ranged from 12*s.* to 18*s.* Had he said from 14*s.* to 32*s.*, exclusive of bread, flour, and lodging, it

would have been nearer the fact. The average in our own case being above 1*l.* in money, wages ranging from 16*s.* to 30*s.*

(Signed) J. Bonthron.
T. K. Callard.
H. Cheesman.
"*March* 9, 1860." Callard and Bowser."

479. These proposals were not accepted by the council of the operative bakers, and the question remains where it was. In reference to the latter portion of the above letter relative to wages, I will state the earnings of the men in my employ; and I believe that what applies to my men applies equally, with trifling differences only, to all the masters in the full-priced trade, and to many very respectable masters in the underselling trade in the metropolis. I consider my foreman's place worth 34*s.* a week, my second hand's place worth 26*s.*, my third 23*s.*, and my fourth 15*s.* This is made up of money and money's worth. The foreman has in money 28*s.* a week; his perquisites are, sack-money, 1*d.* per sack of flour used; bread, as much as he can eat here, and half a quartern loaf daily to take home with him, and a quartern of flour on Saturdays. The other men have bread and flour, potatoes, soap, candles, towels, brushes, and blacking, and a good bed, and everything as clean and comfortable for them as they can desire. Their money wages are, second hand 18*s.*, third, 16*s.*, fourth, 12*s.* The latter is about 17 years of age; he has been in my employ eleven months. They have no Sunday work; they have consequently their Sunday to themselves; and the bake-house, with the command of cooking materials and gas, is open to them. Considering that they are at no expense for tools and at very little for clothes, and that they are employed steadily all the year round, notwithstanding the fluctuations of demand at different seasons of the year, they are unquestionably better off than many other descriptions of workmen; and there is nothing in their hours of work that need, or that does, injure them. My men work as follows: The foreman sets the sponge at 6 or 7 P.M., according to the temperature. My plan is to leave the sponge to ferment fully at once, and then to make the dough. Instead, therefore, of the common practice of making the dough at about 11 P.M., and then letting it ferment again for a couple of hours or so before weighing off and moulding, the foreman comes in about 3 A.M.; and about that hour, a little earlier or later, according to the state of the temperature of the air, it is ready to be made into dough. My men therefore get until about 3 A.M. in bed, except on Saturdays, when they begin at half-past two. I have two ovens; the bread comes out at 7½ to 7.20, and the hot rolls are then got ready by 7.40, and in the shop ready to be delivered at 8. We do not require them earlier. In neighbourhoods where they do, the work must be begun earlier than I begin here. My foreman gets away from 1.30 to 2 P.M. He might have got away to-day before half past one. The men who deliver the bread might get their work done by 3 P.M., but they are apt to loiter a little now and then for their own pleasure.

They have therefore 12 hours to themselves, exclusive of meals, and might have more. If they say that those who make bread, ought not to deliver it, will they be content with the proportion of wages they would earn by simply making the bread. If this takes, say from 4 A.M. (at day-work) to 10, 11, or 12 o'clock, what is to be done with the remaining hours which make up the twelve? But not one in twenty masters have accommodation for all their men to sleep on the premises, and if they are not in at 11 P.M., to be on the spot, we could never be sure of their being ready to begin at 4 A.M. I consider that hour, therefore, to be impracticable as a rule for the trade. The great evil from which a large portion of the journeymen suffer is that of being confined for 16 or 18 hours in the bakehouses in the shops of the undersellers, who do not deliver their bread. I do not think that the way to meet that evil is by a high licence, as proposed (§§ 434. and 503.); but the way to strike at the root of it would be to amend and make effectual the provisions of the Adulteration of Food Act. This would have the immediate effect of putting an end to the use of alum and to the sale of bread made of various mixtures, and sold as pure wheaten bread. Yesterday I saw a label in a baker's shop advertising the 4-lb. loaf at $5\frac{1}{2}d.$ and $6\frac{1}{2}d.$ The present price of best flour, "town households," is 55*s.* per sack, and good "seconds" is 48*s.* At this price he could not have repaid himself the cost of the flour had he been selling bread made of pure flour. A proper enforcement of the Adulteration of Food Act would put a stop to the system of 18 hours' work in the bakehouses, by making it impossible for that class of undersellers, who employ their men those hours, to exist. They only exist now by first defrauding the public, and next getting 18 hours' work out of their men for 12 hours' wages.

480. It is plain that Parliament cannot interfere in this question of the hours of work between the masters and the men. The masters continue to have every wish to do what is reasonable considering the peculiar nature of their trade; and I speak confidently when I say that a very large proportion of the master bakers at the end of London with which I am best acquainted (the West end) do everything that can be required of them to make their men comfortable and contented. If anything can be done for the youths under 18, or by an inspection and licensing of bakehouses, the trade generally would be glad that it should be adopted. There is no necessity that youths under 18 should be employed earlier than 5 A.M. or later than 9 P.M. This could be done without any inconvenience in the full-priced trade; and in the underselling branches of the trade also, as they have, as a rule, no delivery of goods. But it would not do to begin work at 5 A.M. with the men. In the full-priced trade, where fancy goods are made as well as bread, it would be impossible, without a separate place to put up the bread in as it comes out of the oven, and this is seldom to be had, space being so valuable. Without it, it would make a separation of the two branches of business absolutely necessary, to the disadvantage of the public.

The Salesman at Mr. Cook's shop, 81, NewCut, Blackfriars Road.

481. Stated that the hours of work for their men were as follows:—The foreman stirs the sponge at 8 P.M. The men come in at half past 11, and lie down on the boards until about 2 A.M. They then make the dough, which takes (with two sacks of flour) half an hour. After the dough is made, it is allowed to stay quiet and to rise; this takes place in about an hour and a half. During this time (*i.e.* from half-past 2 until 4) one of the men lies down again; the other cleans the tins, or does anything else that may be required. The dough is then scaled, which takes half-an-hour, and then put into the oven, which takes an hour or so, bringing the time to half-past 5 or towards 6. The baking takes an hour and a half, so that the bread is in the shop by half-past 7. In larger businesses, or where hot rolls are wanted earlier, they have to stir the sponge at 6 P.M., and all the operations are correspondingly earlier. Our rolls go into the oven at 7, and are in the shop at half-past. Where a great many rolls are wanted, they are put into the oven when the batch-bread is drawn.

482. There are many lads under 18 in this part of London doing night-work with the men, beginning at 12 or 2, both where a large and where a small business is done.

Joseph Ball, foreman to Mr. Mackness, 3, Lambeth Walk.

483. Mr. Mackness has four shops; the other three are at 43, Lower Marsh, 7, Broadway, Westminster, and Princes Street, Rotherhithe.

484. I have been a baker 40 years, and have seen two generations of bakers. There are very few men indeed in the trade who have preserved their health as I have. I have been in this shop 21 years. I attribute my keeping my health to regular living and a good constitution. Many in the trade ruin their health by a bad course of living and by drunkenness. One great cause of their losing their health is their beginning night-work too soon. I have known hundreds of lads under 18 working with the men. I know a considerable number now from 14 to 16 years of age, who make dough at the usual hour, from 11 to 12 at night.

485. If Parliament cannot shorten the hours for the men, the next best thing would be that they should stop this night-work for lads.

486. Many places where they work are very badly ventilated, and this is another great disadvantage. Our bakehouse here is nearly on the level, and has plenty of air and light. In this street (Lambeth Walk) there are four bakehouses underground and four above. There are not so many underground on this side of the water as there are on the other, but on this side a good many are very small places, and often very close. It is a pity they have not proper persons to go round and see that the bakehouses are properly ventilated and kept clean.

OBSERVATIONS MADE AT SOME OF THE BAKEHOUSES VISITED. [H. S. T.]

487. No. 1.—Ovens were under the parlour. Sulphur used to pervade the house, and affected the health of all the inmates. Addition made to bakehouse, after some years, at considerable cost. Dwelling house now much more free, but not entirely. Ventilation might be improved. Bakehouse dirty.

488. No. 2.—One oven under parlour. There was another under shop; but the place became so infested with ants and vermin that it could not be used, as "they used to run over the bread in such numbers." Ceiling (bare rafters) about 8 feet high. Cobwebs numerous, and in some parts in heavy masses. Dust and dirt everywhere. Ventilation very imperfect; apertures small, but bakehouse large and said to be cool. Drains only lately made with pipes and "trapped;" smell before that sometimes very bad, from imperfect stone drains. Thinks that the inspection of bakehouses will be a great benefit to the men "and masters too;" and that "plenty of places where he has worked would be the better for it." Dirty sack on the board where bread is made, on which a man had been sleeping.

489. No. 3.—Has been in the baking trade 24 years. Came to this shop as a master 12 years ago. It was in a very bad state. All sorts of filth from the drains often stagnated in one corner of bakehouse. It was also only half the size it is now, and very close. Improved it a few years since, "as soon as he could afford it." Has worked in many bakehouses in London "which are horrible for the men." It is the sulphur that, in his opinion, does them so much harm. Where the sulphur cannot get away, it chokes the men's lungs, and the heat adds to their labour. "And as to perspiration dripping into the dough, as it is said, why there's plenty of it."

490. No. 4.—Two ovens. Bakehouse very dirty; cobwebs, &c. Master said he could not get his foreman to have it kept clean. Did not like to be always telling him about it, as he was in other respects a good workman. Ventilation insufficient.

491. No. 5.—One oven. Bakehouse very small (under shop), and excessively dirty. Hundreds of cockroaches, ants, and other creeping things running about upon the walls and on the boards on which the bread is made. Rafters black with sulphur and flour-dust, and hanging thick with cobwebs in all directions. A dirty sack spread on one of the boards on which the bread was about to be made, and where a man had just been lying down; and ants and cockroaches and other creeping things running over it; numbers of all these running over the rafters, &c. just above. Height of bakehouse 6½ feet; length 24 feet; breadth 12 feet at widest part. Ventilation very imperfect.

492. No. 5.—One of the troughs was open and full of flour, ready for the next batch. Hundreds of animals were running about over the lid and by the side, and upon the wall close by. The other trough was imperfectly shut, and many of these animals were crawling in and out. It also was filled with flour.

The floor was of stone, uneven and very dirty. Harbours for rats and mice, &c. in all directions.

493. No. 6.—Large bakehouse under shop and parlour. Ceiling black, and hung in many places with cobwebs, over the troughs and elsewhere. Flakes of cobwebs, heavy with dust, hanging down. Stone floor, very uneven and dirty, and piles of dark brown and black dust and dirt swept up in corners and under the troughs. A number of very dirty utensils and a wash-place close to the trough. Animals numerous. A large business done at this shop. Ventilation good.

494. No. 7.—Bakehouse large and ventilation ample. Ceiling black, and walls and floor very dirty; cobwebs numerous above troughs, and elsewhere.

495. No. 8.—Bakehouse under shop and parlour, but only one aperture into the open air. Rafters black, and in many places hung with cobwebs; many animals crawling about the troughs and on the walls. Accumulations of dirty flour-dust, and ashes, on the floor. Large holes in the stone floor and in the walls, apparently eaten out by rats, &c.

496. No. 9.—Bakehouse on the level; airy and well lighted; but rafters black, incrusted with dust, aud thickly hung with large masses of cobwebs heavy with flour-dust, some hanging in strips just over the open troughs.

497. No. 10.—Small bakehouse underground, 14 × 10 × 7; arched roof, very seldom whitewashed; half of it nearly black; many heavy cobwebs over troughs; animals running about upon the walls close to and over troughs; much dirt about the floor, which was worn into holes; no ventilation except in front and up the ladder into the shop; small skylight behind, a fixture; men moulding dough, working very quick to each other; temperature of external air 50°; in bakehouse near the oven, where two of the men were working, 85°; two out of the three men much heated, especially one of the two who were moulding; perspiration standing on his forehead and over his neck; all drank water frequently; after the batch was in they immediately began to draw one out of the other oven; temperature rose very soon above 90°; when it was drawn one of the men, very hot, began moulding again; perspiration visible on his face and neck. No reason why skylight behind should not have been made to open, but "they did not think of it." Master said "Foreman was very idle about keeping the place clean."—H. S. T.

Mr. William Purvis, 199, Blackfriars Road.

498. I have been in the baking trade 40 years, all the time in London. I have been a master baker 33 years. I am chairman of the South Metropolitan Master Bakers' Society, the object of which is to discuss matters of interest to the trade. Some of the other members of the committee are Mr. Tring, 24, Stamford Street, Mr. Cameron, Tooley Street, Mr. Scott, Dover Road, Mr. Withers, Borough. Mr. Fitch, 20, Warren Street, Dover Road, is our secretary. We have carefully considered the wishes expressed on the part of the men, that night-work should be

abolished; but we cannot see our way to it. The peculiarities of our trade are one obstacle, arising from temperature, and the varying demands for bread at different seasons and on different days in the same week. Another obstacle is the great variety of circumstances among the bakers themselves. What one man, with plenty of accommodation in proportion to his amount of business, could do very easily, another man with restricted accommodation could not do at all. But in addition to this, if any arrangement as to hours of work were come to, the temptations to break through it would, in the case of a certain class of masters, be so strong that it would not last. It is not a thing that Parliament can interfere with; men and their masters must be left to make their own bargains, and follow their own rules; and I am strongly of opinion, that night-work alone need not be injurious to a journeyman baker. I do not mean youths under eighteen; night-work to them must have the effect of undermining their constitutions, and no one could object to Parliament stepping in and protecting them. But there are men enough in the trade in excellent health and doing well in every respect to show that it is not the night-work that injures them. It is that there are so many journeymen in the trade competing for work that many small masters can get them to do not only night-work, but a great deal of day-work too—sometimes very laborious day-work ; as in some, for instance, making more batches of bread and in others carrying it out. Those in particular who carry out the bread to chandlers' shops have very heavy burdens to carry, generally on their heads, and sometimes for considerable distances. They will carry at times as many loaves as make a weight of 120 lbs. ; in other cases a smaller number ; and this several times a-day. But the ordinary work of delivering bread with a basket or in a truck is tiring to a man after he has been working also at night. But if men will do this double work, Parliament cannot interfere to prevent them.

499. I am one of the largest master bakers in London, in the regular trade. There may be some contractors for hospitals, &c., who make more bread in the week than I do. I have five shops in addition to this one. I have no trust; it is all for ready money over the counter.

500. I take care that my bakehouses shall be perfectly clean and sweet, and such as I am proud to show to any one who may wish to see them.

501. [This bakehouse of Mr. Purvis's is unequalled by any I have seen. Although below the level of the street, and under his shop and parlour, it is airy and light, of sufficient height, very judiciously ventilated, and of the most unexceptionable cleanliness. The ceiling is boarded and painted, so as to admit of its being easily and perfectly freed from all dust as fast as it accumulates. The walls are white, the floor and all the parts beneath the troughs entirely free from any symptom of dirt, all the utensils clean, " a proper place for everything, and everything in its place." Besides the fan-lights for the admission of air, there are four wooden air-shafts at different parts of the bake-

house, which are conducted up the exterior wall behind the house. The steps down to the bakehouse are of stone. The flour-loft, on a level with the shop, is perfectly clean. Washing-place, coal-hole, ash-pit, all apart from each other, and not, as in so many instances which I have seen, in the same dark and excessively dirty vaults with the flour. This is a new shop, and has not been occupied by Mr. Purvis more than four months; but he states that similar cleanliness has always been and is enforced by him in all that he occupies, as far as the conveniences of each locality permit.—H. S. T.]

502. If a bakehouse is dirty it is the fault of the master. A master has no right to lay the blame on his foreman; he has his rules, or ought to have, and ought to see that they are obeyed. A master baker ought, for the credit of the trade and the satisfaction of the public, to be made to keep his bakehouse clean, and inspectors ought to see that they are perfectly ventilated. The men ought to be protected from working in places that injure their health; and the public have a right to demand that their bread should be made in clean places, and not exposed to be contaminated. The inspection and licensing of bakehouses would be a very proper measure. I think it would meet with no serious objection from any one.

503. As to the amount of the licence that should be imposed, I believe that the trade generally would welcome one as high as 10*l.* 10*s.* This question has been for some time under the consideration of our society, long before the Government undertook to inquire into the grievances of the journeymen. Many of the most intelligent master-bakers in the other parts of London have also discussed it. We think that a licence fee to that amount would effect several objects of great importance both to the trade and to the public. We think that by its means the manufacture of adulterated bread would be greatly kept in check; the poor protected in a vast number of instances from being cheated in the weight of their loaf; and a large number of the journeymen relieved from a portion of their work, which is very hard and oppressive to them. Over and above this, the Chancellor of the Exchequer would obtain a considerable revenue from the licence, which would be cheerfully paid by the master bakers, and which would not add the smallest fraction to the price of bread, or diminish the facilities of supplying the public in any degree. I will explain these points in their order.

504. When the Act passed "for preventing the adulteration of articles of food or drink," (23 & 24 Vict. c. 84, 6th August 1860,) there was an immediate apprehension among those bakers in the trade who adulterate their bread that they would be liable to have their bread frequently analyzed, and their premises searched for alum or other things that they ought not to use. But when it was found that no sufficient means were provided by the Act to meet the expenses of this kind of active and constant supervision, (the purchaser having to pay the analyser,) they became confident again, and have resumed their practice of adulteration without any fear of detection. Here and

there a case of detection may occur, but it is not sufficiently common to check the practice. Mixing up myself as I do with the trade, I know that some master-bakers have had as much as a hundred weight of alum in their house at a time. Adulteration with this and other things is particularly common in poor neighbourhoods ; the poor are the principal sufferers, but the rich do not escape. Rice is extensively used, and where this is the case more alum is rendered necessary to bind the dough ; and the public, which believes it is buying fine wheaten bread because it looks so white, is getting so much less nourishment for their money, and something very injurious to them in the alum. Many other things are also used ; some not injurious, as bean-meal, which is used to make damaged flour suitable to be made into bread ; barley, rye, Indian corn, and potato flour, all used to cheapen the price ; and none anything like as nourishing as wheat ; so that people in eating bread made partly from them do not get what they pay for. The law (3 Geo. 4. c. 106.) says that those meals may be used ; but that when they are the public must be made acquainted with the fact, by the letter M (mixed) being stamped upon the loaf (s. 12) ; but this is never done, and the public believe they have nothing but pure wheaten flour in their loaf. I understand that it has been proved by men of science that other things which are decidedly injurious, besides alum, have been in some cases mixed with bread, and that persons have been convicted for using them.

505. Now a portion of the 10*l.* 10*s.* licence fee,—say 10*s.* of it,—might be paid to the vestry or district board, or other authority having the power to appoint the analyst, and this would be sufficient to pay for his services, and for the cost of the frequent analyses which he might be required to make (so many, for instance, every quarter) ; and also the same person might act as inspector of bakehouses, to see that they are clean, and sufficiently ventilated to be wholesome to those who work in them. No licence should be renewed to any baker whose bakehouse was found in the state of dirt and filth that so many are, or which had not the means of admitting a sufficient quantity of pure air to keep them healthy places of work, or whose bread had been proved to have been adulterated. The rest of the licence fee, 10*l.*, would go to the Chancellor of the Exchequer.

506. The next point which I undertake to establish is, that a licence fee of 10*l.* 10*s.* upon every one who sells bread would protect the poor, in numberless instances, against being cheated in the weight of their loaf. It would operate in this way. Everyone knows that if he goes to a baker's shop to buy a 4 lb. or a 2 lb. loaf, the first thing the baker does is to put the loaf upon the scales on the counter, and if, as is almost invariably, and indeed it may be said almost necessarily, the case, it is under weight, a piece is cut from another loaf and put upon it, sufficient to turn the scale. This piece is generally from one to three ounces. No baker can bake his bread exactly to its nominal weight. To be safe, he bakes it a little under, and supplies the weight in the manner just described. A baker who bakes his

bread a sufficient time is seldom out more than an ounce or two, which he adds on sale by weight ; but another who underbakes his bread, or who covers it over with sacks as soon as it is out of the oven to keep the moisture in, may gain many ounces on every loaf ; and if his bread is not weighed to the customer, the result is that the customer is cheated to that amount with every loaf.

507. Now an immense number of the working classes do not buy their bread of the baker at all. They buy it at what are called chandlers' shops ; small shops where they buy their tea, coffee, candles, wood, coal, and other small articles. At these chandlers' shops the bread is, notwithstanding the law which requires every seller of bread as well as every baker to sell the ordinary loaf by weight (3 Geo. 4. c. 166. s. 4.), rarely weighed to them, and they are cheated both in the weight and in the quality of their bread. Many bakers, knowing that they can get off adulterated bread, and bread under weight, at these shops, without fear of detection, manufacture it for sale there ; and the consequence is that a vast system of fraud is carried on against the working classes through the instrumentality of these shops, which it is the duty of the Government, in the interest of the working classes, to check if they can.

508. The question is, can the Government check it without any countervailing injury or inconvenience to the working or any other classes ? We believe that they can, and that a measure requiring that no one shall sell bread without paying a licence fee of the amount above specified (10*l*. 10*s*.) would be the means of checking, and indeed of putting an end to it almost entirely.

509. A licence fee of that amount would operate in this way: It would not answer to the owners of the small chandlers' shops to pay it ; the working classes would in that case go to the baker's shop, and there they would certainly get full weight for their money, and also a better quality, inasmuch as one great means of obtaining a sale for adulterated bread would be put an end to ; for the poor who deal at these shops are generally in debt to them, and they are obliged to take any kind of bread and of any weight that the shopman may choose to give them. This adulterated bread is not only less nourishing to themselves, but often most injurious to their children, and to all who happen to be in any way delicate. No inconvenience would arise, for bakers' shops are plentiful enough everywhere, and nothing is so easy as to set up a bread shop which is a branch shop, where bread is not baked but only sold, and which are already very numerous.

510. Also new shops where bread is baked start up everywhere, wherever there is a chance of an opening. It requires but little capital to start in a small way, and the millers are always on the look-out to help respectable men to set up in the trade. There is no fear, therefore, of the public having to send any distance for their bread, if the number of instances in which bread is sold at chandlers' shops were to be greatly diminished. The most respectable of them would pay the fee ; but in those the public would have a better chance of getting honestly served. The general effect

would be to keep the trade in its legitimate channel; the bread would be sold by the bakers who made it, and their credit would be at stake that what they sold should be good.

511. The chandlers' shops which sell bread offer, in a great many cases, a direct inducement to the bakers who supply them to furnish them with adulterated bread. This arises as follows: the chandler sells bread not so much on account of the direct profit on it, as because it attracts customers to buy other things. The direct profit is very small; and he often sells it at a loss, for the sake of attracting customers, who will then probably deal with him for other things. As his object is to sell his bread at the lowest possible rate, the baker supplies him with bread which costs as little as possible; and this is bread adulterated or made up of mixed materials cheaper than wheat, made to look attractive by being whitened by alum, and by over fermentation, which also injures its nutritive qualities; and thus, in these various ways, the poor, who are the principal dealers at these chandlers' shops, are the sufferers. There are numerous country millers which get up flour at a reduced price, made of mixtures of meal expressly for these shops.

512. Again, the inducement thus created to supply adulterated bread in one instance operates immediately to produce it in many others. The bread that costs less than really good and pure bread is sold for less. The baker who makes and sells it, and the chandlers' shops which help off the sale of it, take away the custom from their neighbours. These make an effort to maintain themselves; they either resort to the same inferior quality of flour, in order to sell their bread at the lower rate without loss; or they lower their price upon the really good article, in the hope of winning in the race of competition by strength of purse. In the first case they inundate poor neighbourhoods with adulterated bread, bread which turns sour as soon as it gets cold, which is an imposition upon the purchaser, and is injurious to all who eat it; in the second case great numbers of them go into the Gazette, and justify the Commissioners of Bankruptcy in what they unanimously say, — namely, that there are more bankrupt and insolvent bakers than any other tradesmen.

513. A ten-guinea licence fee would go far to destroy this inducement to produce bad bread, as far as most of these chandlers' shops are concerned. Ten guineas are 5,040 half-pence. A man must sell 5,040 loaves at the usual profit of half-penny a loaf before he could pay that fee. This would be at the rate of 16 quartern loaves a day, which is not far short of the whole day's sale of a great number of these small shops, and full half the sale of the rest.

514. To put it in another way, if the sale is 20 loaves a day, and the profit $\frac{1}{2}d.$ per loaf, or $10d.$ a day, this gives $5s.$ a week, or $13l.$ a year. The margin beyond the amount of a licence fee of $10l.$ $10s.$ would not be sufficient to induce such shops to take out one.

515. We calculate that there are about 3,000 master bakers in London, and that there is an average of three shops which sell bread, to one baker, or on the whole 9,000 shops where bread is sold. We think that a licence fee of the above amount would cause the sale of bread to be discontinued in upwards of 2,000 of these. Their places would be supplied by the trade in the regular legitimate way, and the public would be great gainers by being relieved from consuming an immense quantity of adulterated bread. There would be no difficulty among the poor about getting credit for their bread when necessary ; bakers as often give credit as chandlers' shops.

516. With the discontinuance of the sale of bread at chandlers' shops, a portion of the labour of the journeymen would cease which is very oppressive to them,—that of carrying large trays on their heads, as said before, with a considerable weight of loaves upon them, several times a day, and often to some distance. The journeymen would rejoice to be spared that excessive labour, which is very injurious to many, especially the younger ones, upon whom it chiefly falls. This carrying out of the bread to the chandlers' shops is also a frequent cause of their falling into bad health. They go out from the hot bakehouse into the cold air, and get a chill, which often brings on rheumatism or inflammation of the lungs.

517. A ten-guinea licence could have no effect in raising the price of bread. I make into bread in this shop above 50 sacks of flour a week ; at 92 4-lb. loaves to the sack, this produces 4,600 loaves. In one fortnight, therefore, I make nearly as many loaves as there are farthings in 10*l.* 10*s.* The sum, therefore, spread over the whole year amounts to nothing appreciable in regard to the selling price of the loaf. What is my case in a fortnight would be the case of others who do an ordinary good business in one shop, of about 20 sacks a-week, in four or five weeks. It would be impossible to take any account of such a sum in your selling price for your bread. The master-bakers, I believe, almost universally are willing to pay it ; instead of its being opposed, as nearly all taxes are, the Chancellor of the Exchequer would find us anxious to pay it, and he would get no small amount of revenue from it.

518. I think I know the feelings and opinions of the trade pretty well, as I have been so long among them, and I am sure that a large number of the most respectable men in the trade concur in these views. If the same objects could be attained in another way less open to objection, we should all be glad of it.

Dr. William A. Guy, M.B.

519. I am physician to King's College Hospital. In prescribing for the out-patients of the hospital, I have been in the habit of making inquiries respecting their occupations, and have also minutely examined into the health of particular classes of men. My attention was very forcibly called to the state of the journeymen bakers, by the cases of several patients who followed

that business ; and I was led to pursue the inquiry at some length in various parts of London. The results are embodied in my evidence before the Health of Towns Commission. This evidence was ordered by the House of Commons to be printed on the 26th May 1848. In the discussions which ensued in the House of Commons, on the question of reducing the hours of labour in the baking trade, the facts given in my evidence were not disputed. The only differences of opinion related to the remedy proposed.

520. The facts were briefly these :—It was shown that a large proportion of the journeymen in the baking trade began their work at 11 at night, and continued at work, with certain intermissions, for from 18 to 20 hours ; that the great majority of their places of work were unwholesome, being very close, very dirty, very damp, and very offensive ; that the heat in which they work, by exhausting them, renders them liable to inflammatory affections, colds, and rheumatism ; that the flour dust, and the gusts from the oven (consisting of carbonic acid, alcohol, and sulphurous acid gas from the coal), irritate their lungs, and predisposes to consumption ; that the severe exertion leads to palpitation, diseases of the heart, ruptures of blood vessels, and apoplectic seizures ; and that as, on a reasonable estimate, upwards of one fourth are under twenty years of age, the early age at which they have to encounter these trials to their constitution tends greatly to undermine it. I stated also, as the result of my own inquiries, confirmed by the authority of Mr. Neison, that the expectation of life among the journeymen bakers was lower than that of most other trades.

521. Although I have not specially pursued these inquiries since that period, my notes of cases that have since come before me confirm the above results. I am able to say that rheumatic fever, inflammation of the lungs, and consumption, but especially the last two, colds, indigestion, bowel complaints, skin diseases, spitting of blood, bleeding at the nose, and ruptures, are the prevailing complaints to which the bakers are subject ; and that no class of men, excepting perhaps the grinders of Sheffield, are so liable to severe and fatal diseases of the chest as the bakers. They are also four times as liable to those diseases as compositors, whose low state of health I had previously ascertained. Their average age at death presents the low figure of 42 years.

522. I attribute their superior liability to disease to long hours of work, great muscular efforts, exposure to heat, the inhalation of the particles of flour and of noxious gases, and to the close underground places in which they work.

523. All these exciting causes of disease are more or less remediable ; and my opinion remains what it was in 1848, that the public interests require that Parliament should apply the remedies as far as it may be practicable to do so. Public opinion must be looked to to supply the rest.

524. It was estimated in 1848 that the journeymen bakers in London numbered 12,000. There was a great amount of surplus

labour in the trade. This arose from several circumstances, the principal being that the trade is very easily learnt ; that being a sickly trade there are many out of work, who when convalescent are anxious to get employment again on any terms ; that the bakers of Scotland and the west of England, who employ chiefly apprentices, dismiss them as soon as they are out of their apprenticeship, upon which large numbers of them come to seek work in London; also that, as I understand, there is a great influx of Germans into the trade, who are content to work at first for low wages. This surplus of labour, by creating a great competition for work, renders it possible for the masters to maintain their system of long hours at low wages, in every case where they think the interests of their trade require it. The journeyman bakers are, I believe, now estimated at 14,000. I have argued, in a lecture on the evils of night work and long hours of labour, delivered July 6th 1848, at the Mechanics' Institute, Southampton Buildings, the then Lord Ashley, M.P., in the chair, that as Parliament has interfered with adult labour in the case of the coalwhippers, by requiring them to be registered, and to be employed in rotation, and by inflicting a penalty upon masters of colliers, in certain cases, if they employ non-registered men, Parliament might also interfere to forbid night work in the case of the journeymen bakers ; but if, after mature consideration and inquiry, such interference should be found open to serious objections, on the ground of public policy, there would probably be no great difficulty in forbidding youths under 18 from working in the baking trade earlier than 4 a.m. or later than 6 p.m. According to the estimate given above, this would be a means of relieving in the metropolis alone about 2,000 young men from work which cannot fail to have an injurious effect on their constitutions.

525. I am also still strongly of opinion that the interests of the public as well as those of the journeymen bakers require that bakehouses should be inspected. If slaughter-houses are inspected, in the interests of the public health,—if lodging-houses are inspected, on the same grounds,—if inspectors of nuisances have power to enter private property, with the same object in view, —if inspectors of weights and measures enter a man's house, to protect the public from fraud, there can surely be no objection, on principle, against entering bakehouses, to see that they are not the means of undermining the health of thousands, and bringing them on the rates ; and to take care that they are not in such a dirty, filthy state as to contaminate the bread of the people, and to create disgust in every one who has seen them,—a state in which I found most of those that I visited in 1848 to be, and in which a large proportion of the bake-houses in this metropolis are still believed to continue.

526. I ought, however, to state, that though, in my opinion, the journeymen bakers and the public must look for effectual relief from existing evils to the legislature, they will derive no small advantage from the introduction of improved methods of mixing and baking bread. No one who has been accustomed to

watch the course of events, and to observe the progress of man's ingenuity as applied to the industrial arts, could fail to anticipate that, before long, science and art combined would find out a way of manufacturing this most necessary article of our food, in a far better manner than by the rude process that has prevailed unaltered for centuries. The process of kneading bread being a simple mechanical process, conducted at present in a most objectionable and repulsive manner, was certain, sooner or later, to be performed by machinery. Accordingly there are already several such machines at work. I have seen that invented by Mr. Stevens at work; and I highly approve of it, both on account of its cleanliness, economy, and wholesomeness. This machine, or some similar one answering the same purpose, must by degrees come into general use for kneading bread fermented by the old process. This will prove a great benefit to the journeyman, by causing a more advantageous application of his labour, and to the public, by substituting a cleanly for a dirty mode of making their bread. But still, even when the kneading has been effected by machinery, a great deal remains for the human hand to do, and often with consequences by no means cleanly or agreeable to think of. In the case of unfermented bread, such as that made by Dr. Dauglish's process, the whole of the work is done by machinery. The human hand does not come into contact with the bread at all. This is of itself a very great advantage; and as the bread thus made is of excellent quality, and can be eaten with comfort by many persons with whom all fermented bread disagrees, it is sure to be consumed to such an extent as to have some effect in reducing the evils of the present system. I am myself in the habit of using the aërated bread in my family. I first obtained it from Dockhead, and I am now (January 1862) so unwilling to use any other that I am supplied by an agent of a person who manufactures it at Leeds, and who sends a quantity up nightly by the trains to London.

Though the introduction of the mechanical processes to which I have just referred will lead to gradual improvements in the baking of bread, and in the condition of the persons employed in bakehouses, I am still strongly of opinion that the evils of the present system are too great and too pressing to admit of such slow methods of reform; and that the interference of the legislature is urgently required.

Dr. Dauglish, M.D.

527. I am the inventor of the new process of bread manufacture, by which what is known by the name of "aërated bread" is made. In March 1859, Messrs. Peek, Frean, and Co., biscuit makers, of Dockhead, Bermondsey, first made bread for sale under my patent. It came extensively into use in all parts of London. Persons using it for the first time are apt to consider it tasteless. Being accustomed to the slight acidity and the taste of yeast in bakers' bread, they at first miss those qualities in the aërated bread. Its entire purity, however, its great advantages in its constituent parts, and the entire and absolute cleanliness of the

process of manufacture, soon make its superiority over every other kind of bread apparent, and lead to an increasing demand for it.

528. As the process necessitates the employment of carefully made and somewhat costly machinery, in order to supply that demand economically, and at the same time ensure a remunerative return upon the capital employed, it is necessary to conduct the manufacture on a somewhat extensive scale, and to sell to and distribute the bread among consumers with the greatest facility and with the least possible expense. It could not be expected that the best mode of effecting this should be arrived at all at once. The method of sale and distribution from one large bakery, placed at the extreme limit of the metropolis, adopted by the wealthy firm who held the exclusive licence to work the patent in London, involved a system of agencies so costly and so difficult of management that it not only absorbed the legitimate profits arising from the manufacture, but it proved so inefficient that the public could never depend upon a regular supply of fresh bread daily at stated hours, a condition absolutely essential to render permanent and to cultivate public patronage. This was the chief cause of the experiments at Dockhead being discontinued in the early part of 1861, although it was not the only one. The early death of two important individuals connected with the firm there is every reason to believe led to a radical change in the original intentions of the first promoters of the undertaking. Besides London, the process has been put into operation in Portsmouth, Dublin, Leeds, Coventry, and Bath. In Portsmouth, where, from the poverty and ignorance of the chief portion of the population, there has been much prejudice to contend with, and where the educated classes are almost the sole consumers, the process has, nevertheless, been worked with great commercial success since the summer of 1859. This success is to be attributed to the small amount of capital sunk in plant, and to the great economy of all the arrangements of the business. In Dublin, where a very extensive and successful business is done, and the most beautiful bread is made, the commercial success is not so great as at Portsmouth, arising from the unnecessary expenditure of capital in plant and machinery and business premises. In Leeds, Bath, and Coventry, where the utmost economy of manufacture is attained, the commercial success is in proportion to the skill with which the business is managed, and to the amount of prejudice and of old established habits which have to be overcome. Indeed the experience which has now been acquired in the working of these several establishments,—in the manufacture of the necessary machinery, in the efficient and economical arrangement and construction of bakeries, in the mode of sale and distribution of the bread,—and in its dietetic value, is such as to convince not only myself but many competent men of business, that the aërated bread manufacture offers commercial advantages to men of enterprise, and sanitary and economical advantages to the public, that require only to be generally known to secure its general adoption throughout the country.

529. This is not the proper place to enter into details respecting the capital required for erecting bakeries on the new system, and the profits to be derived therefrom. I would, however, here make the following general statement :—

530. A bakery capable of converting 2 sacks of flour per hour into bread, which by working 10 hours continuously out of 24 will convert 20 sacks per day, or 120 sacks per week, or allowing for contingencies, say 100 sacks per week, or working with two sets of workmen for 20 hours out of 24, double that quantity, say 200 sacks per week,—such a bakery can be built and fitted with plant and machinery ready for work for from 1,500*l.* to 1,700*l.* Land and patent licence would be extra.

531. A bakery with half the manufacturing capacity of the above would cost between 800*l.* and 900*l.*

532. A small bakery, fitted with machinery and plant for converting half a sack of flour at a time, and suitable for a baker doing about 20 sacks per week, could be fitted, exclusive of building and ovens, for about 250*l.*

533. As the actual profits on working such bakeries will vary according to the localities in which they are placed, and the amount of administrative talent and business capacity of the manager, it would be unsafe to give any estimate of such. I will therefore confine myself to a statement of the advantages specially derivable from the new process in comparison with the old.

534. By the new process there is a clear extra yield of five 4-lb. loaves for every sack of flour more than the same flour would yield by fermentation. This, when bread is selling at 6*d.* per 4 lbs., will be equal to 2*s.* 6*d.* per sack. This arises in consequence of the new process causing no degradation or injury to the flour, similar to what takes place in the process of fermentation, and no loss of flour in the process of kneading.

535. There is then the further fact, that the flour for the aërated bread is ground and dressed coarser than ordinary flour. The quality for alimentary value is thereby also improved to the extent of from 3 to 4 shillings per sack.

536. If the American process of preparing the flour be practised, then there will be a gain beyond that resulting from coarse grinding and dressing equal to 2 shillings per sack. Making a total gain by the new process of 7*s.* 6*d.* per sack.

537. There is now erecting a model bakery in Old Paradise Row, Islington Green, which I expect will be completed by the end of May 1862, which will be still more perfect than those of Leeds, Coventry, and Bath. It will have six ovens in the space of two ordinary ones, and all the machinery connected with the manufacturing processes will be brought down to the greatest state of simplicity and economy. It is intended, as soon as this establishment at Islington is in operation, to erect others in various parts of London, to enable the bread to be delivered direct from the bakery to the consumer, without the intervention of an agent, at the same time as that of other bakers. Their not being able to do this with the bread made at Dockhead was one of the great disadvantages they were under at that establishment.

They could not deliver it at the west end of the town until towards the middle or end of the day.

538. My reason for inviting your attention to this new system of bread-making is, that it is calculated to effect a radical change in the condition of the journeyman baker, by reducing the needful time for conducting the whole processes of bread-making and baking to less than two hours; by greatly improving the mode in which his labour is applied, and the place in which his work will be carried on; and by relieving him from certain accessories to his work, as now conducted, which undermine and finally destroy his health. The tedious processes of bread-making by fermentation in the ordinary way, and by hand-kneading, occupying as they do so many hours (from 8 to 12 for each batch of bread, from the making of the dough to the taking the bread out of the oven), almost necessitate the very long hours of labour complained of by the journeymen bakers; and the ordinary disadvantages under which the journeyman labours, from inhaling the flour-dust, and from the very common state of the bake-houses, are well known. The cost of the machinery and plant required to carry on the new process economically and satisfactorily having been so much reduced by me since the earliest experiments, few respectable bakers will be without the means to erect small bakeries, and carry on the process with their own capital. The benefit, therefore, of the change of system will be widely diffused without difficulty. One of the great obstacles to the improvement of the condition of the journeyman baker, under the present circumstances of the trade, is, that the baking business is one which can be entered upon with a very small amount of capital; and under existing circumstances it has been difficult to obtain a satisfactory return for large capitals invested in that branch of business. It has, therefore, remained, with few exceptions, in the condition of a handicraft carried on under circumstances most injurious to the health of the men engaged in it, and in a manner which cannot fail to create disgust in any one witnessing it. The advantage of my process to the journeymen will be, that it will erect the baking business into a manufacture, and the result will be what it has been after the application of capital on an enlarged scale to other species of manufactures, namely, the improved prosperity and well-being of the workmen.

539. It is necessary that I should ask you to permit me to justify these assertions by entering into details; and I am also confident that I shall prove to you that the benefit to the public will be not less than to the journeyman bakers.

540. In a paper on the new system of bread manufacture, read by me before the Society of Arts on the 25th April 1860, for which the Council of the Society awarded me their silver medal, and which I purpose freely to quote from, as the readiest way of presenting the subject briefly and clearly, I state that "bread-making essentially consists in completely incorporating flour, water, salt, and carbonic acid with each other in such a manner as that they shall form a tenacious, elastic, and bulky mass, in which the aëriform constituent bears to the solid a proportion of

about three or four to one, and which, on being placed in the oven in the form of a loaf, shall expand to about double its size in the process of baking."

541. The mechanical part of bread making, of which the mixing and incorporating of the solid constituents is the principal portion, presents no difficulty, and its results, like all mechanical processes, can always be relied upon with certainty, and of late years some very ingenious kneading and mixing machines have been introduced for facilitating that portion of the art of bread-making.

542. It is the chemical part out of which all the difficulties and uncertainties arise, "and which has presented the only obstacle in the way of the bread manufacture participating in that marvellous progress of the industrial arts, which is the distinguishing feature of the present age, and of its taking that position as a manufacturing institution which its magnitude and importance really deserve."

543. "The chemical changes in the substance of the dough, and which it is the object of the baker to effect, are those which shall result in the alcoholic fermentation of the transformed starch or glucose, whereby these bodies are broken up into alcohol and carbonic acid, which latter is the only product desired, but which cannot be obtained without the previous transformation or degradation, more or less, of the constituents of the flour."

544. The object of the baker in his first process, that of the preparation of the sponge, is to lessen as far as possible the injury done to the bulk of the flour, consistently with giving the requisite lightness to the mass.

545. The sponge effects this object in the following manner :— The flour, warm water, and yeast or leaven, being mixed up together into a soup-like paste, and being allowed to stand some hours, an active fermentation is set up ; bubbles of carbonic acid are rapidly formed and rise to the surface, and the prolonged action of warmth and moisture, combined with the yeast or leaven, change the whole body of the paste into a ferment sufficient to affect a very large quantity of flour when incorporated with it.

546. This large quantity could not have been otherwise so affected without, on the one hand, the use of large quantities of yeast or leaven, and, on the other, without its standing a length of time in a state of active fermentation, during which time a greater loss would have been produced by degradation of the constituent portions of the flour.

547. This result is at once recognized when it is borne in mind that the yeast acts directly upon the glucose or grape sugar contained in the flour, breaking it up into alcohol and carbonic acid. But inasmuch as there is in sound flour very little, not more than a trace, of sugar, certain portions of the gluten and starch have, while in the sponge, under the influence of the yeast and the warm water, passed through the necessary changes for the alcoholic fermentation to act. The gluten, under those

conditions, acts upon the starch, changing it into dextrine and grape sugar, "whilst at the same time the yeast-plant is propagated at the expense of a small portion of the changed gluten," &c. Thus we have in the sponge all the materials—the dextrine, the glucose, the diastase, and the yeast—in a state ready to pass into active alcoholic fermentation, and to give out the necessary bubbles of carbonic acid, immediately on their complete incorporation with the flour being effected, so that the least possible injury to the bulk of the flour is secured."

548. Unsound flour is flour in which some of the changes on which ordinary fermentation depends have already taken place to a greater or smaller extent. "The gluten has already become metamorphic, and the starch partially or wholly changed into dextrine or glucose. The gluten has lost more or less of its elasticity, and is ready, immediately on the application of warmth and moisture, not only to pass rapidly into a state of solution, as Liebig has termed it, but to act with the greatest energy on the partially charged starch, completing its alteration into glucose, so that a running sticky mass results from the attempt at fermentation. Such a state of things, however, may be and is frequently brought about, even when good sound flour is used, either by inexperienced persons, who do not understand the management of fermentation, and the length of time and the temperature necessary, or by peculiar states of and changes in the atmosphere, by which the fermentative operations are so rapidly hastened in the earlier stages as to become almost or quite unmanageable.

549. Between perfectly sound flour and that which runs in the manner above referred to, on the application of a ferment, there are undefined shades of variety; and between the temperature or the state of atmosphere least liable to produce derangement and that which is most, there are also indefinite varieties. Now it is these liabilities to derangements and irregularities which have rendered the preparation of bread so precarious, and, (going along with the absolute necessity to have the article ready always at the same hour of the day, an article which, in the event of its spoiling, cannot be re-prepared under 8 to 12 hours), have raised an effectual barrier to its becoming an extensive manufacture in large establishments, employing large capitals, and deriving the peculiar profits arising out of the division of labour.

550. These difficulties and disadvantages in the manufacture of bread my process obviates:

(1.) It does away entirely with fermentation, and with all those chemical changes in the constituents of the flour which are consequent upon it.

(2.) It avoids the loss consequent upon the decomposition of the portion of starch or glucose consumed in the process of fermentation, estimated at from 3 to 6 per cent. This loss may be estimated at about at least 1,500,000*l.* sterling in the total quantity of bread made annually in the United Kingdom.

(3.) It reduces the time requisite to prepare a batch of dough for the oven from a period of from 8 to 12 hours to less than 30 minutes.

(4.) Its results are absolutely certain and uniform.

(5.) It does away with the necessity for the use of alum with poor flour, and the temptation which bakers are under to use it with all.

(6.) It has the recommendation of absolute and entire cleanliness, the human hand not touching the dough or the bread from the beginning of the process to the end. Even in weighing the dough, if a piece must be added to turn the scale, it is added by the use of a knife and fork.

(7.) The journeymen are relieved from a circumstance most destructive to their health, that of inhaling the flour dust in the process of kneading. Their places of work also, with my process, will always be above ground and well ventilated; and their hours of work need never be more than the usual hours in ordinary occupations, with the recognised hours for meals. Or where a business may be done so large as to necessitate night work, there will be separate sets of hands for day and for night work, and each set of hands will be able to change from night to day work in alternate weeks, as is done in some other trades and occupations.

(8.) It will produce a healthier condition of the baking trade, and thereby diminish to a great extent the inducements which lead to the extensive system of fraud now practised upon the public by the production of adulterated and inferior bread.

(9.) It will effect an immense saving in the material from another source, namely, by preventing the sacrifice of at least 10 per cent. in the nutritive portion of the grain, hitherto lost as human food by the method of grinding and dressing necessary in the preparation of flour for making white bread by fermentation.

(10.) Together with the preservation of this large proportion of the entire quantity of wheat converted into flour, there is also the important result of the proportion preserved (the cerealine), being a most powerful agent in promoting the easy and healthy digestion of food. This agent is retained uninjured by the aërated bread process, but is destroyed by the process of panary fermentation.

551. These three last heads demand a detailed explanation. With reference to clause 8, as to its producing a healthier condition of the baking trade—

552. "In the baking trade, as in most trades, there are different grades of respectability and credit; but there are two great divisions, the high-priced and the low-priced, or 'cutting,' as they are called. In each of these two divisions there are of course many subdivisions. There are some, but these are comparatively few, who are men of substance, possessing considerable capital of their own, and are perfectly independent of any system of credit allowed by the miller. They are consequently in the most favourable position possible for their purchase of the flour both cheap and good. But by far the greater number of bakers trade almost entirely with the capital of the millers, through a most vicious system of credit, which operates most prejudicially in their purchases of flour."

553. If sufficient means can be scraped together to rent or fit up a shop, and to build an oven, and furnish the necessary utensils of a bakehouse, any journeyman baker may marry, and commence business on his own account, as the working capital for his business is readily found by the miller, who will supply him with the necessary flour upon credit, taking for security a bill of sale on all that his premises contain, which not only protects the miller from loss, but secures to him all the baker's future orders for flour.

554. This facility of getting into the trade lays it open to the very fiercest competition. Accordingly, when remuneration cannot be obtained by fair means, the dishonest in the trade will use foul. The description of dishonesty most prevalent in the bakers' trade consists in supplying bread deficient both in quality and weight. The quality is made to appear better than it is by the use of deleterious drugs ; and the weighing of bread at the time of sale, where required by law, being extensively neglected, the amount of fraud upon the public on the purchase of bread deficient in weight is very considerable.

555. One of the best and most natural remedies for this state of things would consist in such a change in the conditions of the manufacture of bread as would lead to its being undertaken by men of capital and social position, who would disdain to resort to the practices which now disgrace so large a portion of the trade.

556. Hitherto the conditions of the bread trade have been such as, except under certain circumstances peculiarly favourable, to prevent capital on a large scale being embarked in it. The trade has remained hitherto a common handicraft, in which there has been no substantial improvement since it was first begun ; a handicraft easily acquired and easily adopted ; open, therefore, to the severest competition ; and one in which, from the nature of the processes and the results produced, capital in most cases had but little chance of a satisfactory return.

557. The new process of bread making has entirely altered that state of things. It has erected bread making into a scientific manufacture. It necessitates the employment of capital, and promises to it a good return. It will place the trade in the hands of men of substance, whose social standing will be a guarantee to the public that they are well and honestly served. As the very process itself compels the employment of good flour, this fact, together with the other recommendations of the system, will be very influential with the public in leading to an increase of demand. With every increase in the production and consumption of good and pure bread, that of the vast quantities of adulterated and inferior bread now sold must diminish, and the system by which the supply of such bread is maintained, and which produces an amount of fraud and bankruptcy unequalled, I believe, in any other trade, will be reduced accordingly within continually narrowing bounds.

558. With reference to clauses 9 and 10, I will now show that the process of the aërated bread manufacture will effect an immense saving of material, and by preserving the "cerealine" will also

prove of much value by its effect upon the public health; upon both of which points experience now enables me to speak confidently.

559. About 1846 Mr. Bentz, an American, invented a machine for removing the outer seed-coat of the wheat grain (previous to grinding), without injuring the grain itself, by which he proposed to save that highly nutritious portion of the internal coat of the grain, which, adhering to the bran, in the ordinary process of grinding is torn away and lost to human consumption. It is stated that by this means ninety per cent. of fine white flour was obtained from the grain, instead of about seventy-four or seventy-five, as by the old method. The invention was brought under the notice of the French Emperor, who caused some experiments to be made in one of the Government bakeries, to test its value. The experiments were perfectly satisfactory, so far as the making of the extra quantity of fine flour was concerned, but when this flour was subjected to the ordinary process of fermentation, and made into bread, much to the astonishment of the parties conducting the experiments and of the inventor himself, the bread was brown instead of white. The consequence of course has been, that the invention has never been brought into practical operation. But about four years ago a French chemist, M. Mége Mouriès, directed his attention to the subject of utilising, for the purpose of white bread-making, the nutritious substances ordinarily thrown away with the bran, and the results of his inquiries were communicated in a memoir to the Academy of Sciences, on the 9th June 1856, and have since been reported on by MM. Dumas, Pelouze, Payen, Peligot, and Chevreul.

560. These results explain most satisfactorily the cause of failure of the flour prepared by the American method to make white bread.

561. Before the publication of M. Mouriès' researches, the nutritious substance attached to the bran was considered by chemists to be a portion of the gluten of the grain, but it now proves not to be gluten at all, but chiefly a new nitrogenous body, analagous to gluten, which the discoverer has named "cerealine," with a portion of another well-known nitrogenous body,—"vegetable caseine."

562. Among the properties of this body, cerealine, M. Mouriès gives the following :

It is soluble in water, and insoluble in alcohol. It acts as a ferment on starch, dextrine, glucose, or grape sugar. It alters gluten extremely, and gives to the altered matter a brown colour. Its peculiar action, when brought into contact, in the process of fermentation, with the ordinary constituents of fine white flour, is the true cause of the dark brown colour imparted to the bread made from flour in which the cerealine was retained.

563. M. Mouriès, having satisfied himself as to the properties of cerealine, adopted a method by which its peculiar action was neutralised, and then made bread by the ordinary process of fermentation, in which the whole of the bran contained in the internal coat of the grain was allowed to remain. The

result was a loaf having merely an orange colour, but none of that dark brown colour which always results when the bran contained in the internal coat of the grain is used in bread made by the ordinary method.

564. In like manner, by my process, in which the fermentative changes are never allowed to take place, bread made from wheaten meal, from which only the coarsest bran has been separated, is so free from the dark brown colour that it is difficult to persuade people that it is made from wheaten meal at all.

565. By the method of grinding and dressing necessary in the preparation of flour for making white bread by fermentation, about 392 lbs. of flour are obtained from 504 lbs. of wheat, the remaining 112 lbs. being lost to human consumption in the form of bran, pollard, &c., which is used chiefly for feeding cattle, and about two per cent. waste by evaporation and dust in grinding. About one fourth of this bran, pollard, &c., which is rejected, consists of the hard siliceous external coat of the grain, which is wholly indigestible, and therefore not a desirable substance to retain as food. The remaining three fourths consist of the internal coat; this, however, instead of being indigestible, proves to be the most valuable alimentary substance in the whole grain.

566. The experiments above adverted to as directed by the Emperor of the French proved that when the whole of the nutritive portion of the grain was made into flour it gave an extra yield of from 10 to 15 per cent. This corresponds with the results stated in the last paragraph upon the grinding of 504 lbs. of wheat; inasmuch as three-fourths of the 112 lbs. hitherto lost, —78 lbs.—amounts to 13½ per cent. upon the 504 lbs. (See 794.)

567. Even if the lower figure (10 per cent.) be taken, this, upon the estimated annual consumption of wheat in this country, 30,000,000 quarters, would give a saving of 3,000,000 quarters, or, in other words, an addition to human consumption of that amount, equal in money value, at 50*s.* a quarter, to 7,500,000*l.* From this must be deducted the value of that number of quarters as bran, &c., which would amount to about 1,000,000*l.*, leaving as net gain for human consumption a value of 6,500,000*l.*

568. I have already shown that the destruction of nutritive matter by the ordinary process of fermentation in bread making amounts in money value to at least 1,500,000*l.* per annum.

569. The national gain, therefore, in the consumption of wheaten bread, if my process of bread making became universal, would amount to the sum of 8,000,000*l.* yearly.

570. But, in addition to this money value, there remains to be considered the alimentary value of the cerealine, of which mention has been made above.

571. The investigations of M. Mouriès have demonstrated that the internal coat of the wheaten grain is an infinitely more important alimentary substance than its mere bulk would indicate. It had been long known to be exceedingly rich in plastic or tissue-forming elements, and these were supposed to be chiefly gluten;

but it appears that they are almost entirely in the form of a substance possessing properties hitherto unsuspected. It belongs to a class of bodies known as catalytic agents (solvents), which by simple contact have the power of determining definite chemical changes. This substance, named by its discoverer "cerealine," has a most powerful solvent action, in the presence of warmth and moisture, on gluten and starch, and promotes the easy and healthy digestion of those matters when taken as food. It is the true solvent prepared by nature for the gluten of wheat for its assimilation in the system. It is to be found in minute particles in most flours, small quantities of it becoming detached from the coating of the grain in the process of grinding and dressing in the ordinary way for the preparation of fine flour. But the aërated bread process affords the means of incorporating the whole of it, and of thus securing the whole nutritive and chemical value of the wheaten grain. That bread made by this process possesses all the properties which theory leads us to expect, is established beyond doubt by the experience of nearly three years, and by the testimony of some of the most eminent men in the medical profession, who have had opportunities of watching its effects as an article of diet. Wherever it has been introduced into the nursery its effects have been most marked. Its action upon the adult must be, and is, in like manner beneficial; but in this case its effects cannot be so easily or so specially noted, because there are generally several causes of derangement of digestion in adults besides that of fermented bread, the withdrawal of which alone will not effect an improvement.*

572. The injurious effects often resulting from the use of fermented bread in cases where the digestive organs are weak or impaired are attributable to the following causes:—1st, to the acetic acid (or vinegar) which is produced in large quantities in the bread, especially in hot weather, by the oxydation, by atmospheric contact, of the alcohol generated in the process of fermentation. 2nd. To the yeast plant, which is rapidly propagated during the alcoholic fermentation. The life of the yeast plant is frequently not destroyed in baking. In order to destroy it, it is necessary that the bread should attain, and remain for some few minutes, at the heat of 212 degrees (the boiling point). This has been ascertained in numerous instances by registering thermometers inserted in the loaf. It is not difficult to understand how the most painful and distressing symptoms and derangements may follow the use of bread in which the yeast plant has not been thoroughly destroyed. When the functions of digestion are weak, they are in most cases incapable of preventing the develop-

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* Dr. Sieveking, one of the physicians to, and lecturer on Materia Medica at, St. Mary's Hospital, having especially noted the effects of the aërated bread as a diet in his own family and in his professional practice, expressed his conviction in a letter to me, that on account of its great value and the universal approval which the medical profession had accorded to it, it must eventually supersede the use of all other breadstuffs prepared in the usual way. A like conviction has been expressed to me in conversation by many of the principal members of the medical profession in the metropolis.

ment of the yeast plant in the stomach, and the consequent setting up of the alcoholic fermentation to derange the whole process of digestion and assimilation. 3rd, to the use of alum. Doubtless respectable bakers who prepare their bread from good and sound flour abstain altogether from the use of alum. Those, on the contrary, who deal in bread made of weak or unsound flour, or flour containing mixtures of meal other than wheat, use alum in greater or less quantities. It cannot be said to be ever altogether harmless, and will be injurious in proportion to the quantity used. It has a prejudicial effect upon the mucous secretions, preventing the action of solvents in the process of digestion ; also its astringent qualities on the surface of the alimentary canal materially derange the processes of absorption. The very purpose for which it is used by the baker is the prevention of those early stages of solution which spoil the colour and lightness of the bread while it is being prepared, and which it does most effectually ; but it does more than this, for while it prevents solution at a time when it is not desirable, it also continues its effect when taken into the stomach, and the consequence is that a large portion of the gluten and other valuable constituents of the flour are never properly dissolved, but pass away without affording any nourishment whatever. Experiments of the action of alum upon gluten have fully established these conclusions. And, lastly, to the absence of the special alimentary value of the cerealine, which the process of fermentation entirely destroys, as has been proved by Mr. Mége Mouriès.

573. The proportion of which the inhabitants of the earth who resort to the practice of fermenting the flour or meal of the cereal grain bear to those who do not is quite insignifiant. The nations who are wholly fed on the products of the vegetable kingdom reject the process of fermentation entirely. Thus the millions of India and China, who feed chiefly on rice, take it for the most part simply boiled ; and that large portion of the human race who feed on maize prepare it in many ways, but never ferment it. The same is true with the potato-eater of Ireland, and with the oatmeal-eater of Scotland. Nor do we find that even wheat is always subject to fermentation. In the less civilized states it is first roasted and then ground. On the borders of the Mediterranean it is prepared in the form of maccaroni and vermicelli. In the East, it is made into hard thin cakes, or into thicker and more dense masses, of baked flour and water. Even in our own nurseries wheaten flour is baked before it is prepared with milk for infants' food. The necessity of subjecting wheaten grain to these manipulations arises from its richness in gluten, and from the peculiar properties of that gluten. If a few wheaten grains are taken whole, and thoroughly masticated, the starchy portions will be easily separated, mixed with the saliva, and swallowed, whilst nearly the whole of the gluten will remain in the mouth in the form of a tough tenacious pellet. A similar state of things will follow the mastication of flour. In this condition, the gluten is extremely indigestible, since it cannot be penetrated by the digestive solvents, and they can only act on its

small external surface; hence the necessity to prepare food from wheat in such a manner as shall counteract the tendency to cohere and form tenaceous masses. This is the object of baking the grain and the flour as before mentioned, of making it into maccaroni, and of raising it into soft spongy bread; by which latter means the gluten assumes a form somewhat analogous to the texture of the lungs, so that an enormous surface is secured for the action of the digestive juices; and this, I believe, is the sole object to be sought in the preparation of bread from wheaten flour.

574. The process of kneading has for its object the mixing of the wheaten flour, yeast or ferment, salt, and water together in such a manner as that the gluten of the flour, becoming saturated with the liquid, shall form a soft, adhesive mass, as a matrix, in which are imbedded and bound together the minute particles of starch; and if the kneading is carried on in a very thorough manner and for a prolonged period, the dough becomes tough, by the particles of gluten being driven close together, and forming a kind of sticky coat or shell around the particles of starch which thus adhere firmly to each other. When this mass is obtained, the next result is the liberation of minute bubbles of gas within each sticky coat surrounding each granule of starch. In the ordinary process of bread-making by fermentation, the carbonic acid, which is the agent of distension, is obtained from the decomposition of the starch or glucose, by the action of the ferment used, which, by its incorporation with the dough or paste, is thus brought into contact with the starch and with the gluten with which the starch is surrounded.

575. Each of the minute particles of starch imprisoned in its covering of gluten is thus made the centre of a distinct chemical action, and yields up its bubbles of carbonic acid to distend its gluten coat, and the mass of dough becomes spongy or light.

576. When the materials have not been thoroughly incorporated, and the action of the ferment is consequently not uniform, or when the gluten is not of a firm yet elastic quality, the generation of the gas will be unequal, the small bubbles will be burst into large ones, and the texture of the dough will be impaired accordingly,—rendered, as it is called, "full of eyes," instead of being dispersed in minute bubbles, as numerous, or nearly so, as the particles of starch from which it is given off.

577. By the aërated bread process the gas is obtained from the water with which the dough is formed, and which is supersaturated with carbonic acid gas previous to its being mixed with the flour.

578. This is effected by taking advantage of the known law that water will absorb its own bulk of carbonic acid, whatever the density, with great readiness, when agitated with it.

579. The water which has been made to hold in solution the necessary quantity of carbonic acid gas is incorporated in a closed apparatus, under pressure, with the flour; and the gas being then allowed to escape, the minute bubbles of gas, in escaping, distend the dough into a perfect sponge, even more perfect than that which is obtained by fermentation, since every atom of water

yields its atom of gas, not only between the particles of starch and their gluten coat. but also within the substance of the coat itself, rendering that porous.

580. The apparatus consists of a gas holder and a generator similar in construction and principle to but larger in size than what is used by the makers of aerated waters ; of pumps, suitable for condensing elastic fluids ; and of a mixing vessel, and a water vessel in connexion, both made so that they can be tightly closed, to sustain an internal pressure of from 100 to 200 lbs. on the square inch. The mixing vessel is supplied with flour through a shoot passing from the floor above, and the water vessel with water through a pipe from a cistern at the top of the building.

581. The apparatus is so simple that it is found that there are few workmen who, having given their hearty attention during a week's instruction and observation, to its working, are not competent to take the whole charge of the process.

582. The order of working, and the time required for making a sack of flour of 280 lbs. into dough, is as follows :—

Opening lid of mixer, [a hollow globe of cast iron, in which iron arms are made to revolve on an axis turned by the steam-engine], and fitting within the neck the end of the flour shoot, and turning water-cock to fill water vessel - - - - -	1	minute.
Passing from top of machine to floor above, and shooting down a sack of flour - -	3	,,
Returning, closing water-cock, removing end of shoot, and closing mixer - - -	2	,,
Withdrawing atmospheric air from mixer -	3	,,
Passing gas through water into mixer, &c. -	10	,,
Mixing - - - - -	7	,,
Total - - -	26	minutes.

583. At the end of this time the dough is ready to be drawn into loaves from a nozzle or mouth, through which it is forced by the pressure within the mixer, and as it expands or rises in the act of leaving the mouth, it is ready to be baked immediately. One boy is capable of drawing the dough from one sack of flour into loaves in fifteen minutes, as fast as they can be weighed and placed in the oven.

584. The baking of the bread, like the baking of any bread, of course requires the management of a man who has the necessary judgment and knowledge for the task.

585. Thus, in a little more than forty minutes, a baker can rely upon having his dough ready for and placed in the oven, and this with a certainty which is nearly mathematical ; whilst by the process of fermentation it requires from 8 to 12 hours, and is subject to many vicissitudes and much uncertainty. The other advantages of the process have been already described.

586. It may be naturally asked if the new process is capable of effecting so great an economy in bread making, will not the bread be cheaper ? I have answered that question in a letter,

briefly describing the new process and its results, addressed to the editor of The Times, and published in that journal on the 26th October 1861. That the aërated bread can be made and sold at a price to compete with fermented bread is now beyond a doubt. But it should be remembered that, while the aërated bread process makes more bread, it necessitates the employment of flour which has no sour or musty flavour, as, unlike the process of fermentation, it imparts no strong flavour to mask such in the material used ; and that likewise the expenses which are always attendant upon the introduction of any new process will prevent its full economy being felt in the reduction of price until it is pretty generally adopted.

587. But although the new process necessitates the employment of sound flour, it not only does not prevent but it greatly facilitates the use of weak flours, which, by the process of fermentation, cannot be converted into bread without the use of alum or some other corrective. The term weak has been applied to flours the gluten of which, though not deficient in quantity or in nutritive value, is yet liable to rapid transformation, when subjected to the process of panary fermentation. In this transformation the gluten loses its elastic and expansible properties, upon which the spongy texture of wheaten bread is dependent. It will at once be seen, therefore, that as the causes which produce such a result are absent in the aërated bread process, perfectly good and nutritious bread may be made from weak flours, without the use of any corrective agent whatever. A loaf of it can be kept for a fortnight without injury.

588. The pretty general adoption of the new process would have, upon the class of master bakers, this effect : the small baker would become a bread seller instead of a bread baker. This would in the great majority of cases be eminently to his advantage, the commission upon the sale of bread being a source of income quite as good, more certain, less attended with anxieties and risks, than in most cases his returns as a maker of bread, subject to the present great drawbacks of excessive competition. To the class of journeymen its general adoption would be an increased advantage in every respect, as has been already made clear.

589. It has been suggested by interested opponents, though not by persons possessing any knowledge of chemistry, that the sulphuric acid used in the preparation of the carbonic acid gas may impart arsenic to the bread. There is not a shadow of truth in this supposition. As the carbonic acid for aërated bread-making is prepared from the same materials and in a similar manner, though with a far more perfect apparatus, as the carbonic gas used by the makers of aërated waters, a similar objection could be made to the purity of such aërated waters, which have for so many years been largely consumed in this as in most civilized countries. We have, however, never heard such an objection hinted at. The fact is that even if the common "brown" sulphuric acid were used (which is made from iron pyrites for artificial manure making, and contains a considerable quantity of arsenic,) it would be simply impossible for arsenic to

pass over with the gas generated, and so find its way into the bread. In the manufacture of "unfermented" bread by means of bicarbonate of soda or of ammonia and hydrochloric acid, which was so fashionable a few years ago, there were good reasons for believing that arsenic did find its way into the bread, as the acid used generally contained traces of that substance; but in this instance the acid was actually *mixed with the bread*, and therefore was necessarily retained there. In the aërated bread process, as in aërated water making, the sulphuric acid is simply used to generate carbonic acid gas from carbonate of lime in a separate and distinct vessel, and the gas so generated is received into a gas holder for use, whilst the sulphate of lime formed in the generator, in which any arsenic that might possibly be in the sulphuric acid is retained, is afterwards thrown away or used for making manure. I may state that the aërated bread has been several times analysed by distinguished chemists, and in every case it was found to be absolutely pure.

590. It was objected while our experiment was going on at Dockhead, that we only made bread in tins, and that the public did not like tin made bread, and that consequently our bread would never come into general use. The answer to that is that more than half the bread made or sold at Dockhead was not baked in tins, but in the form of what is called "Paris bread," —an oblong crusty loaf. We baked so much in tins because the public liked it. There is no difficulty in baking our bread without tins; the dough is put into the oven so quickly, and incrusted over in the baking, that there is no time for the escape of the carbonic acid gas. All our loaves are baked separately, and are consequently crusty all over. There is an advantage in that to the consumer, as the crust of a loaf baked separate is more easily digested by persons of delicate digestive powers than the crumb of a batch loaf; it is more perfectly cooked.

591. This mode of baking also gives us another advantage over the ordinary baker of batch bread. Our Paris loaves are baked in 45 minutes, and our tin loaves in one hour to one hour and five minutes. It does not take the heat out of the oven so much. We are able to have batches following each other all day continuously; less fuel is consequently consumed. We can bake 84 sacks of flour converted into bread with one ton of coals. A baker baking two sacks a day estimates the cost of coal at 1*s.* per sack. If our ton costs us 20*s.*, our fuel costs us a little less than 3*d.* per sack.

Our carbonic acid costs us 9*d.* to 10*d.* per sack; the yeast costs the baker from 3*d.* to 1*s.* per sack.

Our actual cost of converting flour into bread, when we are in fair operation, with our machinery perfectly employed, is 3*s.* per sack, namely,—

	s.
Labour - - - - -	1
Carbonic acid gas, fuel for oven and steam engine, dusting, salt, gas for lighting, &c. -	2
	3

592. The ordinary baker estimates his costs at 4*s.* per sack.

593. I have spoken of the national gain (amounting to at least 10 per cent. upon the amount of wheaten grain converted into flour for human food) arising from our being able to grind coarser, and dress through larger sieves ; so coarsely that if the flour was made into bread by the process of fermentation, it would be unsaleable. I have also shown that the portion thus saved for human food, is, from its peculiar qualities, the most valuable portion of the grain. It will now be asked what is to be said as to the flavour of the aërated bread ? The answer is, that persons accustomed to ordinary fermented bread at first consider it tasteless ; but after using it a short time they return to fermented bread with great reluctance. The best proof of this is, that there are so many persons in London anxious to obtain the aërated bread that while the new establishment at Islington is being prepared bread is sent up by train nightly from Coventry, Southsea, and Leeds, and sold at depôts in London to supply the demand.

594. We have also a few other economical advantages not yet adverted to. We have no loss from flour dust, all our work with the flour being done in hermetically sealed vessels. We are never subject to the losses by fermentation to which the ordinary baker is subject. Sometimes, in an ordinary baking, a whole batch is ready to go into the oven, and it cannot go in ; it is spoilt in the process of fermentation. Again, those who carry on the ordinary baking business on a large scale are under great difficulties during great changes of temperature, not only as to the quality, but also as to the quantity of the bread to be made. A sudden accession of cold leads to a considerable increase of consumption, and vice versâ. In providing for this, if they make too little bread it leads to loss of custom, if too much, to loss of bread. As the process requires from 8 to 12 hours, they cannot meet these contingencies rapidly as they occur. By our process which requires only between two and three hours we can make our bread as we require it ; we can bring our production round to the hour or the minute. We thus put an end to the great obstacle which has hitherto stood in the way of the baking business being carried on on a large scale.

595. I think I have now fairly demonstrated the proposition with which I commenced, namely, that the aërated bread process is calculated, not only to effect a great national saving, and to supply a perfectly pure bread, possessing qualities superior to any bread ever yet made, but to raise the condition of the journeyman, and to relieve him from all the injurious consequences of his calling, as it now exists.

596. In order that it may be seen that I lay no claim to being the first to dwell upon the importance of the subject of the waste which the present methods of preparing flour and bread from the wheaten grain entail, I would refer to a paper by the late Professor Johnston, Professor of Chemistry in the University of Durham, which appeared in Blackwood's Magazine for June 1847, and has since been published in the form of a pamphlet ;

and also to a pamphlet by an anonymous physician, published in London in the year 1846, entitled "Instructions for making unfermented bread." In the latter pamphlet, attention is drawn to the fact that Dr. Thomas Thompson, Professor of Chemistry in the University of Glasgow, states in an essay which he wrote on baking for the supplement of the Encyclopædia Britannica which was published in 1816, that as the only purpose served by fermentation in bread-making is the generation of the carbonic acid required to raise the dough, this end can be attained by the use of carbonate of soda and muriatic acid, and that by thus avoiding the waste consequent upon fermentation, a considerable economy is effected. The writer of the pamphlet goes on to state that the saving so effected is not less than 13 per cent., which of course would represent the loss caused by fermentation. I have stated that this loss may be estimated at from 3 to 6 per cent., which I think will more nearly represent the average of loss by fermentation in this country. The loss in France where the bread is more highly fermented will I think be greater than in this country.

597. The mode of raising bread by the use of muriatic acid and bicarbonate of soda, besides the objection which I have pointed out, of its being liable to introduce small quantities of arsenic, is objectionable in another way, and that is, that it is found impossible in practice to adjust the material in their due equivalents, and to secure so perfect a chemical combination as that the bread shall not contain either free acid or free soda, either of which would be prejudicial, especially the soda, to a very large proportion of the population. Again, it has been found to be practically impossible to make bread by this process, in any way approaching to the lightness and texture of fermented bread, in large quantities, say in more than 30 or 40 lbs. at a time. The extreme rapidity with which the gas is evolved, immediately on the application of the necessary moisture to form paste causes the greater portion of it to escape before the dough is kneaded or properly "formed," the consequence is, the bread is heavy and indigestible, and almost incapable of being thoroughly "soaked" or cooked.

Professor Johnston's pamphlet describes so clearly the composition of the different portions of the seed of wheat, and the proportions they respectively contain of the several constituents of the human body that I beg leave to introduce some passages from it as illustrating the subject in hand:—

"The solid parts of the human body consist, principally, of three several portions; the fat, the muscle, and the bone. These three substances are liable to constant waste in the living body, and therefore must be constantly renewed from the food that we eat. The vegetable food we consume contains these three substances almost ready formed. The plant is the brickmaker. The animal voluntarily introduces these bricks into its stomach, and then involuntarily,—through the operation of the mysterious machinery within,—picks out these bricks, transports them to the different parts of the body, and builds them into their appropriate places. As the miller at his mill throws into the hopper the unground grain, and forthwith, by the involuntary movements of the machinery,

receives in his several sacks the fine flour, the seconds, the middlings, the pollard, and the bran; so in the human body, by a still more refined separation, the fat is extracted and deposited here, the muscular matter there, and the bony material in a third locality, where it can not only be stored up, but where its presence is actually at the moment necessary.

"Again, the fluid parts of the body contain the same substances in a liquid form, on their way to or from the several parts of the body in which they are required. They include also a portion of salt or saline matter which is dissolved in them, as we dissolve common salt in our soup, or Epsom salts in the pleasant draughts with which our doctors delight to vex us. This saline matter is also obtained from the food.

"Now, it is self-evident, that that food must be the most nourishing which supplies all these ingredients of the body most abundantly on the whole, or in proportions most suited to the actual wants of the individual animal to which it is given.

"How stands the question, then, in regard to this point between the brown bread and the white,—the fine flour, and the *whole meal* of wheat?

"The grain of wheat consists of two parts, with which the miller is familiar,—the inner grain and the skin that covers it. The inner grain gives the pure white flour; the skin, when separated, forms the bran. The miller cannot entirely peel off the skin from his grain, and thus some of it is unavoidably ground up with his flour. By sifting, he separates it more or less completely: his seconds, middlings, &c., owing their colour to the proportion of brown bran that has passed through the sieve along with the flour. The whole meal, as it is called, of which the so-named brown *household bread* is made, consists of the entire grain ground up together,—used as it comes from the mill-stones unsifted, and therefore containing all the bran.

"The first or whitest flour, therefore, may be said to contain no bran, while the whole meal contains all that grew naturally upon the grain.

"What is the composition of these two portions of the seed? How much do they respectively contain of the several constituents of the animal body? How much of each is contained also in the whole grain?

"1. *The fat*:—Of this ingredient a thousand pounds of the

Whole grain contain	- - -	28 lbs.
Fine flour	,, - - -	20 ,,
Bran	,, - - -	60 ,,

So that the bran is much richer in fat than the interior part of the grain, and the whole grain ground together (whole meal) richer than the finer part of the flour in the proportion of nearly one half.

"2. *The muscular matter.*—I have had no opportunity as yet of ascertaining the relative proportions of this ingredient in the bran and fine flour of the same sample of grain. Numerous experiments, however, have been made in my laboratory, to determine these proportions in the fine flour and whole seed of several varieties of grain. The general result of these is, that the whole grain uniformly contains a larger quantity, weight for weight, than the fine flour extracted from it does. The particular results in the case of wheat and Indian corn were as follow:—A thousand pounds of the whole grain and of the fine flour contained of muscular matter respectively,—

	Whole grain.	Fine flour.
Wheat - - -	156 lbs.	130 lbs.
Indian corn - -	140 ,,	110 ,,

Of the material out of which the animal muscle is to be formed, the whole meal or grain of wheat contains one-fifth more than the finest flour does. For maintaining muscular strength, therefore, it must be more valuable in an equal proportion.

"3. *Bone material and saline matter.*—Of these mineral constituents' as they may be called, of the animal body, a thousand pounds of bran, whole meal, and fine flour, contain respectively,—

Bran - - - - -	70 lbs.
Whole meal - - - -	18 „
Fine Flour - - - -	9 „

"So that in regard to this important part of our food, necessary to all living animals, but especially to the young who are growing, and to the mother who is giving milk, the whole meal is twice as nourishing as the fine flour.

"Our case is now made out. Weight for weight, the whole grain or meal is more rich in all these three essential elements of a nutritive food, than the fine flour of wheat. By those whose only desire is to sustain their health and strength by the food they eat, ought not the whole meal to be preferred? To children who are rapidly growing, the browner the bread they eat, the more abundant the supply of the materials from which their increasing bones and muscles are to be produced. To the milk-giving mother, the same food, and for a similar reason, is the most appropriate.

"A glance at the mutual relations of the whole meal and the white flour in regard to the three substances, presented in one view, will show this more clearly. A thousand pounds of each contain of the three several ingredients, the following proportions :—

	Whole meal.	Fine flour.
Muscular matter - -	156 lbs.	130 lbs.
Bone material - -	18 „	9 „
Fat - - -	28 „	20 „
Total in each -	202	159

"Taking the three ingredients, therefore together, the whole meal is one-third more valuable for fulfilling *all* the purposes of nutrition than the fine flour,—and especially it is so in regard to the feeding of the young, the pregnant, and those who undergo much bodily fatigue.

"It will not be denied that it is for a wise purpose that the Deity has so intimately associated in the grain, the several substances which are necessary for the complete nutrition of animal bodies. The above considerations show how unwise we are in attempting to undo this natural collocation of materials. To please the eye and the palate, we sift out a more generally nutritive food,—and, to make up for what we have removed, experience teaches us to have recourse to animal food of various descriptions.

"It is interesting to remark, even in apparently trivial things, how all nature is full of compensating processes. We give our servants household bread, while we live on the finest of the wheat ourselves. The mistress eats that which pleases the eye more, the maid what sustains and nourishes the body better.

"But the whole meal is more wholesome, as well as more nutritive. It is on account of its superior wholesomeness that those who are experienced in medicine usually recommend it to our attention. Experience in the laws of digestion brings us back to the simple admixture found in the natural seed. It is not an accidental thing that the proportions in which the ingredients of a truly sustaining food take their places in the seeds on which we live, should be best fitted at once to promote the health of the sedentary scholar, and to re-invigorate the strength of the active man when exhausted by bodily labour.

"Some may say that the preceding observations are merely theoretical; and may demand the support of actual trial before they will concede that the selection of the most nourishing and wholesome diet is hereafter to be regulated by the results of chemical analysis. The demand is reason-

able in itself, and the so-called deductions of theory are entitled only to the rank of probable conjectures, till they have been tested by exact and repeated trials.

"But such in this case have been made; and our theoretical considerations come in only to confirm the results of previous experiments; to explain why these results should have been obtained, and to extend and enforce the practical lessons which the results themselves appeared to inculcate.

"Thus, from the experiments of Majendie and others, it was known that animals which, in a few weeks, died if fed only upon fine flour, lived long upon whole-meal bread. The reason appears from our analytical investigations. The whole-meal contains in large quantity the three forms of matter by which the several parts of the body are sustained or successively renewed. We may feed a man long upon bread and water only, but unless we wish to kill him also, we must have the apparent cruelty to restrict him to the coarser kinds of bread. The charity which should supply him with fine white loaves instead, would in effect kill him by a lingering starvation.

"Again, the pork-grower who buys bran from the miller, wonders at the remarkable feeding and fattening effect which this apparently woody and useless material has upon his animals. The surprise ceases, however, and the practice is encouraged, and extended to other creatures, when the researches of the laboratory explain to him what the food itself contains, and what his growing animal requires.

"Economy as well as comfort follows from an exact acquaintance with the wants of our bodies in their several conditions, and with the composition of the various articles of diet which are at our command. In the present condition of the country, this economy has become a vital question. It is a kind of Christian duty in every one to practise it as far as his means and his knowledge enable him.

"Perhaps the whole amount of the economy which would follow the use of whole meal instead of fine flour, may not strike every one who reads the above observations. The saving arises from two sources.

"First, the amount of skin, separated by the miller from the wheat which he grinds, and which is not sold for human use, varies very much. I think we do not over-estimate it, when we consider it as forming nearly one-eighth of the whole. On this supposition, eight pounds of wheat yield seven of flour, consumed by man, and one of pollard and bran which are given to animals, chiefly to poultry and pigs. If the whole meal be used, however, eight pounds of flour will be obtained, or eight people will be fed by the same weight of grain which only fed seven before.

"Again, we have seen that the whole meal is more nutritious, so that this coarser flour will go farther than an equal weight of the fine. The numbers at which we arrived, from the results of analysis, show that, taking *all* the three sustaining elements of the food into consideration, the coarse is one-third more nutritive than the fine. Leaving a wide margin for the influence of circumstances, let us suppose it only one-eighth more nutritive, and we shall have now nine people nourished equally by the same weight of grain, which, when eaten as fine flour, would support only seven. *The wheat of the country*, in other words, *would in this form go one-fourth farther than at present.* The wages of the poor man would feed nine children instead of seven, supposing even the coarser flour to cost as much as the fine."

598. It will be seen that, notwithstanding the strength of the arguments thus put forth, there has been little or no progress hitherto made in pursuading people to adopt the practice of eating "whole meal" bread instead of fine white bread. One

would have thought that if mere ignorance and prejudice had stood in the way of such obvious economy, at least our Poor Law Commissioners and our prison authorities would have insisted upon feeding paupers and prisoners with "whole meal" bread; nor indeed have there been wanting those, both philanthropsists and economists, who have taken steps to introduce "whole meal" bread into Unions, as well as into the houses of the poor. But the results were not satisfactory. In fact, it has been found that only a very small minority of persons living in large towns (and especially among the poor and ill-nourished), are capable of eating whole meal bread without its producing so much irritation in the alimentary canal as to lead to far greater waste in the system than if the bread had been altogether *minus* that extra quantity which the materials of the bran added to it.

599. The silicious covering and woody fibre forming the outer coat of the wheat grain are wholly and entirely indigestible, and their presence in the food acts as a powerful purgative, causing much nutritive matter to pass away with the excretions, which would otherwise be absorbed into the circulation to nourish the body.

600. Hence it would appear, that by the American process of preparing flour (patented by Dr. J. E. Brown), and the aërated bread process for making that flour into bread, we have for the first time the means of securing for perfect human food, the whole of the nourishment offered by the wheaten grain.

Mr. Miller, Duke Street, Grosvenor Square.

601. I have been a master baker 21 years; I am one of the full-priced trade. I issued a circular to my customers, in November 1859, to say I was going to change the hours of labour. Having worked as a journeyman myself and knowing the evils of night-work and long hours, I felt it my duty to make an alteration, and I did not think it would make any difference to those who dealt with me, with this exception, that the bread would be delivered an hour or two later, and that those who wanted household bread earlier would have to take the bread of the day before 12 or 18 hours old. None objected, and I hardly lost a customer, but received congratulations from several of my customers, who thought I was doing right; and my business has increased since that time.

602. I have the sponge set between 9 and 10 P.M., just before the men go to bed, and the sponge for the cottage bread and rolls immediately after. The policeman calls me at 4 o'clock, and I call the men. They all sleep in the house. In hot weather I take the ordinary precaution against the sponge coming on too quick. It may happen once in two or three months that the policeman is called off; but habit causes one of us at least to wake about the time, and if we are a little late the hot rolls come out a little later, that is the only difference. It does not make much difference in getting out the household bread, because we work faster and make up the time.

603. The men who do night-work are liable to the chance of not being called at two or three o'clock to throw out the dough; they are generally called by the policeman. In some cases the foreman keeps awake, but the rule is that the policeman calls them.

604. Under the old plan, the bread was out first, and could be delivered with the rolls, before eight o'clock if necessary. Under my plan, my batch bread can be delivered by eleven o'clock. I have, therefore, two deliveries ; first, of the rolls, then of the cottage and household. I am therefore obliged to have another boy, and there is the objection that many masters make to it. But in such a neighbourhood as mine such an objection does not apply.

605. Although I employ an additional boy in order to carry out my plan, I can prove that the saving under different heads, arising from doing the work in the day, more than counterbalances the extra wages. First, there is less wear and tear in the oven; we are less liable to be obliged to get up the heat suddenly from the fire having gone down when we were asleep, and, consequently, to crack the tiles and injure the bottom of the oven. Secondly, we burn less coal and gas. Thirdly, there is less waste of flour. At night-work the men are sleepy and this produces carelessness and recklessness, and, consequently, a good deal of waste. Fourthly, as we can always have an eye upon the dough while it is rising, we can regulate the progress of the fermentation exactly, to prevent its getting sour, and thus always have sweet bread. If a man has one sour batch in the course of a year, (and he is very liable to it under the system of night-work,) there is a loss at once of 90 loaves at $8d.=3l.$ per sack ; but the batch is generally a sack and a half to two sacks, and some, during the season, three sacks ; so that a man may lose $9l.$ at once ; the larger the batch the greater chance of its being spoiled by over-working.

606. On the whole, I estimate the gain from working by day instead of by night, at not less than $1s.$ per sack ; so that if a man is doing 20 sacks a week, as I am, there is a clear saving of a man's wages ; much more than the wages of the extra lad required to be employed. 15 to 20 sacks a week is a fair trade at the West End of the town.

607. I only turn out one batch a-day, except on Saturday, when I turn out two. I have two ovens, and I fill them both on that day. My batch is two sacks a day on ordinary days, besides cottages and rolls; and on Saturday always over three for household bread, and a sack, or, in the season, a sack and a half for rolls and cottage bread; besides which we have biscuits and buns, tea cakes, milk rolls, &c., all of which are out by seven to eight o'clock.

This work can be got through in 12 hours, or a little more, not more than 13. My men do not attempt to tie me down to an exact time. I have never found any man inclined to do that ; they are always inclined to give and take. On Tuesdays and Thursdays they have done at three o'clock.

But where a business is done of three or four batches a day, it would be impossible to adopt the 12 hours' plan without a corresponding additional number of ovens and other accommodation. There is a large number of bakers in London who do three or four batches with only two ovens; but it necessarily takes them much over the 12 hours to bake and carry out that amount of bread. Some few do that amount with only one oven, but they have to resort to underbaking their bread to gain time. While, therefore, there are so many masters in the trade who insist upon getting 18 hours work out of the men for 12 hours pay, the adoption of a 12 hours' plan, as a rule, is out of the question.

608. I have no doubt that there are many youths under 18 who are called up at 12 and 1 o'clock at night to help to make dough, and after the dough is made and proved, to hand it up after weighing; if the boy is far enough advanced he has also to mould. I know a case of a boy of not 15 years of age, who works at 12 o'clock at night, and helps to make the dough. It is not a heavy place, but still he is up at night and does all that is required of him. He is on his feet from 12 at night to 6, 7 and 8 the next. I saw him at eight o'clock lately, and he had not been to bed. This kind of work, which is so common with growing youths in the baking trade, cannot fail to undermine their health. If Parliament were to declare those hours illegal for them, I think the men themselves, as well as the masters, would take care, generally speaking, that it was attended to. Every one must condemn that system, and, in my opinion, it only wants an Act of Parliament to put a stop to it.

609. As regards the inspection of bakehouses, I think it is much wanted for the sake of the health of the men. I have been conversant with the baking trade in London for 28 years, and I am certain that great improvements are required in very many instances in bakehouses. The ventilation is often very indifferent, and many bakehouses are in a very dirty state. In many that I have known, the men sleep in the bakehouse, or in a place just shut off from it, or among the sacks of flour. Some sleeping places are in what would be the coal vault, with no communication with the open air; in others, in holes in the wall, or in low places boarded off. Such places must be injurious to the health of the men, from the heat and the impure air, and in many cases from the damp. I think it ought to be enacted that no bed should be in a bakehouse, or flour loft, or any place adjoining, unless it had a window, with communication with the open air. As for cleanliness, I have seen bakehouses indescribable for dirt and filth, and want of proper ventilation, and they are by no means uncommon; there are more even in the West End of London that are in a very dirty, ill-ventilated state than people are apt to suppose. All ought to be inspected; there should be means of bringing to the notice of the public all that are found in an improper state. The public officer should send in a list to the guardians or the vestry, and the baker should be warned, and a certain time given him to put it right,

and if he did not do so, his name should be published. That I think, would be sufficient without any fine. I have been in bakehouses where I have seen privies, and the smell from them is naturally drawn into the bakehouse, to the injury of the health of the men. Nothing of this kind ought to be allowed to be in a bakehouse, flour room, or any other place in immediate communication on the same level with a bakehouse. The want of knowledge on the part of the masters is more often the cause of imperfect ventilation than any expense or other difficulty in the way of altering it. The suggestion of some public officer would very easily lead in most cases to its being improved at a slight cost.

610. I have read the evidence of Mr. Purvis and Mr. Dwarber, as to the desirableness of putting a licence fee upon the baking trade, with a view to benefiting the men as well as the public. I think they exaggerate the evil consequences to the men from carrying out the bread to the chandlers' shops, and I do not think that licensing the trade in the way proposed would be beneficial to the men. It would leave untouched or unaltered the night-work,—the calling the men up at unseasonable hours. The greatest benefit that could be done to the men, and to the masters too, would be to put an end to the night-work by bringing public opinion to declare itself against it. I think, if the public could be made sufficiently aware of the injurious consequences of the night-work, they would submit to the little inconvenience of receiving their bread later in the day, in order to effect so desirable an end. If night-work were abolished by the common consent of the principal part of the baking trade, backed by public opinion, this would also effect the object aimed at by the proposed high licence fee, as regards improving the quality of the bread sold in the neighbourhoods most inhabited by the labouring classes. Day-work instead of night-work would oblige masters to employ an extra hand, at 14*s.* a week at least. This would amount to 36*l.* 8*s.* a year,—very much more therefore than a 10*l.* 10*s.* licence ; and it would have to be repaid to the master in the price of his bread. This would prevent his underselling his neighbour who produces good bread and sells it at a fair price ; which the underseller would accommodate himself to, or cease to do business. This would effectually prevent many a man from supplying chandlers' shops at a profit to them in selling the bread again ; it would absorb the $\frac{1}{2}d.$ per loaf allowed as commission. It cannot be the object of Mr. Purvis and others to shut up the small shops merely because they are small ; many small shops supply good bread, and are very useful to the neighbourhood around them.

611. Much has been said in the evidence about the working classes being often cheated in the weight of their loaf at the chandlers' shops, which are so numerous in the trade. I believe that is quite true. In the full-priced trade we weigh our dough, 4 lbs. 6 oz. to 4 lbs. 8 oz. for the 4 lb. loaf, and we bake it close upon two hours. In the under-priced and "cutting" trade the dough is weighed, 4 lbs. 4 oz. to 4 lbs. 6 oz. to the 4 lb. loaf, and

it is baked an hour and a quarter; sometimes more, sometimes even less. Where the bread, on being served over the counter, is weighed to the customer, the full weight of 4 lbs. is made up with every loaf; but a large proportion of the bread sold to the working classes at the chandlers' shops is not weighed to them, and they lose accordingly one or two ounces of bread with every loaf. I am aware that the Act of Parliament (3 Geo. 4. c. 106.) requires that every baker and every seller of bread to sell all bread, except fancy bread, by weight. Nevertheless, as far as the full-priced trade is concerned the practice has entirely gone out of use. We of course weigh a loaf to a customer if he requires it, and some do occasionally, but as a rule it is not weighed; we feel ourselves bound in honour to give the right weight, and our customers have confidence that we do so.

612. As regards the quality of the bread sold in the under-sellers' shops, there is a great difference in their mode of manufacture from ours. We use, as a general thing, brewer's yeast for the batch bread, a quart to two sacks of flour. This is quite sufficient to ferment that quantity of flour. The under-sellers use from four to six times that quantity, of what is called "patent yeast," made by themselves from malt and hops. This requires to be worked warmer, and they hasten it on by additional heat: the large quantity of the ferment and the more rapid process together tend to produce sourness in the bread, and the bread is thus often sour as soon as made. They hasten it on, in order to get out as many batches as possible, three to four a-day. It is impossible, without giving up other things, to get out more than three batches in 12 hours from one oven. It would be more costly to get out that quantity from two ovens, so that taking the original cost of the additional oven and repairs, and the additional fuel, an under-seller would not be able to undersell his neighbours unless he worked much beyond the 12 hours with each oven.

613. I am aware that the Act (3 Geo. 4. c. 106. s. 12.) requires "That every person who shall make for sale, or sell or expose for sale, any bread made wholly or partially of the meal or flour of any other sort of corn or grain than wheat, or of the meal or flour of any peas or beans, shall cause all such bread to be marked with a large Roman 'M,' under a penalty of 10*s*. for neglect of so doing." But I have never seen or heard of its being done.

In the full-priced trade we are well satisfied if we get 90 loaves to a sack; we often do not get that. The general calculation is that we add from 11 to 12 gallons of water to the sack, according to the strength and quality of the flour. All, I believe, use a certain quantity of potatoes, about 9 or 10 lbs. to the sack, for the sake of making the ferment act more evenly, and increasing the fermentation; as potatoes facilitate the diffusion of it, their nature being to take the fermentation more rapidly than the flour; and the result is that sweeter bread is produced. We cannot put in more water than the flour will properly take up, without too much weakening the dough.

The men who make the dough make it to what they consider a proper consistency, by drawing in flour from one end of the trough as they require it. If dough is weak from too much water it is difficult to handle, and requires a sharp oven.

614. My experience is that numbers of the more prudent of the working classes come to the full-priced shops for their bread, and admit that, although it is a 1*d.* per 4 lb. loaf dearer than that sold at the cheap shops, it is cheaper in the end ; they find that at the end of the week they have not paid more for bread for themselves and their families than they would have paid for the cheaper bread, and they have had bread of better quality, of which they are very good judges. They eat the cheap bread mostly new, and do not like it stale ; they eat ours mostly a day old.

615. There is another reason why, in the interest of the public, it would be very desirable that the short hours of work should be adopted. It is well known in the trade that many journeymen, engaged during the day in delivering bread at the houses of the nobility and gentry, feel aggrieved within themselves and dissatified with their condition, because after having been at work at night making bread, and then at work in delivering it, they do not obtain for their 18 or 20 hours of labour more wages than they would for 12 hours work. They consequently resort to another mode of ekeing out their remuneration, entering more bread than has been delivered. This they do in collusion with the servants whose business it is to receive the bread. From my knowledge of the trade, I can confidently say that this is a system which prevails very commonly, in the West End especially.

616. There is another objection on the part of many masters to the adoption of day-work ; and another difficulty in the way, which is not, however, by any means insurmountable ; it is that in many houses of the nobility and gentry the servants who receive the bread insist upon having it at an earlier hour than it can be had if it is not made at night,—*i.e.*, as early as eight or nine o'clock. Plenty of men have to start with their barrows full of hot bread before 8 o'clock in the season ; not merely hot rolls, which could be furnished as early as 7 or 7½ o'clock, but with batch bread, which, unless eaten by some part of the household (and which is very wasteful), is not needed until much later. With a system of day-work,—*i.e.*, not beginning work till 4 a.m., the only difference to the public would be that the batch-bread could not be delivered hot until 11 a.m. ; with rolls, cottage bread, &c., it would make no difference. For making these, German yeast is generally used by nearly all the full-priced trade, and this requires much less time to produce the fermentation ; any quantity, therefore, of rolls, cottage loaves, &c., may be out of the oven before 8 o'clock.

617. I believe that if the nobility and gentry at this end of London were aware of the injury inflicted upon the journeymen bakers by the long hours and night-work they would be willing to inform their tradesmen that they would cease to deal with any

baker who called his men before 4 o'clock in the morning; and I am convinced that if such an intimation were conveyed to a baker by one or two of his principal customers, he would soon find out that the objections to the change were imaginary. It would please many of the full-priced bakers if they could get the day work fixed by Act of Parliament, but I object to applying to Parliament to do what we can do for ourselves; and it is certain that this is a matter in which Parliament will not interfere, but public opinion could do it at once.

Mr. McEwen, 61, Great Portland Street, Regent's Park.

618. I have been a master baker since 1828; I have been in my present shop 27 years. I am in the full-priced trade; my shop has been in existence for a hundred years. I adopted the hours from about 4 A.M. to about 4 P.M. two years ago; and I have found no practical difficulty in adhering to these hours. My custom lies principally with the families of the neighbourhood. I deliver the batch bread about 11 o'clock. My customers did not want their bread delivered earlier when the men did night-work. There must be many businesses in London similarly situated to my own, in which the same hours could be adopted with equal facility. My men sleep in the house, and I call them between 3 and 4 A.M. I then go to bed again, and get up between six and seven. I wake of my own accord; I find that habit makes me very regular in that. I tried being called by the policeman, but he was sometimes called off. There is certainly a saving in gas, wear and tear of oven, and in other matters, from working by day, and the bread is better manufactured. There are unquestionably difficulties in the way of day-work being universally adopted; it could not be done in many businesses without an enlargement of the premises, but still it might be done in many instances; and a great relief it would be for the men. I do not look to Parliament to interfere in it, but there is one matter in which Parliament might do much good, that is in forbidding the labour of youths under 18 years at those unseasonable hours. There are in London some thousands of young lads, most of them just come up from the country, who find themselves compelled to do the night-work, getting up at 11 or 12 at night, and working on more or less, on their feet generally, till about 6 o'clock the following day. It stands to reason that this must undermine the health and shorten their lives.

619. I have seen a great many bakehouses in London which are very injurious to the health of the men who work in them, and very dirty; so much so, that it is extraordinary that the owners do not insist on their being kept clean; but they are often unwilling to interfere with their foreman, or he with the men,—it leads to words. If a sanitary inspector were to go round and give suggestions, they would be attended to at once. No one would like to be reported for neglect, after being told by a sanitary officer that his bakehouse was not in a proper state.

Mr. Cook, Master Baker, Duke Street, Manchester Square.

620. I have been a master baker 25 years ; all the time at the West End of the town. I have often talked over the question of shortening the hours with my men, but we both see so many difficulties in the way that we not consider it practicable. All my men sleep out of the house, and have an objection to rising at 3 or 4 A.M., especially in winter, on account of their liability to take cold in coming out to the open air so soon after leaving their beds. One of them lives on the Surrey side of the water ; another lives about three-quarters of a mile off. Working all day in a warm bakehouse naturally makes them susceptible of cold. Then they can never be certain of being called in time. Again, who is to let them in at 3 or 4 A.M., especially as it cannot be expected that they could always come punctually. Again, in summer, if they should be unpunctual, there would be a great probability of a batch of dough being spoilt by getting sour. Nothing does a master so much harm as sending out, even only once, bread however little sour. You may send the very best bread the next day, and people will fancy it sour, and you may lose a great deal of custom.

621. I know 8 or 10 bakehouses in the West End, and all are properly drained and ventilated, and kept clean, and whitewashed once a year. There is no difficulty whatever in keeping down all vermin and dirt of every kind. A bakehouse ought to be as clean as any room in the house. In my bakehouse I have four "false chimneys" as air-shafts. My father built the house expressly for a bakehouse, so that we have great advantages over most of those in London. I have two ovens. My trade is neither in the high-price nor under-seller's line ; it is a medium between the two, and I have a pretty steady trade throughout the year. My hours are from ½ past 11 P.M. to ½ past 2 or 3 P.M., except the foreman, who always goes home about ½ past 1. The second hand sets the sponge, by arrangement with the foreman, and can have 5½ hours in bed, and 2 hours sleep during the night. The others may have 7½ hours in bed.

Mr. Thompson, Upper Berkeley Street, Portman Square.

622. I have been a master baker (in the high-price trade) 23 years, and have been conversant with the baking trade in the West End of London 38 years. I attended the conference between the men and the masters after the meeting at Exeter Hall, but the men wanted such strict rules as to hours that it was impossible that they could be carried out. At the West End of the town night-work in some shops is an absolute necessity. They cannot enlarge their premises at any cost. A person might take other premises, but it might not answer. There is a great difference in the demand for bread, not only in the season, but between fine days and wet days, and between cold weather and warm weather. On a wet day there will be many of the small things left, consequently the next day there will not be so

much wanted to be made. Sometimes orders are slack from the country; sometimes large orders come in. The men would not give and take, but determined on the 12 hours.

623. Expecting that some time or other my neighbours might see their way to abridge the night work, I put up another oven to prepare for it at a very considerable expense. Fortunately I had the space to enable me to do it, but very few of my neighbours have the same opportunity. I think I could manage even in the season to begin at 3 A.M., except on Saturday, when we should have to begin earlier. Beginning at 3 A.M. my men would have done their work at 3 P.M., and in the slack time much sooner. But I should be obliged to keep an extra boy. My customers want the batch bread delivered between 10 and 3. They do not like their bread to be delivered late. In winter there are many people who will have their area gates locked when it begins to get dark, and most persons object to have their tradesmen about in the afternoon. The servants do not like it, because they are busy about their dinner, and they want to give their orders about flour, biscuits, dinner-rolls, &c. Sometimes we are obliged to make dinner-rolls after the men come home from delivering the bread.

624. If orders were always given the day before this might be obviated. If the public would second us the change might be made.

625. My bakehouse is particularly clean and well-ventilated. I see no reason why all bakehouses should not be kept clean and free from vermin. I have no vermin of any kind, either black-beetles, ants, or any thing else in mine. I have known many bakehouses which were exceedingly dirty, and where very little expense would have put them all right.

Mrs. Jones, Eccleston Street, Belgrave Square.

626. We tried the plan of day-work some years ago, but our men begged us to return to the old system. They found it very inconvenient, both as regards the early hour of coming in the morning and in the delivery of the bread, &c., to our customers. Our men generally get through their work by 2 or 3 in the afternoon at the latest, except in the height of the season, when it never need be more than a little later. They begin at the usual hour of 11 P.M. We might adopt day-work with two sets of men, but that would not answer either to the men or their employers.

627. It is indispensable in this part of the town that the bread should be delivered as much as possible before one o'clock. After that it would be very inconvenient to the servants, and would not be liked by our customers. The housekeepers have other duties after the servants' dinner hour, and at many houses the area gate is locked at one o'clock.

This bakehouse was built 22 years ago as a bakehouse, and has ample accommodation and every comfort, and well ventilated, very different from some that I have heard of at the east end

of London, and it would be a good thing to have bakehouses inspected. We have a dressing room for the men with shelves all round. I believe the boys under 18 at this part of the town do not do night-work. Ours begin at 5 A.M.

Mr. H. Laws, 9, Queen's Row, Pimlico.

628. I am in the full-price trade, and make the best kind of bread. I abandoned the system of night-work two years ago last August. I was determined to give the sysem of day-work a trial, as I had experienced the bad consequences of night-work when I was a journeyman. We begin according to temperature and circumstances, from $3\frac{1}{2}$ A.M. to 4. I get out my hot rolls by $7\frac{1}{2}$ A.M., they are in the Palace Hotel, which I serve, by $\frac{1}{4}$ to 8, and my batch and cottage bread in my shop before 9. Very few of my customers want cottage or batch bread before that time. It occasionally happens that a customer may want one or the other, but I have found no disadvantage to my trade for adopting these hours. But it has made it necessary for me to employ an extra boy. My experience is, that the saving from adopting day-work is not much. I do not think it counterbalances the extra wages. I have always had careful and attentive men as workmen, and the waste has never been great.

629. My foreman sleeps on the premises. I have an alarum, and so has he, so that the men are always at work at the right time.

630. It is not every neighbourhood where you can get your customers to wait until 9 in the morning before the batch bread is delivered. I had a shop in Carnaby Street, and I supplied tradesmen in Regent Street, and they insisted upon having their bread before they set out their shops in the morning.

631. I have two ovens, but numbers of bakers in London doing a large business, three or four batches a day, have but one. They could not get through that number of batches in 12 hours without giving up their dinner bakings ; and many make a good deal of money by their dinner bakings.

632. When I was about 23 years of age I worked at a place, the hours of which were from 11 P.M. to 5 P.M., except Saturday, when we get away at 4. When I went to that place I was a stout, strong young man ; I worked there about two years. My health gradually gave way, until I did not weigh more than eight or nine stone. I lost my appetite for solid food almost entirely. What must the effect be upon younger constitutions ? It is a common thing in the trade for youths under 18 to make dough with the men. I have a lad, J. Hawkins, now about 18, who has been here a few months making dough.

633. As to inspection of bakehouses with a view to promote better ventilation and cleanliness, I think it would do much good. Many bakehouses are very deficient in each. One shop that I had was so bad that I immediately set to work and improved the ventilation by putting in fan lights ; before which it must have

been very injurious to the health of all, master and men. Any one accustomed to such matters would have easily suggested such an alteration years before it was done.

Mr. Costiff, 15, Sussex Street, South Belgravia.

634. I have been in the baking trade as master 12 years. I have two shops, the other is in Merton Street near here. I have adopted day-work, *i.e.*, beginning at 4 A.M., for about ten months. It has obliged me to employ an extra boy. My own opinion is that there ought to be a saving arising from day-work enough to compensate for the extra wages, but I have not found it to be so myself. So far from there being a saving in gas, I can show to you by my gas card that my consumption has not been less. The summer quarter, during which Peacock (§ 96) was with me was higher, as appears by the card now submitted to you, than any summer quarter since I have been in the shop. There was no more escape of gas than there is now. Where the master does a part of the work in the bakehouse (which is not my case), the advantage of day-work would be greater ; in those cases the master takes the place of a foreman.

The foreman comes about 4 A.M. and rings the bell, and is let in by us.

635. The man who gave evidence to you (Peacock, s. 96.), who was a great advocate for the day-work, left my service on his own account six months ago to take another place.

636. As far as my customers are concerned, my delivering the bread later does not make any difference to them, except in a few cases, and in those I deliver by the extra lad at the time they require.

637. In my other shop, where the business done is entirely over the counter, my reason for not adopting the day-work is, that if I were to adopt it, while all my neighbours were doing night-work, my shop would be empty two or three hours in the morning while their shops were full, so that I should lose custom.

The length of the day's work depends upon various circumstances. In the first place, some men will get over their work much quicker than others ; some will loiter about and will not have done till 6 or 7 A.M. ; others will have finished by half past 4 to 5. Again, if the weather is very wet, and the roads very heavy, this will make an hour's difference to them ; so that we cannot engage to get through our day's work in the exact 12 hours, as the advocates of the men required. Also, if it is a cold day, it would take the men longer to make their entries in their books.

638. I know that there are very many hard places in the baking trade, where the men have to be working nearly night and day, and where the bakehouses are very often very close, ill-ventilated, and dirty ; but good workmen and steady men need not stay in such places, as there is plenty of demand for them

in all parts of London. Steady men, whether for in-door or out-door work, are in demand in our trade.

639. I do not think that there are many lads under 18 in this part of the town who are called up before 3 or half-past; they are then wanted to take the dough as "thrown out," to "scale off" ready to be put into the oven. If Parliament were to say that lads under 18 should not be employed before 4 A.M., there would be no difficulty whatever in carrying it out. It would only oblige the foreman and second-hand to throw out the dough a quarter of an hour earlier, and scale it off themselves, instead of calling the lad out of his bed to do it. If the foreman would let them, all those lads might be allowed to remain in bed till 4 o'clock, without any inconvenience.

640. I think an inspection of bakehouses most desirable. In the course of my experience in London, both as a journeyman and a master, I have seen a good number of the bakehouses in London, and I am sorry to say that a large proportion of them which I have seen are in a very disgraceful state, both as places of work and more particularly as places where the men are required to sleep. In nearly all places, whether the bed-room is partitioned off from the bakehouse or is over the bakehouse, they are very ill-ventilated and very filthy, and many have no window or other communication with the external air. It would be a great boon if Parliament were to forbid the masters making the men sleep in places which have not a window or other communication with the external air. I should say that 15 out of 20 sleeping places are such as I have described; the East End of London and the South are the worst, but there are many even in the West End which are very bad.

Mr. Morse, Ebury Street, Belgravia.

641. About two years ago I tried day-work for six months, in the slack time of the year, but even with that advantage I could not make it answer. One of the difficulties I found was that my foreman, being pressed for time, did not leave the bread long enough in the oven to bake it properly. My men do not now wish for any alteration of hours; they have their Sunday to themselves, and that is all they desire. Had I made the trial of day-work in the season, I should have been obliged to employ an extra man. Night-work was not injurious to myself or my two brothers, while we were journeymen, as we were for many years, and we have all become masters, having a good business, in different parts of the town. Our habits were steady, and we got our proper rest. My men might always have done work by 3 p.m., even in the busiest time. I have two ovens, and my bakehouse is well ventilated and kept clean. Many, especially in the east of London, are in a very different state, and an inspection of them would do much good. I think it would also be very beneficial to the health of the young men in the trade if all under 18 were forbidden to do night-work.

Mrs. Mason, Chapel Street, Belgrave Square.

642. We tried the day system about two years ago, but we found it did not answer. It would have required an extra hand, and it is not every business that will justify an extra hand being employed. Another difficulty was that our second hand slept out, and as all the upper part of the house is let, the families did not like to be disturbed at between 3 and 4 in the morning by letting the man in. Again, with our present hours, the hot bread is all in the shop and has cooled before any one is about, whereas under the day system it was filling the shop and house with the steam and smell from it at a time when it was disagreeable to my lodgers and to the customers that came into the shop. Boys under 18 doing night-work suffer much in their health from want of their rest, and it would be very proper to forbid their doing night-work under that age.

643. [Dec. 14th, 1861. I witnessed the process of making a batch of dough in a large bakehouse underground, but very well ventilated. Temperature of bakehouse 69 to 72. The batch consisted of a sack and a half of flour, nearly one half of which had been used in making the sponge. Two men commenced "breaking the sponge" at 1·4 p.m. Having poured the water into it, they plunged their arms in, and stirred it about until it became of the consistency of thin batter. At 1·10 they began to mix the dry flour with it, immediately upon doing which they were enveloped in a cloud of flour-dust, their heads bent down to within a few inches of the mass they were handling. Flour and pieces of dough were splashed over the trough upon the floor. At 1·12 a third man was added. This is not very usual with so small a batch; but the master, in this case, superintends the making of every batch, in order to see that the men do their duty by thoroughly mixing and kneading it. Their hair, caps, and face powdered thickly with the dust, a thick cloud of which was thrown up with every movement, especially when large masses of the dough as it became a little solid were taken up in their arms and thrown upon the rest, fresh flour being first strewn between. At 1·15 one of the men became very red and heated. The other two were very pale, and did not show any perspiration. At 1·16 the cutting off of large masses began, as much as two men could lift, to place over the adjoining mass. At 1·23 the three men began to pound the mass with their fists. At 1·26 one of the pale men, who was also very thin, began to look red and hot. At 1·29, after smoothing the mass down, they began again to pound it with their fists. At 1·30 it was again smoothed over, the sides of the trough scraped, and a little dry flour thrown over it. It was then considered finished. The lid of the trough was shut down, and it was left to stand until it went again through a slight fermentation; after which it would be cut into large pieces, taken out by the arms, and thrown upon the lid of the adjoining trough, to be immediately cut up into small pieces and weighed, each piece, when weighed, being then "moulded" and passed on to the foreman, who puts it into the oven.

The master stated that the men, unless "looked after," are apt to do the work too rapidly ; in fact, with a small batch such as this, they would have done it in half the time, but the bread would not have been as good ; it would have been "short and rotten," there would have been dry flour in it, and he believed it would not have turned out as much bread.

644. While the men were cutting out the dough in another trough I placed a lighted candle about an inch below the surface of the dough, when it immediately went out. I again placed it in the trough by the side of the mass, when it again went out immediately. Both the men engaged in the process of cutting and taking out the dough said they "smelt the spirit and felt it in their lungs." It was very perceptible to me as I stood near, producing a sense of oppression in breathing.—H.S.T.]

Mrs. Bruce, 61, Albany Street, Regent's Park.

645. My men adopted the day system last Christmas twelvemonth, but after a month's trial it was discontinued. I found that there was much irregularity in the time of delivering the rolls and cottage bread, and my customers complained. Sometimes the baking was hurried, and the rolls and bread burnt outside and doughy within. At other times the cottage bread was not delivered until too late for my customers in the Regent's Park, and I lost some of them in consequence. If I could not send them what they wanted at the right time they went to some one who could. I was the only person in the trade in this part of the town who tried the day system. Sometimes the men did not come punctually in the morning, and everything therefore was thrown out. If every one adopted the day system it might be very well, but even in that case there would be a frequent risk of spoiling goods, according to my experience, and I had men who understood their business well; but while the day work lasted the irregularities were too great to make it possible for me to continue it. The men professed to come punctually at 4 A.M., but at that hour no one could be sure that they would come punctually, and a little delay might spoil 10*l.* or 15*l.* worth of goods. Again, it is not all men who can be depended on for sobriety. When they come in at 11 to 12 P.M., I am up to see them in, and the house safe ; but I have had to refuse men admittance at that hour on seeing that they had been drinking.

Mr. Hue, Pont Street, Belgravia.

646. I have been a master baker 24 years. My business is one of the largest in this part of London. Considering the kind of customers whom my men have to serve, it is necessary for me to take care that I have the most steady and trustworthy men I can find ; and I accordingly pay them well, and do all I can to make their places comfortable. When the movement took place in favour of substituting day for night work,

I determined to meet the wishes of the men at once, and I accordingly enlarged my bakehouse and put up an additional oven, at an outlay of 200*l.*; and I engaged the additional hands which the adoption of day-work made necessary, at the rate of an additional 100*l.* a year in wages. I made the trial in the summer of 1860, and continued it for four months, but was then obliged to return to the old system. The difficulties were numerous. Notwithstanding the additional accommodation, which was all that my premises would admit of, there was not room enough to get through the work, which had to be crowded into the shorter space of time. Mine is a mixed business, supplying bread of different sorts, "home-made" bread, cottage bread, brown bread, rolls, &c., as well as batch bread; and where that is the case the difficulty of conforming to day-work exclusively is greater than when the business consists in supplying batch bread only. We were obliged to have two deliveries, one beginning at 7½ A.M. and going on to about 10½; the other for the batch and "home-made" bread, from that time until 1 P.M. and after, until it was all delivered. Many housekeepers in this neighbourhood, and those the best, require the whole of the bread and the other supplies of the house to be delivered before 1 o'clock; the proper routine of household work is interfered with if they are delivered later. Many persons will have their area gates locked at one. When it is known that tradespeople are about, up to that time, attention can be given to them; but if they are to come in at all times after that, while plate and other things are about, it might lead to very disagreeable consequences. I lost some customers because I could not deliver the bread to them before that hour; and I was even obliged to buy bread of other people to serve some of my customers by the proper time. To myself and family the consequences of adopting the day-work were not without inconvenient and disagreeable incidents, but that would not have prevented the system from being adopted had it succeeded in other respects. I employ in the season nine men and boys, of whom four sleep out of the house. These I had to let in at 4 A.M. I should not have much minded that if they had come regularly and all at once; but there was frequently as much as half an hour before they were all in, during which time I had to stay up. Frequently one of the four did not come at all, and I had to get into a cab and go and see for him. He had probably been drinking and had overslept himself. Had this occurred during the old system of night-work I could have gone to one of their houses of call between 11 and 12 and found a man. The whole house, also, was apt to be disturbed by the ringing of the bell at the early hour of four. I was more often inconvenienced by the men not coming at all at that hour than I had been under the system of night-work. Under all these circumstances I felt obliged to return to the old system.

647. In consequence of the work being crowded into a much shorter space of time when we were doing day-work, the bread had to be put hot into the barrows, instead of standing, as it does in the ordinary way, a couple of hours on the shelves to cool.

When put hot into the barrows, the steam from the loaves at the side is condensed by the wood, and the bread will soon be soaked a quarter of an inch deep, and the bread consequently has a soddened appearance, and it also imbibes the taste of the wood. Then again the bottom loaves are crushed and made heavy. I tried to obviate the effect of the condensing of the steam by keeping the lid of the barrows partially open by an iron bar, but it only partly removed the evil. I had the bottom of the barrows made of open cane-work, to let the steam off from the bottom loaves, but that did not prevent the effects of the pressure of the weight above. Barrows all made of cane or wicker work would be too expensive, and that would not relieve the pressure.

648. If the men are of regular and temperate habits and work in a well ventilated bakehouse there is nothing in the night-work that need injure them. They are well paid, and many men are able to leave work by 2 or 3 in the day ; they have therefore ample time for rest. I have in the season four boys, at other times three, whose duties consist chiefly in delivering the bread. They are employed from about 6 A.M. to about 9 P.M. Their ages are, two about 18, and two about 16. There is much difficulty in getting lads of this age for this kind of work only, at wages of from 12*s.* to 13*s.* a week. They come up from the country at about 16, and will at once take to night-work with the men, earning from 14*s.* to 15*s.* a week ; and for these two additional shillings a week they very unwisely take to night-work at that early age, to the great injury of their health. It would be highly desirable for their own sakes to put an end to this.

649. My bakehouse here has the advantage of being larger and more airy than many, but I have seen many in London quite unfit for men to be confined in for so many hours ; so close, and with sleeping places for the men in them, that human food ought not to be manufactured in them ; they are disgusting in every way, and the heat and want of proper air makes the perspiration stream off the men when making bread in such places. It would benefit the men and the community too, if the law should compel the owners to put in air shafts, or otherwise to ventilate them, and keep them clean. I did not find that any gain arising from day-work went any way to compensate me for the additional outlay. The gas burnt was less, and there may have been less waste, but not much. My "sweepings" did not differ to any amount. They do not amount to one sack for every 100 sacks of flour.

Mr. Nevill's Bakery.

650. [See 158—165.] Mr. Nevill called before me, from his pay-book, every man employed in his bake-houses. They all stated that they found no injury to their health from the hours of work at his establishment, and those who had had experience of day-work preferred Mr. Nevill's hours to that, and also to the ordinary hours of the trade.

651. I questioned 25 of the men as to the age at which they began to do night-work regularly with the men. The result is given in the following table ; from which it appears that

out of the 25, only 5 were 18 and upwards when they began night-work; that 5 were only 15 years of age, and 3 only 14. I asked the age of nearly all as they came before me; most of them were under 30; more than two-thirds looked nearly twice as old as they stated themselves to be; the result, apparently, of night-work and over-work at an early age. One stated, "I was 14 only when I began to work at night; I worked from 11 P.M to 5 P.M. the next day; it was in Somers' Town; it was for my father. I continued at this work for seven years. We had only one oven. My father was an underseller. We used to bring out four batches a day." Another stated, "I began night-work at 17; it was at an underseller's in St. Pancras; the hours were from 11 P.M. to 4 P.M. We had one oven; we used to bring out three and four batches a day." Another, "I began night-work at 16; I worked for 18 months from 10½ P.M. to 4½ P.M.; it was in Islington; it affected my health, and I went to day-work." Another, "I began at 16 at a place in Oxford Street, where four of us got six batches a day out of one oven, between 11 P.M. and 7 P.M. It did me much harm." Another, "I helped to make dough at night at 13, and I made it regularly at 11 P.M. at 15. It was ruin to my health." Another, "I began to make dough at 15; it was at Bristol, where there are many places where the hours are as long as in London." Another, "I began to help to make dough at night when I was only 14; it was at my uncle's in Kingsland Road." Another, "I began to make dough at night at Weymouth when I was just 15." Another, "I used to work 15 and 16 hours in bakehouses under ground; I continued this for a long time, and I began it at 15." Another, "I began night-work at Bristol when I was 15; only on two nights a week we used to begin later, at 2 A.M." Another, "I was only 14 when I began to work from 11 P.M. at making dough to late the next day; I used to assist in carrying out the bread. It very much affected my health."

Men in Mr. Nevill's employ.						Age at which he first began to make dough with the men at 11 P.M.
No. 1.	3	years	4	months	-	16
2.	6	„	0	„	-	17
3.	0	„	4	„	-	18
4.	3	„	6	„	-	21
5.	2	„	6	„	-	16
6.	5	„	0	„	-	21
7.	3	„	0	„	-	14
8.	1	„	4	„	-	15
9.	3	„	0	„	-	18
10.	1	„	11	„	-	16
11.	2	„	0	„	-	15
12.	8	„	0	„	-	15
13.	3	„	0	„	-	16
14.	4	„	0	„	-	15
15.	2	„	6	„	-	17½

[*cont.*

Men in Mr. Nevill's employ.					Age at which he first began to make dough with the men 11 P.M.
No 16.	1 years	2 months	-	-	15
17.	6 „	6 „	-	-	15
18.	1 „	3 „	-	-	16
19.	9 „	0 „	-	-	16
20.	6 „	0 „	-	-	20
21.	1 „	6 „	-	-	17
21.	3 „	0 „	-	-	19
22.	0 „	2 „	-	-	16
21.	1 „	0 „	-	-	17
22.	2 „	0 „	-	-	17
23.	0 „	3 „	-	-	14
24.	0 „	1 „	-	-	16
25.	10 „	0 „	-	-	14

James Mason.

652. I have been in Mr. Nevill's employ 2½ years as the third foreman. I think the hours of work here much preferable to those of the trade generally, and I should prefer them to beginning at 4 A.M. I began to do night-work at 16. I was much younger when I first learnt to mould. I learnt to do it tolerably in six weeks; and in three months I could mould and set a batch of bread as well as I can now. I worked with undersellers entirely. It would be no disadvantage to them if boys under 18 were prevented by Parliament from working in a bakehouse earlier than 5 A.M. or later than 9 P.M.; but it would be a great benefit to the lads themselves.

653. I have been a foreman eight years. I consider that one of the advantages of a roomy well-ventilated place of work like this is that less flour is wasted in the course of the work. Here also all the troughs are fed through shoots from the flour-loft, which prevents much dust arising when putting in the flour. The "sweepings" here are consequently only one-third of what I have always found them in small places of work. Here it takes 150 sacks of flour to make one sack of "sweepings" of pure flour. I have worked at seven different places before I came here, all small places, and in every place 50 sacks of flour produced one sack of "sweepings" of pure flour, without raspings, &c.

Samuel Chave.

654. I am one of Mr. Nevill's foremen, and have worked under him for 17 years. I had worked in London previously for five years, both with high-priced masters and undersellers. I see no ill effects to the men from the night-work as carried on here. Many say they are not troubled with cough as they are in most underground bakehouses. I should like to see youths under 18 prevented from doing night-work. There could be no dis-

advantage to the trade if they were not to be allowed to be employed earlier than 5 A.M. or later than 9 P.M.; only men would be employed instead; and it would be an advantage to the health of the growing lads. But what I should most like to see would be the bakehouses put under inspection; it would be a great help towards keeping men in better health.

655. At one time I worked day-work with Mr. Nevill when he was in Holborn, beginning at 4 A.M. I like his present plan best; there was more trouble and inconvenience about the other, as men could not depend upon being called by the policeman; sometimes he was not that way; and I nearly lost my situation from being sometimes late. The other men also did not like that hour to begin at. One had to walk half a mile, and one had to come two miles and a quarter. Five had to come in; and at times we have been kept at the door, and could not make any body hear. We all thought it more injurious to health to have to get up at that hour in the morning, and walk so far in all weathers. If all slept on the premises it would be a different thing; but then there could be no married men.

656. In consequence of the good arrangements and conveniences of the place of work here, we make much less "sweepings" than I have known at other places. When working with an underseller, where I was for two years, we were doing 14 sacks a week, and we made one sack of sweepings of pure flour (no raspings) every four weeks; that is one sack of sweepings to every 56 sacks of flour.

657. Good "town households" flour in good condition will take 16 gallons of water per sack. I have known first-rate flour take 18 gallons per sack. I have often tried it carefully. I have known weak country flour only take 12 gallons per sack, and it could not be used then without alum, and it had also either bean or pea meal in it, or other mixtures; I could tell it by the smell.

H. Merritt.

658. I am Mr. Nevill's first foreman. I have heard all that Samuel Chave has said, and I quite agree with it. I wish to add as to alum,—many millers have to send flour to small bakers ready for immediate use, and its quality is such that it can only be made so by the addition of alum; otherwise it would not be ready for perhaps three weeks. I have frequently seen such flour from the most respectable millers, as well as from the small country millers.

Mr. Thos. Karr Callard, 4, Blenheim Terrace, St. John's Wood, N.W.

659. I have been a master-baker 16 years; all the time in this shop. Twelve years ago, (long before the agitation commenced upon the subject,) I thought it desirable, on behalf of my men, to make an attempt to abolish night-work. The hour I

adopted for commencing work was 4 A.M. I employed then two men and a boy; the latter did not begin his day's work before 6 or 7. I had beds on the premises for both the men; one, however, was a married man, and he usually slept at home. I had to get up, and let him in. Sometimes he was late, and I had to go and bring him. I tried this plan for two years, but I found my business suffered from it, as I could not get my bread delivered as early as others. My trade at that time was almost exclusively a bread trade, which made the experiment easier. The tendency of our trade, especially of the full-priced branch of it, is to combine the fancy trade (the making of buns, biscuits, cakes, confectionery, &c.), with the bread trade, it being the more profitable of the two. Wherever that is the case night-work to some extent becomes a necessity. In the first place, so large a portion of the public of all classes consider hot rolls, or hot fancy bread, indispensable at an early hour in the morning,—some, such as coffee houses, taverns, hotels, &c., as early as seven, and nearly all the rest at eight, or soon after,—that it is not reasonable to expect that people's habits can be altered in that respect. Neither do we wish them to be; for that portion of our business is a profitable one in itself, and often leads to its extension. It is a common observation that it is not so much the profit on the hot rolls that is so important, but the hot roll draws the custom for the household bread. In order to make and deliver these at the hour required, the work must be begun either at three or four in the morning, according to the particular business. Then, if the ovens, &c. are occupied with this portion of work until near seven or eight, the batch bread cannot be baked and brought up into the shop and packed for delivery until 11 or half past. But long before this we want to have our fancy goods laid out, and the shop clean and free from steam and dust, ready for ladies who begin to make their purchases for the day, and others, to come into it. An important portion of our sale or orders, for fancy goods takes place before 12 o'clock, when ladies and housekeepers, &c. are out giving their orders. If the bread was to be brought up steaming into the shop, and put upon the shelves at that time, not only would the shop not be fit for ladies to come into, from the dust and steam, and the men moving about, but the fancy goods exhibited would be injured. If it is said that the bread might be taken hot from the bakehouse and packed at once into the barrows, and so taken out, the answer is, that bread ought to stand some time before it is taken out, as it otherwise is liable to be injured. The only alternative would be, either that I must have two shops, one for my bread trade, the other for my fancy trade, or I must have space enough somewhere on the premises to have a bread room, where the bread can be stored until wanted to be taken out. It is obvious, however, that neither of those alternatives can be easily adopted, except in rare instances, in a place like London, where space is so valuable and rents so high. It is not an easy matter in the face of so much competition, to succeed under the most favourable circumstances, without being able to unite a fancy with the bread trade on the

same premises. And in very few cases, indeed, could those businesses be made to pay if carried on in two separate shops. The difficulty also of getting any additional room on the premises is obviously great, and seldom to be overcome at any price.

660. These are some of the circumstances which make it impossible that the same hours should suit every master in the trade. It is plain that if one master must have his hot rolls out at seven, he must begin earlier than one who does not want them before eight. And the master who makes few hot rolls, or none at all, can begin later than those who have to make a large quantity.

661. Since I gave up the experiment of beginning at 4 A.M., I have been working for some time on the following system, which, although I find it suitable to the existing state of my business, I cannot say could be taken as a rule applicable to the trade at large.

662. I have, as bakers, one foreman and two men ; they begin to make dough at a quarter past two, A.M. It takes them an hour. From a quarter past three until half-past four they take refreshment and rest. From half-past four until nine they are continuously and actively employed, in throwing out the dough, scaling it off, moulding, and putting it into the oven. While the batch is baking (about an hour and three-quarters), they are engaged in getting the rolls ready ; afterwards in getting out the batch bread and bringing it up into the shop ; then in getting out the rolls, and weighing flour and other jobs. At nine they get their breakfast, dress and at ten they begin delivering the bread to the customers. They return, and have done work before or about 2 P.M. They have the rest of the day at their disposal, except the foreman, who comes to put in the ferment and set the sponge, which together take him 1¼ hours. On Friday night they began at a quarter to 11 P.M., and have done by 3 P.M. the next day. I have no Sunday work, except that of the ferment and sponge. I have beds for all the three men, and I make a practice of their being all in the house by 11 P.M. The policeman undertakes to call them at 2, and I also have an alarum. I find this arrangement of hours answer, but its success depends upon the fact of my having all the men upon the premises at the usual hour of 11 P.M., by which I am secured against the risk of their not being present to begin work at the proper moment.

663. I have a biscuit baker and a confectioner ; their hours are from 8 A.M. to 7 P.M.

664. You will observe, therefore, that I employ my men in the bread business on an average about twelve hours a day, in which they have for meals and rest about two hours and a quarter.

665. As they all help to serve customers, they are about eight hours in the bakehouse, and about four in the open air.

666. As a rule in the trade, the same men do both branches of the business, the bread and the fancy portion of it ; and in that case the foreman would make the biscuits, &c., with the assistance, perhaps, of a lad; and in some cases the men help to do it after they come home from serving customers. But if the biscuit

business has grown sufficiently to make it necessary to employ the bakers beyond the twelve hours, it is time to have a biscuit baker.

667. I am quite of opinion that the desire of the men is reasonable, that twelve hours should be considered their day's work, with the intervals for refreshment; and I have advocated these hours on behalf of the men, on the occasions of our public meetings, and at the conferences between the men and the masters. But I could not agree to the strict limitations which the men sought to impose upon us. I thought, and still think, that the selection of those twelve hours should be left to the individual masters, and that Saturday should be made an exception. It must be evident that if the men work twelve hours on five days in the week, they must work a few hours more on the sixth, as they have on that day also to provide for the consumption of the seventh, and this is only what is done in every provision business. And considering the great difference in the demands of business, and consequently the necessary difference in the modes and times of carrying it on, I do not see how it is just or possible to attempt to impose an unvarying rule, as to hours, upon all. We are, indeed, referred to the example of Scotland, where night-work is said to be entirely abandoned, and the hour of 5 A.M. adopted uniformly for the commencement of work. But if the making of bread did not begin until 5 A.M., the delivery could not commence before twelve o'clock, and even if it was put hot into the barrows, which would be a disadvantage, it would not all be delivered before 5 P.M. Many West-end houses of business have no private doors, and object to have their bread or other articles of household consumption delivered after the shop is "set out," and the customers are coming in. Many families object to taking the bread in after one o'clock; others, after four; and none would like it as late as five. In reply to the memorials from the Master Bakers of Edinburgh, Leith, and Glasgow, I would say that whilst I appreciate the kindly motives that dictated that address, and should be heartily glad to co-operate with them in ameliorating the condition of those men who are oppressed, I cannot agree in the conclusion at which they arrive that because they can begin at five and get their rolls at seven, that we could do the same without injury to the employer or the public; for to enable us to do so we should have to adopt their mode of fermentation. Now, without wishing to give offence to my brethren in Scotland, I must say unhesitatingly that to substitute Edinburgh, Leith, or Glasgow made bread for London bread would be greatly to deteriorate our article. It is not from want of skill on the part of the workmen that the bread of Scotland is inferior to that of London, for many of our best workmen in London are Scotchmen. I believe it arises from the different mode of fermentation employed, and we should hesitate at making an alteration which we are persuaded would be unsatisfactory to our customers.

668. It has been said on behalf of the men, why cannot there be two sets of men, one to make the bread, and the other to dis-

tribute it? This appears very plausible, and might be the case, and indeed is, where bread-making is carried on on a large scale, one set working by night, the other by day. But where an ordinary business in the full-priced trade is done, the men have finished making bread in 5½ hours. What are they to do with the rest of their time? And will they consent to divide their wages with men who are to be employed 4 or 5 hours only in delivering it?

669. I would here remark that I had during the two years experiment of begining at four o'clock two different foremen with me, both of whom, upon leaving me, went into business on their own account, but neither of them did their business on the day system, and it was at the suggestion of the latter one whilst in my employ that I gave up what was then called the 4 o'clock system. If the journeymen were to confine their attention to getting the hours of labour limited to twelve hours, making an exception of the Saturday, I doubt not that they would easily obtain their desires, which would certainly be a great boon to those who are working 17 or 18 hours at present.

670. I was examined before the Committee of the House of Commons, on the subject of the adulteration of food. I objected at that time to decisions of the chemical analysts in respect to the detection of alum in bread, founded upon the great discrepances which existed in their statements, being convinced that there must be some error in their mode of analysis; which has since been proved by Dr. Odling, who, in a paper read before the Society of Arts, showed that by Kühlman's process, as in use at that time, a white precipitate, the presence of which was considered a proof of the existence of alum, could also be found in wheat-straw and other substances. In order that an analysis should be satisfactory, it would be necessary, not only that there should be an improvement upon Kühlman's process, but also that it should be a quantitative instead of a qualitative analysis, as alumina, the basis of alum, is often found in salt; and only when it exists in quantities beyond what is found in salt, is it fair to infer that there has been adulteration.

671. The more recent investigations, as they have appeared in the Lancet, and which have been quantitative analyses, justify the conclusion that the analyses have been more trustworthy.

672. I have made experiments, as a practical baker, upon the action of alum on gluten. My opinion is, that inferior flour contains an excess of gluten, which, in the process of fermentation, causes too large a transformation of the starch into glucose, or grape sugar, which destroys the elasticity of the bread, besides imparting to it a dark colour. Such flour could be improved in one of two ways; either by extracting the surplus gluten, or by rendering it partially inoperative by adulteration with an astringent substance, such as alum, in quantities bearing a relative proportion to the excess of gluten.

673. The usual quantity of alum used with inferior flour is about ten ounces to the sack, an amount which would be more than would be given by a medical man to check diarrhœa. It

must therefore be to some extent injurious, as an astringent, to a person in good health.

674. As an experiment I have tried lime water, as suggested by Baron Liebig, as a substitute for alum, but found it could not be used as such; and salt, if used to the extent necessary, would render the bread unpalatable.

675. Within my recollection alum was almost universally used by the London bakers; only in very small quantities with the best bread; but it has been getting into disuse for some years past, except with the inferior qualities, and it would now, I believe, be quite exceptional to find it used in any but the inferior bread.

676. I approve of the Adulteration of Food Act, and think it desirable that any defects which experience has pointed out in it should be corrected, in order to make it effectual. I should have no objection to seeing the analysts required to make a certain number of analyses of articles of food liable to adulteration, within certain periods,—so many per month,—and to report the same to the Vestry or Local Board. If this were done I think it would have an immediate effect in nearly putting an end to the use of alum by the baking trade.

677. As a rule there is but a small portion of flour, in an average year, which could not be made into bread without alum, although it would be bread of a darker colour. As regards that small portion it would not be wasted, but would be used for other purposes.

Mr. William Spiking, Dover Street.

678. I have been a master baker and in this house upwards of thirty years. Being desirous of seconding, as far as circumstances might permit, whatever may be thought conducive to the welfare of the persons in my employ, I responded to the wishes of my men, in 1859, to make a trial of substituting day for night work. My foreman at that time was a leading man in the movement and one of the deputation to the masters. He had every reason, therefore, to do his best to make the experiment succeed. I made it in August, September, and October of that year,—the dullest months of the year. I had plenty of ovens and other accommodation, and a superabundance of men. All the men slept in the house, so that there was no reason why they should not be punctual at their work. The hours were from 4 A.M. to 4 P.M. At first it went on very well. The hot rolls, &c., went out at half-past 7 to 8, and the first batch of bread at half-past 9. This, however, gradually fell off, until it was sometimes nearly 12 o'clock before the first batch-bread was ready for delivery. Both the foreman and the men saw that this could not continue, and neither the foreman nor the men made any objection to returning to the old hours.

679. I have at this season of the year (February) six men and two boys (exclusive of biscuit bakers), besides shopmen and clerks. The number is increased with the season. The fore-

man comes at 4 P.M., for an hour, to set the sponge; he then goes home until 11, and gets away at 12 the next day. At 11 P.M. the men begin to make dough. One of them comes in from delivering the bread at about 3 P.M., another between 4 and 5, and on Saturdays at 6; in the dull time of the year they have done by 2 P.M. They can, therefore, have several hours in bed every afternoon; and they have the Sunday entirely to themselves. The work for those who both make bread and deliver it is certainly long; but, taking their wages and privileges together, they are paid well; and I do not find that those who both make and deliver bread have any wish to give up the delivery of bread, and lose a portion of their earnings.

680. Unfortunately there is, I believe, too much truth in what has often been imputed to them, that in many cases they make more by the delivery of bread than the masters are aware of, or than they would like to confess. It has been alleged, as their excuse, that as they are compelled to work night and day, (which they are not, for there is a great surplus of labour in the trade, and they do it of their own accord,) and as their recognised wages and privileges are an insufficient remuneration for such work, they feel a sort of moral justification in adding to their earnings in a manner not recognised, and that cannot be avowed. That manner is known in the trade as the "making" system, and has been described by a clerk of mine, John Challice, in a pamphlet entitled "The Baker's Friend," (London, Hunt, Duke Street, Manchester Square, 1861), and which I beg to place in your hands. It consists in entering in their books more bread to customers than they have delivered. The pamphlet states that, "of the heads of the smallest families not one in ten escapes paying for a half-quartern loaf per week above his household consumption;" and that, "with regard to the heads of large families," that amount is very greatly exceeded. The pamphlet states that men whose wages are 18*s*. a week really make their places worth 30*s*. by this mode of dishonesty, and that it is (as it is most truly) a great source of anxiety and annoyance to the masters. Bills are frequently returned for alteration, and customers lost, in consequence of the detection of these impositions, or the suspicion that they are practised. As regards my own case, I have always endeavoured to keep respectable men in my employ, to pay them good wages, and to make them as comfortable as circumstances permit. And about a year ago, in order that they should have no possible excuse for carrying on that dishonest system, I raised their wages considerably, to a point much higher, I believe, than they can get anywhere else in the trade. I raised the second hand from 23*s*. to 30*s*., and two others from 21*s*. to 28*s*. I have also one at 25*s*. who delivers bread, and who does not assist in making the dough. I am glad to say that the raising their wages to that high point has had a good effect, as no bills have been brought back to me for correction since it commenced.

681. My bakery is one of the largest in London. I have four ovens. In the space behind the house, over the ovens, I have

built sleeping places for the men. Some years ago I had extensive alterations made, with a view to making them as cool and comfortable as, under the circumstance of the confined space at my command, was possible. I had the floors raised, and air shafts put in at all four corners, to keep up a full draft ; but I am sorry to say they are still warm places to sleep in. They are, however, amply ventilated, and I have them kept clean by a man hired for that purpose, and lime-washed twice a year. The bakehouses are as well ventilated as they can be, and I do not think any improvement can be made in that respect. I have them lime-washed once a year. I may here mention that in consequence of conversation which took place at our last meeting I went to several places where Mr. Stevens's patent bread-making machine was in operation, and from what I saw and heard was so well pleased that I have given him an order for one, which I hope to have in operation on my premises in a few days. It must certainly relieve the men of a great amount of labour, and is also a more cleanly mode of operation than the old system. I anticipate great advantage both to myself and the men from the use of it.

682. I wish to call your attention to a subject which has lately caused much disquietude among those masters in the baking trade who study to supply the public with the best quality of bread. I allude to the present unsatisfactory state of the law regarding the detection and punishment of persons adulterating articles of food.

683. As a "full-priced" baker, I may say, that those in my branch of the trade, as well as the more respectable masters in other branches of it, are at present liable to be very seriously injured in their business, by no fault of their own, by the operation of the present law. We are fully aware that it is desirable that analyses of bread should from time to time be made by competent persons, to check the use of alum and other adulterations by the less scrupulous sellers of bread in the trade ; but we think that they should be done under some system, and subject to such regulations as will afford to the honest man an opportunity of setting himself right with the public, or guarding himself against unfounded accusations. What has occurred recently will afford an illustration of what we mean. There appeared in the "Lancet" of 15th Feb. 1862, a list of analyses of the bread of 32 bakers in different parts of the Metropolis, from which it appeared that of these 32 specimens of bread, 17 had alum mixed with it. Now, among these 17 a few were among the most respectable bakers in London, whom, I believe, it would be a great act of injustice to hold up as habitually and knowingly mixing alum with their bread. That alum was found in the bread analysed may be perfectly true ; but that the baker was the party in fault may have been most untrue ; and the fact, in all probability, was, that the price given by some of those master bakers for the flour of which the bread was made, was such as ought to have guaranteed them against all risk of having flour with any, even the slightest, admixture of alum in it. But the bread was taken from the shops without any notice of the use

that was going to be made of it. Had such a notice been given, the first thing that an honest master baker would do, would be to insist that samples of the different qualities of flour of which the batch was made should be authenticated and set apart, under seal, to be analysed in case the bread was found to contain alum. If this were done, the baker, if alum were found, would have his remedy against his miller, and would be able successfully to vindicate his own character. At present I, for my part, as soon as I saw that list of analyses in the "Lancet," felt so strongly that my character was liable to be injuriously affected by proceedings behind my back, and which I should have no means of openly meeting, that I immediately went to the expense of having a sample of every kind of flour I had in stock analysed by one of the first analytical chemists in London; not that I had the slightest suspicion of the integrity of my own millers, but to guard myself beforehand against any possible proceedings of that kind. I must, however, mention that these analyses cost me the sum of 11 guineas. Now, I am taking in portions of my stock of flour from different millers, perhaps, on an average, 120 times a year. At the rate I was obliged to pay for the analyses above-mentioned, the analyses of all these would cost me upwards of 120 guineas a year. I will leave it to you to imagine how many master bakers in London, many of whom, especially the smaller, take in additions to their stock nearly as often as I do, could encounter that expense.

684. For the protection of the trade and the public, I should desire to see such an alteration in the law as would cause the analyses appointed under the Adulteration of Food Act, to make a stated number of analyses of bread, and other articles, within stated periods, say monthly, and report the same to the Vestry or Local Board, for publication, in case adulterations were found. But the articles to be analysed should be openly and formally taken under definite regulations which do not now exist, or in the case of bakers, should include specimens of flour if they desire it. Such a system of periodical analyses would, I am convinced, go far to put an end to the adulteration of bread, which is asserted and generally believed to be so common; since no one would know when his turn might come to have his bread selected for analysis. It would also be of great service to the trade, and to the journeymen in particular, by checking the production of adulterated or inferior bread, the sale of which, among the labouring classes, is said to be sustained to so great an extent by those long hours of work (often 16 to 18 in the 24), which are among the principal and most legitimate grievances of the journeymen.

William Bond.

685. I am foreman to Mr. Spiking. I was here, as second hand, when the trial of day-work was made in 1859. It failed because the foreman often did not get up till near five instead of

four, and very often past five. The trial lasted three months, and it was in the dullest and most favourable time of the year. I think that after a time the men would have got accustomed to waking in time for beginning work at four, and I still think that day-work might be adopted all over London, if it was fairly tried, and if the public would second us. At this end of the town, the great difficulty is said to be with the higher class of customers, whose servants say that the household bread must be delivered before one o'clock in the day, although it is not, or ought not to be, touched till the next morning. If those families do not object to have their fish delivered after one o'clock, I do not see why the housekeepers and servants could not take in the bread after one o'clock ; and I think they would, if they would remember that they would give us a good night's rest by so doing.

686. There are some few customers, I know, but they are very few, who are so unreasonable as to say they will have hot batch bread for breakfast ; and they leave a baker if they cannot get it ; and rather than lose his customer, the baker will say to his men he cannot adopt day-work on that account. Such people can always have hot rolls or hot cottage bread for breakfast, and they might surely have some consideration for us who make it, and not require batch-bread at that hour.

687. Under the system of day-work, the hot rolls can be ready at from seven to half-past seven, and the cottage bread at eight ; the first batch of bread will be ready for delivery at 10, the second at 11, the third at 12. It is true that for some weeks in the year we must have the hot rolls in the shop here at 6 A.M, and on Saturdays soon after 5 A.M. If they were later our numerous customers could not be supplied. But during that time of pressure we should not object to begin as much earlier as was necessary, leaving off earlier, so as to have only 12 hours work altogether. I do not think that more than a dozen of our customers require the bread to be delivered before one o'clock, out of some 500 customers in the season. Not one third of our bread is now delivered before one o'clock ; the rest is not all delivered before six. Out of the season we have fewer batches, but the time would be the same, as we have fewer men.

688. As to serving the larger shops where they do not like to have the bread delivered after the shop is set out, we should, under the day system, serve them the first thing in the morning with the bread of the last batch of the day before. In that case we should get the last batch out at about three in the afternoon, so that it would not be more stale when eaten than what they eat at present. I have worked in many small shops as well as large, and there is no more difficulty about it in one than in the other, except that they make the same men both make the bread and deliver it, and if they did not the masters could not exist. They, in fact, support their business by getting 18 hours labour out of the men for 12 hours pay, and the only remedy in that case is a union among the men to prevent men working those long hours.

689. I am confident that there would be a considerable saving by day-work. There must be much less gas burnt, and also less

coal, for there would not be the same chances of letting the oven get cold. After we had got into the system, I am sure that only one extra hand would be wanted; he would be wanted to help to deliver the bread, If a man has had his night's rest, he can serve customers in half the time that it takes him when, after dragging about all night, he has to drag about all day. Two of the men now have to deliver bread after a part of their work is done in the bakehouse. These two would be entirely confined to the bakehouse until all the bread was out of the oven, which would be at about 12 o'clock; between that and four they might help in the delivery. The extra man would do the rest.

690. Another saving would arise from the work being better done. Where the master takes a pleasure in looking after his own business, day-work would enable him to do so, and he would find his advantage in it. Besides this, when men work by daylight, with all their senses about them, and not tired and sleepy, they make much less waste. Our sweepings, of flour-dust alone, amount to just one sack for every hundred used. The sweepings, while we were doing day-work, were one-half less. Sometimes, when doing night-work, the men are half asleep when "dusting," and will spoil a good deal of flour, and bread too is often spoilt by being burnt or broken. They lose time by oversleeping themselves, and then have to work too much to recover it.

691. The hours under the system of day-work would be as follows:—The foreman would set the sponge at eight, or from that to nine, according to the time of year. We should all begin work about 4 A.M. The men would be willing to give or take an hour each way, morning and evening, to meet particular circumstances; but all over-time beyond that ought to be paid for. This the masters refused at the time of the conferences two years ago.

692. I have no doubt that within those hours all the bread in London might be made without any difficulty, if the public would give us their support. I believe they would if they knew what we suffered from this night-work. I do not think that even in the smallest bakehouses, where there is only one oven and a large business done, there would be any difficulty. I have seen three batches of bread turned out from one oven in 13 hours. There are not three bakers in London with one oven who do such a trade as that. With two ovens it is easy enough. Here, two men make two sacks of flour into dough in 45 minutes. It is well done. But in a cheap shop, two men will do the same quantity in half an hour. We generally reckon one man to a batch of bread per sack of flour. Our flour, which is the best, generally turns out from 92 to 94 four-pound loaves, baked $1\frac{3}{4}$ hour, to weigh 4 lbs. when cold; it takes near 12 hours for bread in the mass to get cold. We use, as near as I can calculate, $13\frac{1}{2}$ gallons of water to the sack. A sack of flour (5 bushels) makes six bushels of bread. This morning we scaled and put into the oven, with six men, 40 bushels of bread in $2\frac{1}{4}$ hours. The batch-bread which is now taken out of the oven at 5 or 6 A.M. stands about five hours on the shelves before it is taken out to be delivered.

If we were working on the day plan all this bread would be out of the oven between 3 and 4 P.M. It would then be left on the boards in the bakehouse (if there was no bread-room) for a couple of hours, when it might be packed away in the bins the last thing at night. This bread would be the first to be delivered in the morning, and would only be twelve hours staler than the bread delivered on the present plan, but it would not be drier, because while packed in the bins the steam would keep it moist. This is the plan which would be adopted by the full-priced baker. The arrangement would be equally easy for the undersellers, only they would have to arrange their hours according to the time when they wanted the greatest part of their bread to be ready. If their greatest demand was early in the morning they would have to get the greatest part of their bread out of the oven in the afternoon. It might, therefore, be more convenient to them to work from 6 to 6. As it is, the last batches made in the day by the undersellers are generally sold the next day. The bread delivered by the full-priced bakers now in the afternoon is, as a rule, not eaten until the next day, when it is 24 hours old, or entirely consumed until it is 36 or 40 hours old. Under the day plan a small portion of what would be out of the oven at 4 P.M. might be delivered with the rolls by 8 A.M. without inconvenience, and would be only 16 hours old, but the bulk of it would be 40 to 52 hours old when consumed. But I contend that packed away in the bins, as I have stated, during the night, it would be as moist as what now is eaten when 24 hours old. It would be packed away in the bins by the extra hand, who would have to be employed at all events if the day system was adopted ; and the saving arising from day-work ought to pay for the extra hand.

Mr. John Bonthron, Regent Street.

693. I have been a master baker twelve years. I served my apprenticeship in Scotland, and have a thorough knowledge of both branches of my business, bread and biscuit making. I employ 11 men and boys. With the exception of one lad extra, I have the same number all the year round at the same wages. The amount of business varies with the season, and is less at the dull part of the year by from 12 to 15 sacks a week. In the dull months of the year the bread men get away from 11 A.M. to 2 P.M. ; and on no occasion, even at the busy season, are they employed, either indoors or out, later than 3½ P.M., and seldom later than 2. On Saturdays they are always away about mid-day, as they bake no biscuits on that day. They have, therefore, all the year round, ample time for rest.

694. The bread men (three men besides the foreman) begin to work at 11 P.M. These men make two batches of dough. One man has done his work in less than an hour, the other two in about an hour ; they take the work alternately. They then lie down till two o'clock. From two till a quarter to seven they are employed continuously, in throwing out the dough, scaling, moulding, and putting into the oven. It is sharp work. The

bakehouse is well ventilated, and the heat is not to be complained of. They have the three quarters of an hour for breakfast and dressing; after that they are engaged in delivering rolls and bread at the same time. As the bread is all out of the oven by six, it enables me to get bread and rolls sent away together, by which much time is saved. Two men who, have been doing this night-work are engaged in delivering. One has booked all his bread, and is away home by one o'clock, he having to assist in making the sponge; the other is away at two, or may be kept till three if required.

695. It may be asked, why is there not a division of labour between the men who make and those who deliver the bread? The answer is obvious to any one who knows the trade, namely, that it only takes a man about six or seven hours to make the bread; what is to be done with him during the rest of the day?

696. If all the men who make bread and deliver it were employed no more hours than with me, they would have no reason to complain; but it must necessarily over-work their strength when they go on delivering bread until four, five, or six o'clock in the afternoon. I do not, for my part, think it can answer to any employer, in the long run, to keep his men at work for this unreasonable time; as where there is physical exhaustion, there is very likely to be moral deterioration also.

697. I endeavour to procure and to retain respectable men, and I pay them at a rate that I believe secures me the services of such. The lowest wages which I pay to any man who gets up at night is 1*l.* a week, with bread and flour in addition. They have no Sunday work, except that four men take it in turns to come in for an hour's work in the morning, and another hour in the afternoon to put the flour in the troughs.

698. I have a good airy sleeping place for six of them, and their bed linen is changed as often as my own; and a charwoman comes at stated times to clean it thoroughly. One of our servants makes the beds.

699. In the autumn of 1859 I tried the day system for about three months. I found that I did not get good rolls; they were too hurried in the process of making. There was an absolute increase of labour, as I was obliged to send out the rolls alone first, and the same man had to go over the same ground again with the bread.

700. The bread had to be put into the baskets and carried out, quite hot out of the oven. This injured its texture; it would not cut so well.

701. There was a great uncertainty about the time of beginning. The foreman came in for about a week regularly; but after that he came in one morning at half-past four, another at five, which threw out the whole work of the day. I had to get up every morning at four, to let the foreman and the other men in; four slept out; they were never all in within half an hour. All that time I had to remain in the shop. I was obliged to be called by an alarum, which woke other people besides myself. All the above causes combined made it abolutely necessary to return to the old system, with the assent of the men.

702. The biscuit bakers, of whom I have four only work 12 hours, beginning at half-past seven. This is the general case in all houses doing a considerable business.

703. It is often said that day-work produces a saving. This is, doubtless, the case where the labour is excessive ; but, according to my experience, the saving amounted to little more than the saving of the gas. The hurry with which the work was done produced much waste. The waste is caused more by over-labour than by night-work.

704. In my branch of the trade (the full-price, for best bread) we cannot make use of young lads in making the dough ; it is too heavy for them. In the branches of business where the dough is weak (from an inferior quality of flour being used), and the batches smaller they may be usefully employed. My batches are from 12 to 15 bushels of bread. Small batches in other branches of the trade are about 9 to 10 bushels. Their ovens are more easily heated, and they are filled more quickly. As to inspection with a view to better ventilation and cleanliness, I think it most desirable. I limewash my bakehouse once or twice a year.

705. Reference has been made to Scotland and to the statement that night-work has been abolished there. Memorials have been sent from the employers there to the employers here in London showing forth the good effects of the improved system. With all due respect to my brethren in Scotland, I may be allowed to remark that there are several reasons why their doing it may-be and is no proof of our being able to do it. In the first place, the change there was not one of system but simply of restricting the hours of labour from an unlimited number to twelve per day, and in doing so began an hour or two later in the morning. In the second place, as a rule, their premises are larger, their rents lower, the competition less keen, and altogether they have greater advantages and capacities for any change than we ; and chiefly, I unhesitatingly state, that however excellent their system, the bread produced by it is by no means so. It is acknowledged by all that, from whatever cause, London bread is far superior to that produced in Scotland. I would just remark that friends in Scotland may pause before they assume that London employers have ill-regulated minds, or are indifferent to the welfare of their men. The London masters have not been in the position the Edinburgh masters admit themselves to have been in. They did not need to be coerced by the men to make a trial. Some of them of their own free will (and not in the smallest shops) made that trial, bringing to it an amount of skill, energy, capital, and self sacrifice that might have satisfied the public, the Scotch employers, and the men themselves, that there was no want of good will to do all possible to ameliorate the condition of the men. In conclusion, I take this opportunity to state that I and several others did offer twelve hours per day or rather seventy-two hours per week without any reduction of wages. I am truly sorry the men did not accept it, as I believe their condition would have been much better than it now is.

Mr. SQUIRE, Jermyn Street.

706. I have been a master baker, and in this house, since 1837. In the autumn of 1859, I commenced a trial of day-work. My foreman was E. Blackmore, who was at that time one of the principal movers in the attempt to do away with night-work, and was also at that time chairman of the Operative Bakers Association. He remained with me about six months, during which time the experiment succeeded moderately, although it was occasionally attended with great inconvenience, and sometimes a decided loss. Blackmore slept out of the house; he was generally pretty punctual, but on several occasions he came in from quarter to half an hour after his time, which threw out the work altogether, and led to the work being hurried, the bread under-baked, and great waste. This arose from the necessity of having the goods up in the shop ready for delivery at a particular time. This was in the slack time of the year, when I was not serving the Palace and the other families whom I serve in the season.

707. After Blackmore left me, except while we were serving the Palace, the foreman who succeeded him continued the day-work, but he came in much more irregularly than Blackmore, and I was absolutely obliged to return to the old system.

708. The regulation at the Palace is, that all the bread, both fancy bread and household, must be at the store-room at a quarter before eight at the latest. They take, on an average, about 96 4-lb. loaves a-day, and a small quantity of fancy bread. This is all, I believe, for the supply of the Household. Their breakfast hour is always punctually at eight. These 96 loaves come out of the oven at six in the morning, with the exception of a small quantity, which is one day old. The whole of the 96 is for that day's consumption. If the new portion of that bread could be received later in the day, one difficulty in the way of the day-system would be obviated; but the greatest obstacle arises from the fact that no dependence is to be placed upon the foreman or the men coming in punctually at four in the morning.

709. Henry Webb (s. 126) who worked for me some years ago, states that his hours of work were from 3 A.M. to 7 P.M.; this is a mistake; it could only have happened occasionally. My bake-house, and the sleeping-place for the men who sleep in the house, have been altered and improved since the time he speaks of.

710. While we were doing day-work, I did not find any saving arising from it; certainly not in the matter of "sweepings," for more were made in that time than had been made previously. It proved the hurry with which the work was done.—[Small but very clean bakehouse, and sufficiently ventilated. H. S. T.]

Mr. MARSHALL, Hungerford Street.

711. I never tried to substitute day for night work, as it would be impossible for me, with my business, to carry it out on these

premises, although they are large and roomy, and I have three ovens. I have a large bread trade as well as fancy trade.

712. I remember Henry Webb working for me ; he was here about four years ago. He is not correct in his statement as to his hours of work. The hours were from 12 at night to 3 the next day; on Fridays, from 9 P.M. to 1 P.M. on Saturdays.

713. I have a machine for breaking the biscuit dough, which saves a great deal of labour. I believe there are few in my branch of the trade who have adopted it, although it is very simple.

714. I have no youths under 18 doing night-work, but there must be many in the trade, in the undersellers and other small shops, who are ; and it would undoubtedly be an advantage to them, as regards their health, that this practice should be put an end to. A periodical inspection of bakehouses would also be quite unobjectionable. Mine is very well ventilated and kept clean, but there is much to improve in great numbers in the trade.

Mr. JOHN ELPHINSTONE, 227, Regent Street.

715. I have been a master baker 30 years, the whole of the time in London.

716. I took a part in the discussions between the masters and the men, about two years ago, as to the possibility of adopting day-work. My opinion was that the demands of the men were inconsistent with what could be carried out, and they defeated their own purpose by their unwillingness to make reasonable concessions. They demanded the hour from four to four, without any exception. They demanded payment for all overtime, and that we should take on additional men on Saturdays. It would be impossible to take a stranger on every occasion when extra work was required. Our men also have, during several months in the year, comparatively easy work, but they are kept on all the year round. My men who make dough at 11 P.M. are always able to get away by one or two o'clock in the afternoon. Others who begin later go a little later. There is nothing whatever oppressive to steady men in this branch of the trade (the high-priced), the proof of which is, that so many are found in excellent health, and so many get on in life. It is the great competition which has sprung up and increased in the trade, since it was thrown open, that has led to the great pressure upon labour in the under-selling branches of it. And in those branches it is that men are found who will submit to the long hours, at a low rate of wages, like the Germans, and also English and Scotchmen of inferior capacity and character.

717. The competition in the baking trade is a serious evil to the community, as being the cause of the great quantity of inferior and adulterated bread that is sold, much to the injury of the largest body of consumers,—the labouring classes. The fact is well known, that those masters who are engaged in this severe competition against each other, are continually resorting to lower

and lower qualities of flour, made marketable by various adulterations, in order to enable themselves to make a living at the very low price at which they are obliged to sell their bread.

718. This competition is more and more drawing away custom from the high-priced trade, and encroaching upon the class who are supplying the public with a pure and unadulterated and wholesome article. I know many instances of full-priced shops which have been brought down, and their places taken by the undersellers, and afterwards by the class below them, in consequence of this process. These men can only exist by getting wages down to the lowest point; and the men who work for them consequently work longer hours, and in worse places—in places most detrimental to their health and morals—than any others in the trade.

719. It would be most desirable, in the interests of the public and of the journeymen, that this system should be stopped if possible.

720. My attention has never been called to the clause in the Act 3 Geo. 4. c. cvi. s. 12. requiring that bread made of meals other than wheat should be stamped with the letter M. I have no doubt, however, that if it were to be enacted that the word MIXED were to be stamped in full upon all loaves made of that species of bread, it would operate very advantageously, by bringing to the notice of purchasers that on paying a less sum for their loaf, they were getting less nourishment, and bread of an inferior quality.

721. If there was not some check upon the sale of bad and unwholesome meat, the sale of it would be very great. It is at least as desirable that an article of first-rate importance to the health and strength of the community, the labouring classes in particular, should be insured to them as far as possible in a pure and good state. The poorer classes are, unfortunately, too apt to be taken in by cheapness. They think that if they can save a halfpenny or a penny on their loaf, they have it to spend on something else; not being aware that they are getting a halfpenny or a pennyworth less value for their money.

722. If means were taken by the Vestries or Local Boards to ascertain that no mixed bread was sold without being stamped, and for detecting adulteration by alum and other things, it would be a great benefit to all in the trade who desire to supply a pure article.

723. Within my experience a great deal has been done by the larger and more respectable masters in the trade to improve the condition of the men, and promote their welfare and comfort. Many of my friends and myself were desirous some time ago to promote the formation of a reading-room and library for the journeymen, but we found they would not themselves come forward and contribute, so that it fell to the ground.

724. There is a constant difference of price of from 16*s.* to 20*s.* per sack of 280 lbs. (or 5 bushels) between the highest and lowest class of flour. The lowest price now is 39*s.* to 41*s.*

for "country," and the highest price for town households is 55*s.* per sack. A great quantity of the low-priced is of English growth.

Mr. Alexander Robb, 79, St. Martin's Lane.

725. I have heard all that Mr. Elphinstone has stated above, and I entirely concur, and there is nothing that I wish to add to it.

Mr. Wm. Hill, 61, Bishopsgate Street.

726. I have been in the business for the last 30 years, and we have one of the largest establishments in London.

727. About two years ago I talked over the matter of substituting day for night work with my men, but I did not find them at all unanimous about it. I have four men who make dough and deliver the bread; one of them has done his work by 12 o'clock, and they all might finish by two or three. The foreman can generally get away about two o'clock.

728. The biscuit bakers begin at 6 A.M. and leave at 8 P.M. We have no lad under 18 who does night-work.

729. It is necessary for my business that the fancy-bread should be ready for delivery by 7 A.M.; and as new household bread is required early in the day by a great number of my customers, such as chop-houses, coffee-rooms, luncheon-houses, large warehouses, these all must have their bread by nine or ten, and many others by two; indeed few like to be served after two o'clock.

730. These premises will very likely be rebuilt shortly; at present they are somewhat confined. The one I have in Jewry Street for biscuits—a new building—is 100 feet high. I have there eight ovens and some machinery for making biscuits, &c. Here I have seven ovens. I doubt whether there is any other establishment in the city that has more than four ovens.

731. I have my bakehouses whitewashed once a year.

Dr. C. J. B. Aldis, M.D.

732. I am one of the medical officers of health for the parish of St. George, Hanover Square, but I attend chiefly to the sanitary condition of the sub-district of Belgravia. In the summer of 1860, I visited 53 bakehouses in my sub-district, and reported upon their condition to the vestry. About the same time my colleague, Dr. Druitt, the medical officer for the Hanover Square and May Fair sub-districts, visited and reported upon 25 in his sub-district. We were led to this step by the allegations, which had been publicly made, that the health of the journeymen bakers was suffering from, among other things, the dirty and ill-ventilated state of their places of work. It had been alleged also that many bakehouses contained disgusting nuisances in the shape of water-closets, privies, and dust-heaps. We conceived that those public assertions, made in many quarters

at that time, were sufficient to set us in motion to inquire into the truth of them, with a view to protect the ratepayers from having to support the men and their families in case of sickness.

733. We therefore called on each of the bakers in our respective districts, and having stated the motives of our visit, we requested permission to inspect the bakehouses. We only met with one refusal.

734. Our observations were directed to three principal sanitary points: first, the cleanliness and ventilation; secondly, the sleeping accommodation provided for the men; thirdly, the existence (if any) of offensive nuisances or bad drainage about the premises. Another point of our inquiry, relative to the hours of work, it is not material to enter into at this moment.

735. We gave the master-bakers, who admitted us, to understand that in case anything amiss should be found, no details should be made public. Upon that assurance a cordial reception was given to us; and the masters readily agreed to the few suggestions for the improvement of ventilation, and of the sleeping-places, &c., which were offered to them. The inspector of nuisances reported to us subsequently that these improvements had been effected.

736. The result of our inspection, upon the whole, was that we found the great majority of bakehouses in those three districts in a much better state than we had been led to suppose by the assertions that had been promulgated about the bakehouses of London in general. Many were perfectly clean and well-ventilated; and in some instances the sleeping accommodation testified to great care for the comfort and welfare of the men.

737. No inspection of bakehouses has been made since in either of those districts. I do not doubt that not only occasional supervision, but inspection at stated periods, is very desirable in the case of bakehouses, and I do not consider that we are empowered by law to make such inspection. We cannot infer that circumstances injurious to health exist in all bakehouses; for the result of the above inquiry was to show that it was not so. And we cannot depend upon circumstances being brought to our knowledge, which would justify our taking the initiative at all as often as an interference on our part would be desirable, with a view to the health of the people employed. The "local causes" which by s. 132. of The Metropolis Local Management Act (18 & 19 Vict. c. 120.) we are required to point out the existence of, as likely to originate disease, do not seem to me to comprehend bakehouses as a matter of course; and that being so, we do not feel justified in visiting them unless after a complaint has been made or sufficient cause shown to us why the state of a particular bakehouse should be inquired into. And as regards suggesting improved ventilation in them, the subsequent part of that same clause, which directs us "to point out the most efficient modes for the ventilation of churches, chapels, schools, lodging-houses, and other public edifices within the parish or district, and to perform other duties of a like nature which may be required" of us, confines our powers in that respect to public edifices.

738. Under the Nuisances Removal Act (18 & 19 Vict. c. 121. s. 9–11.) the Sanitary Inspector has power of entry when he has "reasonable grounds for believing that a nuisance exists on any private premises, or that the premises are in such a state as to be injurious to health;" for those purposes he may enter "at any hour between nine in the morning and six in the evening." And in the case of bakehouses, he may enter "to inspect and examine" "bread or flour exposed for sale," or "in course of preparation for sale or use," in case "they appear to him to be unfit for food;" and for such purposes he may enter at "all reasonable times, or at all hours during which business is carried on," on the premises. (ss. 11 and 26.)

739. I think that in regard to bakehouses these powers should be extended, or that the sanitary officer should be required to inspect them periodically, and make a return to the vestry or district board as to their state.

740. In case any nuisance or any circumstance injurious to health is found to exist, the sanitary inspector would proceed in the usual way, under ss. 12 and 13 of the Act, to cause its removal, "by order of the justices," where necessary. But although this process would secure "sufficient means of drainage and ventilation," together with "whitewashing," when so ordered, those clauses do not entirely meet the necessities of the case.

741. The peculiar circumstances of bakehouses require, even more than factories, that they should be whitewashed not less than twice a year, and that a watchful eye should be kept, in the interest of the public, upon the provisions for ventilation in them, and their cleanliness and means of drainage and other matters. There are also strong sanitary objections to bakehouses being under dwellings, and I think that it should be provided that in future no new bakehouse should be permitted to be opened if under a dwelling. I met with a case recently of the health of a baker and his family being greatly improved by the removal of the bakehouse from underneath the dwelling into the back yard. Persons also should in future be prevented from having sleeping-places in bakehouses, unless they had a sufficient opening into the external air.

Mr. James Grant, Sanitary Inspector for the Parish of St. George's, Hanover Square, 43, Lower Belgrave Place.

742. I have been the sanitary inspector for this parish since the Act (18 & 19 Vict. c. 121, the Nuisances Removal and Diseases Prevention Act,) came into operation, which was in August 1855. At the time when public attention was much called to the state of the bakehouses, in 1860, I was desired by the Sanitary Board to endeavour to ascertain the state of the bakehouses in this parish. I consequently called at, I believe, the whole of them, 85, in the parish, and asked permission to see them. None refused. I found 26 in a state requiring sanitary improvements. Having obtained admission, and found the state they were in, I was able, under the Act, to take the steps necessary

for causing what was requisite to be done. I was not obliged to resort to a formal order by the magistrates in any case, but as soon as I pointed out what was required it was promised to be done, and I afterwards called and ascertained that it was done. I ordered 12 to be whitewashed and cleaned, six to have common privies converted into water-closets, four to have the ventilation improved, four to have the sleeping places removed ; they were mere pens or boxes boarded off from the bakehouses, quite unfit for men to sleep in. The bakehouses in which I ordered these improvements to be made were about one third of the whole number visited ; the remaining two thirds were very fairly clean and ventilated.

743. Before I was engaged in my present duties I had considerable opportunities of becoming acquainted with the state of the bakehouses in many other parts of the metropolis. I was, in early life, in the building trade, and subsequently for some years in the police, latterly as sergeant or acting inspector. I have, therefore, seen the interior of a great number of bakehouses, and am able to say that those which I have above described, in the parish of St. George's, Hanover Square, are very favourable specimens, as compared with those of the metropolis generally; and that the class of master bakers at the West End is, upon the whole, a very respectable one. They will not, therefore, as a rule, allow their bakehouses to be in the state that so many are in, in other parts of London.

744. I have made no visitation of bakehouses since the above date (1860). I have no power to do so. To enable me to enter a bakehouse as of right, I must have, in the terms of the Act (s. 11), reasonable grounds for believing that a nuisance exists. I cannot infer this of bakehouses generally. And notices are not given, or likely to be given, to the local authority under s. 10 of the Act, enabling the local authority "after entry made," "to take cognizance" of the nuisance. Many bakehouses may be a "nuisance, or injurious to health," as described by clause 8, and may be so for a long time before any person aggrieved thereby" (s. 10), or before "two or more householders" or "the relieving officer" would bring it to my notice, or to that of the local authority. It is not like the case of offensive drains which annoy the neighbours, or any other nuisance likely to affect the public. The persons injured are those who work in the bakehouse, and they are very often insensible of the injury done them, or unwilling to complain.

745. I think it highly desirable that the powers of entry of the sanitary inspector into bakehouses, given him by s. 11. of the Act, should be enlarged.

746. By that section the inspector has power to enter a bakehouse, *without notice*, "at all reasonable hours, or at all hours during which business is carried on on such premises," to "inspect or examine bread or flour," under the powers and for the purposes of the Act.

747. I think that this power should be extended as follows :—

748. 1. The sanitary inspector should have power to inspect

and examine as to the ventilation, drainage, and general cleanliness of a bakehouse, as well as regarding the bread and flour.

2. As to lime-washing; it should be ordered that every bakehouse should be lime-washed twice a year, and oftener if the inspector should find that it requires it, as many small bakehouses would.

3. He should be empowered to see that no sleeping places existed in bakehouses. Clause 103 of the Metropolis Local Management Act, which makes certain provisions in regard to underground rooms, does not apply to the bakehouses, they not being "occupied separately as a dwelling." Sleeping places should be forbidden in bakehouses, or on the same level with a bakehouse, unless the sleeping place is quite distinct from it, and has a sufficient window opening into the outer air.

4. He should be empowered to require that the floor of every bakehouse should be kept in a good and sound state.

5. It should be provided, as regards the future, that no bakehouse should hereafter be constructed under a dwelling, or used as a bakehouse until the district surveyor was satisfied that it was provided with sufficient means of ventilation; and that the floor of every bakehouse should be of stone, brick, slate, or other similar material.

749. I have no doubt that these powers would soon lead to a very great improvement in bakehouses, which would benefit the health not only of the journeymen, but of all who lived in the house under which a bakehouse how exists.

750. My experience in enforcing the regulations of the Act in regard to slaughter-houses (20 & 21 Vict. c. 135), in connexion with the other above-named Acts, convinces me that the improvement would be very rapid. I have 34 slaughter-houses in this district, which I inspect once a fortnight. At first the ventilation and drainage and the pavements were very bad; all now are in a good state in all those respects. A contractor goes round every night, and carries off all the offal, &c. Eleven lost their licences in consequence of being underground and unfit.

751. I have found a great readiness among all persons to conform to the sanitary regulations which it is my duty to enforce. I have served, since the Act came into operation, 1,311 notices; and in many more cases I have called the attention of owners and occupiers of premises to things required to be done, and which upon that were done. Notwithstanding that large number of notices, I only found it necessary to take out 43 summonses altogether; of these, only 15 did not do the work without the order of the magistrates; but within the time allowed by the magistrates, all the work was done, except in four cases, three of which arose from the poverty of the owners. The remaining one was a case of dispute between owner and occupier as to who was to do the work. There was, therefore, great readiness in complying with what was pointed out as desirable; and I have no doubt the same thing would happen with the bakehouses if the law was specially extended to them.

Dr. Edward Ballard, M.D., 7, Compton Terrace, Islington.

752. I am the medical officer of health for the parish of St. Mary, Islington. I have for some time devoted my attention to the questions you have put to me, and I will answer them in order.

(1.) *Sanitary condition of the bakehouses.*—I have inspected at present very few in this district, but those I have seen, with the exception of Mr. Nevill's establishment, have been miserably defective in respect of cleanliness and ventilation, and some in respect also of drainage. I am of opinion that it would be highly desirable that they should be placed under sanitary supervision, and this both in the interests of the public and in those of the workmen.

(2). *Sanitary supervision.*—If this is to be established at all, it must be universal in its application. To limit it to a few, or a certain number of those in which the arrangements are most objectionable, would be to throw an invidious task upon the officers of the local authority, and would only issue in complaints from bakers of unfair selection. The inspection of slaughter-houses now practised in each metropolitan district prior to the annual licensing, for the satisfaction of the local boards, should form a precedent. For the proper sanitary arrangements of these places the boards look to the medical officer of health, and are guided by his opinion as to their requirements, and the mode in which they are met by the butchers. In the bill for the amendment of the Metropolis Local Management Act, now before Parliament, it is proposed to extend a similar licensing to the cow-houses of the metropolis, and the regulation of these places will naturally fall under the direction of the health officers. I think that the manufacture of bread might fairly be subjected to similar supervision. There could be no difficulty in requiring bakers to take out a licence, greater than has been found in requiring butchers to take out a licence for the places in which they slaughter. The *fee* for the latter is only a shilling, which money goes to the clerk to the magistrates. The inspection and the advice tendered to the vestries is included among the ordinary duties of the medical officer of health, who also, when the granting of a licence is opposed, has to attend the petty sessions and give his evidence without any further remuneration. I certainly think that this is not quite as it ought to be. The fee paid for the licence is thus only nominal. I think that if a similar system of licensing is adopted for the bakehouses a higher fee, *e.g.* of five shillings, might be fairly required, and that it should be payable to the medical officer of health, whose duty it should thus be not to visit these places *once* only in a year, but two or three times at least, entering his remarks upon the condition of each at the time of his visit in a book which would guide the magistrates in the subsequent licensing. I have said that the responsible officer in this instance, as in the case of cow-houses and slaughter-houses, should be the health officer ; and my reason is grounded upon the supe-

rior education, the medical character of the investigation, and his social position, which last invests him with greater authority, and enables him to deal more readily with manufacturers and tradesmen of all kinds.

(3.) *Adulteration of bread, &c.*—That this is carried on to a great extent there is every reason to believe. The object of the baker is to produce a good-looking loaf from flour, which, without some extraneous addition, would fail to furnish it, and also to increase the weight of the loaf by enabling it to hold a larger quantity of water. The former object is one to which, on grounds of public advantage, but little objection can be taken. If the flour used is not absolutely unwholesome, and the addition made be also not of a character injurious to health, I think that the advantage thus gained by utilising that which would otherwise be abstracted from the material available for the food of the people may be regarded as fairly counterbalancing the apparent wrong in supplying an adulterated loaf. But as to the other object, it is clear that a positive fraud is intended and committed. The legislature is bound to protect the public against fraud and injury to health, *where individuals are not in a position to protect themselves*, and this is just the case in the instance of bread. To detect its adulteration the person undertaking the task must be *skilled*. An unskilled person is open to fraud which no *ordinary* care on his part will protect him from.

The same principle is applicable also to other adulterations. In the case of excisable articles, the legislature acts upon it ; a special department is engaged in detecting and punishing adulteration in fraud of the revenue. The purse of individuals, as well as their health, demands equally the protection of the state.

(4.) *Act for preventing adulteration of articles of food and drink.*—This act must be admitted to have failed in its object. In the first place, it is a *permissive* act, and, as vestries are constituted, it could scarcely have been expected that many of them would be disposed to adopt it. It should be made compulsory. The dread of compulsory sanitary legislation is unfounded. Of all nations, the English are the most ready to submit to law, even to the extent of trade restrictions. One might readily show that this is the truth. As the Act now stands, very few parishes or townships have thought fit even to appoint an unsalaried analyst. In my own parish I was appointed without a salary, but a moderate sum of money was voted by the vestry for the fitting up of a laboratory. I have not, however, had a single application for an analysis to be made under the Act. The initiative should not have been thrown upon individuals. Rather than render themselves obnoxious to their neighbours and disagreeable to their tradespeople, they will accept the article offered to them without inquiry either as to their wholesomeness or to the question of fraud. One cannot fail to applaud this feeling. It is one which every government ought to encourage as leading to domestic peace. As things stand, a person putting the Act into operation would place himself in the light of an informer.

5.) *Remedy for food adulterations.* — The protection of the public should be governmental ; it should be the duty of local authorities. The appointment of an analyst should be compulsory, and it should be his office to examine and report *to the local authority* upon every article submitted to him by it. I think that each district containing 100,000 of population, or more, should be required to support an analyst of its own. Districts containing a less population should be permitted to join with some other district in appointing one, if they do not elect one for themselves. As to the *selection of articles for analysis*, I think that this should not be placed upon the analyst, but either be the duty of some committee of the local board or of some officer appointed by it for that purpose. There should be power to take samples of certain specified articles of food, such as bread, butter, coffee, pickles, pepper, beer, spirits, &c., wherever they are sold, ane to submit them for analysis ; and it should be its duty to prosecute whon considered advisable, And this power the local authority should be compelled to *exercise.** In my parish, and I believe this is the case in some other districts, an organization for the purpose is ready to hand. There already exists an "annoyance" jury of gentlemen, sworn to exercise their office impartially, who, at stated periods, visit all the shops in the parish, *to examine weights, scales, and measures*, seizing such as are found deficient, and submitting flagrant cases to be dealt with by the magistrates in petty sessions. It would be an easy matter to *add* to their duties the taking of samples for examination by the analyst. In the instance of bread the analyst himself might be empowered to take any samples from flour or dough found in the bakehouse, or on the premises of a baker, in addition.

(6.) *Payment of an analyst.*—This should not be by fee, which would be open to objections on the part of the tradesmen, but by salary. And I think the *minimum* salary should be fixed by law, and *made dependent upon the population* over which he exercises his office. Otherwise the compulsory character of an enactment might be rendered nugatory by parsimony on the part of the local authorities. The salary should be such as would remunerate the analyst for the time he must spend, and the care which he would have to exercise. The rate of 2*l.* per 1000 of population would, in my opinion, be a fair one, and sufficient to engage competent men in the work. I think that *the medical officer of health* would be the *proper* person, when competent to fill the office ; and no person ought to be a health officer unless he be competent for such work as this. If not competent, he might render himself so readily enough by a few months instruction.

If the health officer were also the analyst, and paid in the manner I suggest by a proper salary, there would be no necessity for exacting a fee from the bakers to remunerate him for inspection of bakehouses, for this might be made part of his regular

* Fines inflicted should go to vestries or local authorities.

duties, and a shilling licence fee would suffice, as with the butchers. There is another point which is worthy of consideration, and that is, whether an analyst so appointed might not very fitly be also made the *the official adviser of the Crown* upon medico-legal matters, as in questions of poisoning, &c. At the present time ordinary medical practitioners, whose education and pursuits by no means adapt them for the work, are expected to make analyses for their preliminary enquiries, much to the obstruction of the course of justice. Such duties, however, should be paid for by fees : they would be special. The fees should be remunerative, and fixed by law.

Number of bakers in Islington 146, for a population of about 160,000.

Dr. Arthur Hill Hassall, M.D., 74, Wimpole Street.

753. I am a member of the Royal College of Physicians of London, Doctor in Medicine of the University of London, and Senior Physician to the Royal Free Hospital. I have devoted many years to the subject of adulteration, being analyst of the "Lancet Sanitary Commission," and author of the Reports of that Commission published under the title of "Food and its Adulterations." I am also the author of the work entitled "Adulterations Detected," and of other works.

754. Having paid much attention to the subject of flour and bread, and their adulterations, and to the manufacture of bread, I readily availed myself of some opportunities offered to me of examining Mr. Stevens's machine for making dough. It was obvious that if its results were such as were claimed for it, it was an invention likely to prove of great value, not only to those practically engaged in the process of bread-making, but to the country at large.

755. A cursory inspection only is sufficient to satisfy any one that its use would be attended with great practical benefits to the journeyman : 1st, by diminishing to a great extent the inhaling of flour dust, which is now unavoidably taken into the lungs in considerable quantities every time that a batch of flour is made into dough, and which cannot but be productive of irritation in the lungs, and must have a tendency to aggravate if not to produce disease ; a certain quantity of carbonic acid gas is also often inhaled at the same time, the effect of which is also of an injurious tendency : 2nd, by enabling him to perform, at a great mechanical advantage, a portion of his labour which, as now conducted in the old manner with the hands and arms, is severe, and, from the position of the workman, is performed at a great mechanical disadvantage.

756. A like cursory inspection is also sufficient to show that, as regards the public, its use would be, in one important respect, highly satisfactory ; namely, by substituting an entirely cleanly process in the kneading of bread, for one which, as hitherto practised, namely, with the hands and arms and the body bending

down over the troughs, necessarily, and in most cases, must result in impurities being mixed with the dough, which it is most unpleasant to contemplate.

757. Another important advantage claimed for the machine on behalf of the public, that of its producing a certain number more loaves from every sack of flour according to its quality, struck me at first as doubtful. That such a result would, if correct recommend the machine to the baking-trade, is sufficiently obvious, and would manifestly tend to bring it rapidly into general use, inasmuch as it would soon pay its own cost, and be a permanent source of additional gain to the baker.

758. But whether the production of that additional number of loaves per sack involves any corresponding disadvantage to the consumer is another question. The first impression would be that it did ; that if a given quantity of flour, by the addition of a certain quantity of water, yielded more loaves, the total number of loaves produced would be, individually, of less value in a nutritive point of view, than a smaller number of loaves produced from the same quantity of flour.

759. On investigation, however, I do not think that this is the case as regards the additional loaves stated to be produced by the ordinary and fair action of the machine ; on the contrary, I think that the form and action of the machine combined, produce from a given quantity of flour a legitimate and bonâ fide increase in the amount of nutriment, beyond what is obtained from the same quantity of flour when converted into dough by hand labour.

760. In the first place there is no waste of flour, such as obviously occurs when dough is made by hand, both in the form of dust, which consists of the finest particles of the flour, and from portions both of flour and dough often thrown over the trough in the hurry of making. In the next, the mixing power of the machine is so great, that the knobs of dry flour, so often found in hand-made bread, can scarcely ever occur in the dough made by the machine. But further, this mixing power is so effectual that it brings every particle of the flour into contact with the liquid, and enables the flour to take up as much as is due to its quality. If the flour takes up, as it does, more water than it would if mixed by hand, this is a proof that it requires more, in order to saturate properly its entire mass, and to place it in the condition to rise evenly and completely, and therefore to yield a more perfect description of bread. The baker cannot, by fair means, make it take up more than will form it into a certain consistency; if he does, he defeats his object, which is to produce a dough that will stand in the oven in a certain shape. The water added to every sack of flour is not a constant quantity. You may have a varying quantity with almost every loaf you eat, it depends upon the quality and condition of the flour, and the amount of baking ; and may be affected by other circumstances, such as the treatment of the bread when it leaves the oven. Flour newly ground will take up less than old flour. This same flour will take up more after a time, which will vary with the

temperature and the state of the atmosphere. Flour strong in gluten will take up more water than weaker flour.

761 If, as is the case, every particle of flour in machine-made dough is properly and thoroughly saturated with the liquid, namely, the water and the ferment that is to make it light, it may be assumed as highly probable that the digestive organs will extract more nutriment from a given quantity of such bread, than they would have done from bread the particles of which had been in a less favourable condition to be acted upon by the agents of fermentation, even although that bread may have contained a fraction more flour per loaf. There is no doubt that if you make ninety-five 4-lb. loaves from a sack of flour by the machine, and only ninety-two by hand, the ninety-five will contain about one once and a half less flour per 4-lb. loaf, than the ninety-two, supposing the entire 280 lbs. were applied to the making of the bread in each case. But it has been shown that much which is dissipated or lost in making the hand-kneaded dough is preserved, and goes to make up the ninety-five loaves produced from the machine-made dough; and while this may account for a loaf or a loaf and a half of the increase, the remainder may he fairly attributable to the natural yield of the flour when fully and fairly exposed to the action of the ferment by due saturation with water ; in which state it becomes a better and a more nutritious article of food. I think, therefore, that the gain in quantity of bread per sack of flour is a legitimate one, and the machine consequently a decided sonrce of benefit to the public, as well as to the baking trade and the journeymen.

762. My attention has been from time to time called to some of the questions affecting the general condition of the journeymen. Among those questions a very prominent one is the severe competition existing among the masters in the underselling branches of the trade. This severe competition has two consequences ; one affecting the men, and the other affecting the public. It affects the men by causing a certain class of masters to keep the men at work for the greatest possible number of hours for the least amount of wages that they can find men to work for ; and, unfortunately for those men, the redundancy of labour in their branch of the trade makes it possible for the masters to find men to do their work on those terms. It affects the public by constantly stimulating the production of adulterated and inferior bread. There are hundreds of bakers in London, in certain branches of the trade, who are continually underselling their neighoours ; selling their bread at a price much lower than bread made of good and pure flour can be sold for, and often at a loss to themselves, in the hope of destroying a competitor. The master bakers who suffer from this competition are greatly tempted to resort to inferior flour, mixed and adulterated so as to produce, when made into bread, a loaf which at least looks as well as one made of pure or really good flour. This leads again to others using a still more "made up" and adulterated quality of flour, which they get at a still lower price, in order to be able to offer their bread for sale at a halfpenny a loaf under their neighbour,

and thus sustain themselves in this contest of low prices, accompanied by a lower quality of the article produced.

763. If anything could be done which would have the effect of producing greater uniformity in the price of bread, and therefore checking this race of competition, a great benefit would be conferred both upon the journeymen and the public.

764. The great means by which this inferior bread is produced, and made to assume the appearance of good bread, consists in the use of alum.

765. If any mode, therefore, could be devised by which the use of alum could be effectually kept in check, the most decisive blow would be struck against this injurious system of competition.

766. The frequency of the use of alum in bread may be inferred from the results of the several examinations of flour and bread instituted by the "Lancet." On one occasion, of 28 samples of bread tested for alum, that substance was found in every one of the samples. On a subsequent occasion 25 samples of bread were tested for alum, and it was found in the whole of them. It should be stated that these samples were purchased in the poorer parts of the metropolis where adulteration was most likely to be met with. On a recent examination, the results of which were published, with the names of the bakers, in the "Lancet" for 15th February 1862, of 32 samples of bread purchased partly from low and partly from high priced bakers, and subjected to analysis, 17, or more than one half, contained alum. The quantities were as follows:—

TABLE showing the quantities of alum detected in the 4-lb. loaf, and calculated to the sack of ninety-two 4-lb. loaves. ("Lancet," Feb. 15, 1862.)

	Per 4 lb. loaf. Grains.	Per sack of ninety-two 4-lb. loaves. Oz.	Drs.
No. 1.	82·91	17	4
2.	25·91	5	4
3.	82·91	17	4
4.	152·88	32	2
5.	62·18	13	1
6.	85·50	18	0
7.	103·65	21	8
8.	106·24	22	4
9.	85·50	18	0
10.	82·91	17	4
11.	98·46	20	7
12.	69·96	14	7
13.	38·86	8	1
14.	158·06	33	2
15.	98·46	20	7
16.	44·05	9	2
17.	90·69	19	1

These quantities are somewhat in excess of those which would be found in fresh and moist breads. The loaves analysed were in most cases quite stale, and the calculations per loaf and sack

were made upon the basis of the amount of alum found in 1,000 grains in each of the stale loaves.

767. The remarks of the "Lancet" upon this table are the following :—

"It appears further, that as the rule, to which there are some exceptions, the more respectable high-priced bakers, who buy the best flour and sell superior bread, do not make use of alum, for the employment of which no necessity whatever exists.

"The principal reason why alum is so generally used by the bakers who sell cheap bread is, that they are thereby enabled to impart to much less costly flour, when made into bread, the colour and appearances which, without the alum, can only be obtained by means of a flour of superior quality and higher priced.

"That the addition of a powerful substance like alum, and in the large quantities detected in the above analyses, is prejudicial to health, and is productive of dyspepsia and other derangements of the digestive organs, is well ascertained.

"The adulteration of bread with alum is contrary to law, and bakers using that substance are liable to punishment. This offence is punishable not only under the Bread Act, but under the recent Act for the prevention of adulteration. The former Act is sometimes—that is, rarely and at long intervals—enforced, but the latter is, as respects the adulteration of bread, as of other articles, inoperative. It is, therefore, obvious that the law is at present wholly ineffectual in putting a stop to a very scandalous and injurious adulteration of a prime article of daily consumption."

768. It should be stated, in support of the correctness of the several examinations made on the responsibility of the "Lancet" that although the results have been published in that paper, with the names of bakers attached, and therefore under the liability to actions at law in case of error, in no one instance have proceedings been taken for such publication. I am also able to state that, in some instances, bakers, confessing to me that the analysis showed the exact quantity of alum which they had put into their bread, expressed their surprise at its correctness. These facts will probably be accepted as a sufficient answer to certain criticisms that have been made upon the mode of ascertaining the presence of alum in bread ; and I think the public are now in a condition to decide for themselves, after the evidence taken before the Adulteration of Food Committee, and the discussions at the Society of Arts, published in their journals of April 9, 1858, and April 27, 1860, and from other publications upon the subject, whether or not the adulteration of bread by alum is carried on to a very great extent in London and elsewhere. Doubtless a considerable number of highly respectable men in the baking trade are entirely free from the imputation of ever knowingly using it. Indeed, as they deal with the most respectable millers, and pay a proper price for their four, it may be safely assumed as a rule that alum is not present in their bread. In the occasional cases of exception, it may be

asserted that the alum was placed in the flour without their knowledge, and before it came into their possession. There can, however, I think, now be little doubt that the mixture of alum with wheaten flour of an inferior quality, and with flour made up of mixtures of other meals besides wheat flour, in order to give the appearance of good bread to that which is in reality of less value as an article of nutrition, is very extensively carried on, and that it is the means of sustaining that system of competition in the inferior branches of the baking trade which leads to palming off upon the working classes a vast quantity of mixed and inferior bread as good bread, and to the long hours of work which are so injurious to the journeymen in those branches of the trade. If, therefore, a system of inspection by skilled and competent persons, as recommended by millers and others in the evidence before the Adulteration of Food Committee, could be brought about, together with such an amendment of the Adulteration of Food Act as would provide adequately for the expenses of a certain number of analyses of different articles of food in each district, required to be made within a given period, I have no doubt that a most beneficial result would be produced, both to the public, the master bakers, and the journeymen.

Dr. Septimus Gibbon, A.B. and M.B. (Cantab.)

769. I am Medical Officer of Health for the Board of Works, Holborn District. I am a Licentiate of the Royal College of Physicians, and late Assistant Physician to the London Hospital. In March 1857 I presented to the Board of Works a Report upon the adulteration of various articles of food sold in the district. Of bread, I analysed 32 samples, and detected alum in the whole of them. About a fortnight previously, I had a collection made of 10 specimens of flour from flour dealers and bakers in the district. I did not find alum in any of them; it may be inferred, therefore, that the alum was put in by the bakers in the process of making the bread. Some of these specimens of flour were of a very weak quality; the rest were of an ordinary quality. In the weakest I detected, by the microscope, the husks of oats and rye, and I also discovered the presence of rice. In another specimen, subsequently analysed, I discovered fungi. The flour was mildewed. These fungi were likely to be very injurious in the stomach; causing, among other bad effects, diarrhœa.

770. I am strongly of opinion that a systematic plan should be adopted, under the regulations of an Act of Parliament amending the Adulteration of Food Act, and making it compulsory, by which analyses of different kinds of food liable to be adulterated should be periodically made, and their results published. I am of opinion that that would be the only effectual way to put an end to these adulterations, which, I have no doubt, continue to take place in bread and in so many other articles. It should be a system prescribed by Act of Parliament, and containing the means by which the tradesmen would have due security that the articles taken for analyses were not tampered with, and that the

statement of results should be, as far as possible, correct. I do not think that the expense to any district of such a system need be great. Not many analyses of any one article would be required. If, say, six per month of bread, that could be done in two days. The microscope can be used for that purpose in the case of a great number of articles, and in those the result can be ascertained with great rapidity. Again, the important aid of the recent great invention of the spectrascope might perhaps be available for all cases where the metallic bases are present, as in the case of aluminum in bread.*

771. I am also of opinion that an inspection of bakehouses is desirable with a view to enforcing proper ventilation and cleanliness, and I think that bakehouses should be licensed as the slaughter houses are, or some other effectual mode taken to cause them to be placed in a proper state when reported upon by the Sanitary Inspector, confirmed by the Medical Officer of Health, as likely to be injurious, from defective ventilation and cleanliness, to the health of the persons working in them.

[The Report by Dr. Gibbon, above adverted to, on the subject of alum in bread, was considered by the Board of Works of the Holborn District of such public value, that it was ordered to be printed for general circulation among the inhabitants of the district.

The following passages embody the substance of the Report :—

"Of all manufactured articles of diet, bread is the most important, consequently it has claimed my earnest attention. On analysing numerous samples of that article purchased of different bakers in the district, I have generally found them more or less adulterated with alum; in other respects the article has proved good and wholesome. Notwithstanding that the law (37 Geo. III. c. 98. sec. 21.) prohibits, under a penalty, the use of alum in the manufacture of bread, it is admitted even by bakers themselves to be so used under the name of 'stuff.' I am satisfied that this sophistication has been practised with the most innocent intentions. The bakers believe the portion of alum mixed with the bread to be quite harmless. To a certain extent it is a commercial fraud, though it is a great convenience in the manufacture, and improves the quality of the bread in certain respects, which the public appear to value. If it be perfectly harmless, I conceive we have no right whatever to interfere in the matter. However, it is my deliberate opinion, that although alum is not a poison, yet that its use in the manufacture of bread is injurious to health, and concurs indirectly with other things in increasing the mortality, especially of young children, the staple article of whose dietary is bread.

"The more effectually to discontenance this practice, I will briefly detail some of the grounds whereon this opinion is founded.

"The well known medicinal effect of alum is to confine the bowels. It is also well known that small doses of alum repeated for a considerable time will produce at first costiveness, afterwards great irregularity of the bowels, that is to say, alternations of costiveness and looseness, and at

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* The cost of the apparatus is only about 6*l.* 6*s.* See "A Lecture on Spectrum-Analysis by Dr. W. A. Miller, Professor of Chemistry, King's College, London :" *Pharmaceutical Journal*, Feb. 1, 1862.

length continued looseness with ulceration. The quantity of alum which I have generally met with in bread has been in the proportion of from half a drachm to one drachm in the 4 lb. loaf; so that the man who consumes half a loaf a-day swallows every twenty-four hours from 15 to 30 grains of alum. Now it is found that even 12 grains per diem, taken by a healthy adult, will produce constipation. Its effects on children would of course be greater than on adults; a smaller quantity would suffice to produce the diarrhœa and dysenteric symptoms, and they would appear sooner. Alum enters into chemical combination with the gluten of the flour, therefore I admit that its effects in bread are less active and injurious than when administered in its pure state. I have little hesitation, however, in assigning this impurity in the bread as the chief cause of the frequent constipation, headaches, liver derangements, &c., of those who are dependent on bakers for their bread. The fatal diarrhœa of infants under three years of age may also have arisen from or have been aggravated by this cause.

"As this adulteration has been practised for a very great length of time, I cannot recommend the adoption of any harsh measures for its suppression; I would suggest that all bakers in the district should be cautioned against it. If any flagrant case occurs where the injury to health is clearly made out, I shall feel it to be my duty to advise your Board to take the necessary proceedings to prevent its recurrence.

"When the bakers are duly informed of this opinion, I am in hopes that they will of their own accord cease to use alum in making bread. The bakers' plea at present is that it is harmless, and the public 'like it,' and 'will have it.' So that the more effectually to put down an adulteration which is injurious to health, the public on their part should cease to set so high a value on those qualities in a loaf which alum is used to produce.

"The following particulars will, I trust, enable the purchaser to distinguish a loaf that does not contain alum from one which does:—

"Alum increases the whiteness and firmness of the bread made from inferior flour, and thereby causes it to resemble bread made from the very best flour. The qualities which alum imparts to a loaf are very unimportant, having reference merely to the appearance, 'lightness,' neatness of shape, &c.

"The chemical action of alum on moistened flour is analogous to tanning, and destroys in a considerable degree its nutritiveness. It converts the gluten (the most nutritious portion) of the flour into a kind of tough tenacious 'wash leather,' which is difficult of digestion. This gives the dough a tenacity and firmness, enabling it to retain the thousand of little air bubbles (given off by the yeast) which constitutes the 'lightness' or spongy porous character of the bread. Hence flour that will not 'rise' may be made to do so by means of alum. Another object in the use of alum is that it preserves the upright form of the loaves, and prevents them from adhering firmly together, thereby enabling the baker to separate them more readily on their removal from the oven — the 'batch parts clean,' as the expression is, without tearing. An unalumed loaf is, with a little practice, distinguishable from an alumed one by its appearance alone. It is wanting in all those peculiarities which I have mentioned as the effects of alum; it is not so bulky nor so symmetrical in its shape; its sides are roughened and torn in being separated from the batch. Unalumed bread 'bites short,' alumed bread 'bites tough,' and the rough sour taste of alum is slightly perceptible in it. The most marked contrast, however, is apparent in 'crumbling,' when a day or two old; unalumed bread crumbles with the greatest facility by rubbing it between the hands, whereas alumed

bread, however old, 'crumbles with difficulty.' In the same way alum renders the new loaf less liable to crumble when cut.

"These then are the qualities and appearances in a loaf which I recommend the purchaser to disregard. I am not prepared to say that these points can be fully relied on as tests for the presence of alum; chemical tests alone can justify one in declaring positively that a loaf of bread contains alum."]

Mr. William Weston, 12, Park Terrace, Camden Town.

772. Although not brought up to the trade, I have been a master baker in a large way since 1855. I have three shops; one in Camden Town; another, 128, Edgware Road; the other, 21, Moor Street, Soho. I am engaged in what is called in the general baking trade, and belong to the full-price section of bakers. My business would be much greater but for the system of under-selling, which prevails to so great an extent.

773. One effect of the underselling system is this, that when bakers make pure bread to sell at the lower rates they are sure to lose money. To avoid which, when compelled to sell cheap, they are driven to the use of inferior flour, which has to be raised in appearance through the use of adulterating agents, for only thus can they live and pay their way. So that in the end the public must suffer, for as men cannot go on losing money they are sure to turn to adulterations.

774. I know of one marked instance of the evil of this system. In the Paddington district, during the last winter, the price of household flour was 50*s.* to 51*s.* per sack, and the price of the 4 lb. loaf, to yield anything like a living profit, should then have been 8*d.*, but in consequence of the halfpenny under-men, as they are called, we were not able to obtain above 7½*d.*, and taking ninety loaves to the sack of flour, this reduced the returns to 56*s.* 3*d.* per sack, thus returning only a profit of 6*s.* 3*d.* Now it is a well-ascertained fact that the profit should be from 10*s.* to 12*s.* as the lowest which will cover expenses and furnish a living profit. Formerly the amount allowed by the assize was 13*s.* 4*d.* The evil, however, did not end here. The halfpenny-under men succeeded in drawing so many to their shops that the general price came down to 7*d.*; then the undersellers went to 6½*d.*, although the price of flour was about the same. The general price of bread then became 6½*d.*, when the halfpenny men went down to 6*d.*, and what they will come to I cannot see. I do know that if good flour was used the sale of the bread must have been attended with considerable loss. And if this was not the case, then no other conclusion than this can be arrived at, that inferior flour, mixed with rice, cones, &c., with large quantities of alum added for binding purposes, must have been used, for good household flour at 50*s.* the sack could not be made into bread and sold at 7*d.*, the 4 lb. loaf, without great loss, in fact there would only be 2*s.* 6*d.* per sack above the cost of the flour. And even if you calculate, as some do, 92 loaves to the sack, it would then be only 3*s.* 8*d.* I do not, however, believe it to be safe to calculate upon getting 92 loaves out of a sack of flour. There are exceptional cases in

which it may be true, as, for instance, where the greatest portion is sold on the same day it is baked, when it weighs heavier.

775. It is of course an important question, can a sort of bread be made to sell at these low rates so that a living profit shall be reaped by the baker? I believe it can, but only by the use of cones and rice mixed with the flour, having a good quantity of alum to bind it. It is true, however, that good cones made from Revet wheat or from rice cannot properly be called adulteration. Obviously, however, it is a great deception. Genuine cones are made from Revet wheat, and ground coarse, being used for dusting the dough, to prevent the loaves sticking together when moulded up ready for baking.

776. I never used cones myself, but "mixed cones" have been offered to me at from 6*s.* to 9*s.* per sack below the genuine. Genuine cones are about equal in price to inferior wheat, say 32*s.* to 35*s.* per sack; that is about 8*s.* per sack below good households. Therefore mixed cones can be bought at about 15*s.* a sack below good households flour.*

777. Again, supposing the price of the best household flour to be at 44*s.*, the price of bread should then be 7½*d.*, giving a profit of 12*s.* 3*d.* per sack. This would be the highest point, as stated before; from 10*s.* to 12*s.* The underseller could then use the same quality of flour, and sell his bread at 7*d.*, when, through his price being below that of his neighbour, he would be sure to draw a large trade, and sell nearly all his bread over the counter, which would be worth at least 1*s.* per sack; so that his profit, with flour at 44*s.*, would be 9*s.* 6*d.* per sack, allowing the 90 loaves per sack. But suppose the general price of bread to be 7*d.*, with

* This fact was confirmed to me by one of the largest millers in London. It corresponds also with what has been stated to me by numerous other persons in the course of this inquiry. The following statement regarding the effect upon the price of bread by the use of "cones" was made to me by an experienced foreman in the eastern part of London, in the presence of a gentleman minutely conversant with the baking trade, and assented to by him as correct. "With ordinary household flour at 40*s.*, genuine cones will "be at 35*s.*, and mixed cones at 32*s.*; difference 8*s.* per sack between mixed "cones and common households. It is quite a common practice with the "under-sellers in the 'cutting trade,' when pressed by competition, or when "they want to draw off custom from their neighbours by lowering their price "of bread, to use for their batch flour and cones in the following proportions; "namely, 4 bushels of flour and one bushel of mixed cones. The gain will "be (at a difference of 8*s.* per sack) nearly 2*s.* 5*d.* per batch. But this mix-"ture would take up more water, and yield at least ten pounds more dough, "than if no mixed cones were used. 10 lbs. of dough, weighed at 4 lb. 6 oz. "for the 4 lb. loaf, would make nearly 2½ quarterns of bread; 2½ quartens at "6½*d.* would be 1*s.* 4¼*d.* This added to 2*s.* 5*d.* gives a gain of 3*s.* 9¼*d.* per "sack. But alum must be used with it to restore the colour. 6 oz. would be "used to the sack, which, at 2*d.* per lb. for rock alum, would be about ¾*d.* each. "Deducting this from 3*s.* 9¼*d.*, the net gain would be 3*s.* 8½*d.* per sack from "the use of mixed cones in the above proportion, and at the prices stated, "which are about the common ones. Many bakers in the 'cutting trade' "do not make more than that clear. I have been in business myself, and "have known the trade 21 years, and I speak from experience as to the above "facts."—H.S.T.

flour at 44*s.*, the profit in that case would be 8*s.* 6*d.* The underseller sets his at 6½*d.*, and his profits can only be 5*s.* 9*d.*, with which it is impossible for any man to live, and pay his way. But as the men do live, the public must judge for itself as to how this is done. The people are cheated, first, by short weight, second, by inferior flour (which is also so fermented that if it possesses any nourishing qualities they are greatly impaired), and third, by the admixture of alum in large proportions, which is well known to produce a state of indigestion. Unless it can be believed that bakers, unlike all other tradesmen, are constantly selling bread below the cost price, the fact must be admitted that sophistication prevails to an alarming extent. I know indeed that through the mania for cheapness on the part of the public the baker is exposed to great temptations; but after all it is probable with the tradesmen themselves the evil originally lies; and it reacts upon them and their men; it is the source of nearly all the evils of which the journeymen bakers now complain. I know indeed that many masters are brought to poverty, while their children are left to grow up uneducated, so that many of the journeymen are in a better position than those who employ them. But it is in consequence of the evils of underselling and adulteration that men are over worked, and that, so frequently where none but men should be employed, in order to curtail the expenses mere boys are put into their places; and these boys are compelled to sleep in such wretched places that I have seen many a pigstye infinitely preferable to sleep in. The masters have no rooms in the house, and cannot afford to let them sleep out.

778. In regard to the 12 hours' movement, I do not think it possible to carry it out to the letter, because what some could do in 12 hours another would take 15 in doing, and the difference would arise from the convenience one has above another. Beside this, the nature of the trade is such that the work must be done when the dough is ready, and must be finished when begun; and the temperature of the weather often causes a delay in the process of fermentation. But that something ought to be done for lessening the hours of labour, and better accommodation provided for the men, is undoubtedly an imperative necessity; yet, unless means can be found through which this insane competition can be checked, I see no prospect for any permanent change. As to the doing away with night-work, I do not think it universally practicable; first, because such a large number of the public want bread sent to their houses. If no bread was sent out it might easily be done. For my part, I have done away with night-work for the last three years, and have found no difficulty in so doing, except at first from the men themselves not coming all at the same time; but with a little tuition and patience I soon got over this; and I have also got plenty of convenience for doing the work, which many have not, especially at the Edgware Road, where I have an oven of my own invention. It is heated by hot air, so that, no fire going into the oven, it is always ready for baking, and is a complete remedy against the exhalation of sulphur,

which I believe is more injurious to the men than any other part of their work. The cost of fuel for this oven has been 4*d.* per sack ; in the ordinary ovens I believe it generally costs 6*d.* per sack ; but were I to erect another oven of this kind the cost of fuel would be much less, as it would be easy to introduce many improvements. We are also enabled to burn coke and the Welsh coals, which are smokeless. These coals could not be used in an ordinary oven, as you could not tell when the oven was sufficiently hot Th ere is also a great saving in the wear and tear. I believe this oven will stand for a hundred years without the cost of a single shilling, except for the furnaces, and even that will be very much less than the cost of repairing the furnaces of any ordinary oven. I have now had mine in constant use for two years, and to all appearance it is as good as it was the first day it was used. The cost of one of these ovens would be about 80*l.*; but one of the ordinary well-built ovens costs about 50*l.*

779. I should have observed, however, that, in reference to the evils I am speaking of, no practical saving in wages that can be effected by any man above another would prove sufficient for enabling him to carry on the under-selling competitive system consistently with selling a pure article.

780. Dr. Hassall and others have shown what "cones" are often composed of; namely, besides rice, rye, Indian corn, barley, and other grains, in larger or smaller proportions, and sometimes without any Revet wheat at all. The low-priced flour is also itself often adulterated ; and I myself had occasion not long ago to return a quantity of flour sold to me as pure flour, which turned out to be entirely unlike the sample, and which, on having it analysed, I found to contain pea meal. The barrel flour is also not to be depended upon for purity, and is largely used by those who sell what is called "cheap bread." It has often alum in it. I buy my flour from a miller who never has any barrel flour on his premises, and whose prices are therefore always several shillings per sack higher than those who mix barrel flour with English. It is generally New York flour. I sometimes buy barrel flour of the first qualities, and have sometimes had it analysed, and have found it pure.

781. I wish very much to impress upon you my opinion that it is time that Parliament should make the Adulteration of Food Act more effectual. If these adulterations of bread could be stopped, the public would benefit, and the men would benefit, for it is in these under-selling shops that such long hours are worked; they keep them at it in the bakehouse night and day, and make one man do two men's work.

782. I am acquainted with one underseller who made a living with a profit of only 4*s.* 6*d.* above the cost price of his flour, but he was obliged to work himself like a slave, and every one belonging to him, and to force a sale of at least 60 sacks a week ; but that is not a common instance, and few men can keep this up long. I have nothing to say against the quality of his flour. He carried on this plan by the sacrifice of himself and his men. I

have known them work 18 hours a day for four days in the week, and from Thursday night to Saturday afternoon, with only a few hours of rest. These cases are not nearly so common now as they used to be; neither masters nor men will stand it.

783. There is one other subject that now presents itself, viz.—that supposing measures to be adopted to insure a pure good article to the public (and a better condition of the journeymen bakers, as the consequence), what is to be done with all the lower qualities of flour, as there is much flour of a lower quality that is sweet and as wholesome to eat as the best? To which I would answer, that all flour that was good and fit for human food could always be used up with the higher qualities without any injury whatever, and all that was not fit can certainly never be made so by adulteration.

Mr. Rice, Bakers' Hall, Harp Lane, Great Tower Street.

784. I am beadle of the Bakers' Company. I have charge of the records and of the Bakers' Hall. I have held this situation since 1849. Previously to that I was a master baker. The assize of bread was in force during the time that I was a master baker. It was abolished by Act of Parliament in 1822 (3 Geo. 4. c. 106.) I entered the baking trade as an apprentice in 1811, and became a master baker in 1815. The abolition of the assize completely altered the character of the baking trade. The competition that arose seriously affected my business, and I gave it up. When I first was in business for myself there were only three master bakers in the City who sold bread below the rates fixed by the assize. A class of master bakers very soon sprang up, who sold bread at a price much below what bread made of good and genuine flour could be sold for. They drew off the custom from the shops that continued to sell the best article, and have been gradually superseding them all over London. Many of these "undersellers," no doubt, supply pure bread of an inferior quality of flour at a a lower price than the best bread, and they are content with a lower rate of profit than was allowed during the existence of the assize; but a large class has come into existence who sell bread under them again, the "cutting trade," and these are supplied by the millers with flour mixed with various sorts of meal, and also adulterated with alum; so that they sell bread at a price much below the other branches of the trade. This lowness of price much attracts the public, who are always looking out for "cheapness" in every thing. And however low a man of this class may advertise his bread, there is pretty sure to be some one near him who will, for a time, advertise it lower. This leads each, in turn, to apply to the millers for flour at a lower price; it must necessarily be more adulterated; and thus the public is constantly getting mixtures, sold as flour, which are as much adulterated as it is possible for them to be, and still to be able to be made into bread.

785. The price of bread, under the assize, was undoubtedly, as a rule, higher than it is now; but the public had genuine bread.

The bakers' charges or profit allowed on the sack of flour, during the existence of the assize, was, according to my recollection, 13*s.* 4*d.* This yielded a good profit, and kept the trade in respectable hands. The public has certainly gained something by the abolition of the assize, inasmuch as respectable bakers are now content with 10*s.* per sack for costs and profit, equal to about three farthings less upon the price of the 4lb. loaf.

786. The bakers' profits also, during the assize, might be increased in another way. The assize was set on the calculation of 80 quartern loaves (of 4 lb. 5½ oz. each) to the sack of flour. A baker who used good strong flour, and took care that his men worked it thoroughly, made 84 or sometimes 86 quartern loaves. All above 80 were an additional profit. In getting the proper quantity of bread out of the sack of flour, all depends upon the proper degree of kneading. If the men are lazy or unskilful, they will not get the proper quantity of liquid into the dough ; it will consequently be too stiff. If, on the other hand, the men work it thoroughly, it will take up as much as it is capable of before it comes into the state he requires it to be in for moulding, of which the eye is the judge. It cannot be made too weak, otherwise the dough will not stand.

786. There were several reasons why the assize of bread became unpopular. There was first the outcry for cheap bread. Then the bakers did not like their shops to be visited as they were by the master and wardens of the company. The visits took place very seldom, not above twice a year, and then only to some shops taken indiscriminately. They used to examine the weights, and see if the bread was of proper weight. I remember cases where very respectable bakers were fined, and had all their bread seized for being under weight, when the cause was that by some accident it was overbaked, and had lost weight in consequence. Bread was always then baked full two hours. Now a great deal of the bread sold by the lower class of shops is not baked much more than one hour and a quarter. This is a great source of fraud, to the working classes especially, as much of the bread they buy through chandlers' shops is never weighed to them. Much bread also which is delivered is under weight, being underbaked, and also originally of short weight when the dough is scaled.

787. I am aware than an Act of Parliament requires the letter M to be stamped upon bread made of mixed meals, but I very seldom knew of its being attended to when I was in business.

788. When I was in business the prices of different kinds of flour never varied more than a few shillings. Now you can buy the cheap flour even 10*s.* or 15*s.* under the price of the best flours. This is a proof that the cheap ones must be of an inferior quality. Then "cones," mixed with rice, horse-beans, and other things, sell at 15*s.* to 20*s.* per sack under the price of the best flour. These mixed cones are often used by the cheap bakers to mix with their batch to the amount sometimes of a sack of cones to three sacks of flour. Impure cones must have alum to bind them

together, and to produce colour. The cheap bakers, using inferior flour, produce a good colour in their bread by the use of the "patent yeast," which they make themselves, which costs them only 6*d.* a batch; whereas brewers' yeast would cost them 1*s.* 6*d.* per batch. But the patent yeast does not produce sweet bread.

[The following is a copy (without the details of the names of those who made the relations) of the mode of setting the assize, copied from the books of the Bakers' Company.—H. S. T.]

"Corn Exchange, London,
9th April 1804.

"A Return of Wheat from the Corn Factors' Returns, from Monday 26th March to Saturday 31st :—

"Quarters, total, 5,802. Average price, 53*s.* 2*d.*

"Cocket Office, London,
9th April 1804.

"A Return of Flour from the Bakers' Returns, from Saturday 31st March to Friday 6th April :—

"Sacks, 11,857. Average price, 44*s.* 8*d.*
"Salt - - 4*d.*

45*s.* 0*d.* per sack.

"Wheaten bread - 8½*d.* per quartern.
"Household bread - 7*d.*

"(Signed) David Crichton,
Geo. Pirie,
Richard Archer,
W. Batt,
} Master Wardens."

Mr. Stewart, 46, Old Bond Street (Corner of Piccadilly).

789. I have been a master baker six years. Next to Mr. Spiking's, my business is the largest in this part of London. I am in the full-priced trade. I tried the hours of from 4 A.M., when I had a smaller business, in 34, Carnaby Street, and again here. Although my men lodged in the house, I was unable to get the batch-bread ready in time, and made in a proper manner. The bread was hurried in the baking, and sometimes burnt, sometimes not half baked. After persevering some weeks, I was obliged to give it up, and return to the old hours. It was tried in a slack time of the year. I could not carry on such a system in the busy time of the year without a double set of hands. And in a business such as mine, having a large biscuit trade as well as bread trade, I could not carry on the day system without a separate set of premises. These would enhance the cost of bread so much that the public would have to pay 1*d.* more per 4lb. loaf if this system was adopted.

790. My men begin to make dough at 12 at night; it takes them an hour; they then lie down till three; they are then busy till half past six with the bread; they then breakfast, and change their clothes, and are in the shop by half past seven, ready to deliver the rolls and bread. Three men are thus employed. They all might have done their work of delivering bread by one o'clock every day, even in the busy time. If they are longer, as they often are, it is because they choose to take a longer time for it, up to half past four. I proved it myself, by going round with all of them, and it was difficult not to get over it by one o'clock. They have to work for an hour after they come in, in helping the biscuit bakers; but we should be glad if they would come and do that by two o'clock, when they would have all the rest of the day to themselves.

791. My other men and boys, biscuit bakers and others, begin, one at 5 A.M., the others at 6, and have done often by two in the slack time of the year, from July to Christmas, and generally by 4 P.M. On rare occasions later.

792. The foremen and journeymen's wages are much higher now than they were 16 years ago, and they are much better off in every respect; the accommodation for them is better in all respects, in most businesses. My foreman's place is worth, in money and privileges, 2*l.* 10*s.* per week on an average of the year; second hand, money wages 22*s.*, money's worth 8*s.* more; third hand, money 1*l.*, money's worth 8*s.*; fourth hand, 17*s.* and 8*s.*; all these are bread bakers.

These wages are about the average of the west end, in the full-priced trade, which supply the best bread and use the best flour. In the underselling trade, where they sell the best seconds bread made of the best seconds flour, the average wages are somewhat lower; foreman, 25*s.* to 26*s.* per week wages; the second hand, 18*s.*; their other hands will be often country lads and Germans, who are to be had at 12*s.* to 14*s.* per week.

793. My opinion is, that if the Government would improve the Adulteration of Food Act, it would benefit the baking trade more than anything, as it would compel all those in the lower grades of the trade, who now sell adulterated bread, to use pure flour, and with that they must have a better price. This would stop the "cutting" process, which ruins so many respectable men in the trade who sell a good article; and it would be the best thing for the men also, as it would stop the long hours in the lower branches of the trade.

Messrs. Hadley.

794. We are proprietors of the London City Flour Mills. We have been making experiments for some time on the mode of unbranning wheat, invented by Mr. Bentz about the year 1846, in America, and subsequently patented. The object of this process is to separate the outer cuticle, which is wholly innutritious, from an interior section of the wheat-berry, which contains mostly

nitrogenous matter, and which has hitherto been lost as human food.

795. There are two leading advantages in this process. First, the cleanliness of the flour produced. In grinding by the ordinary process, it is impossible to render the flour entirely free from dust and dirt. After putting the wheat through two or three processes of cleaning in the common way, there will still be some dirt remaining in it. All flour always contains more or less of this dust. There is also a portion of the beard of the wheat, a kind of fibrous appendage, which is always ground up with it; no process hitherto known has been able to get rid of it.

796. By Mr. Bentz's process, as the exterior cuticle is entirely removed previously to grinding, the flour is necessarily perfectly clean, and free both from dust and this fibrous down.

797. Secondly, by the ordinary mode of grinding the result obtained is 76 per cent. of flour for human use. By the new process we find, after a series of very careful experiments, extending over several months, that we obtain about 86 per cent. of the whole berry available to make bread. (See 566.)

The money value of this increase of 10 per cent. is subject to a deduction of about one-half in consideration of the lessened quantity of offal, the value of which we may take at half of that of the flour if used as human food. The offal is used for many purposes, which give it a value larger than would at first sight be conjectured.

798. In addition to this net increase of 5 per cent. in value of flour available for human food, the flour made by this process, containing all the nitrogenous or nutritious matter existing in the portion of the berry hitherto lost, yields a large increase in the number of loaves per sack. From the trials which we have ourselves made, we are satisfied that that increase may be safely stated at 20 lbs. of bread per sack of flour. This, taking the common average yield of a sack of flour at 90 4-lb. loaves, or 360 lbs. of bread, amounts to an increase of upwards of 5 per cent. on the bread (18 lbs. would be exactly 5 per cent.)

799. The aggregate gain in flour and bread may therefore safely be stated at 10 per cent.

800. There is also another source of gain in a national point of view, in the increased nutritive value of the whole mass of the flour made by this process.—[June 12. H. S. T.]

801. [The following is a statement made to me by a practical baker at the East end of the town.—H.S.T.]

At present the cheapest flour is 42*s.* per sack; the very best is 50*s.*

The best flour ought to turn out the best loaves, as the stronger the flour is the more water it will take up.

The full-priced baker does not work his flour so weak, there is therefore more substance in his loaves.

The full-priced baker gets only 90 to 92 loaves out of a sack; the underseller, 94 to 96.

The prime cost of 92 loaves, made from flour costing 50*s.*, is a fraction under 6½*d.* To this must be added the cost of labour, rent, interest of premium given for business, and bakers' profits.

First, labour :—

In first-class shops the master does not work himself ; he employs a

Foreman - - -	at	26*s.* per week.
Second hand - - -	at	18*s.* ,,
Third hand - - -	at	16*s.* ,,
		60*s.* per week.

Twenty sacks per week, which would be a fair quantity for three men to do, would give the cost of labour as 3*s.* per sack.

Which divided among 92 loaves gives ¾ per loaf; making—

Cost of Flour - -	6½*d.*
,, Labour - - -	0¾*d.*
	7¼*d.*

The selling price in first-rate shops is now—

per loaf - -	9*d.*
	7¼*d.*
Giving profit for rent and living -	1¾*d.* per 4lb. loaf.

92 loaves at 1¾*d.* is 13*s.* 4*d* ; giving thus this sum as the total profit per sack of flour for rent, fuel, yeast, salt, tools, repairs, and cost of living.

802. While the "assize of bread" existed, which was put an end to in 1822, the Lord Mayor used to allow 13*s.* 4*d.* per sack of flour as bakers' profits for the manufacture.

803. So that the West End baker receives. at the above prices, just the sum that used to be allowed by the Lord Mayor ; which, considering that rents are higher now than then, and the higher rents generally at the West End of the town, and also in favourable situations elsewhere, and the credit given, is very moderate.

804. In fact, the profits of many arise partly from their taking advantage of the turn of the markets, and purchasing their flour in large quantities, which is given out to them by the miller as they want it.

805. He buys of the miller, who books him at the price of the day ; he buys, perhaps, 200 sacks at a time, which may be about twenty weeks' consumption.

806. To contrast this with the underseller. He buys his flour at, say, 42*s.* He gets, by under-baking, say, 96 loaves per sack, and as it is sold at 6½*d.* per loaf (96 loaves × 6½*d.* = 52*s.*) he receives 10*s.* as profit. (72–5.)

807. The wages paid by the underseller are less by, first, the difference between the wages of the third hand and those of a boy; the boy costs, say, 7*s.* per week, the difference is therefore

9*s*. The wages of the foreman and the second hand are also less in some cases.

808. The number of loaves turned out per sack of flour depends entirely upon the quality of the flour. A strong flour will turn out legitimately as many as 96 loaves, as it will take up more water; flour of poor quality will not turn out as many as 90 loaves with the same quantity of water. Flour of an average quality ought not to turn out more than 92 loaves.

809. To produce 96 loaves legitimately, the flour must be good, and not baked more than $1\frac{1}{2}$ hours, instead of $1\frac{3}{4}$ hours, which is the proper time in an ordinary oven.

810. Again, the position of an underseller, who uses weak flour, and gets only 90 loaves per sack, may be thus stated :—

Ten sacks per week is an average business in London ; but a large underseller will do 20 sacks per week.

If 5*s*. per sack cover working expenses, such as yeast, salt, coals, and gas, &c., and if he makes 7*s*. for rent, labour, and profits, he receives 12*s*. per sack.

811. Now if he can receive $\frac{1}{2}d$. per loaf profit he can make a fair living. His 20 sacks per week, at 90 loaves per sack, give him 1,800 loaves ; 1,800 halfpence or 900*d*. is 75s. per week.

812. But the competition he is subject to from the class below him, who are always "cutting down" prices, does not long permit him to maintain this rate of profit on the sale of pure bread made from good flour, unless he is a man of capital, and makes successful purchases on a large scale. If he is not (and that is the case with the majority), he is driven to adulterate his bread, to save himself in the race of competition.

813. [The memorial of the master bakers of Edinburgh and Leith, addressed to the master bakers of London in the spring of 1859, recites the principal facts relative to the injurious effects of night-work upon the journeymen in London, both in a physical and in a moral point of view, and "confidently appeals to the experience of the masters of Edinburgh and Leith, for a period of more than 10 years, as to the benefit of the system of day-work, to the masters as well as to the men. The Scotch masters adopted the hours from 5 a.m. to 5 p.m. And the masters do not hesitate to say that, even in a commercial point of view, the change has been to them a great advantage, inasmuch as their work is much more efficiently, without being in the least more expensively, performed." They proceed to state that the interests of the public have not suffered by the change. "The rolls are prepared by seven o'clock in the morning ; and in other respects, from the comparative vigour and attentiveness of the workmen, the wants and requests of the customers are more carefully and punctually attended to." "What can be done here can surely be done by the enterprize and energy of London." * * *

814. A memorial to the same effect was about the same time extensively signed by the master bakers of Glasgow.

815. Mr. Callard (667) and Mr. Bonthron (705) give various

reasons why, in their opinion, it is more difficult to conform to those hours in London than in Scotland.—H.S.T.]

816. A MS. poem of considerable length, entitled "A Voice from the Oven," was addressed to Viscount Palmerston by Joseph West, a journeyman baker, and transmitted by the Home Office to me in March last.

817. In a letter accompanying the poem Mr. West traces all the evils, which he describes, to the competition among the minority of masters, who are continually reducing the price of the bread they sell below what good bread can be honestly sold for. His remedy is "councils of conciliation," who shall have power to fix the price of bread, as was done under the assize. He does not object to night work, and "does not think that 1 in 20 do object to it, but all do most reasonably and sincerely object to working all day as well;" and "as the abolition of night-work would seriously affect many masters in confined premises and expensive localities," he does not think it desirable to abolish the system at once, but "after notice, if found desirable, and after other means had been tried."

He says,—

"If you put your case in harmony with right reason,
You'll get assistance at the proper season."

Accordingly, he thinks that if the trade was ruled by a council of conciliation, and every shop licensed, it would happen that—

"Truth, Reason and Justice conducting the trade,
Which all would rejoice in, no one could evade
Fair prices, fair hours; fair treatment as men
We may rest assured we all should have then;
When every master his own time should choose,
Confined to fair hours; and none will refuse,
On needful occasions, just a little over,
So it's not systematic;"———

He adds that,—

. . . . "In truth I must own I am
Averse to live longer in this Pandemonium."

But he has better hopes for the future:—

"And as far as I can see,
Such a glorious thing 'twill be,
When bakers shall no longer work like slaves,
But enjoy their fair rest then,
Like other working men,
Nor sink into their early pauper graves.
When those sons of midnight toil
No longer bread shall spoil
Thro' sheer exhausted nature, or despair,
But gather in a ring,
And with cheerful voices sing,
Oh, gaily goes the work when the hours are fair.

So as far as I can see,
Such a glorious thing 'twill be,
When bakers will no longer work like slaves,
But enjoy their fair rest then,
Like other working men,
Nor sink into their early pauper graves."

(Signed) Joseph West, at Mr. Miller's, Baker, 2, Wellington Terrace, Bayswater Road. [I have seen Mr. West, and ascertained that this poem is his production.—H. S. T.]

Mr. William Franey, 45, South Audley Street.

818. I have been 40 years in this street in the baking trade. I should be glad to see night-work abolished if it was possible to do so; but our trade is a very peculiar one. It takes 18 hours to make a loaf of bread; that is including the intervals from the time that the ferment is put to work until the bread comes out of the oven; *i. e.* from 12 o'clock in the day until 6 A.M. If it were possible, without raising the price of bread, to work with a double set of hands, night-work might be put an end to. But day-work could not be accomplished with the same amount of labour, and we should therefore have to pay more; for we could not get wages below their present point, consistently with employing respectable men. Again, if we were to give up getting out the hot rolls and fancy-bread early in the morning we should have plenty of Germans, who would come and take up the trade, and take it out of our hands. In the suburbs of London, where they have a less demand for fancy bread early in the morning, I find that the day system is becoming much more general.

819. My men, who deliver bread as well as make it, have generally done work at 3 o'clock even in the busiest time; in slack time at 12 or 1 o'clock in the day. But even when they go on till 3 o'clock they have from that hour to 11 P.M. to themselves, besides the hours of rest during the night, generally from 12 until 4 A.M.

820. Some of my neighbours in this part of the town tried the day system, and they left it off at the mens' desire. I therefore did not attempt it, as I could not carry it out with my business.

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821. Dr. W. A. Miller, Professor of Chemistry at King's College, London, has favoured me with the following paper on a new mode of detecting alum in bread, which he describes as "a simple and, I think, satisfactory mode of ascertaining the fact of its presence or absence."

Notes on Alum in Bread, and its Detection, by Edward Ash Hadow, Demonstrator of Chemistry in King's College, London.

There are two methods recommended in chemical works, with a view to the detection of alum in bread, to both of which there appear at first sight to be theoretical objections, rendering it difficult to understand how they could answer the purpose for

which they were proposed. One method, that of Messrs. Robine and Parisot, depends on the extraction of the alum from the bread by digestion in cold water, and then testing the clear filtrate for sulphuric acid and alumina, with chloride of barium and ammonia respectively. This method seems open to the objections that the detection of sulphuric acid would not prove much, since it might have been derived from the common salt employed in making the bread ; and the non-precipitation of alumina would not make its absence certain, since it might be retained in solution by organic matters extracted from the bread. The second method, that recommended by Kuhlman, consists in incinerating the bread, digesting the ash in nitric acid, and after filtration, testing the filtrate for alumina with potash. Here again it seems questionable whether the alumina would be found capable of solution in nitric acid after the prolonged incineration of the bread.

With a view to settle these points, 20 grains of alum were given to a baker to be introduced into a 1-lb. loaf of bread, which being in the proportion of 80 grains to the quartern loaf is probably above the average amount employed ; the loaf thus prepared was broken up and macerated in successive portions of water for 48 hours. The expressed liquids mixed became perfectly clear by filtration through coarse paper. The filtered liquid was very feebly acid to litmus paper, rendering it by long immersion purple rather than red. One portion tested with chloride of barium, the other with ammonia, gave moderate precipitates. The great bulk of the liquid was evaporated to dryness, and ignited to get rid of a quantity of gummy organic matter. The residue, which fused readily, owing to the common salt present, dissolved for the most part in water, and wholly on the addition of a little nitric acid. Potash (pure and free from alumina) gave on addition an abundant precipitate insoluble in excess, and the filtrate remained perfectly transparent on addition of excess of chloride of ammonium, proving thus the total absence of alumina. The inorganic matters extracted by water were further examined, and found, in addition to common salt and sulphate of potash, to contain alkaline phosphates existing in the fused ash, at first as pyrophosphates, together with phosphate of lime, and a large quantity of phosphate of magnesia, which fully accounts for the precipitate obtained by ammonia in infusion of bread.

The glutinous mass of the bread left undissolved by water was then incinerated completely, when the ash was found to be wholly soluble in dilute nitric acid. Potash was then added in excess, and the whole was filtered on testing the solution with chloride of ammonium ; alumina was found in abundance ; the portion of the ash insoluble in potash was chiefly phosphate of iron and magnanese with a little phosphate of lime. Thus, it appears, that on treating alumed bread with water, no alumina is extracted even when alum is present in so large a proportion ; so far from it, that the aqueous infusion of this bread produced an immediate precipitate with a solution of alum, becoming abundant on gently warming the mixture, and rendering it impossible that alum

should exist in the solution; so that this process of maceration in water only is entirely fallacious, and any sample of bread thus examined will give a precipitate with ammonia ; but this precipitate consists only of phosphate of lime and phosphate of magnesia and ammonia, the extraction of which, by water only, appears somewhat remarkable, the acidity of the liquid being insufficient to account for their solution. The removal of these phosphates by water appears to be nearly complete, while the retention of alumina and phosphates of iron and magnanese is no less entire.

The quantity of alkaline phosphates present in the ash, renders it highly probable that the alumina is retained as phosphate, which would sufficiently account for its ready solubility in nitric acid, after strong ignition ; at any rate Kuhlman's method of extraction by nitric acid from the ash answers perfectly, the only objection being the length of time required for complete incineration of the bread, to obviate which, it may, after charring in a capsule of platinum, be deflagrated with nitrate of potash, a process which can be effected over a spirit lamp. On digesting the mass in water, the alumina is almost wholly found in solution in the carbonate of potash thus produced.

Nitrate of cobalt is of no use as a means of detecting alumina in the ash, since the phosphates present are capable of giving the same reaction with this reagent before the blowpipe.

Since alumina is thus obstinately retained by bread, it seemed probable that its mordant properties might serve for its summary detection. With this view, a proportion of pure bread was immersed, simultaneously with a piece known to contain alum, in a freshly prepared and dilute decoction of logwood, and set aside for some hours, when a distinct difference between the two pieces was perceptible both in intensity and in shade of colour, which was more evident on breaking the two pieces. The pure bread was simply stained superficially with the pale orange-red colour of the decoction, while the alum piece had acquired a purple dye, which had penetrated to some depth. A baker in whose bread alum had been detected, acknowledged the fact when accused of it, but stated that he *only* used 1 oz. for a bushel of flour, or 1 oz. to about 19 quartern loaves, which amounts to about 5·7 grains of alum per 1 lb. of bread. Dr. Normandy also states that no effect is produced in improving the appearance of the bread, if the quantity of alum be reduced below 1 in 906 of flour, or below 1 oz. per bushel ; hence this may be taken as the *minimum* probably in which this ingredient would be added. A loaf was therefore prepared with this proportion of alum, and was found to give a perfectly satisfactory reaction with the decoction of logwood, a piece of pure bread having been immersed at the same time by way of comparison.

Sulphate of zinc was on on one occasion detected in bread by Professor Bloxam, when he was led to suspect it, from observing that the ash had a yellow colour while hot, which disappeared on cooling. It is probable that with bread of pure wheat-flour, this phenomenon would not be observed, in consequence of the trans-

formation of the sulphate into phosphate of zinc, by the alkaline phosphates present, there being no excess of alkali present to prevent such a combination. On one or two occasions, however, I have observed a strongly alkaline reaction of the ash, due in all probability to the addition of potatoes ; in such a case only would such a phenomenon probably be observed.

Having on one or two occasions detected small quantities of copper in brown bread, and finding it left in the bread after digestion of the latter in water, I wished to try whether sulphate of copper was in the same predicament as alum, and if so, whether ferrocyanide of potassium was capable of detecting its presence, as it is stated to do, by merely moistening the bread with its solution. A loaf was, therefore, prepared with the addition of this salt, in proportion of 10 grains to the lb.; it was macerated in successive portions of water, in which very little copper was found to be dissolved, yet the residue from which all soluble matters had been abstracted acquired a decided reddish tint when treated with ferrocyanide of potassium, which was found to produce a more marked effect than ammonia or hydrosulphate of ammonia. Bread thus adulterated becomes equally with alumed bread, strongly dyed by an infusion of logwood; so that this test, though alone incapable of distinguishing between the two, would at least indicate that something was wrong. In applying this test, the solution should be freshly prepared, and diluted considerably; the pieces of bread should likewise be allowed to float in the liquid for about 12 hours, the effect being more marked than when they are entirely immersed so as to exclude the air. It is possible that unfermented bread might occasionally give a fallacious indication, if the carbonate of soda were not wholly neutralized by the hydrochloric acid, added for the purpose by the baker. As, however, the alkali would pass into the solution, it seems probable that the latter would likewise be simultaneously affected, and the alkaline reaction of the bread would explain the phenomenon. The only unfermented bread thus examined became unmistakeably dyed ; the bread, however, had a feebly acid reaction, and was found to contain abundance of alum.

Before concluding, it may be well to remark, that it is difficult to judge of the quantity of alumina present, merely by observing its bulk and appearance on precipitation, since its appearance varies much with its mode of precipitation. It probably appears most abundant when precipitated from its solution in potash by careful neutralization of the latter with a diluted acid, or by the addition of chloride of ammonium and gentle warming ; if, however, the latter be boiled, or the precipitation be effected by addition of ammonia to its acid solution, the alumina is far more transparent, and in a hasty examination might even be overlooked, when present in small quantity. The decoction of logwood should also be made with water containing carbonate of lime, such as that ordinarily supplied in London; for with a decoction of logwood in distilled water the differences of colour are far less marked.

Mr. Henry Dodson, 98, Blackman Street, Borough.

822. I am patentee of the unfermented white and brown bread and nursery biscuits, and I make the ordinary fermented plain and fancy bread as well. I represent the eighth generation in the baking business in this house. It was commenced by my family in 1662.

823. I supply the unfermented bread to all parts of London. It is distributed by our carts. It is made at night, during the usual working hours of the trade, beginning at 11 P.M., and also during the day up to one o'clock. As the process only requires a little more than an hour from the mixing of the flour with the liquor to the producing of the loaf out of the oven, we can bring out a great number of batches in that period. The process of mixing occupies but a few minutes. The loaves being baked separately are well baked in about an hour.

I have given great attention to this process of making unfermented bread; my father and I brought it to the notice of the public. By close application and various experiments I have succeeded in practically applying the process with perfect certainty as to the results. I myself prepare the material for every batch, and have done so from the commencement of the carrying out of the process, about 20 years ago. I have a mode of my own of reducing the result to a certainty, so that the bread when made consists of nothing more than flour, water, and common table salt. We are the sole manufacturers in London, that I am aware of, of bread made according to this process.

824. I employ eight men at night. Many have been with me for many years; the rest for three or four years. They are all in perfect health, and none of them have ever complained of the effect of night-work. They have all done their work at 12 or 1 o'clock in the day. The distributing the bread is done by a separate set, with horses and carts. Their wages are about the highest given in London; the lowest wages I give are 16*s.* a week.

825. I think it highly desirable, for the sake of the young lads under 18, that they should not be allowed to work at night. I have no one in my employ under that age. I have also no doubt that great benefit will arise from a proper inspection of bakehouses. [Mr. Dodson's bakehouse is above ground, and is exceedingly clean and well ventilated.]

Mr. E. T. Jobbins (at Mr. E. Jobbins's, 7, St. James's Street).

826. I was in the baking business at Kilburn. I had a shop there for six years. About three years ago I adopted day-work, beginning at 4 A.M.; at that time I had only one oven. At the end of a week my men said they found it so difficult to get through the work that they declined proceeding with the day system, and returned to the old hour. I then had another oven built; it cost me 60*l.*; and I also was obliged to raise the wages of

my third hand from 12*s.* to 16*s.* a week, because he then began at the same hour, and worked as long, as the second hand. As to saving by the day-work, all I found was a fractional saving in gas. All my bread was delivered by 4 P.M. I was satisfied with the change ; but it could not have been carried on had I not been able to put up the additional oven.

Mr. SIMPSON, South Audley Street.

827. It would be impossible for me to enlarge my premises; and without that I could not, during four months in the year, get through the work in less time than at present with any additional number of men that I could properly employ. My foreman, on my asking him if he would like to begin at 2 A.M., said he preferred the present hours.

ROBERT WIGHTON.

828. I am foreman to Mr. Duer, of 146, New Bond Street. From August 1859 to May 1860 we tried the day system, beginning at 4 A.M. It was then given up because the batch-bread could not be ready for sale in the shop until 10 A.M., which was 3½ hours after other bakers in the neighbourhood, who continued the old hours, had theirs in the shop. We have now three ovens; we had then only two. But this would make no difference; we could not get the batch bread out earlier. Our fancy bread was got out earlier—by 6½ A.M.; now it is out by 7. None of the men slept in the house. All generally came regularly; but on one occasion one man did not come at all, and on two others not until 5 A.M., which put us out much.

Mr. JOSEPH WARREN, assistant to Mr. Duer,
146, New Bond Street.

829. During the experiment of day work, which was made principally during the slack season, we had to employ one extra man at 4*s.* 6*d.* a day to deliver bread. During this time the additional cost fell on Mr. Duer ; but if it had been continued into the full season we must have had two, if not three men more. The cost of this must fall upon the public, if the system should become general, and would amount to ½*d.* per 4-lb. loaf. This can be shown as follows :—

830. The regular trade of a baker in London averages from 12 to 14 sacks per week. One halfpenny per loaf on the sack yielding, say, 90 loaves, is 3*s.* 9*d.*; which, multipled by 12, gives 45*s.*, or just the wages of two men, second hands, such as we should employ to deliver bread, at 42*s.* a week. This is such a charge as no baker, except perhaps the very few in unusually large businesses, could take upon themselves. It would have to come upon the public if it became the established rule of the trade.

831. [The statements of many other persons, both masters and men, which I received, both orally and in writing, (among the former those of Mr. Cameron, of Tooley Street; Mr. Thompson,

foreman of Mr. Stewart, Old Bond Street; Mr. Jobbins, St. James's Street, and others both in the East and West ends of the town,) did no more than confirm evidence previously received on various points. I have not, therefore, thought it necessary to insert them.—H. S. T.]

832. *Patent Yeast.*—"The dough is allowed to remain in the trough for about an hour and a half or two hours, if brewers' or German yeast have been employed for the making of the sponge; if, on the contrary, *patent yeast* or *hop yeast* have been used, three or even four hours may be required for the dough to rise up, or, in technical language, 'to give proof.'

"The so-called 'patent yeast' is the cheapest and at the same time the weakest of the ferments. * * It is made either with or without hops; when with hops, it is called 'hop-yeast,' and is nothing more than a decoction of hops to which malt is added, which is in a scalding hot state; when the liquor has fallen to a blood heat, a certain quantity of brewers' or German yeast is thoroughly mixed with it, and the whole is left at rest. The use of the hops is to diminish the tendency of this liquid to become acid.

"*Potato yeast* is a kind of patent yeast, in general use."—Ure's Dict. of Arts, &c., (London 1861,) p. 403–4.

833. According to the account given in Dr. Ure's "Dictionary of Arts and Manufactures," &c. (London, 1861,) p. 402, of the art of baking bread, it was first practised in the East, and was introduced into Rome A.U.C. 580, on the return of the Roman armies from Macedonia. (Plin. Nat. Hist. lib. xviii. c. 28.) In the time of Augustus there were 329 public bakehouses in Rome, nearly all in the hands of the Greeks. The foreign bakers who came to Rome with the army of Macedonia were incorporated. Criminals and slaves, for petty offences, were condemned to work in the bakehouses. The bakehouses were distributed throughout the 14 divisions of Rome. The Corporation of Bakers had the care of the public granaries, and baked the bread that was given away. They had also stores of their own, but the price of bread was regulated by the magistrates.

The Roman practice of bread-making gradually but slowly spread through the rest of Europe. But Pliny remarks that it was more properly the business of women than of men. "Ipsi panem faciebant Quirites, mulierumque id opus erat, sicut etiam nunc in plurimis gentium." (Nat. Hist. lib. xviii. c. 28.) It continues to be domestic work, to a great extent, out of the towns, in all parts of Europe. Even in some of the towns of Yorkshire and other parts of the North of England a great portion of the bread is still made at home. (Evidence before the Committee of 1855–6 on the Adulteration of Food.) It is recorded that in 1804, Manchester, with 90,000 inhabitants, did not contain a single public baker. (Encycl. Brit., 8th ed., 1854, art. "Baking.")

A system somewhat similar to that of Rome, of restriction as to the number of bakers and a regulation of the price of bread,

was common in France and elsewhere during the middle ages. But M. Le Play, in his Report already adverted to (p. xii), states (p. 33) that "from the time of the middle ages to the Revolution of 1789, it was only the 'pain de luxe' that was subject to regulations, and that the principle of free competition was always maintained on behalf of the household bread, which was consumed by the mass of the population. The "régime réglementaire" for all kinds of bread was introduced progressively in France, at the time of the Revolution. After various fluctuations it was finally established by a decree of the First Council in 1801, which led to the complicated organization which exists at the present time. (p. 43.) In 1807, by the authority of the Préfet of Police, the number of bakers was fixed at 601 for Paris ; and in 1854 the principle of limitation, "proclaimed for the first time since 1789 in an Act emanating from the Sovereign," was extended to "all the Communes, urban and rural, in the Department of the Seine." (p. 43.) The result of this limitation is, according to M. Le Play, unfavourable to the interests, both of the public, and of the bakers themselves and the people they employ. "L'un des faits les plus saillants que révèle la comparaison de Paris et de Londres, est la situation inférieure faite au boulanger Parisien en ce qui concerne l'aisance acquise, l'intelligence du négoce, l'activité et l'initiative, et, en général, l'ensemble des conditions qui fixent le niveau social. Cette infériorité, conséquence forcée du régime réglementaire dont la limitation est le trait principal, réagit d'une manière fâcheuse sur la fabrication Parisienne. . . La situation faite aux simples ouvriers est encore un des vices de l'organisation Parisienne. . . Le principe de la limitation entrave de plus en plus, à Paris, cette élévation graduelle des ouvriers d'élite, &c." (p. 69.) The purport of M. Le Play's Report is that, as a consequence of the restrictive system, bread of equal qualities is dearer in Paris than in London and Brussels.

834. M. Drouot's kneading machine (machine pétrisseuse) exhibited at the International Exhibition, is distinguished by a mode of making use of the heat of the oven to obtain steam-power of sufficient force to move a kneading apparatus fixed in a revolving trough. The invention has been adopted by four of the principal Paris bakers, of whom one is M. Courcier, Rue Saint-Maur, No. 97. M. Drouot, in setting forth the advantages of his machine, in his prospectus, describes the condition of the Paris journeymen and the state of the Paris bakehouses in terms very applicable to London. He says that "the journeymen bakers are condemned to an amount of labour beyond human endurance (this labour being also during the night), in an atmosphere all the more insupportable because almost all the ovens being under ground or behind shops, are deprived of the means of sufficient ventilation * * * To introduce, therefore, a machine of this kind is to ameliorate the lot of the journeymen, to establish regularity in the bakehouse, and that cleanliness

which is so urgently required in the process of bread-making; it is to raise the moral and intellectual character of the journeyman, who will henceforth perform his work more satisfactorily, when he is relieved from the exhaustion attending his present mode of work."