

SUMMER TIME COMMITTEE.

REPORT

OF THE

COMMITTEE

APPOINTED BY

THE SECRETARY OF STATE FOR THE HOME DEPARTMENT

to enquire into the social and economic results of the Summer Time Act, 1916, and to consider (i) whether it is advisable that Summer Time should be reintroduced in 1917 and in subsequent years, and if so (ii) whether any modifications in the arrangements are required, and (iii) between what dates Summer Time should be made operative.

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



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WARRANTS OF APPOINTMENT.

I HEREBY APPOINT :

The Right Hon. J. W. WILSON, M.P. (Chairman),
Mr. MALCOLM DELEIVINGNE, C.B.,
Mr. CHARLES DUNCAN, M.P.,
The Right Hon. LAURENCE HARDY, M.P.,
Sir JOHN LONSDALE, Bart., M.P.,
Miss T. M. MORTON,
Sir WALTER NUGENT, Bart., M.P.,
Sir ANDREW PETTIGREW, and
Mrs. HERBERT SAMUEL

to be a Committee to enquire into the social and economic results of the Summer Time Act, 1916, and to consider (i) whether it is advisable that Summer Time should be reintroduced in 1917 and in subsequent years, and if so (ii) whether any modifications in the arrangements are required, and (iii) between what dates Summer Time should be made operative.

(Signed) HERBERT SAMUEL.

WHITEHALL,
29th September, 1916.

By subsequent Warrants, Mr. JOSEPH DAVIES was appointed to be an additional member of the Committee, and Captain BEVILLE STANIER, M.P., was appointed in place of The Right Hon. LAURENCE HARDY, M.P.

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REPORT

To the Rt. Hon. SIR GEORGE CAVE, M.P.,
Secretary of State for the Home Department.

SIR,

We were appointed by your predecessor on September 29th, 1916, as a Committee "to inquire into the social and economic results of the Summer Time Act, 1916, and to consider (1) whether it is advisable that Summer Time should be reintroduced in 1917 and in subsequent years, and, if so, (2) whether any modifications in the arrangements are required, and (3) between what dates Summer Time should be operative."

HISTORICAL ACCOUNT OF THE SCHEME.

1. The originator of the scheme of which the principle was incorporated in the Summer Time Act, 1916, was Mr. William Willett, F.R.A.S., who for many years devoted a great deal of his energies to advocating the adoption in this country of a system of Daylight Saving. His proposal was to advance normal time, *i.e.*, Greenwich Mean Time, by four steps each of 20 minutes on the first four Sundays in April, which would have extended the day by 80 minutes after the fourth Sunday until September, when by a counter-motion of 20 minutes each on four Sundays, clock time would again agree with Standard Time in Great Britain on the fourth Sunday in that month.

Mr. Willett's proposals were incorporated in a Bill which was introduced into the House of Commons by Mr. Robert Pearce on the 4th February, 1908, and read a second time on the 26th March, when it was referred to a Select Committee. This Committee agreed on the 30th June to a special report which found that the object of the scheme, *viz.*, that "of promoting the earlier and more extended use and enjoyment of daylight," during the months from April to September, "is desirable and would benefit the community if it can be generally attained, and that the weight of the evidence submitted to the Committee agrees with and supports this view, though there was divergence of opinion as to the best mode of accomplishing it." The Committee also found that a single alteration of one hour in April and a similar alteration of one hour in September would be the best mode of attaining the object of the Bill, and recommended that "these changes should take place at two o'clock in the morning, Greenwich mean time, in the case of Great Britain, and Dublin mean time in the case of Ireland, on the third Sunday in April," and at two o'clock in the morning on the third Sunday in September in each year.

The Bill was amended accordingly, but no further steps were taken in that session.

2. In 1909 a new Bill was presented by Mr. T. W. Dobson, incorporating the amendments made in the Bill of the previous year. This Bill was read a second time on the 5th March with a majority of 36, and was again referred to a Select Committee. This Committee reported that "having regard to the great diversity of opinion existing upon the proposals of the Bill and to the grave doubts which have been expressed as to whether the objects of the measure can be attained by legislation without giving rise, in cases involving important interests, to serious inconvenience, your Committee recommend that the Bill be not further proceeded with." They recorded, however, "their appreciation of the efforts of those connected with the movement, and particularly those of Mr. W. Willett, since, owing to these efforts, the hours of beginning and leaving off work have already been advanced in many cases."

3. Daylight Saving Bills were introduced in the House of Commons in the Sessions of 1911, 1912-1913, 1913, and 1914, but in no instance were they advanced beyond a first reading.

4. In the spring of 1916, the subject was again revived, and on the 8th May, 1916, Sir Henry Norman moved in the House of Commons: "That, in view especially of the economy in fuel and its transport that would be effected by shortening the hours of artificial lighting, this House would welcome a measure for the advancement of clock time by one hour during the summer months of this year." This motion was carried by 170 votes to 2.

The "Summer Time Bill" was accordingly introduced by the Home Secretary, Mr. Herbert Samuel, on the 9th May, read a second time on the 10th May, and became law on the 17th May. The provisions of the Act were put into force on the night of Saturday to Sunday, the 21st May, and the reversion to normal time took place on the night of Saturday to Sunday, the 30th September.

5. It was expressly stated by Mr. Herbert Samuel and, we believe, generally understood in the country that the immediate object of the Act was to effect an economy in the consumption of coal, oil and other fuel used in the production of artificial light. Following, however, the instructions in our terms of reference, we have not confined our investigations to the question whether this particular purpose was achieved; in fact, the major part of our enquiry has been concerned with the more general question whether one season's experience of the Act has in general confirmed the anticipations of its supporters as to its beneficial effects, or the apprehensions of its opponents as to the difficulties and disadvantages likely to arise from its operation.

METHODS OF INQUIRY.

6. We decided at the outset that a much more general reference to the interests affected by the Act would be necessary than could be secured merely by hearing oral evidence from witnesses representing such interests. We, therefore, in the first instance addressed, or arranged for the distribution of, a series of questionnaires (of which we print a specimen in Appendix II.) to a very large number of authorities, organisations and individuals, and by this means obtained the general views of every section of the community in regard to the effects of Summer Time. The following is a brief account of the distribution of these questionnaires.

7. Among the most important and most convenient sources of information as to the effects of the Act on the life and habits of the people generally as well as on particular classes of the community, were the public authorities, *i.e.*, County, Borough, Urban and Rural District Councils, Local Education Authorities, and the Police.

The County Councils' Association kindly undertook to circulate our questionnaire to all County Councils in England and Wales; the Municipal Corporations' Association to County Boroughs and a selection of smaller boroughs; and the Urban and Rural District Councils' Association to a selection of Urban and Rural District Councils respectively. The Scottish Office and the Irish Government arranged for a similar distribution to Scottish and Irish Local Authorities.

The Board of Education circularized on our behalf those Education Authorities in England and Wales who are authorities for both Higher and Elementary Education, and the Scottish Education Department circularized a selection of Education Authorities in Scotland. In Ireland the question was referred by the Irish Government to the Office of National Education.

As regard Police Authorities, the Home Office circularized the Chief Constables of County Boroughs, and of a selection of Counties with a large urban population, in England and Wales, while the Scottish Office and the Irish Government arranged for the distribution of enquiries to the Scottish and Irish Police.

8. In order to ascertain the effects of the Act on Labour and the life of the working classes we sent out questionnaires to 14 of the principal Trade Unions, to the Women's Trade Union League, the Women's Co-operative Guild and the Mother's Union, and we included a question on the subject in the circulars addressed to commercial, industrial, and agricultural interests (see below). The Warden of Toynbee Hall also circularized the heads of a number of representative social settlements on our behalf. The Irish Government circulated enquiries to a number of Trade Unions in Ireland.

9. To obtain information as to the effects of the operation of the Act on Industry and Commerce, we sent out questionnaires to 18 representative Manufacturers' Associations, and (through the Home Office Inspectors of Factories) to about 140 individual manufacturing firms; to 10 leading business and commercial associations and to the Bankers' Clearing House, Stock Exchange, Corn Exchange, Lloyds', and the Baltic; to 14 associations of employers in the distributing trades, and to 25 of the largest co-operative societies.

10. We felt that it was an important part of our task to ascertain whether the principal object for which the measure was introduced in the first instance, *viz.*, economy in the consumption of coal and other fuel, had been achieved, and if so, to ascertain, if possible, the extent of this economy, and also of the saving by the public in their expenditure on artificial light. In our circulars to industrial and commercial associations, individual manufacturers, and co-operative societies, we included a question as to reduction in consumption of artificial light; but it was obvious that, so far as gas and electric lighting were concerned, the only bodies who were likely to be in a position to furnish us with the materials for a general estimate were the gas and electric light undertakings. After consulting the Board of Trade, we were able to arrange for the distribution of carefully worded enquiries on these points to a considerable number of such undertakings in all parts of the country. The Institution of Gas Engineers were good enough to undertake the distribution to gas undertakings. For the circularization of electric light undertakings we were indebted to Mr. Faraday Proctor and Mr. C. McArthur.

Butler, of the Incorporated Municipal Electrical Association, Mr. F. E. Gripper, Manager of Edmundson's Electricity Corporation, Ltd., Mr. F. J. Walker, Secretary of the St. James' and Pall Mall Electric Light Co., Ltd., and Mr. A. de Turckheim, Secretary of the Incorporated Association of Electric Power Companies.

The Secretary of the Committee for the Regulation of Petroleum Supplies was good enough to supply us with a statement as to the effect of Summer Time on the consumption of illuminating oils.

11. In view of the fact that, throughout all the discussions on the Daylight Saving Scheme, considerable apprehension had been expressed as to its probable effects on agriculture, we aimed at obtaining the views of representative farmers and agriculturists from all parts of the country with regard to their experience of the actual results of the Act during the first year of its operation. In conference with the Board of Agriculture, we drafted a suitable questionnaire which was circulated by the Board among all the Agricultural War Committees in England and Wales, with a request that the questions should be submitted in the case of each Committee to five or six representative members, and that a summary of their views should be sent to us. The Scottish Office arranged for a similar distribution of questionnaires in Scotland. In Ireland circulars were issued to the County Committees of Agriculture and Technical Instruction.

12. We also addressed special inquiries to certain other organisations and Government Departments which appeared to us to be specially interested, including the Admiralty, Post Office, Astronomer Royal, Meteorological Office, Railway Executive Committee, British College of Physicians, and the Royal Geographical Society.

13. As a number of European countries and some of our colonies had last year adopted some form of Daylight Saving, the Home Office addressed on our behalf a request to the Foreign Office and the Colonial Office that we should be informed of the experience of those countries from which information could be obtained through the usual official channels.

The War Trade Intelligence Department also furnished us with a very considerable quantity of valuable press matter as to the working of Daylight Saving Schemes on the continent (including Germany and Austria).

14. In addition to the information obtained from the replies to the questionnaires, we invited a number of witnesses representing the most important interests concerned to give oral evidence before the Committee, and we held five meetings for this special purpose. At these meetings we received evidence from directors and managers of large individual business concerns, from Employers' Associations, from the Early Closing Association, from a number of Trade Union officials, from the Women's Industrial Council and the Mothers' Union, from representatives of Education and of Agriculture, of Electricity and Gas Undertakings, of the Stock Exchange, and from a number of witnesses specially representing Irish interests.

A list of the witnesses appears in Appendix I.

GENERAL SUMMARY OF THE EVIDENCE.

15. We proceed to summarize the main points raised in the very considerable body of evidence furnished to us from England, Wales, and Scotland.*

As the evidence from Irish interests is somewhat conflicting, and raises moreover certain special issues, we have thought it best in our Report to deal with the case of Ireland separately (*see* paragraphs 90 to 98 below).

Public Health.

16. As Summer Time was only in operation for a few months, and in view of the abnormal conditions prevailing, no very definite evidence could be expected as to the effects of the Act on the health of the people.

It is, however, almost universally stated that, so far as the conditions permitted, the extra hour of daylight was generally used for the purpose of outdoor recreation and pursuits, and in particular for the cultivation of gardens and allotments.

17. It is hardly necessary to attempt to quote in detail all the evidence which we have received on this subject, but the following extracts from a report submitted by Mr. Edward Cadbury from Bournville, though the conditions there cannot be regarded as quite representative of industrial districts generally, will serve to illustrate the general tendency.

* Close on 1,300 replies to the questionnaires were actually received by the Committee—over 76% of the number of letters sent out. These figures are, of course, exclusive of a very large number of replies received by various organisations to circulars addressed by them to their members.

"The Athletic Club reports that the extra hour of light was a great boon to our members, and cricketers, bowlers, and tennis players took full advantage of it. . . ."

"In normal times, when the factory will be working normal hours, the Athletic Club anticipate that the figures will show much greater advantage still being taken of the extra daylight."

"The Open Air Swimming Bath has been made much greater use of than previously in the evening"

"In the Gardening Classes for boys and girls the extension of daylight was a great advantage and enabled the Committee to continue the two-hour meetings of these classes a month longer than in previous years."

18. All our information points in the same direction; and the general medical opinion communicated to us is that the extra hour in the open air must have proved beneficial to the health of those who enjoyed it, although at the moment no particular facts and figures could be adduced in support of the statement. This is the view taken by Dr. Frederick Taylor, President of the Royal College of Physicians, who made inquiries on the subject from a number of the Fellows of the College. Although most of them replied that they had no positive evidence, they nearly all agreed in the impression that the change was beneficial, and Dr. Taylor himself remarks: "The additional hour of sunlight or daylight, in the case of those to whom this is granted by the alteration of the clock time, must tend to improve their health, from the well-known physiological effects of light upon the biological processes in both animals and plants."

19. We have devoted particular attention to the question of the effects of Summer Time on the health of children and we have been glad to find that, in spite of certain statements which had been made to the contrary, the bulk of the evidence (mostly derived from Education Authorities) favours the conclusion that in the case of children also Summer Time has proved a success. We deal more fully with the question in paragraphs 32 to 36 below.

Public Morals and Order.

20. The police authorities have necessarily been our main sources of information in regard to the effects of the Act on Public Morals and Order, and we have found among them a general consensus of opinion that the operation of the Act resulted in a definite improvement. During the Summer Time period there were other and perhaps more important forces at work in this respect, but it is generally agreed that the Summer Time Act did contribute to the improvement which has been observed in public order. Police work is always easier during the hours of daylight than at night, and the closing of the public houses before dark during several weeks materially assisted the greatly reduced police forces in the execution of their duty. The tendency throughout the country to spend the extra hour of daylight in the evenings out of doors is said of itself to have made for an improvement in the general moral tone. In particular, a marked decrease was noticed in some districts in juvenile offences, which is attributed by the police to the fact that during the Summer Time period boys were expected to be home in daylight.

21. In our circular to police authorities we also included an inquiry as to the effects of the Act on street accidents. The replies were somewhat conflicting, and a few authorities reported a slight increase in the number of accidents which, however, it is admitted is probably attributable to other abnormal influences, viz., (i) The increase in the proportion of inexperienced drivers in charge of vehicles, and (ii) The fact that more people were out on the streets during the summer evenings in 1916 than in previous years. On the whole, however, the evidence points to a definite, though slight, decrease in most places, which is the more remarkable in view of the abnormal conditions mentioned above.

Workers' Interests.

22. Enquiries have been made from a large number of different sources as to the effects of Summer Time on Labour and the life of the working classes (*see* paragraph (8) above).

So far as the Trade Unions were concerned, we were not able to obtain quite as much detailed information as we could have wished. However, out of the fourteen Trade Unions to whom we addressed our circular, we had a definite expression of opinion from nine, the general verdict being favourable in each case, though one or two of the Secretaries remarked that they had not been able to make detailed or extensive inquiry amongst their members.

Special points were raised by the representatives of the Operative Cotton Weavers' and Shop Assistants' Unions. With these we deal at length in paragraphs 60 to 66 below.

23. The evidence from the associations representing the interests of working women was also favourable. The Women's Co-operative Guild remarked on the tendency on the part of workers and their families to stay up late in the evenings, and on the difficulty experienced by many mothers in getting their children to bed; but they did not consider that this outweighed the advantages derived from the Act in other directions.

24. The replies which we received from the Wardens of Social Settlements were all very favourable and seemed to show that Summer Time was widely appreciated by working-class families, though many of the replies recorded the same tendency to stay up late in the evenings which was alluded to by the Women's Co-operative Guild.

An interesting indication of the change in feeling which has taken place amongst those who at first were doubtful about Summer Time is given by the Warden of the Robert Browning Settlement at Walworth, who says that their "Women's Meeting, more than a hundred in number, representing all grades of motherhood in Walworth, who were very dubious at the beginning of the administration of the Act, at the close of the season decided with practical unanimity in its favour and in the hope that it would be renewed." The Warden adds that "in the height of the summer it was as though a Saturday afternoon holiday had been added to each day."

25. The general view of employers, as expressed in the replies to the questionnaires, was that their employees had taken full advantage of the extra hour's daylight; and while the majority were not in a position, with so short a period for observation, to state positively whether or not an improvement in health had resulted, a number had noticed increased vitality in their workers, and in some cases an improvement in the standard of the work. Only one or two employers recorded the appearance of any ill effects in the shape of tiredness and irregular time-keeping.

We have already cited some interesting statistics supplied to us by Mr. Edward Cadbury; and we may also quote the opinion of Mr. J. E. Hutton, Manager of the Labour Department of Messrs. Vickers, Ltd., who considered the Summer Time Act to be "one of the greatest boons conferred on the industrial classes of the greater towns and cities by recent legislation."

26. We have had evidence from all sources of the value of the extra daylight to the very large numbers of workers who cultivate gardens and allotments.

27. We have received some letters from individual workers and from persons writing on their behalf, stating that Summer Time involves hardship on those who have to get up very early in the mornings, not only on account of the difficulty in getting to bed in time (to which we have alluded above), but also on the ground of the alleged reduction in the vitality of the human body in the early morning hours, and the general inconvenience of an extra dark hour at the beginning of the workers' day.

It is to be remarked, however, that we did not receive any complaints on this score from any of the Trade Unions who replied to our circulars, or who gave evidence before us; which shows, we think, that no strong feeling on the subject exists among their members. We have heard that the extra darkness in the early morning has been objected to in certain districts by miners, but to what extent we have not been able to ascertain, as the Miners' Federation, who sent out a circular on the subject of Summer Time to all their branches, informed us that they had not received a sufficient volume of replies to indicate the general feeling of their members.

28. We were not disposed to attach any very great weight to the allegation as to lowness of vitality in the earlier hours, but we felt it would be of value, in view of the very vague ideas on the subject which are current, to obtain a definite pronouncement on the matter from an authoritative source. By a fortunate coincidence the Health of Munition Workers Committee, among the members of which are included certain very eminent medical authorities, have recently been making close researches into the subject in view of its bearing on the question of the efficiency of night work. The Committee have been good enough to furnish us with a statement from which we quote the following:—

"The results of recent scientific investigation on this question may be shortly summarised as follows:—

"The temperature of the human body is not constant, but is known to exhibit a distinct cycle during the 24 hours. A modification in the hours of work and rest leads to a corresponding modification in the hours of highest and lowest temperature. Thus a party of Arctic explorers found that a complete reversal of their hours was followed within a few days by a similar reversal of their temperature curves.

“‘ It follows that the establishment of “Summer Time” should not increase the difficulties experienced by abnormally early risers except in so far as their friends and neighbours may tend to postpone their hour of going to bed and to curtail their rest period. The Committee have no reason to suppose that the large numbers of men and women workers who frequently rise before 5 a.m. in order to commence work at 6 a.m. were adversely affected last summer.’ ”

29. The above opinion seems to confirm what had been our own strong impression, viz., that nearly the whole trouble of those who found it irksome to get up in the early mornings during any part of the Summer Time period, or who complained of feeling tired during the day, was their failure (and the failure of their neighbours) to retire to bed at the same hour by the clock as at other times of the year. This is, we feel confident, a circumstance which will right itself with experience; and provided a sufficient night's rest is obtained we do not believe that, in a reasonably limited summer time period, the inconvenience of extra darkness in the mornings will weigh very heavily, particularly in view of the advantage gained at the other end of the day.

30. We fully recognise, however, that the very early risers would have reason to complain if Summer Time were made to begin as early or end as late as some would wish to have it, and in deciding upon our recommendations we have borne their interests carefully in mind.

31. Taking the whole of our evidence, we are satisfied that the great bulk of the working classes are favourable to Summer Time, and we are convinced that they stand to profit by it as much as, and in many cases more than, any other section of the community. Such real inconveniences as have been experienced will, we believe, be remedied with a little more experience of Summer Time conditions.

It has, moreover, been frequently pointed out to us that the great pressure of work under war conditions has prevented many workers from taking much advantage of the extra daylight, which they will be able to enjoy more fully when normal times return.

Children's Sleep.

32. A serious allegation made against the Summer Time Act was that it had led to a curtailment of the sleeping hours of children, who were allowed by their parents to stay out of doors in the evenings beyond their proper bed time.

We recognised that this point was one which demanded particularly close enquiry, and we have carefully examined the replies to the question on the subject which was asked in the circular sent out to Education Authorities. In addition, we discussed the matter personally with some representative school teachers and medical officers.

33. We are glad to be able to report, as a result of all the evidence which we have received, that while in a certain number of districts a tendency to shortened sleeping hours has been noticed, the fears which were entertained in the matter have not in the main been justified.

Of the English and Welsh Education Authorities who replied to the circulars about 46 per cent., and of the Scottish School Boards about 80 per cent., appear to have had no evidence of curtailment of sleep. Of the rest, who report a tendency to curtailment, the majority state that only a limited number of children were affected, or that the tendency was confined to the first few weeks of Summer Time, before people were fully accustomed to the change.

34. The tendency, where it was noticed, manifested itself as a rule by tiredness and lassitude or by restlessness in the morning hours, and seems to have been most apparent, as was to be expected, in the case of small children from the poorer districts, where home conditions are lax.

Only a very few authorities appear to consider that the evil was so pronounced as to outweigh the other advantages which children derived from the Act. The opinion of the very large majority, and the enthusiastic opinion of a great number, is that the children benefited by the operation of Summer Time, both by reason of the extra time which they were able to spend in the open air, and also because of the cool hour gained in the morning in the place of a trying hour in school in the heat of the afternoon. Many authorities reported that children had been brighter and fresher in the mornings in consequence.

This view was confirmed by the medical opinion which we received, and it was unanimously supported by the witnesses who gave evidence before us.

35. Our attention has, moreover, been drawn to the fact that even in normal times there is a tendency amongst children of the poorer classes to lose sleep at the height of summer by staying out too late, and we were informed by Dr. C. J. Thomas (Principal Assistant Medical Officer of the London County Council) that reports concerning fatigue and sleepiness of infants in school had been more numerous in some previous years than in 1916. Dr. Thomas also pointed out that the advent of Summer Time was accompanied by warnings in this connection, and that closer attention had perhaps been paid to the matter than was usual.

36. While, however, we are glad to be able to report thus favourably on the whole in regard to this very important aspect of our enquiry, the fact remains that in certain districts children did lose sleep, and we are strongly of opinion that all possible steps should be taken by Education Authorities through the School Medical Services and the Care Committees to ensure that the tendency shall be kept within the narrowest possible limits in the future, if Summer Time is renewed. It is no doubt a difficult matter in many cases to persuade children to go to bed during daylight (though this is not a problem peculiar to "Summer Time"); nevertheless, many of the authorities comment severely in their replies on the carelessness shown by parents in regard to their children's sleeping hours.

Accordingly, we recommend that the attention of parents should be drawn by every Education Authority to the danger, and that it should be a standing instruction to teachers to report all cases showing symptoms of loss of sleep to the Care Committees, who can then take the matter up with the parents either by visit or letter. Effective action of this kind was taken by certain authorities in 1916, and others announced their intention of taking such steps in the future. We commend the matter to the careful consideration of the Departments concerned.

Trade, Industry (other than Agriculture) and Commerce.*

37. The replies received to the very comprehensive inquiries which we have described in paragraph 9 above show beyond all question that the opinion of employers in every trade, industry, and business throughout the country, is overwhelmingly in favour of Summer Time. We summarise the evidence on points of detail, such as the effect on the health of workers, saving in artificial light, &c., under the appropriate headings elsewhere in our Report.

The only industry which had any complaint to put before us was the Cotton Trade, in which some inconvenience arose out of the necessity for lighting up the factories in the early mornings in the second half of September. We discuss this question in paragraphs 65 and 66 below.

Economies in Artificial Light and Fuel.

38. As mentioned in paragraph 9 above, we made extensive inquiries among gas and electric light undertakings as to the economies effected during the Summer Time period in artificial light and fuel; and we also included a question on the subject in our circulars to industrial and commercial associations, individual employers, and co-operative societies.

39. In our questions to gas and electric light concerns, we asked for estimates (a) of the percentage of reduction in the consumption of light during the Summer Time period, (b) of the consequent saving in the consumption of coal or other fuel, and (c) of the actual saving in expenditure by consumers on artificial light, due in each case to the operation of the Summer Time Act alone, allowance being made so far as possible for other influences.

40. We realised from the beginning that the very exceptional conditions prevailing during the Summer Time period last year would in all probability make it difficult to arrive at any very definite estimates on these points. Unfortunately, our apprehensions in this respect have been confirmed, and although we have been furnished with a large mass of information, we feel that for the purpose of arriving at any definite figures for the country as a whole it is somewhat unsatisfactory.

There were during the period so many other forces at work, often of a very conflicting nature, influencing the consumption of light and fuel, that the figures supplied to us were, for the most part, and could only be, rough estimates. The lighting restrictions, the earlier closing of public-houses and (in many districts) of shops, the increases in the charges for electricity (made in many cases before Summer Time came into operation) all tended to reduce consumption during the period. On the other hand, the great increase in overtime and night work in many industrial districts, and the multiplication of factories and offices, tended to *increase* the consumption of light. In the case of the gas undertakings there were further complications, to which

* See paragraphs 53 to 59 below.

we allude later. It was, therefore, almost impossible to arrive at the results of one factor only out of so many, and, owing to the lack of uniformity in the methods of allowing for the other operating influences, any general estimate based on the figures furnished to us can at the best be only conjectural.

41. As an illustration of the complexity of the problem, we may cite some interesting figures supplied to us by the Chief Engineer of the Manchester Corporation Electricity Works. For the three months ending September 30th, 1916 (during which Summer Time was in operation), the lighting units sold by the works showed an *increase* of 7 per cent., but a more detailed analysis of the figures for certain typical areas showed the following results :—

In four residential districts, there had been a marked decrease (about 15 per cent.) as compared with the corresponding period in 1915 :—

	1915	1916
	Units.	Units.
No. 1	5,186	3,931
No. 2	28,524	26,080
No. 3	36,080	32,059
No. 4	25,973	18,821

Three industrial and shopping districts showed, on the other hand, a marked increase (about 8 per cent.) which the Chief Engineer attributed to war work and the revival of retail trading :—

	1915	1916
	Units.	Units.
No. 1	70,694	74,769
No. 2	61,252	63,009
No. 3	180,180	199,021

This case is by no means exceptional—either among electricity or gas concerns.

42. Nevertheless, though it has proved so difficult to arrive at any accurate estimate of the economies effected in light and fuel, it is perfectly clear that the substitution of an hour's daylight in the evening during many weeks of the year for an hour's artificial light must have resulted in a considerable net saving; and this is certainly borne out by the information furnished to us.

43. *Electric Light.*—Replies were received from over 80 municipal electric light undertakings, from between 50 and 60 private companies and from 11 electric power companies. The estimates of the reduction in the consumption of electric light vary very widely, from 1·25 per cent. in one case to 55 per cent. in another.

The returns from the power companies give a mean reduction of 20 per cent. for lighting purposes, 38 private companies furnished figures which give an estimate of reduction varying from 10 to 41 per cent., the mean for the 38 being 23 per cent., and 64 municipal undertakings give a mean reduction of 18·3 per cent. in units used for lighting.

44. It would appear from the returns to our questionnaires that the estimates of the saving in coal and the reduction in expenditure on artificial light are largely calculated on the basis of the estimate of the reduction in the consumption of units, and are therefore subject to exactly the same criticisms as that figure. Further, so far as the saving in coal is concerned, it is pointed out in many cases that the falling off in the quality of the coal supplied last year as compared with previous years increased the difficulty of arriving at an accurate figure. Our returns, however, show clearly that the saving in coal throughout the country must have been considerable. One point should be made clear in this connection, viz., that although in some few cases there may be a reduction in the consumption of coal more or less proportionate to the reduction in the consumption of artificial light, in other cases (*e.g.*, in the case of companies which supply a considerable amount of electricity for power purposes) the saving in coal may be trifling. As the plant has to be kept in readiness to supply the maximum demand, and the consumption of coal for "standby" is an important factor in the total consumption, particularly in summer time, when although boiler and electric pressure have to be maintained throughout the 24 hours, the actual lighting hours are very few.

45. The following interesting calculation as to the three main sections of our inquiries was placed before us by Mr. Faraday Proctor, the Hon. Secretary of the Incorporated Municipal Electrical Association. In his calculation Mr. Proctor assumed as his basis that the Summer Time period would extend from the beginning of April to the end of September. The following are his words :—

"The lighting consumption in the six winter months may be taken on the average as being twice that of the six summer months. If, therefore, the diminution in con-

sumption is taken at from 5 per cent. to 25 per cent. for the summer months, this corresponds to a diminution of from 1·7 to 8·3 per cent. of the lighting consumption for the whole year.

"I have extracted data from the copies of the Annual Accounts of all those municipalities who show the output from lighting as distinct from the output for power and other purposes, and the same indicates that the total number of units sold is 4·37 times the number sold for lighting only, that is to say, the lighting units are 22·883 per cent. of the total units output.

"The figures I have extracted relate to undertakings representing about 25 per cent. of the total output by municipalities or about 17½ per cent. of the total output *by municipalities plus companies* as returned in Garcke's Manual, and may, I think, therefore be taken as representing a reasonable average, and if these figures are accepted, then the diminution in the consumption due to the Summer Time Act would represent from 39 per cent. to 1·9 per cent. of the total units sold per annum for all purposes throughout the Kingdom.

"The total units sold for all purposes by municipalities and companies is about 2,000 millions per annum.

"At 3½ lbs. of coal per unit sold this would represent a consumption of 3,125,000 tons of coal per annum.

*"At 4½ lbs. of coal per unit sold this would represent a consumption of 4,017,000 tons of coal per annum.

"At 5½ lbs. of coal per unit sold this would represent a consumption of 4,910,000 tons of coal per annum.

"Owing to the standing charges, a diminution of the units sold does not result in a corresponding diminution in the coal bill. I estimate in my own undertaking, which may perhaps be taken as an average, that the diminution in the output would result in a saving of only 66 per cent. of a corresponding diminution in the coal bill. Therefore, if the total units sold are reduced by from 39 per cent. to 1·9 per cent., the coal bill would be reduced by, say, 66 per cent. of this, viz., by from 2574 per cent. to 1·254 per cent., and on the table of coal consumptions above given the resultant saving in coal throughout the Kingdom, in respect of the supplies afforded by municipalities and companies, would be as shown in the following table :—

"TOTAL ANNUAL COAL CONSUMPTION, AND SAVING IN SAME DUE TO SUMMER TIME ACT ON
LOW, MEAN, AND HIGH ESTIMATES :

Estimate.	Low			High	
	Reduction in Lighting Units :—			5 %	25 % (Summer Period only.)
	Total Coal for Light and Power ...			Saving 2574 %	Saving 1·254 %
Low	3,125,000 tons			8,043 tons	39,187 tons
Mean	4,017,000 "			10,340 "	50,370 "
High	4,910,000 "			12,640 "	61,570 "
					Per annum.

"With such widely divergent views as to the percentage reduction in the consumption of electricity for lighting, it is difficult, and perhaps presumptuous, for me to suggest what percentage figure should be accepted, but I should say that one should not look to the saving in coal exceeding from 10,000 to 20,000 tons per annum as directly attributable to the variation of one hour per day summer time for a period of six summer months.

"If the lighting units are as mentioned above, 22·883 per cent. of the total units, the total lighting units per annum would approximate 457,660,000.

"A reduction of 1·7 per cent. in the lighting units will amount to 7,780,000 units per annum.

"A reduction of 8·3 per cent. in the lighting units will amount to 37,980,000 units per annum.

"The average revenue from lighting is about 2·7d. per unit, and therefore the loss in gross revenue to electrical undertakers and the saving in expenditure by consumers would approximate in the case of the lower estimate to £87,520, and in the case of the higher estimate to £427,290."

* Mr. Proctor considered this to be the most reasonable figure to take as an average. The figure varied—in Bristol it was 4½ lbs., in Manchester, 3½ lbs., but in other places it would be considerably higher.

46. We also addressed a question to electric light concerns as to whether the charge for light had been increased during the Summer Time period, and we found that such had been the case with a very considerable proportion of the undertakings. This was so with about 30 per cent. of the municipalities, and nearly 50 per cent. of the private companies, who replied to the circulars. In many cases, however, it was pointed out that the increase had been decided upon before the Summer Time Act came into operation and was due to other causes, such as the increase in the price of coal and the cost of labour and stores; while in the other cases almost without exception it is stated that the increase last year was only partly due to the Act. It is frequently pointed out that an increase in charges will probably be necessary in future years if Summer Time is renewed, more particularly in the case of the smaller concerns where lighting forms the most important part of the business.

47. *Gas.*—Replies were received from 85 gas undertakings, the majority of whom gave figures, though many emphasised the difficulty of arriving at even approximate estimates of the kind required. In addition to the influence of the lighting restrictions and of the other factors which we have mentioned in paragraph 40 above, there was, in the case of the gas undertakings, the further complication of a very large increase since the summer of 1915 in the quantity of gas supplied (i) to private houses, for heating and cooking purposes in the place of coal, and (ii) in industrial districts, to munition and other factories for power; resulting, in the case of a considerable number of undertakings, in a substantial increase in the total output of gas over the Summer Time period as compared with 1915. It appears that the nature of the records kept by the majority of the undertakings did not permit of their being readily sifted for the purpose of arriving at the estimate we asked for, particularly with the limited time and staff at the disposal of the management.

48. Accordingly, as in the case of the estimates from the electricity concerns, there was a considerable diversity in the methods of calculation employed. In many instances it was not indicated what had been the basis of reckoning.

The estimates of the percentage of reduction in consumption of gas for lighting purposes varied from 2 per cent. to 26 per cent. The mean—not a very valuable figure in the circumstances—works out at about 9 per cent.

49. Mr. Hanbury Thomas, of the Sheffield United Gas Company, has suggested that a general estimate for the whole country can be arrived at from the figures of actual saving in coal given in the replies from those undertakings who use coal and no other fuel, on the following plan:—The amount of coal stated by such undertakings (twenty-eight in number) to have been saved as a direct result of Summer Time works out in the aggregate at 1·449 per cent. of the total annual quantity carbonised by them. The total quantity of coal used by all gas undertakings in the United Kingdom in 1915 was, in round figures, 18,000,000 tons. Reckoning 1·449 per cent. of these figures, therefore, the saving in coal effected by gas undertakings in the United Kingdom as a result of the 4½ months of Summer Time may be put at about 260,000 tons.

Further, applying the same percentage to the total annual sum spent by consumers on gas (reckoned on the total annual sales of gas undertakings,* at 3s. per 1,000 cubic feet) the saving in expenditure to consumers works out at about £475,000.

These estimates cannot, of course, be regarded as anything but conjectural; but they represent the best that can be done with the figures, and are not perhaps very far wide of the mark.

50. It is obvious that there must also have been a very considerable saving in the quantity of oil used by those Gas undertakings which manufacture water-gas, but unfortunately we have not sufficient data to make it possible to form an estimate.

51. *Evidence of Employers.*—The great majority of the replies which we have received from individual employers, from business and commercial associations, and from co-operative societies, agree in the view that, except in the case of factories which were running continuously day and night, there had been a substantial saving in the consumption of artificial light.

The Secretary of the Drapers' Chamber of Trade sent out a special letter on the subject to some two hundred members of the Chamber in London and in the provinces, and 50 per cent. of the replies furnished figures giving an average estimated saving of 22 per cent. Similar estimates furnished to the National Chamber of Trade, in reply to a circular sent out by them to their affiliated associations and individual employers in the distributing trades, gave an average of well over 30 per cent. Estimates received from thirteen Chambers of Commerce, however, averaged under 16 per cent.

* According to the Board of Trade returns for 1913, plus 6%, which Mr. Hanbury Thomas thinks might be added to represent the increased consumption since that year.

52. *Illuminating Oils.*—As we have already mentioned, Mr. E. Houghton Fry, the Secretary of the Committee for the Regulation of Petroleum Supplies, was good enough to supply us with a report as to the effects of Summer Time on the consumption of illuminating oils in this country. Mr. Fry estimates that the economy effected by the Summer Time Act in the consumption of these oils amounts to about $2\frac{1}{4}$ per cent. of the consumption for the year, *i.e.*, approximately 11,500 tons. Mr. Fry adds—“This seems a very modest proportion, but it should be remembered that 11,500 tons represents two journeys by an oil-tanker, which would occupy approximately four months, and this saving, therefore, can by no means be regarded as negligible. In fact, owing to the shortage that is at present being experienced in these vessels, the result is a very welcome one.”

Agriculture.

53. As might have been expected, the opinions of farmers and those interested in agriculture have been more conflicting than those of any other interest, in many cases totally diverse opinions as to the effects of Summer Time having come from the same district.

54. The difficulty most widely recorded occurred in connection with harvest operations, owing to the fact that ordinary harvest work could not be done until the heavy morning dews had lifted. This difficulty was naturally accentuated in the north, where harvests are later, and was more marked in the corn than in the hay harvest. In the majority of cases in which the difficulty was experienced it is admitted that it was satisfactorily met by making arrangements with the farm workers to adhere to “sun time” at least during harvest. The inconvenience seems to have been greater on farms which combined dairying with corn growing, &c., as workers had in those cases to come according to Summer Time in order to get the milking done for the delivery trains, and then had an interval before harvesting could be commenced. Many farmers report that under these circumstances they had to pay overtime for the extra hour in the evening. Others point out, however, that advantage had been taken of this intermediate period between milking and harvesting to do other work which often has to be neglected during harvest.

We find that the general opinion is that difficulties were easily overcome by organisation, and that the very definite advantage of having an extra evening hour for carrying crops outweighed any inconvenience. Many reports also mentioned the advantage at harvest time of the help of workers employed in other occupations whose longer evenings made it possible for them to give assistance on the farms. This, of course, occurred chiefly in districts near villages or towns.

55. In some cases trouble was experienced with milkers, who were, it is said, unwilling to commence work in the very early mornings, and it is also stated in a few instances that at the outset the quality and quantity of the milk was affected by the earlier milking. These difficulties are only mentioned in a few of the replies, and the majority even of these few add that they were only temporary.

56. In the gathering and transit of fruit and vegetables, the operation of the Act is generally reported to have been very beneficial, as in almost all cases these are better gathered with the dew on and transported during the cool of the day.

57. In the opinion of the large majority of employers, the Act has been a genuine advantage to the agricultural labourer in that he has had an extra evening hour to work in his own garden or, in other cases, has frequently earned overtime wages for evening work, which, at a time when labour was scarce, was of very special value on farms. Some reports hold that the Act made the labourers' day in effect an hour longer, particularly during the longest days, and that he was overtired and consequently of less value to his employer; but the general mass of evidence received by us seems to controvert this view. Some difficulty was experienced, at first, in regard to carters, who have to get up in the morning considerably earlier than other workers, but in most cases this soon disappeared.

58. It seems clear that on many farms and in some entire districts (so far as the agricultural community was concerned) the Act was not observed at all—the farmers and others refusing to alter their clocks. The complete ignoring of the provisions of the Act by one section of the population resulted in two different times being kept in the same neighbourhood—old time on farms, and Summer Time in schools, post offices, railway stations and similar places. This naturally caused confusion and friction, particularly in the home of the agricultural labourer, who had to work according to old time, while his children went to school by Summer Time, with the result that the meal hours of different members of the family did not coincide.

It may be that during certain periods of Summer Time, particularly during the harvest, some readjustment of the hours of work on farms will prove desirable, but if this only amounts to altering the working hours, *i.e.*, changing the hour of commencing work from, say, 6 a.m. to 7 a.m., it need not involve any serious interference with domestic and other arrangements. Our evidence goes to show that no confusion need arise, except where the clocks are left unaltered, and where a general policy of non-observance of the Act is adopted by a particular class or section of the people.

59. In spite of such difficulties as have been recorded, a very large majority of farmers and War Agricultural Committees are in favour of the renewal of the Act, and the majority even of those who are of opinion that it was not advantageous to agriculture consider that it should be renewed, as they recognise its great benefits to the community at large.

The opinions of farmers and agriculturists vary widely as to the dates for the beginning and the end of Summer Time, but the period most generally favoured by the agricultural community for the application of the scheme would seem to be from the middle of April to the middle of September.

Later Closing of Shops.

60. Suggestions were made during the Summer Time period that advantage was being taken of the extra hour's daylight by shopkeepers to keep their shops open an hour longer, and the matter was raised in the House of Commons and to some extent discussed in the Press. The allegation was a serious one, particularly in view of the fact that shop assistants are clearly among those who stand to gain most by Summer Time; and we accordingly included enquiries on the subject in the questionnaires addressed to local authorities and to associations connected with the distributing trades. A number of the latter made exhaustive enquiries on the subject amongst their members; in particular the National Chamber of Trade obtained the opinions of their affiliated organisations in all parts of the country. We also discussed the matter personally with the Secretaries of the Shop Assistants' Union, the Early Closing Association and the President and Secretary of the Drapers' Chamber of Trade.

61. The Secretary of the Shop Assistants' Union (Mr. John Turner) informed us that, while the Summer Time Act was in general regarded with satisfaction by his Union, there had been cases in which it had led to extension of hours of work amongst shop assistants, causing serious discontent and irritation. It was true that the tendency was most marked among the small retail shops, but it was just in this class of establishment that the most serious cases of over-work and long hours were found. Mr. Turner was of opinion that there had been an extension of hours in more than 5 per cent. of the shops in the United Kingdom. His Union felt that the evil was one which would tend to grow and they pressed strongly that there should be some statutory provision to meet the point.

62. Mr. Turner's statements were not, however, supported by the evidence which we received from the other sources. Out of 186 local authorities who replied to our questions, only eleven had noticed any tendency towards later closing. The associations of employers in the distributing trades were also almost unanimously of the opinion that there had been no extension of hours. The Secretary of the Early Closing Association (Mr. Albert Larking), who warmly supported the Summer Time Act, informed us that he had received no complaints of later closing; had it been adopted to any extent in the distributing trades, the fact would certainly have been brought to his notice.

63. The evidence from Ireland was very similar. The Drapers' Assistants' Benefit and Protective Association stated that shops had been closed later in certain districts, but the Grocers' Assistants' Association and the great mass of the local authorities had not had any evidence of it.

64. Taking the evidence as a whole, therefore, while undoubtedly there have been cases of later closing during the Summer Time period in a certain number of districts, chiefly among shops of the smallest class (and therefore not always involving the hours of an assistant), it is clear that the tendency has not been a marked one. There is no doubt that the great mass of opinion in the distributing trades and public opinion generally is against the practice, and, so far as concerns establishments which employ assistants, we cannot think that it is ever likely to spread beyond a very small and not over-reputable minority of shopkeepers. It may also be remarked that it is only possible in those districts or in the case of those classes of shops which are not covered by Closing Orders under the Shops Act.

We think, however, that a watch should be kept on the matter by the Home Office and the local authorities.

Early Morning Lighting in the Cotton Trade.

65. We have already mentioned that it was found generally necessary in the Cotton Trade to use artificial light in the early mornings during the second half of September. In the case of weaving sheds in Lancashire this has given rise to a peculiar difficulty. It was represented to us that in a warm September the use of artificial light in the sheds would raise the temperature to such a degree that the operatives would refuse to work in them. In 1916, September happened to be a cool month, but even then, it was stated, the difficulty had been experienced.

These points were put to us by the Cotton Spinners' and Manufacturers' Association, and confirmed by the Amalgamated Weavers' (Operatives) Association, both of whom gave evidence before us.

66. One obvious remedy was, of course, to start and finish work somewhat later during the fortnight or so in September when otherwise it would be necessary to use artificial light in the mornings. This expedient was tried in a number of cases, but was objected to by the operatives on account of the disorganisation which the altered mealtimes produced in their domestic and travelling arrangements. This does not appear to us to be an insuperable difficulty, and we should certainly not be justified in suggesting that a purely local inconvenience of this character should be met at the expense of the general interests and wishes of the community as a whole. However, in point of fact, it will be seen that we have recommended below, mainly on other grounds, an earlier date for reversion to normal time than was adopted last year. This should, we think, go a long way towards meeting the difficulty of the Lancashire weaving sheds.

Stock Exchange.

67. In reply to an inquiry which we addressed to them, the Stock Exchange Committee brought to our notice a difficulty arising out of the operation of the Summer Time Act which they feared might in normal times cause them considerable inconvenience.

It is important that some portion of the business hours of the London Exchange should coincide with a portion of the New York Exchange session. Before the war, the last hour during which the London Exchange was open (3-4 p.m.) overlapped the first hour (10-11 a.m.) of the New York session, and during this hour in normal times a vast amount of business was done, and was often continued in the street after the London Exchange had closed. At the present time, however (for reasons connected with the war), the London Exchange closes at 3 p.m., but after the war, when normal conditions are restored, the importance of coincident periods in the two sessions may possibly be still greater than in former times.

68. It is clear that the difficulty might be overcome by keeping the Stock Exchange open later during the Summer Time period, but it was pointed out to us that this course is open to objection, as it would practically compel the markets in other securities to remain open, and would not allow time for members to attend to their correspondence and prepare their contract notes before the departure of the mails. The proposal would therefore result in longer hours for a section of the Stock Exchange population.

69. We recognise the importance to the two Exchanges of a coincident period in their sessions, but we believe that the difficulty in securing it during the Summer Time period is capable of adjustment between the London and New York Exchanges without serious inconvenience to their members and their clerks.

Meteorological Work.

70. The operation of Summer Time last year appears to have introduced some elements of uncertainty and difficulty into the work of the Meteorological Office. Sir Napier Shaw, the Director of the Office, supplied us with an interesting statement on the subject, the most important features of which we give below.

71. The work of the Meteorological Office, we were informed, has to be regarded from two points of view, viz. :—

- (1) *The current daily work* of collecting information by telegraph from about 100 observatories and stations in the United Kingdom, on the Continent and the Atlantic Islands, and distributing reports, storm warnings, &c., based on this information, to various quarters; and

- (2) *The public record*, which involves collection by the week or the month of (mostly voluntary) observations from 500 stations, in addition to the 100 official stations above mentioned.

72. *The current daily work* was continued at the same hours as previously, by Greenwich time, in accordance with the proviso in Section I (5) of the Summer Time Act. Consequently, as the messages from the stations are always telegraphed at the last possible moment before the closing of the post offices, the hour for sending them had to be changed, thus spoiling the continuity of the records.

Moreover, the whole daily output of the office's reports, forecasts and storm warnings was nominally an hour late. So far as storm warnings are concerned the delay of an hour would have been fatal, since the country post offices were closed before the reports could be prepared and the hoisting stations could not therefore have been reached by telegraph.

No inconvenience, however, actually resulted in this respect in 1916 because, by request of the Admiralty, the general issue of warnings to coast stations had already been suspended on other grounds.

The distribution of the daily weather reports by early post (1.30 p.m. at the G.P.O.) had to be abandoned.

The opinion of the French Service was taken as to the possibility of accelerating the whole service *permanently* by an hour, but the proposal was not favourably received.

However, summing up the general effect of Summer Time on the current daily work, Sir Napier Shaw observes that "the inconveniences were as far as possible overcome without serious complaint from the Services or the various Naval and Military establishments for which the information was collected."

73. As regards *the public record*, Sir Napier Shaw remarks that it is too soon to form an official opinion. In spite of very careful instructions a great deal of confusion arose with the observers as regards the hours at which the observations were made, and the continuity of many series of observations has been interrupted. "My impression is," he says, "that there is now no possibility of placing beyond dispute the exact time of any event, except those dealt with by telegraph, which occurred between May 21 and September 30. A future historian may find it impossible to fix the exact hour of the battle of Jutland. How many discontinuities, intentional or unintentional, there are in the records, will only be known when we summarise the results for the year, and how far they will affect the value of the results to be obtained from the observations will not be disclosed until we know what questions the Services want us to answer. From the scientific point of view the discontinuity of hour introduces a defect which is fatal and for which there is no remedy."

74. Sir Napier Shaw concludes:—"We have got through the immediate difficulties of Summer Time by making special provision of one sort or other to meet complaints addressed to us. For the future, if the experiment of 1916 is repeated, the proper course will be again for us to keep continuity as far as possible and make good the requirements of the service by whatever special provision we can devise and carry out."

75. We do not feel that we can add anything to Sir Napier Shaw's statement; but we may perhaps express the hope that the proposal for a permanent acceleration by one hour of the international service of weather reports (which we are told is not impossible to carry out, although it involves certain difficulties) will receive further consideration.

The Alteration of the Clocks.

76. Considerable apprehension had been expressed as to the confusion that would be likely to arise when the actual changes in time were made. As a matter of fact the transitions from Normal to Summer Time and vice versa seem to have been accomplished without any public inconvenience of any kind, though we believe that summary methods of putting back the time on the 30th September (in spite of the official warning on the subject) led to a number of casualties among striking clocks.

Foreign Countries.

77. We have described in paragraph 13 above the steps taken to obtain information as to Daylight Saving schemes in foreign countries. In accordance with the request of the Home Office the Foreign Office were good enough to circularise H.M. representatives in the allied and neutral European countries concerned, asking for information as to the general effects of Summer Time in each, and as to the intentions of the Government with respect to

1917 and future years. Up to the present moment, however, only a few replies have been received; and thus, though valuable matter from the foreign press has been supplied to us by the Editors of the "Daily Notes" of the War Trade Intelligence Department, our information on the subject is very far from complete. The following, however, is a summary of the information which we have gleaned.

78. Daylight Saving schemes were adopted last year in France, Holland, Denmark, Norway, Sweden, Italy, Portugal, and in Germany and Austria. The schemes were started on various dates from the 1st May onwards, and terminated for the most part at the end of September, the only exception apparently being in Portugal, where Summer Time was continued until the 31st October. The variation from normal time seems to have been one hour in every case.

79. *France*.—Judging from press reports Summer Time appears to have been a great success in France, and there were advocates for a starting date as early as February 15th this year. The matter does not seem to have been finally settled by the Government. We understand that the Chamber of Deputies has voted in favour of starting Summer Time on April 1st, and continuing it till September 30th, with a variation of one hour over the whole period. The question, however, has still to be considered by the Senate, and there seems to be a possibility that the starting date may be put back into March.

Holland.—According to accounts in the Dutch press, the official attitude towards Summer Time is favourable. An extensive investigation has been made, and an early decision in the matter is expected (26th January).

Denmark.—According to Danish newspapers, no enquiry on the subject of Summer Time has been made by the Government, and it is probable that they will be guided by what Sweden and Germany decide to do. Opposition is reported from country districts.

Norway.—In an official commentary from the Norwegian Government it is remarked that the effects of Summer Time are not considered to be of any importance, on account of the light summer evenings prevalent in the northern latitudes. Factory workers are stated to have been dissatisfied on the ground that "work began one hour earlier, while the hour of going to bed was just as late." The opinion of employers is said to be divided. On the other hand commercial workers, particularly those in subordinate positions, seemed generally to have appreciated the extra daylight. Agricultural opinion was generally unfavourable. The reduction in consumption of artificial light and consequent saving in coal and other fuel is considered to have been small.

No decision as to 1917 had been reached by the Government at the end of January.

Sweden.—The evidence from Sweden appears to be rather more favourable, so far as town life is concerned. While the saving in light and fuel does not appear—from the press accounts—to have been great, one newspaper reports an estimated saving of 50,000 kroner (about £2,800) to the inhabitants of Gothenburg on electric current, and of 2,500 kroner (about £140) on coal used in the production of gas. The Government are stated to have called for reports from all the districts as to the working of the scheme in 1916.

Italy.—We have had no information as to the working of the scheme in Italy in 1916 or as to the prospects of its reintroduction.

Spain.—Daylight Saving was not adopted in Spain last year and the intentions of the Government as to the future have not yet transpired.

Portugal has decided to begin Daylight Saving this year on the 1st March, and to continue it (as last year) up to the end of October.

80. *Germany and Austria*.—The Prussian Government have made elaborate enquiries amongst all the interests concerned, and a number of German and Austrian newspapers have also been conducting researches on their own account.

The evidence from trade, commercial and industrial sources, and from town interests generally, seems to have been distinctly favourable. Striking instances are given of saving in artificial light and fuel in various large cities, *e.g.*, at Berlin the municipal gasworks were able to report a decrease during May and June of 508,500 cubic metres, notwithstanding the fact that 18,000 new gas meters were put up during the first six months of 1916, and the records from January to April showed an increase of 2·4 million cubic metres output of gas as compared with 1915.

In the country districts of Germany the agricultural opposition appears to be strong (hence, it is stated, the reason why the Prussian Diet, which is predominantly agrarian in character, recently reported unfavourably on Summer Time). School children are said to have suffered from loss of sleep in many country districts, chiefly, it appears, owing to the late hours which the parents were obliged to work in the fields; and the hope is expressed that all schools may be permitted to start at 8 a.m. instead of 7 a.m. in future summers.

It appears to have been the intention of the German and Austrian Governments all along to retain Summer Time for the period of the war. According to the most recent statements the 15th April has been decided upon as the starting date for this year.

81. *America.*—We understand that there is a movement in America towards the adoption of Daylight Saving, and that the Government have instructed their representatives in various European countries to enquire into the working of the schemes in 1916.

82. It is hardly necessary for us to point out the value of close international co-operation in the matter of Summer Time between the United Kingdom and the other European countries who observe the Greenwich meridian; in particular, it would clearly have been a great advantage to have had a common arrangement with France. We have given in paragraph 79 above such information as has been supplied to us through the Foreign Office as regards the present position in France; but at the time of presenting our Report a final decision has not yet been reached by the French Government, and we are not therefore in a position to discuss the matter in detail.

The Colonies.

83. According to information which has been supplied to us by the Colonial Office, Daylight Saving schemes have been adopted in Australia and, to a certain extent, in Canada; but not in New Zealand (where a Summer Time Bill was defeated) or in the Union of South Africa.

In Australia, Daylight Saving was adopted by the Tasmanian Government on the first Sunday in October last, and is apparently to continue until the last Sunday in March. After a period of negotiation between the other States, Daylight Saving was eventually put into force by the Commonwealth Government for the whole of Australia on January 1st.

In Canada Daylight Saving schemes have been tried by numerous communities with varying success during the past few years. Last year the Legislature of New Brunswick passed an Act providing for Daylight Saving from the 30th April to the 30th September, but the Act was not "proclaimed," and was only carried into effect by the city of St. John, where it was quite successful. The Act will probably be "proclaimed" this year.

It has not yet been decided whether any action is to be taken this year for the Dominion as a whole.

CONCLUSIONS.

84. Taking the evidence we have received as a whole, we can unhesitatingly say that the vast preponderance of opinion throughout Great Britain is enthusiastically in favour of Summer Time and of its renewal—not only as a war measure, but as a permanent institution.

As we have already pointed out, some difficulties have undoubtedly been experienced, but not to anything like the extent predicted by the critics of the scheme, and we have not heard of any that could not be overcome with goodwill and organisation. Indeed the experience of Summer Time in 1916 has converted many of its former opponents into hearty supporters. Moreover, as we have pointed out elsewhere, many of those who still hold the view that Summer Time may be prejudicial to their own interests admit that the general public advantages arising from it more than outweigh any inconveniences that may be caused in particular cases. In a few years we believe that what opposition still remains to Summer Time will have completely disappeared, and that the whole nation will regard it as a wholly beneficent measure.

We recommend, therefore, that Summer Time should be reintroduced in 1917 and in subsequent years.

85. The suggestions which we have received as to the respective dates on which Summer Time should begin and end have been of a varied character, but the general view appears to be that the period of its application should be approximately from the beginning of April to the end of September.

In arriving at a conclusion on this matter many considerations have to be borne in mind. An early date of commencement would be of great advantage to those who devote their leisure hours to the cultivation of allotments, gardens or plots, on which a great deal of work has to be done in the early spring. On the other hand, a very early beginning and a very late ending for Summer Time must prove irksome to a large section of the industrial population of the country who have to start work in the early hours of the morning. We may refer to our remarks in this connection in paragraphs 27 to 30 above. We have considered a number of possible alternatives, and it has not been easy to arrive at a solution which would meet the views of all. However, after carefully weighing the above mentioned and other relevant considera-

tions, and particularly bearing in mind the views expressed from Ireland (with which we deal in paragraphs 90 to 98 below), we have decided to recommend that Summer Time should begin on the 2nd Sunday in April and end with the 3rd Sunday in September in each year.

86. It is obvious that the week end is the most convenient time for the change; and it has further been represented to us that advantage would be gained by making Sunday (which is, for the greater part of the population, a holiday) the last as well as the first day of Summer Time. We entirely agree with this view, and we therefore recommend that the change from normal to Summer Time should be made during the night of Saturday-Sunday, as last year, but that the reversion to normal time should take place during the night of Sunday-Monday. We have no reason to believe that any inconvenience will be caused by the latter proposal.

87. As to the extent of the variation from normal time, we have received only a very few suggestions for any departure from the plan adopted last year, viz., a variation of one hour throughout the whole period, which has the paramount advantage of complete simplicity. Any system of graded variations introduces an element of complication and would be bound, we think, to lead to inconvenience and confusion. We are also convinced that the adoption of a greater variation than one hour, over the period during which we have recommended that Summer Time should be operative, would be unsuitable for this country.

We therefore recommend that during the Summer Time period the variation from normal time should be one hour.

88. The following, then, is a summary of our recommendations :—

- I. That Summer Time should be renewed in 1917 and in subsequent years.
- II. That the period of the operation of Summer Time should be from the 2nd Sunday in April to the 3rd Sunday in September in each year.
- III. That the change from normal to Summer Time should be made on the night of Saturday-Sunday and the reversion to normal time on the night of Sunday-Monday.
- IV. That the variation from normal time should be one hour throughout the whole period.

89. We would, further, call attention to certain suggestions which we have made in regard to the questions of children's sleep and the closing of shops in paragraphs 36 and 64 respectively of our Report.

We have recorded our opinion (in paragraph 82 above) as to the desirability of uniformity in time between the United Kingdom and those European countries observing the Greenwich meridian (particularly France), and we would express the hope that it may prove possible, if not now, at any rate in future years, to co-ordinate their systems of Summer Time without any serious inconvenience to any one of them, and thus secure uniform hours throughout the year in the time zone.

IRELAND.

90. We have already stated that in view of the somewhat conflicting nature of the evidence which we have received from Irish interests, and also on other grounds, we have thought it best to deal with the case of Ireland separately from the main body of our report.

91. As has been mentioned above, enquiries were issued to County, County Borough, Urban and Rural District Councils, to the Police, to the County Committees of Agriculture and Technical Instruction, and to a number of Trade Unions; while the views of the Office of National Education were obtained as to the question of children's welfare. In addition, we had the advantage of discussing the position with some representatives of Irish interests from different parts of the country.

92. We found that Irish opinion is divided on the question of Summer Time, on lines that were perhaps to be expected.

93. *Opinions of Town dwellers.*—It is clear from the evidence that the benefits of the Act were thoroughly appreciated and enjoyed by the very large majority of town dwellers in Ireland, as in the rest of the United Kingdom, and in particular by those engaged in trade, business or industry, both employers and workers.* In view of all that has been said in the

* Out of twelve Trade Unions who replied to the circular sent out by the Irish Government only three are unfavourable to Summer Time—principally on the ground that their members tended to lose an hour's sleep by not going to bed early enough.

main body of our report as to the advantages derived from the extra hour's daylight we do not feel that we need elaborate the point further.

94. *Agricultural opinion.*—On the other hand it is also clear that, while farmers are by no means unanimous on the question, the bulk of agricultural opinion is unfavourable to Summer Time. We hear a good deal in the replies of the same difficulties, particularly in regard to haymaking and harvest, and also in regard to dairy work, which were generally urged by agriculturists before Summer Time was introduced, but which in Great Britain, as we have seen, were surmounted for the most part without serious trouble. In many districts in Ireland the farming community appear to have kept to old time by the clock; in other cases the hours of labour were shifted, as was largely done during certain parts of the Summer Time period in Great Britain. Elsewhere, complaints are made of the loss of an hour (some say the most valuable hour) at the end of the day.

It is not easy to see, at first sight, why so much more inconvenience should have been experienced by farmers in Ireland than in the rest of the United Kingdom, though it was pointed out to us that particularly heavy dews are experienced in that country in the early mornings; and some part of the explanation would also seem to lie in a circumstance which is mentioned in a number of the replies, viz., difficulty in getting labourers to consent to changes in the working hours; in particular they seem to have objected to working after 6 o'clock in the evening.

So far as we are aware this latter difficulty has not appeared to any appreciable extent outside Ireland, and we certainly do not think it should be regarded as insuperable.

95. *Children.*—In one or two of the replies from rural districts it is stated that Summer Time is attended with hardship for children who have any distance to go to school, though this point is not alluded to by the Office of National Education. The latter, however, mention that the sleeping hours of the children appear to have been shortened before people became fully accustomed to the change. The extent to which the tendency was apparent is not indicated, but it may perhaps be safely assumed that the facts are not very different from those which we have recorded in the case of Great Britain (*see* paragraphs 32 to 36 above).

96. *The question of renewal.*—When the question is considered whether Summer Time is to be applied to Ireland for the future, it must of course be borne in mind that since October last the time in Ireland has been permanently advanced by 25 minutes owing to the substitution of Greenwich for Dublin Time by the Time (Ireland) Act, 1916; so that in the event of Summer Time being applied to Ireland in the same way as we have recommended above for the rest of the United Kingdom, the advance would be 25 minutes in excess of what was experienced last year.

This consideration is very much in the minds of those who are not favourably disposed towards the renewal of Summer Time in Ireland; in fact, it would seem to be in many cases the principal ground of opposition.

97. We think, however, that its significance can easily be exaggerated.

It may be noticed, in the first place, that so far as "Summer Time" is concerned Dublin and the East of Ireland are only a few minutes ahead of the West of England, Wales and Scotland.

Moreover, there would be more ground for apprehension if it were proposed to begin Summer Time very early in the Spring, or to continue it late into the Autumn. In point of fact, as has been seen, we have recommended, largely with Ireland in view, that Summer Time should end on the third Sunday in September, *i.e.*, at the latest on the 21st September, instead of on the 30th as was the case last year; and that it should begin on the second Sunday in April, *i.e.*, between the 8th and the 14th April inclusive, when the days are no shorter than at the beginning of September.

98. It has been suggested by some that, as a compromise, the variation from normal time should in the case of Great Britain and Ireland be half an hour or thereabout; by others that this variation should apply in the case of Ireland only.

As to the first proposal, we are convinced that it would not be supported in Great Britain; while the second, in that it would involve difference from time in Great Britain during the Summer Time period, would be a step back from the reform effected by the Time (Ireland) Act, 1916, which we are informed is of great value to the commercial interests of Ireland.

If Summer Time is to be applied to Ireland at all, as we unanimously think it should be, it must be applied in its entirety.

99. It would be quite impossible for us to acknowledge in detail the very great assistance which we have received from the numerous departments, organisations, and individuals whom we have consulted in the course of our enquiry, and of whom a great number devoted considerable time and trouble to obtaining for us the information for which we asked. We aimed at securing a large mass of representative evidence from every interest in the country, and we have succeeded considerably beyond our expectations. Without the cordial co-operation of all concerned, these results could not have been attained.

100. In presenting our Report we wish to record our high appreciation of the work of the Joint Secretaries, on whom has fallen an unusually large proportion of the labour of the enquiry, its organisation, and the tabulation of the replies, owing to the procedure adopted.

We are,

Sir,

Your obedient Servants,

J. W. WILSON.

JOSEPH DAVIES.

MALCOLM DELEVINGNE.

CHARLES DUNCAN.

JOHN B. LONSDALE.

T. M. MORTON.

WALTER NUGENT.

ANDREW H. PETTIGREW.

BEATRICE M. SAMUEL.

BEVILLE STANIER.

T. HUWS DAVIES,

M. H. WHITELEGGE,

Joint Secretaries.

22nd February, 1917.

APPENDIX I.

LIST OF THE WITNESSES WHO HAVE GIVEN EVIDENCE BEFORE THE COMMITTEE.

AGRICULTURE—

Mr. W. W. Berry (of Gushmere Court, Faversham, Kent).
 Mr. Davis Brown (of Marham Hall, Norfolk).
 Mr. R. W. Hobbs (of Lechlade, Gloucestershire).
 Mr. Alfred Inskip (of Clifton Bury, Biggleswade).

EDUCATION AND CHILDREN'S INTERESTS—

Miss I. Cleghorn (Ex-President of the National Union of Teachers and Head Mistress of an Elementary School for Girls at Sheffield).
 Miss R. Oldham (Head Mistress of the Streatham Hill High School).
 Mrs. Perry (Head Mistress of the Stanhope Street Infants' School, Euston Road).
 Mr. B. S. Gott (Secretary of the Middlesex Education Committee).
 Dr. C. W. Hutt (Senior School Doctor for Brighton).
 Mr. Austin Keen (Director of Education for Cambridgeshire).
 Dr. C. J. Thomas (Principal Assistant Medical Officer of the London County Council).

ELECTRICAL UNDERTAKINGS—

Mr. H. Faraday Proctor (Hon. Secretary of the Incorporated Municipal Electrical Association).
 Mr. J. C. Wigham (Electrical Engineer of Edmundson's Electricity Corporation, Ltd.).

GAS UNDERTAKINGS—

Messrs. W. T. Dunn and H. E. Price (Secretary and Hon. Secretary of the Institution of Gas Engineers).
 Captain R. S. Hilton (Manager of the City of Birmingham Gas Department).
 Mr. H. E. Jones (President of the National Gas Council).
 Mr. Hanbury Thomas (Managing Director of the Sheffield United Gas Light Company).

EMPLOYERS, ETC.—

Mr. W. Bethell (Assistant Manager of the Woolwich Arsenal Co-operative Society).
 Mr. Edward Cadbury (Messrs Cadbury Bros., Bournville).
 Messrs. Charles Coleing and J. R. Quilter (President and Secretary of the Drapers' Chamber of Trade).
 Messrs. Richard Greenwood and John Taylor (Chairman and Secretary of the Cotton Spinners' and Manufacturers' Association).
 Mr. J. E. Hutton (Manager of the Labour Department of Messrs. Vickers, Ltd.).
 Mr. R. J. Lake (Secretary of the Federation of Master Printers and Allied Trades of the United Kingdom).
 Mr. Howard Williams (Messrs. Hitchcock, Williams & Co., St. Paul's Churchyard).

TRADE UNIONS.

Messrs. E. Holden, W. Hesmondhulgh and A. H. Cottam (Amalgamated Weavers' Association).
 Mr. T. E. Naylor (Secretary of the London Society of Compositors).
 Mr. John Turner (Secretary of the National Amalgamated Union of Shop Assistants, Warehousemen and Clerks).

WOMEN'S INTERESTS.

Miss Goddard and Mrs. Dodge (Women's Industrial Council).
 Miss Hussey (Mothers' Union).

IRELAND—

Mr. Martin MacDonagh (Chairman of the Galway Urban District Council).
 Mr. Alfred MacMullen (Vice-President of the Cork Chamber of Commerce and Shipping).
 Mr. W. P. O'Neill (Engineer-in-Chief of the Midland Great Western Railway of Ireland).
 Mr. James Robertson (of Malahide, Co. Dublin).
 Mr. J. H. Stirling (President of the Belfast Chamber of Commerce).

OTHER INTERESTS—

Mr. E. Satterthwaite (Secretary of the Stock Exchange).
 Mr. A. Larking (Secretary of the Early Closing Association).

APPENDIX II.

SPECIMEN OF THE QUESTIONS SENT OUT BY THE COMMITTEE.

(LOCAL AUTHORITIES).

1. What is the general opinion in your district in regard to the effects of the Summer Time Act, 1916?
 2. Have any particular difficulties been experienced in your district in connection with the working of the Act? If so, what arrangements were made to meet such difficulties, and with what results?
 3. (a) Has advantage been taken to a large extent of the extra hour of daylight for outdoor pursuits and recreation?
(b) Is there any evidence that the Act has affected the health of the people, or of any section of the people, beneficially or otherwise?
 4. Has the operation of the Act produced any tendency towards later closing of shops in your district? If so, in what classes of shops?
 5. (a) Does your Council think the scheme should be renewed in 1917 and in subsequent years?
(b) If so, would they suggest any alteration (1) in the length of the Summer Time period, (2) in the extent of the variation from normal time during that period, (3) in any other respects?
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NOTE. Daylight Saving schemes have also been adopted this year in France, Portugal, Italy, Holland, Denmark, Norway, Sweden, Germany and Austria. The advance in time was one hour in each case. The schemes came into operation on various dates in May and June and terminated, for the most part, at the end of September. In this country, where there was some delay with the passing of the Act, Summer Time came into force on the 21st May and continued until the 1st October.
