round light) for a period of nine to ten hours.* The lamps are tested in explosive mixtures of methane-air and petrol-air, and so the tests can be accepted as satisfactory for lamps to be used near inflammable liquids, but not necessarily so for gaseous mixtures containing hydrogen. (Payman and Wheeler, *Chem. Soc. Trans.*, 1919, 115, 36; this J., 1919, 38, 126 A.)

The flame lamp as gas detector.—It is well known that the flame lamp can be used as a "gas detector." A lamp is sometimes lowered into large containers before men are allowed to enter for repairs etc., in order to make sure that the atmosphere contains sufficient oxygen to support breathing. A more important use of the flame lamp is the detection and rough estimation of inflammable gas by the "cap" method. An experienced mine fireman can readily detect slightly over one per cent. of firedamp in mine air, and can estimate percentages above this without difficulty to within an accuracy of about 0.5 per cent. This method is applicable to any inflammable gas or vapour.

In testing for inflammable gas the flame is first carefully drawn down until the yellow light almost disappears. If any inflammable gas be present a "cap" or "aureole," usually blue in colour, forms above the lowered flame. The greater the percentage of inflammable gas present in the atmosphere the brighter and the more plainly does this cap appear, and the larger does it become.

The height of cap with a given percentage of inflammable gas will vary with different gases and vapours, but it may be accepted that the effect of each gas is inversely proportional to the percentage of gas present in a "lower-limit mixture" of that gas with air. Thus with all gases the amount necessary to give a large cap extending into the gauze will be a little less than that required to form a limit mixture. Evidently a limit mixture would give an infinitely long cap. When testing for "gas" under works conditions it will be only necessary to know when the limit of inflammability of the gas or vapour present is being approached; in a coal mine a much smaller proportion of inflammable gas would be considered unsafe on account of the presence of coal dust. The following description† of the caps in firedamp-air mixtures (limit 5.3 per cent.) will be of use for comparative purposes if used in conjunction with the value for the lower limit of inflammability of the vapour under consideration (this J., 1918, 408 A):—

1 per cent. methane.—Cap just visible round edges of oil flame.

2 per cent. methane.—Blue cone visible above oil flame, the upper tip being very indistinct.

3 per cent. methane.—Cap and tip quite plain, about 3 cm. high from base to tip.

With higher percentages the tip rises rapidly into the gauze until a percentage is at last reached when the cap leaves the flame, which is extinguished, and the methane continues to burn in the top of the gauze. When the cap rises into the gauze the lamp may become unsafe, and should be extinguished, not by blowing or jerking, but by gently drawing down the wick and restricting the air supply to the lamp by folding in a jacket or cap.

The largest caps are visible in artificial light, but the low percentage caps either require a darkened place of operation, or the lamp itself must be suitably shaded.

Lamps are at present constructed to satisfy the special requirements of the coal miner, but modifications will at once suggest themselves for lamps to be used in chemical works to increase their lighting efficiency without in any way interfering with their safety.

* See "Memorandum on the Testing of Safety Lamps." H.M. Stationery Office, London, 1913.

† From the Home Office pamphlet, "How to Test for Firedamp," H.M. Stationery Office, London, 1912, which contains a diagram showing the appearance of the caps.

THE INTERNATIONAL LABOUR CONFERENCE AND THE EIGHT-HOUR DAY.

STEPHEN MIALL.

The proceedings at Washington (this J., 1919, 4 A) were to some extent informal, because the International Labour Office is a part of the League of Nations, and the League of Nations did not come into being until the ratification of the Treaty of Peace. It was therefore necessary to hold a purely formal conference in Paris to affirm the decisions come to at Washington. This Paris conference was held towards the end of January; the convention on the eight-hour day is affirmed, and the International Labour Office is now duly constituted in accordance with the Treaty of Peace. Monsieur Thomas has been appointed director, and Mr. W. H. B. Butler deputy-director, of this office, which will find temporary accommodation in London. In all probability there will be a special conference in June next, at Genoa, to deal with the conditions of employment of seamen. Other subjects are to be discussed in due course, and as soon as a staff can be got together information will be obtained from a number of countries in preparation for the next annual conference, which may possibly be held in Geneva in the early part of 1921.

The actual decisions of the International Labour Conference at Washington have received but scanty attention from the Press, and some information on the application of the eight-hour day may perhaps not be out of place.

No question was so keenly disputed and so long discussed as the choice between the eight-hour day and the forty-eight-hour week, and countless propositions and amendments on this topic were submitted. On several occasions it seemed that the commission dealing with this subject was at a deadlock, and Mr. Tom Shaw, M.P., the chairman, had to exercise considerable patience and tact to induce the members to frame a draft convention which finally met with general acceptance. All concerned—and who is not?—should be grateful to him for the skill with which he brought conflicting views into some sort of harmony.

Articles 9, 10, 11, 12, and 13 of this Convention do not apply to Great Britain; the remaining articles are as follows:—

1. For the purpose of this Convention, the term "industrial undertaking" includes particularly:

(a) Mines, quarries, and other works for the extraction of minerals from the earth.

(b) Industries in which articles are manufactured, altered, cleaned, repaired, ornamented, finished, adapted for sale, broken up or demolished, or in which materials are transformed; including shipbuilding and the generation, transformation, and transmission of electricity or motive power of any kind.

(c) Construction, reconstruction, maintenance, repair, alteration, or demolition of any building, railway, tramway, harbour, dock, pier, canal, inland waterway, road, tunnel, bridge, viaduct, sewer, drain, well, telegraphic or telephonic installation, electrical undertaking, gas work, waterwork or other work of construction, as well as the preparation for or laying the foundations of any such work or structure.

(d) Transport of passengers or goods by road, rail, sea or inland waterway, including the handling of goods at docks, quays, wharves or warehouses, but excluding transport by hand.

The provisions relative to transport by sea and on inland waterways shall be determined by a special conference dealing with employment at sea and on inland waterways.

The competent authority in each country shall define the line of division which separates industry from commerce and agriculture.

2. The working hours of persons employed in any public or private industrial undertaking or in any branch thereof, other than an undertaking in which only members of the same family are employed, shall not exceed eight in the day and forty-eight in the week, with the exceptions hereinafter provided for:—

(a) The provisions of this Convention shall not apply to persons holding position of supervision or management, nor to persons employed in a confidential capacity.

(b) Where by law, custom, or agreement between employers' and workers' organisations, or, where no such organisations exist, between employers' and workers' representatives, the hours of work on one or more days of the week are less than eight, the limit of eight hours may be exceeded on the remaining days of the week by the sanction of the competent public authority, or by agreement between such organisations or representatives; provided, however, that in no case under the provisions of this paragraph shall the daily limit of eight hours be exceeded by more than one hour.

(c) Where persons are employed in shifts it shall be permissible to employ persons in excess of eight hours in any one day and forty-eight hours in any one week if the average number of hours over a period of three weeks or less does not exceed eight per day and forty-eight per week.

3. The limit of hours of work prescribed in Article 2 may be exceeded in case of accident, actual or threatened, or in case of urgent work to be done to machinery or plant, or in case of *force majeure*, but only so far as may be necessary to avoid serious interference with the ordinary working of the undertaking.

4. The limit of hours of work prescribed in Article 2 may also be exceeded in those processes which are required by reason of the nature of the process to be carried on continuously by a succession of shifts, subject to the condition that the working hours shall not exceed fifty-six in the week on the average. Such regulation of the hours of work shall in no case affect any rest days which may be secured by the national law to the workers in such processes in compensation for the weekly rest day.

5. In exceptional cases where it is recognised that the provisions of Article 2 cannot be applied, but only in such cases, agreements between workers' and employers' organisations concerning the daily limit of work over a longer period of time may be given the force of regulations if the Government, to which these agreements shall be submitted, so decides.

The average number of hours worked per week, over the number of weeks covered by any such agreement shall not exceed forty-eight.

6. Regulations made by public authority shall determine for industrial undertakings:

(a) The permanent exceptions that may be allowed in preparatory or complementary work which must necessarily be carried on outside the limits laid down for the general working of an establishment, or for certain classes of workers whose work is essentially intermittent.

(b) The temporary exceptions that may be allowed, so that establishments may deal with exceptional cases of pressure of work.

These regulations shall be made only after consultation with the organisations of employers and workers concerned, if any such organisations exist. These regulations shall fix the maximum of additional hours in each instance, and the rate of pay for overtime shall not be less than one and one-quarter times the regular rate.

7. Each Government shall communicate to the International Labour Office:

(a) A list of the processes which are classed as being necessarily continuous in character under Article 4;

(b) Full information as to working of the agreements mentioned in Article 5; and

(c) Full information concerning the regulations made under Article 6 and their application.

The International Labour Office shall make an annual report thereon to the General Conference of the International Labour Organisation.

8. In order to facilitate the enforcement of the provisions of this Convention, every employer shall be required:

(a) To notify by means of the posting of notices in conspicuous places in the works or other suitable place, or by such other method as may be approved by the Government, the hours at which work begins and ends, and where work is carried on by shifts the hours at which each shift begins and ends. These hours shall be so fixed that the duration of the work shall not exceed the limits prescribed by this Convention, and when so notified they shall not be changed except with such notice and in such manner as may be approved by the Government.

(b) To notify in the same way such rest intervals accorded during the period of work as are not reckoned as part of the working hours.

(c) To keep a record in the form prescribed by law or regulation in each country of all additional hours worked in pursuance of Articles 3 and 6 of this Convention.

It shall be made an offence against the law to employ any person outside the hours fixed in accordance with paragraph (a), or during the intervals fixed in accordance with paragraph (b).

14. The operation of the provisions of this Convention may be suspended in any country by the Government in the event of war or other emergency endangering the national safety.

15. The formal ratifications of this Convention, under the conditions set forth in Part XIII. of the Treaty of Versailles of June 28, 1919, and of the Treaty of St. Germain of September 10, 1919, shall be communicated to the Secretary General of the League of Nations for registration.

16. Each Member of the International Labour Organisation which ratifies this Convention engages to apply it to its colonies, protectorates, and possessions which are not fully self-governing:

(a) Except where, owing to the local conditions, its provisions are inapplicable; or

(b) Subject to such modifications as may be necessary to adapt its provisions to local conditions.

Each Member shall notify to the International Labour Office the action taken in respect of each of its colonies, protectorates, and possessions which are not fully self-governing.

17. As soon as the ratifications of two Members of the International Labour Organisation have been registered with the Secretariat, the Secretary General of the League of Nations shall so notify all the Members of the International Labour Organisation.

18. This Convention shall come into force at the date on which such notification is issued by the Secretary General of the League of Nations, and it shall then be binding only upon those Members which have registered their ratifications with the Secretariat. Thereafter this Convention will come into force for any other Member at the date on which its ratification is registered with the Secretariat.

19. Each Member which ratifies this Convention agrees to bring its provisions into operation not later than July 1, 1921, and to take such action as may be necessary to make these provisions effective.

20. A Member which has ratified this Convention may denounce it after the expiration of ten years from the date on which the Convention first comes

into force, by an act communicated to the Secretary General of the League of Nations for registration. Such denunciation shall not take effect until one year after the date on which it is registered with the Secretariat.

21. At least once in ten years the Governing Body of the International Labour Office shall present to the General Conference a report on the working of this Convention, and shall consider the desirability of placing on the agenda of the Conference the question of its revision or modification.

22. The French and English texts of this Convention shall both be authentic.

NEWS FROM THE SECTIONS.

CANADA.

During the past two or three months many successful meetings of the different local Branches of the Canadian Section of the Society of Chemical Industry have been held. Good attendances have marked all the meetings, and the Society can be said to be in a sound and healthy condition. The increasingly large number of plant managers and superintendents who attend the meetings is marked evidence of the interest the management of Canadian chemical industries is taking in the transactions of the Society.

Ottawa.

The opening meeting, on December 18, took the form of a dinner at the Chateau Laurier, when the guest of honour was the Right Hon. Sir George E. Foster, Minister of Trade and Commerce.

After the toast of the King had been honoured, Dr. F. T. Shutt, chairman, referred to the success achieved by the Branch during the previous session. He alluded particularly to the initiative taken by the Branch in the matter of re-classifying the Government Chemical Service, which had been approved by all the chemists in the Dominion. The official classification—based on an alphabetical arrangement—was in every way most unsatisfactory from the standpoint of the chemical service. The special committee appointed by the Ottawa Branch drew up a rational scheme, which was duly presented to, and its adoption urged upon, the Government and Civil Service Commission (this J., 1919, 288 n). It was not accepted as a whole, probably because its acceptance would have entailed the wholesale reconstruction of the official plan, but the committee was successful in obtaining better terms for chemists in the matter of salaries. Unfortunately, the Government has been losing a number of its most promising younger chemists, and if this continues the service will inevitably become a second-class one. There is great need for disseminating among the public a knowledge of the utility of the chemist's work. Dr. Shutt also referred to his address as chairman a year previously (this J., 1919, 117 n), in which he had advocated the founding of a professional organisation for Canadian chemists. This project was now a *fait accompli*. The work of the Canadian Institute of Chemistry will in no way interfere with that of the Society of Chemical Industry. The object of the former is to safeguard the interests of chemists and raise the status of the profession throughout the Dominion, whereas the chief function of the latter is to bring chemists together for the dissemination and interchange of chemical knowledge.

Sir George Foster, in his address, referred to the various activities of the Government service with which he was actively connected and which were of direct service to the chemical world, and then, after some badinage pointed at the chemist by reason

of his lineal descent from the alchemist, the necromancer and soothsayer, and the evil one, he dwelt at length on the benefits accruing from the applications of chemistry to industrial life. He emphasised the need for increased production and its necessary counterpart—economy. "With the exception of the United States, which is a wasteful country too, Canada is probably one of the most wasteful countries in the world," and he instanced the enormous wastage that had characterised the lumber industry in the past. A country's material resources may be divided into two classes: those which are exhaustible, *e.g.*, coal and other mineral wealth, and those which can be maintained always if we deal with them in the right way, such as agricultural products, fisheries, and livestock. Science was needed to conserve both. The terrible wastage of the late war would not be entirely in vain if we remembered the lesson that business must not be divorced from nationality. Whilst the business man should be allowed as much freedom as possible, he, on his side, must recognise that he owes a fealty to the nation which protects him and within the borders of which he carries on his activities. Under the old *régime* of internationalised commercialism, some of the most valuable inventions and processes which were discovered in Great Britain went over to the Germans; that must never be allowed to happen again. The war has not only shown up our weakness; it has brought the realisation that we have within the Empire resources, genius and skill equal to those found in any other country in the world.

On January 22, a paper on "Colloidal Fuels," written by Mr. L. W. Bates, was read by Mr. Stansfield, chief engineering chemist of the Fuel Testing Plant. It was shown that Mr. R. O. Cantelo, of the Fuel Testing Division of the Mines Branch, had carried out successfully some preliminary investigations to ascertain whether carbonised lignite could be employed in place of pulverised coal.

Toronto.

At the December meeting Brig.-General C. H. Mitchell, Dean of the Faculty of Applied Science and Engineering of Toronto University, who has recently returned from overseas service on the Intelligence Service of the Allied Armies, was the speaker, and delivered a very interesting address on "The War and Reconstruction as Applied to Chemical Industry." Dean Mitchell referred to the war as a "chemical war," emphasising the important parts which chemists and chemicals had played therein. He firmly believes that were science and scientific men and management allowed full sway, the Allied countries could retain the trade which they have wrested from Germany during the war.

Montreal.

In November "The Zinc and Lead Deposits of Gaspé" were discussed, Mr. Beidleman's paper being read by Mr. Alexander Gray. Geological reports have shown that these ores are practically free from iron, are of high grade, and equal to those at Joplin, in Missouri, U.S.A. In the 50 acres developed the sphalerite has a zinc content of from 62 to 65 per cent., with less than one-half per cent. of iron.

A paper on "The Utilisation of Kelp" was given by Mr. Ball in December. During the war the Hercules Powder Co. developed the kelp industry on the Pacific Coast.

On January 23, Mr. C. F. Bardorf, of the St. Lawrence Sugar Refineries, gave a paper, "Notes on Decolorising Blacks."

The Montreal Branch expects to hold a meeting and to visit the large electro-chemical plants at Shawinigan Falls, Quebec, in May next.