

the ionized layers of the atmosphere, through the stage of detection of aircraft at long ranges to the exact location, range, bearing and height determination for warning and for anti-aircraft gunnery purposes. The latest development is the plan position indicator (P.P.I.) which produces a 'map', on the screen of a cathode ray tube, showing all the radio-reflecting obstacles surrounding the observer, who is assumed to be situated at the centre of the 'map'. The map shows clearly the range and bearing of all objects such as coastline, mountains, high buildings, shipping, aircraft, etc., under any conditions of weather—clear or foggy, night or day. The applications of this device in aerial and sea navigation are of very great importance. In his review of radar, Sir Edward spoke of the excellence of the instruments produced by the electrical industry for use by all the Services. Vast numbers of valves, cathode ray tubes and high-grade electrical circuit components were used in these operations, and the electrical industry deserved the highest praise for its efforts. Sir Edward in his concluding remarks referred to the applications of radar in navigation and in further researches on the upper atmosphere. He visualized the use of radar echo methods in the near future to obtain data relative to the heights of the mountains and depths of the craters on the moon.

The third discourse was given by Dr. J. C. Swallow, of I.C.I., Ltd. (Plastics Division), who dealt with the subject of "Modern Plastics and Cements". He referred to the rapid growth of the plastics industry and to the numerous applications of plastics in the design and construction of scientific instruments. The wide variety of mechanical, electrical and optical properties provides a valuable source of material for selection by the instrument designer. Thus the mechanical properties range from rigid to flexible, rubbery or leathery, tough to brittle, transparent to opaque. The electrical insulating properties of some of the plastics are extremely good. "All the plastics are polymers, that is, are composed of macromolecules, or as they are more frequently called, chain molecules with primary valency forces as links, whilst the chains themselves are held together by weaker secondary forces . . . being polymeric in character the physical properties of plastics can be changed by varying their average chain-length, and the distribution of chain-length round a given average; and we are therefore concerned in many cases with a spectrum of products based on one polymer structure, and subtle differences of properties can be produced by relatively minor changes in manufacturing conditions". Dr. Swallow referred to the usual division of plastics into thermoplastic and thermosetting, and to the sensitiveness of plastics to temperature variations. He dealt in some detail with the use of plastics for constructional purposes; the extensive use of polymethyl methacrylate ('Perspex') as a glazing material in aircraft and in the construction of laboratory apparatus. Polystyrene may be used in much the same way as 'Perspex', but it is particularly valuable when good insulating properties are required and in high-frequency apparatus. Polyvinyl chloride (p.v.c.) is a plastic used as an insulating coating for electrical conductors; it possesses the valuable properties of non-inflammability and a wide range of flexibility. These are only a few of the better-known plastics: the possible variety of these products is almost bewildering. It is obvious that a great future lies ahead in the use of plastics in the scientific instrument industry.

As further evidence of development in the industry, reference could be made in detail to many of the exhibits and demonstrations at the exhibition. Within the limits of this brief survey, however, this is not possible and the reader is recommended to see the exhibition catalogue for further information. As examples of the type of scientific instruments now available may be mentioned a few chosen at random from the catalogue. Thus, in addition to those already mentioned in optics are instruments for colour measurement, high-speed cameras taking 10,000 pictures/second, cameras for aerial surveys, etc. In radio there are numerous radar instruments, air and sea navigational instruments, homing and night-landing equipment for aircraft, new types of valves, such as the magnetron and klystron for centimetre waves, etc. Developments in electronics technique are exemplified by electron microscopes, vacuum evaporation and blooming, cyclotrons (a mechanical model illustrating the principle was shown). Among the many other interesting exhibits may be mentioned sensitive radiation thermopiles, infra-red recording spectrometers, supersonic flow detectors, samplers for bacteria counts, meters for indicating directly the amount of moisture in grain, cotton, etc., calculating machines which integrate, differentiate, solve mathematical equations or determine the structure factors in X-ray analysis, electrical strain gauges for measuring mechanical strains in complex structures such as the wing of an aeroplane, and so on.

It is almost invidious to pick out particular exhibits in this way, but it must be either that or nothing! Enough has been said to illustrate the rapid developments that have taken place in the British scientific industry during recent years, and to indicate the importance of the industry to progress in research and ultimately to national progress. While appreciating the point made by the President of the Board of Trade that the industry should be in a position to make a sufficient number of instruments for export, it must be definitely realized that from a national point of view it is most important first of all to satisfy the needs of the universities and the research organisations in Great Britain. The industry has served us well during the War; it must be allowed to continue its progress during times of peace.

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## INFECTIVE HEPATITIS IN FRANCE

By DR. JAMES MARSHALL

**I**N Great Britain during the War there was a great increase in the incidence of infective hepatitis, and, in the army particularly, of the so-called 'post-arsphenamine jaundice'. (This last is almost certainly a virus disease and not directly caused by arsenic<sup>1,2</sup>.) We have suggested in the past that war-time diet, relatively deficient in protein, may have been one reason for this increase<sup>3,4</sup>.

It was known that dietary deficiency was widespread in metropolitan France, particularly in the cities, during the German occupation. It was thought, therefore, that valuable information on the relationship between dietary deficiency and the incidence of hepatitis might be obtained from a study of conditions there. No details about hepatitis during the occupation were available to the French authorities in Britain, and what French medical literature was

available was of no help. Through the courtesy of Médecin Général Sicé and Commander Guillermin of the French Red Cross, I was invited to France to make some observations during April and May, 1945. The time at my disposal did not allow me to travel, but in Paris itself a great deal of information was available, and I was able to make inquiries of medical men from other parts of France who were in Paris at the time.

### Post-arsphenamine Jaundice

By visits to the principal venereal diseases clinics and hospitals in Paris, by questioning several venereologists from provincial cities, and from the answers to a questionnaire which was seen by many members of the Société Française de Dermatologie et de Syphiligraphie, a good survey was obtained on this type of hepatitis.

I gathered that in the few years before 1939, jaundice was an uncommon complication of the arsenical treatment of syphilis (3 per cent was the highest figure), and that no obvious change in the incidence had been noticed either during the occupation (highest figure 2 per cent) or after the arrival of the Allied troops.

The venereologists who supplied this information also stated that they had noted no increase in the number of cases of infective hepatitis in syphilitics or non-syphilitics during this time. It must be noted, however, that the method of sterilization of syringes used in the treatment of syphilis was, in every case, either by boiling or by dry heat. The method of sterilizing syringes is a most important factor in the appearance of hepatitis as an accident of syphilis treatment<sup>3,6</sup>.

During the occupation, German soldiers in France were treated for syphilis in their own hospitals and did not attend French hospitals or clinics.

No large numbers of cases of jaundice had been seen in syphilis clinics in Paris since 1919-24, when there was an epidemic of hepatitis.

### Infective Hepatitis

The protein content of the diet in France during the occupation was never as high as it was in wartime Britain, and there were times when, for months at a stretch, meat was not available in some areas.

Infective hepatitis does not appear to have been a problem in France during the War. All authorities consulted were quite definite in their opinion that there had been no obvious increase in its incidence and, being still mostly without access to British medical literature, were most surprised that I should have come to France to study the problem. A search of the bibliography of the war years confirmed this opinion, and articles on hepatitis in French journals were almost all confined to descriptions of individual cases.

Hepatology research in France has been mainly clinical, morbid pathological, and biochemical, and there was found no mention of original work on filterable viruses or epidemiology.

Prof. E. Chabrol (personal communication) draws a distinction between cases of infective hepatitis with uninterrupted recovery and those in which relapse occurs, and suggests the possibility of different causal factors. From personal observations during the War, particularly in cases of hepatitis occurring in North Africa, I can confirm that this is a problem which is worthy of further investigation. Study of liver pathology by puncture biopsy (usually trans-

abdominal) has been pursued by Prof. N. Fiessenger and by Cazal<sup>6</sup>.

The French hepatologists all stress the importance of the original state of the liver on the ultimate prognosis of infective hepatitis. Complete recovery is least likely in livers damaged by syphilis, arsenic, alcohol, etc.<sup>7</sup>. All remarked on a diminution in the number of cases of cirrhosis during the War, when the consumption of wine was much reduced.

Although metropolitan France has apparently escaped all but minor and local epidemics of infective hepatitis, such as occur at any time, there are records of major epidemics in Tunisia during 1939-40 (Admiralty records seen by courtesy of Médecin Général le Chuiton) and again in 1942-43<sup>8</sup>. Similar epidemics are described in Admiralty records as having occurred in 1915-16, 1920, 1926-33, and 1937. Dr. A. Touraine (personal communication) believes that an epidemic of infective hepatitis in the Paris area in 1937 was originated by the importation of North African natives for an exhibition in that year.

This apparent immunity of the French was not shared by the invaders. Prof. N. Fiessenger (personal communication) recalls that in 1940 a German unit in Paris had three hundred cases of hepatitis among a thousand men; and other observations also suggest that jaundice was not uncommon among German troops in France. Hepatitis has not been uncommon in Allied troops in France during 1944-45.

In Germany, and wherever Germans infiltrated, infective hepatitis has been noted. Gutzeit<sup>9</sup> reports a small epidemic of jaundice in Germany in the summer of 1939, and states that by 1941 jaundice had percolated to German troops everywhere. Northhaas<sup>10</sup> also reports a large amount of epidemic hepatitis in Germany at the end of 1941. At the same time, Ruther and Dorow<sup>11</sup> tell of five hundred cases of jaundice late in 1941 in the South Ukraine: these cases had an incubation period of twenty-one days. Meythaler<sup>12</sup> reports on 2,500 cases of jaundice in Crete during the War, and further states that the symptoms have differed from one geographical area to another; for example, headache was common in Greece, pains and muscular cramps were frequently noted in Russia. We know, too, that infective hepatitis was common among the Germans in North Africa, and also among the Italians there<sup>13</sup>.

### Observations

Although admitting that the information obtained cannot be described as particularly accurate or all-inclusive, it is sufficient to suggest that France has not shared, to the same extent as other European countries, in the major epidemic of infective hepatitis which became obvious in 1941 in England and even earlier in Germany. Investigation was difficult because in France, as in Britain, infective hepatitis is not a notifiable disease and statistical information is lacking.

The suggestion was made to me that infective hepatitis appeared now to be a disease particularly affecting Anglo-Saxons. This theory does not, of course, bear scrutiny; but I have noted in the past that in my venereal diseases service in England the incidence of hepatitis during anti-syphilitic treatment (by standard methods) was lower in French patients than in British. (During 1942-43, when in one hospital nearly 50 per cent of British service men had jaundice as an accident of arsenical treatment, only 20 per cent of French service men were so affected.)

It seems that if these observations are correct, we must review or re-orientate our theories on the relationship between protein deficiency in diet and the incidence of infective hepatitis. Perhaps in wartime France other protecting factors outweighed the protein deficiency. The enormous reduction in wine drinking may possibly have had some bearing.

In the past I have referred to differences in geographical distribution of cases of hepatitis<sup>14</sup>. The results of this present survey suggest that a profitable line of research in the near future would be the investigation of the geographical distribution and route of spread of the present epidemic of infective hepatitis in Europe and Africa.

In conclusion, I wish to record my appreciation of the help accorded me by Médecin Général Sicé and Commander Guillermin, by Prof. Gougerot and all members of the staff of the Hôpital St. Louis, Paris, by Dr. Degos, secretary of the Société Française de Dermatologie et de Syphiligraphie, by Profs. Loeper, Fiessenger and Chabrol of the Faculty of Medicine of Paris, and their assistants, by Dr. A. Vernes, and by all the other members of the French medical profession whom I encountered.

<sup>1</sup> MacCallum, *Lancet*, i, 342 (1945).

<sup>2</sup> Beattie and Marshall, *Brit. Med. J.*, i, 547 (1944).

<sup>3</sup> Marshall, *Proc. Roy. Soc. Med.*, 37, 453 (1944).

<sup>4</sup> Beattie and Marshall, *Brit. Med. J.*, ii, 651 (1944).

<sup>5</sup> Salaman, King, Williams and Nicol, *Lancet*, ii, 7 (1944).

<sup>6</sup> Cazal, *Rev. Med.-Chir. des Mal. du Foie*, 18, 204 (1943).

<sup>7</sup> Chabrol, *Acad. de Med.*, 492 (Oct. 5, 1943).

<sup>8</sup> Fabiani, *Presse Med.*, 96 (Feb. 27, 1943).

<sup>9</sup> Gutzeit, *Klin. Wschr.* (June 13, 1942).

<sup>10</sup> Northhaas, *Der deutsche Militärarzt.*, 5, 247 (1943).

<sup>11</sup> Ruther and Dorow, *Der deutsche Militärarzt.*, 3, 183 (1943).

<sup>12</sup> Meythaler, quoted in *Les Annali d'Igiene*, 59, 6, 281 (1943).

<sup>13</sup> Jacobelli, *Annali di Med. Nav. e Col.* (May and June, 1942).

<sup>14</sup> Marshall, *Brit. J. V. D.*, 19, 52 (1943).

## THE MOYNE REPORT ON THE WEST INDIES REGION

IT is long since complacency in Colonial rule gave place to a more critical mood in which the responsibilities of trusteeship could find full expression; and, more than any previous period, the interval between the World Wars was remarkable for a series of exhaustive inquiries into the social and economic health of the Colonial Empire. The survey of British Africa, directed by Lord Hailey, was the first of these; the second, on a similarly comprehensive scale, is the report, recently published, of the Royal Commission (chairman, Lord Moyne) on West India. It is a document notable for the exceptionally wide range of its inquiry and for the realism and courage, not to mention the humanity, of its conclusions and recommendations. Two shorter documents, concerned with special aspects of social and economic conditions within the West Indies, provide a powerful reinforcement\*.

Nothing indeed is lacking from the report, except only an appropriate accompaniment of maps. The

\* West India Royal Commission Report. (Cmd. 6607.) Pp. xviii + 480 + 16 plates. 7s. 6d. net.

West India Royal Commission. Report on Agriculture, Fisheries, Forestry and Veterinary Matters. By F. L. Engledow. (Cmd. 6608.) Pp. viii + 235. 3s. 6d. net.

West India Royal Commission, 1933-39. Statement of Action taken on the Recommendations. (Cmd. 6656.) Pp. 103. 2s. net.

Colonial Office. Development and Welfare in the West Indies, 1943-44. Report by Sir Frank Stockdale. (Colonial No. 189.) Pp. iv + 115. 2s. net.

(London: H.M. Stationery Office, 1945.)

only map provided is on the inadequate scale of fifty-five miles to the inch, by which the Leeward and Windward groups—and even the larger islands—appear as little more than dots on the vast expanse of the Caribbean. For at least the larger or more important Colonies a series of orographic, climatic, and other maps on a suitable scale might well have been provided. The need for cartographical aid is all the more necessary because of the scattered distribution of the British West Indies, which comprise, in addition to Jamaica, Trinidad and some islands of the Lesser Antilles, the widely separated mainland Colonies of Honduras and Guiana.

Administrative reform, in the direction of the unification of services, would seem to be more manageable and immediately possible than the amelioration of those economic and social conditions which depend as much upon the operation of causes outside the British West Indies as upon local influences. The recommendations in this field may, therefore, be mentioned first. Federation or some other close association of the Colonies, though admittedly desirable and ultimately probable, seems likely to be limited in the first instance to the union of the Leeward and Windward groups. The report is emphatic that the representation of West Indian, as of Colonial interests generally, in the Imperial Parliament is inadequate; and recommends as the most hopeful plan the association of West Indian delegates with any Standing Committee of Parliament which may be empowered to consider Colonial affairs. None of the Caribbean Colonies has attained responsible government, the nearest approach being found in Barbados, where the representative element in both the legislature and executive is considerable.

Much of the criticism which the Commission investigated and largely accepted was that vested interests alone were able to influence Government policy. In consequence, the unofficial representatives, precluded from adequate participation in Government, have tended to adopt a consistently hostile attitude to the latter. The unfortunate effect on the continuity of policy of too-frequent changes in appointments to the higher offices also receives criticism. The rare appointment of coloured West Indians to any but the lowest grades of administration is a consequence of strong racial prejudice which is believed to be on the increase. This is the more serious in that, owing to widespread miscegenation over a long period, the ratio of white to coloured inhabitants is now very low.

The main body of the report and accompanying recommendations is inevitably devoted to the acute social and economic questions which have emerged, largely in response to the prevailing systems of land utilization and tenure. As a whole the picture is sombre and even depressing. It is frankly acknowledged that the economic condition of the rural as of the urban population is deplorable. Only a small and diminishing number of peasant proprietors engaged in the production of an export crop have attained anything approaching security. The foremost agricultural need is increased production of food, in order at least to maintain the existing low standard of life, and to relieve the Colonies from the present necessity of importing essential foods. Peasant agriculture is always likely to be the most helpful enterprise in the ultimate interests of the community; but progress both on small-holdings and on the smaller estates depends on far-reaching reforms of existing agricultural methods. The practice of shifting cultivation