which was approved by the Annual Meeting of the B.M.A. at Cheltenham in 1901.

What a helpless, unorganized body we were before 1903, when the B.M.A. came alive to its responsibilities to the general practitioner. Before that time nobody thought of the Association as the natural protector of the men who form the bulk of the profession. But it soon tackled the glaring abuses of contract practices and the miserable salaries paid for such posts as parish doctor, just in time to be ready when National Health Insurance plunged us into a great political struggle, the result of which, *inter alia*, was greatly to improve the lot of the average general practitioner.

Since 1914 the change in the financial position of the general practitioner has been phenomenal. I suppose there are few who remember the inquiry made by the Government in 1912, when an independent firm of accountants was directed to find out what the doctors in six towns (selected by agreement with the B.M.A.) actually earned per head of the local population for every kind of medical service rendered. It emerged that the average income of all the doctors (225) whose books were examined was £493 a year, which worked out at 4s. 3d. a head, including every section of the local population.

One thankfully recognizes that the present-day G.P. is able to do much more for his patients than we were. He has many remedies quite unknown in my time, when every pneumonia case was a gamble, as we could only treat symptoms. And nearly every puerperal septic case was a tragedy—perhaps the most painful of any in the practitioner's daily work.

It may come as a surprise to my younger readers to hear that there was a time when patients did not want to go into hospital. Many thought that being sent there was a sign that their complaints were incurable. The word operation was anathema. I understand that nowadays it is only the paucity of hospital beds that prevents the majority of patients from having their illness there. I fancy the G.P. of my time was readier than his successors to tackle minor surgery. We had the idea that our hospital training was intended to make us equal to opening an abscess or dealing with a simple fracture. I am credibly informed that a large proportion of these cases now find their way to hospital. This may be all right, but it gives one the impression that much of the elaborate training of the student will be wasted. And I need hardly point out that this state of things does not enhance the reputation of the G.P.

We had one advantage denied to the present generation—at any rate to those entering the National Health Service. We lived in a time when it was regarded as a laudable ambition for a doctor to work hard to build up a practice he could call his own—something he *created* and which accumulated a capital of goodwill with which he could look forward to the future when the time came for retirement. Now, private property of almost any kind is coming to be regarded as nearly a crime against the community. The young G.P. now is working in a practice which belongs to the State, and I doubt if he will put into it the same energy and devotion as we did. But of course I am an old and an old-fashioned man.

But there have been many changes for the better—a great increase in the scientific aspects of practice, with fair hopes of even greater triumphs in the near future. I have even a hope that some day that opprobrium of our profession named very properly the “common” cold may be mastered, and I can think of no disease, not fatal, which causes more misery and discomfort.

TRANSPORT AND COMMUNICATIONS

BY

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The only outstanding inventions in the field of transport and communications that fall within the twentieth century are the aeroplane and broadcasting. Railways, the telegraph, the telephone, and the motor-car all came in during the Victorian era. But neither the telephone, which dates from 1876, nor the motor-car, which reached England about 1895, came into common use until after the turn of the century.

The first great change in the doctor's means of transport since the invention of the wheeled carriage was brought about by the advent of the motor-car. The *British Medical*

Two well-known models popular in 1907

Journal of May 16, 1896, described an “Exhibition of Horseless Carriages” which showed that “the manufacture of these vehicles is now passing out of the experimental stage.” Particularly commended was “a very workman-like carriage,” costing about £125, which was “easily steered and stopped, and did not give out much smell.”

Doctors were the first large professional group to experiment seriously with the car and to keep records of its cost and performance. For example, Sir Henry Thompson, the celebrated surgeon, was one of the pioneers of motoring in England. In 1902 he contributed a chapter on “Motor-Cars and Health” to the volume on *Motors and Motor-Driving* in the Badminton Library, and recorded

Steam-driven ambulance, 1902

that at the age of 82 he was in the habit of making journeys almost daily in his automobile.

Charles Barrett Lockwood is said to have been the first member of the staff of St. Bartholomew's to drive to hospital in his own car—about 1905. This was painted a bright scarlet and was known as "The Red Peril." In 1906 Lockwood was chairman of a "Committee of Medical Men who are Users of Motor Cars." Although the medical profession took rapidly to the use of the motor-car, advertisements of horses and horse-drawn vehicles persisted in the *British Medical Journal* and elsewhere almost up to the time of the 1914-18 war.

The mechanization of ambulances began in this country in 1902, when a steam ambulance car was put into commission by the Metropolitan Asylums Board. This vehicle accommodated eight stretchers and was capable of a speed of five miles an hour. The first ambulance to be driven by an internal combustion engine was manufactured in 1904 and had many unique features. It could carry only one stretcher case, but had a speed of fifteen miles an hour. Horse ambulances were finally abandoned by the M.A.B. in September, 1912. At the present time the London County Council is the largest user of civil ambulances in the world, with 150 petrol-driven vehicles.

From Kitty Hawk to Cloncurry

The possibility of a new method of evacuation of casualties was recognized very soon after the Wright brothers made their historic flight over the sand dunes of Kitty Hawk in 1903, but there is no clear record of the transportation of wounded by air until 1915. Then during the Serbian retreat Captain D. Angelzer and Lieutenant Paulhan, of the French Air Service, carried twelve wounded men distances of 80 to 200 kilometres using service-type planes. To these two Frenchmen is due the honour of having given a literal meaning to the term "Ambulance Volante" used by their countryman Baron Larrey in 1792.

While attached to the R.F.C. in Egypt in 1917, the late Major Alexander Dingwall Kennedy, R.A.M.C., had a D.H.9 converted for the accommodation of stretcher cases. An improved model of the same machine was used in 1919, when three patients were moved 175 miles to base in the short air war against the "Mad Mullah" of Somaliland.

The first aerial ambulance built for the Royal Air Force was a Vickers-Vimy twin-engined machine constructed at Weybridge in 1920, but air evacuation was first used on an appreciable scale in Iraq in 1923.

In 1941 there were 1,996 patients transported by air, most of them during Wavell's advance in the Western

Desert; in 1942 just over 10,000 patients, and in 1943 a further 40,000, were carried by air. The peak of effort was realized in 1944, when about 300,000 sick or wounded were removed by air on all fronts, without a single mishap. Between D Day on June 6, 1944, and VE Day on May 8, 1945, the R.A.F. evacuated 77,348 patients to the United Kingdom from the Continent. This was slightly more than the number taken by the sea route.

Although less spectacular, the services which aviation has rendered to medicine in times of peace are as noteworthy as those given in war. The aeroplane enables medical aid, drugs, vaccines, and sera to be carried to the scene of any epidemic or disaster in the shortest possible time. Patients can be safely transported for special treatment in any emergency; consultants can fly from one end of the world to the other in as many hours as it would have taken weeks or months fifty years ago.

The story of the Australian Aerial Medical Services provides one of the most striking examples of the benefits conferred by the conquest of the air. Over 1,380,000 square miles of the Australian hinterland there is no settlement large enough to support a resident doctor. Many settlers are hundreds of miles from the nearest medical man.

The Queensland and Northern Territory Aerial Service owed its inception to the Rev. John Flynn, of the Australian Inland Mission, and was inaugurated in 1928, having its base at Cloncurry in North-west Queensland. An essential factor in this "Flying Doctor" scheme is the provision of simple wireless sets which derive their power from small high-tension generators worked by bicycle pedals. The "Mother Station" is in daily contact with some forty pedal "Transceivers" distributed among the settlers. The "Flying Doctor" flies on an average 20,000 miles a year and attends directly about 250 patients. The service was placed on a national basis in 1934, and as the Australian Aerial Medical Services, which is a Commonwealth Body, it enjoys Federal and State government assistance.

Turning to transportation in a purely vertical direction it may be noted that the first passenger "elevator" was invented by Elisha Graves Otis in 1857. The first successful electric lift was installed in New York in 1889. Many hospitals in Great Britain had lifts fitted before the end of the last century, although many of them were very primitive affairs, and the earliest models were often constructed in skeleton cages entirely outside the main building.

London County Council Ambulance, 1949

Electric Messages

The first practical telegraph was invented by Morse about 1832-5. One of the best-known early instances of its use was during the Prince of Wales's attack of typhoid in 1871, an occasion commemorated by a later poet laureate:

"Across the wires the electric message came:
'He is no better, he is much the same.'"

The *British Medical Journal* in 1880 hailed telegraphy as "an inseparable part of modern arrangements for life," and made a strong plea for the provision of telegraphic facilities at all hours of the day and night. During August, 1883, the *Medical Record* of New York provided its readers with telegraphic summaries of the daily proceedings of the British Medical Association's annual meeting at Liverpool. Congratulating his American contemporary on this achievement, the Editor of the *British Medical Journal* pointed out that free use of the cable for obtaining medical information was by no means new. Cabled reports of the cholera epidemic in Egypt had appeared in the *B.M.J.* in July, 1883.

An editorial on "Therapeutics by Telegram" in the *British Medical Journal* of April 29, 1893, inveighs against the ubiquitous agents of the daily press who were constantly announcing by telegraph the discovery of some wonderful cure. Among the recent cases cited was the telegraphic statement that Professor Koch had discovered a new and infallible cure for tuberculosis.

The telephone was invented by Alexander Graham Bell in 1876, and in 1878 the first telephone switchboard for commercial subscribers was put into operation at New Haven, Connecticut, with twenty subscribers. It is a striking fact that when the telephone first came into use it commended itself to the medical profession mainly as an aid to physical diagnosis. Thus the *Boston Medical and Surgical Journal* in 1878 discussed "its utility in the class demonstration of auscultative signs."

In medical circles in England the telephone was at first hailed as a means of communicating with patients suffering from infectious diseases. The *British Medical Journal* of May 11, 1878, states that "it has been in use in the house of a medical man during the last few weeks, to enable a member of the family suffering from an infectious exanthem to communicate with her family and friends; and this application we would recommend as very practical to the managers of fever-hospitals and asylums."

Soon afterwards some doctors began to advertise the fact that they could be summoned or consulted by telephone by day or night, and this led to charges of unprofessional conduct. Many medical men thought that the telephone was not sufficiently private, and pointed out the dangers to be feared from eavesdroppers.

Marconi came to England in 1896 and on June 2 took out the first patent ever granted for wireless telegraphy based on the use of electric waves. In March, 1898, he established communication across the English Channel, and on December 12, 1901, succeeded at his first attempt in transmitting and receiving signals across the Atlantic. The medical applications of wireless came more rapidly than those of the telegraph and the telephone. In July, 1898, the Prince of Wales, while staying at Waddesdon with Baron Ferdinand de Rothschild, fell and fractured his patella. He was attended on the Royal yacht *Osborne* by Mr. (later Sir Alfred) Fripp, and at Cowes "an unknown Italian called Marconi came on board and astonished the world by sending daily bulletins of the Prince's progress by wireless to Queen Victoria at Osborne House." By

the end of 1899 communication between ships and land stations over distances of 80 to 100 miles became an accomplished fact, and within a very few years all large ocean-going vessels were fitted with Marconi's apparatus.

Wireless soon proved its value in cases of shipwreck and fire, and from the early years of the present century we read of shipmasters requesting and receiving by wireless professional advice on the treatment of accidents, the management of labours, and on medical and surgical emergencies of all kinds.

We are indebted to Sir Allen Daley for the photographs of the L.C.C. ambulances. The pictures of cars popular in 1907—a 7 h.p. Singer and a 10-12 h.p. Humber—are taken from the *British Medical Journal* of May 4, 1907.

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Certain individual illustrations were reproduced, or in some cases redrawn, from the following books: *The Study of the Pulse*, by Sir James Mackenzie, 1902, Y. T. Pentland, Edinburgh; *An Atlas of Bacteriology*, by C. Slater and E. J. Spitta, 1898, Scientific Press London; *Vitamins in Medicine*, by F. Bicknell and F. Prescott, 1946, William Heinemann (Medical Books), Ltd., London; *Insects of Medical Importance*, by John Smart, 1943, British Museum, London; *Pathology*, by J. M. Beattie and W. E. Carnegie Dickson, 1948, fifth edition, William Heinemann (Medical Books) Ltd., London; *Pneumotherapy*, by P. L. Tissier, 1903, Rebman, Ltd., London; *Blood Transfusion*, by V. H. Riddell, 1939, Oxford University Press, London; *History of the Birmingham Medical School*, 1925, Cornish Brothers, Birmingham.

Two of the older pictures on page 7 are taken from an article by J. Battersby in the *Archives of the Roentgen Ray* (1899, 3, 74) and from an article by A. D. Reid in a special number of the *Practitioner* (1906, p. 80). The Einthoven tracing is from the *Archives Néerlandaises des Sciences Exactes et Naturelles* (1904, 9, 202).

Photographs of some of the crystals of hormones, vitamins, and antibiotics, and of different manufacturing processes, were kindly supplied by: Boots Pure Drug Co., Ltd.; Burroughs Wellcome and Co.; Ciba Laboratories, Ltd.; Glaxo Laboratories, Ltd.; I.C.I., Ltd.; Lederle Laboratories; Parke, Davis and Co.; and Roche Products, Ltd.

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