charity; often it was a fee. For in the house-to-house visitation of mummers, waits, and others, at other seasonal festivals as well as at Christmas, the gifts of money and kind made the donor free of the benefits accruing from the ceremony—good luck, fertility, and the like. The 'Christmas box,' in fact, was an expression of the originally communal character of the festival and a reaffirmation of the one-time solidarity of the social group when the well-being of the whole depended upon the due participation of every member in the prescribed ritual.

The 'Old-Fashioned Christmas.'

By Dr. C. E. P. BROOKS.

WHEN the rain of Dec. 25, 1927, turned to heavy snow, the remark was probably made in thousands of homes in Great Britain that this was Christmas weather of the real old-fashioned sort. It is equally probable that any meteorologist present stated with conviction that the old-fashioned Christmas is a myth. Prof. W. J. Humphreys, of the U.S. Weather Bureau, is particularly severe on the similar belief current in America, assuring us that statistics prove it to have been "just the same as the new"; and nine out of ten meteorologists agree with his dictum. It is, however, quite possible to make out a plausible case in defence of the popular opinion.

Meteorological statistics show that recent winters in Great Britain have been abnormally warm. Comparable records are available for more than a century and a half in both London and Edinburgh, and show several interesting features. In London, after a well-marked maximum about 1780, there followed a pronounced minimum about 1815. The average temperature of the three winter months of 1814–15 was 32° F., this being the coldest winter of the whole series, but 1816 was little warmer. Temperature remained generally low until about 1848, after which a second series of warm winters occurred, with its crest in 1870. A second period of cold winters centred about 1890; from 1886 to 1895 inclusive, only one winter exceeded 40° F., while both 1890–91 and 1894–95 were exceptionally cold. During the present century the winters have become steadily warmer, and the average of the past ten years, 41·4° F., is the highest since records began. In Edinburgh the rise of winter temperature during the twentieth century has been even more marked than in London.

A similar result follows from a table included by Sir Richard Gregory in his paper on "British Climate in Historic Time" (*Geographical Teacher*, 1924), relating to the number of days of skating in Regent's Park, which totalled 236 during the ten winters from 1885 to 1895, compared with only 43 in the nine following winters. After 1904 the records unfortunately ceased, but one knows from personal experience that there has been little skating in London in the past twenty-five years.

An attempt has been made to discover whether there was any corresponding decrease in the number of days with snow, but the figures are difficult to collect, and such as were obtained were inconclusive. A tendency, generally in evidence, for the number to *increase* with the passage of time must be attributed to greater care in observing, rather than to a true increase. A specimen study of the eight days centred round Christmas showed for the twelve years 1870 to 1881 in London exactly the same average as for the 30 years 1886 to 1915; while in Aberdeen the twelve years were decidedly less snowy than the general average. On the other hand, a count of the very snowy and of the almost snowless winters in the British Isles, as described in Mr. L. C. W. Bonacina's paper on "Snowfall in the British Isles" in "British Rainfall" for 1927, gave for the 25 years 1875–76 to 1899–1900, 12 very snowy and 6 almost snowless winters; while the subsequent 25 years gave 7 very snowy and 9 almost snowless, an apparent decrease in snowfall which accords better with the change of temperature.

Although, on the whole, the popular belief thus seems to be justified by statistics, there are several considerations which suggest that the 'old-fashioned winter' was not the winter of a generation ago. The variations quoted above, with the possible exception of the cold spell round 1815, were comparatively small fluctuations, scarcely large enough to impress themselves on slow-moving tradition. Moreover, the belief occasionally crops up in the written records of an earlier day. Mr. Bonacina points out, in the article referred to, that two observers described the snowfalls of December 1878 as resembling those of a former generation, and Dr. Glasspoole quoted in the *Meteorological Magazine* for April 1927 a reference, written in 1853, to "one of the old-fashioned winters, snow and frost." No doubt there are still earlier references, but I do not think that Pepys uses the term anywhere in his diary, as would have been likely had the belief been current in his day.

There seems to have been a real change of climate about 1750. Before that date there was a prolonged period, approaching a century, of abnormally dry weather in England. At the same time, weather in Norway was stormy and snowy; this and other facts suggest that our droughts were of the 'anticyclonic' type, which would be accompanied by generally cold weather in winter. This was the time of the great 'frost fairs' on the Thames, notably 1683–84, 1715–16, and 1739–40, events which were likely to impress the memory of Londoners in a way which mere weather could not do, and which were kept in mind by the numerous 'relics,' such as engravings and ballads from printing presses set up on the frozen river. If the 'old-fashioned winter' ever had a real existence, no series of years is more likely to have given birth to the tradition.

An alternative possibility remains to be considered; namely, that the belief results from

inaccurate mental processes. Three theories may be mentioned. The first is that the change of the calendar was responsible. In 1752 eleven days were added to the date, so that in 1751 Christmas Day fell on Jan. 5, new style, that is, almost exactly at the coldest time of the year. The long record at Greenwich shows, however, that the difference between the mean temperatures of the end of December and of the beginning of January is inappreciable. Moreover, the 'old-fashioned Christmas' is practically interchangeable with the 'old-fashioned winter.' Secondly, Mr. M. T. Spence, in the *Meteorological Magazine* for January 1927, points out that long spells of cold weather occur less frequently than long spells of mild weather in winter, so that by the time a cold spell arrives, the preceding one has passed into the hazy 'good old days.' His figures, however, refer only to spells which are statistically cold or mild, and the popular idea of the weather is often at variance with the statistical. A more plausible theory is that the belief is upheld by the memories of immigrants into London from the colder and more snowy north. A difficulty is that the belief is not confined to London, but is deeply rooted in many rural districts where the amount of immigration is very small.

None of these ingenious theories satisfies, but after all, is such ingenuity necessary? A change in our sense of proportion as we grow older would seem sufficient, for a few frolics in the snow when we were young would colour all our memories of winter. The change may not be in the weather, but in ourselves.

I would suggest, therefore, that the belief in the 'old-fashioned Christmas' may have originated in a series of severe winters in the late seventeenth and early eighteenth centuries, but that since then its vitality has been purely subjective, so that it now refers not to any definite period of time, but to the childhood of the speaker.

The Broadcasting of Seismological Reports.

FROM the records of a single well-equipped observatory the position of the epicentre of a large earthquake at a great distance can normally be determined with considerable accuracy. Closer estimates can be made, however, when the records from several stations are available, and especially when the stations are well distributed over the world. A system of exchange of seismological information by cable was inaugurated several years ago by the British Association. By the use of information received from stations in India, Australia, and America, Prof. H. H. Turner, chairman of the British Association Seismological Committee, has been able to determine the details which he has communicated regularly to the Press.

For the circulation of meteorological data, the submarine cable has been almost superseded by wireless telegraphy, and it is a natural development to use the latter medium for inter-communication of seismological information. The first step was taken by France. Since 1921 the readings of seismographs at Strasbourg have been broadcast regularly from the Eiffel Tower. The information is added to synoptic weather messages by the French Meteorological Office. The seismological code was given an international standing by publication in the report of the Rome meeting (1922) of the Seismological Section of the International Geodetic and Geophysical Union. The code is used by the Egyptian Meteorological Service for reports from Helwan. Since the beginning of 1927, seismological reports from Kew Observatory have been broadcast by the Air Ministry with the midday synoptic weather report which is sent out from Kidbrooke at 14 h. 0 m. G.M.T. Arrangements have been made by the Air Ministry for the transmission to London of seismological reports from Bombay. These reports also are broadcast from Kidbrooke.

In America, co-operation amongst the various bodies interested in seismology is well organised. Information is collected from the United States and Canada by the United States Coast and Geodetic Survey, by the Jesuit Seismological Association, and by Science Service, the well-known news agency. At the request of the Meteorological Office, London, it has now been arranged that from Jan. 1, 1929, seismological reports will be transmitted regularly from Arlington with the meteorological synoptic message which is sent out at 4 h. 0 m. G.M.T. This service is made possible by the co-operation of the United States Coast and Geodetic Survey, the United States Weather Bureau, and the United States Navy. The meteorological message from America is re-broadcast from the Eiffel Tower at 6 h. 20 m. G.M.T., and the seismological information will be included in the re-issue. The international or Strasbourg code will be used for this service. Details regarding the code, wave-lengths, etc., will be supplied by the Superintendent, Kew Observatory, Richmond, Surrey, on request.

The data will refer to two stations which will be selected on each occasion by the Coast and Geodetic Survey. The stations will be chosen from those for which the phases of the earthquake are well determined. Stations not too far from the epicentre and pairs giving a good angle of intersection will be selected.

The list of possible stations includes not only nine in the United States (Berkeley, Chicago, Cincinnati, Fordham, Georgetown, Harvard, St. Louis, Sitka, and Tucson), but also two in Canada (Ottawa and Victoria), one in the West Indies (San Juan), and four in or beyond the Pacific (Apia, Honolulu, Manila, and Wellington).

The new service will be much appreciated by European seismologists. The elasticity of the system by which the most valuable data are selected for transmission is noteworthy. In some cases trustworthy estimates of the positions of the epicentres of earthquakes will be available at once instead of after a delay of several weeks.