LONG-PERIOD RECURRENCES IN CANCER

BY

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Almost all recurrences of cancer appear at intervals of a few months or years, and recent studies have shown that when the onsets of active phases of growth can be dated to a few weeks they may be timed at intervals which are multiples of 7.6 months (33 weeks $\pm$ 3 weeks) or of the half-period (Webster, 1940).

Late recurrences of cancer are so comparatively rare that few observations of value from a statistical basis can be reported by any one centre; and many of the data (as in Ahlbom, 1935, in salivary-gland tumours) must necessarily be from patients' records of treatment elsewhere, or from the patients' memories of past events. But recently some observations have suggested confirmation of my previous records that the onsets of late recurrences are more often grouped together at intervals of 7 or 11 years, or of their multiples or sums (as 14, 18, 21, 22, and upwards), than at the intervening years. The subject was raised lately by the Astronomer-Royal (Sir Spencer Jones) in correspondence; for it would be unlikely that the minor 7.6-months solar cycle should appear to have biological significance (or the rotation one of 27 to 28 days) and the major solar cycle, averaging 11.2 years (17½ periods), be inoperative.

A preliminary notice of studies in progress may be of interest, as any new aspect of cancer may be of importance in time (as in helping forward any prophylactic measures against recurrence: Webster, 1942a).

Analysis of Recurrences

Out of over 3,000 recurrences analysed in neoplastic disease 284 were detailed in their time-relations (Webster, 1940), and of these 248 were in the first three years, 35 in the fourth to twelfth years, and 1 at 28 years. The tenth and eleventh years showed a small peak of six cases, as compared with only one or two at neighbouring years. Notes of some cases seen recently, other case records, and a brief study of the literature confirm this finding: there seems to be a greater probability of the onset of late recurrences of cancer at 7 and 11 years, or at their multiples, than at other intervals of years.

7 Years.—(11 periods.) Seven cancer cases seen lately (lip, breast (2), rectal, glioma of eye, thyroid, and rodent ulcer); one multiple case—tongue and pyriform fossa—had a 7-year interval between onsets.

11 Years.—(Approximately 16 to 18 periods of 10.2 to 11.5 years.) Nine cases (6 recorded in Webster, 1940) of recurrence or second primary have been seen. Sarasin (1939) recorded 5 approximately 11-year recurrences in cancers of the mouth in a study of recurrent cancer at this site. A Hodgkin patient, with a 23-years history, now well, had an 11-year remission once.

14 Years.—One breast case seen lately has a 14-year recurrence after apparent cure following buried radium and x rays (operation had been refused). 14-year and 18-year recurrences of activity have been detailed by Ahlbom (1935) in salivary-gland tumours: in several the total history from onset to death was 18 years. He gave a number of 7-, 10-, and 11-year cases, as well as one recurring each at 21, about 30, and about 50 years.

22 Years.—In one week lately two patients reported to the Middlesex Radiotherapy Institute with second primaries 22 years after the onset of rodent ulcers, cured with radium applications. Ahlbom had one case.

29, 30, and 32 Years.—Ahlbom had several cases.

50 Years.—Ahlbom (1935, p. 200). Case 187, malignant parotid tumour, growing for about 50 years—"much more rapidly in the past few months." Ahlbom (p. 63): Case 4, benign mixed parotid tumour, recurring about 52 years after the first onset at 14 years of age. Prof. W. D. Newcomb at a recent discussion at Oxford referred to a 50-year recurrence of a parotid growth.

Discussion

The occasional cases found with activity beginning again at intervening years are usually at multiples of the fundamental 7.6-months cycle (or its half-period). The link between this and other solar and planetary cycles and the biological (in tree-rings and diseases, for example) is probably a meteorological one.

Most detailed studies of weather cycles have been concerned with the very short oscillations up to a month or so, with monthly or yearly means, or with long cycles of years. But charts of years of temperature, pressure, rainfall, etc. (with daily to monthly details), show as a rule signs of the 3.8-months and 7.6-months cycles; and almost all the longer cycles found—as by Beveridge (1922) in wheat prices and weather, and by Brunt (1927) in European temperature, pressure, and rainfall records for 100 years—are multiples of the 7.6-months cycle or the half-period (of 15 to 18 weeks). Brunt (1919) traced in Greenwich temperatures the period (228 days), and six multiples of it up to 9.5 years (by periodogram analysis). A number of the long weather and disease charts of Petersen (1934) show periods and half-periods in both weather fluctuations and disease; and he has charted (Petersen, 1938) how the 11-year solar cycle has a direct correlation with the death rates in some infective disease records, as in tuberculosis, epidemic meningitis, and puerperal sepsis. Tuberculosis, it may be noted, has been found lately (Webster, 1943) to show a similar cycle, in its relapses, to the influenza-cancer cycle of recurrences. Petersen has reported in great detail clinical and biochemical studies of the microcycles of fluctuations in normal and ill persons parallel to weather oscillations. In both, the curves are those similar to "relaxation oscillations" as studied in physiology (A. V. Hill, van der Pol), and they are not simple sine waves, following one another at invariable periods of time, as electrical pulses in a wire. Special statistical methods will probably have to be devised for the study of such cycles, as is suggested by E. B. Wilson (1936). Biochemical and blood research into the cycles of activity in cancer patients is urgently called for, on lines initiated by Petersen and by Gruner (1941, 1942) in their preliminary studies.

Summary

Analysis of some late recurrences of cancer shows a preponderance in the years 7 and 11 and their multiples. If this be confirmed by later studies it would be a further correlation between solar and biological cycles of disease already suggested by the apparent correlation between the short-period recurrences of cancer—and some metabolic, nervous and mental, and infective diseases (Webster, 1942b, 1943)—and the 7.6-months (33 weeks) cycle discovered by R. Wolf of Zurich in 1859. It was 100 years ago that Schwabe discovered the 11-year solar cycle. It is suggested that meteorological factors are the connecting-link between solar phenomena and disease cycles. Follow-up departments, not ceasing to keep in touch with neoplastic cases after ten years or longer, may, as measures of preventing recurrences become available, find this periodic aspect of value in helping to detect recurrences as early as possible.

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Last May Lord Nuffield announced a scheme for the provision of specialist and nursing-home treatment supplementary to anything obtainable under the proposals of the Beveridge report, to be known as the Central Provident Association (*Journal*, June 5, p. 705). To meet the special needs of Scotland the Scottish Nuffield Provident Society has now been formed, and will act as the Scottish branch of the central body. The terms of membership are the same as in England—namely, anyone under the age of 60, without income limit, living or working in any part of Scotland may join. The annual contribution for a member without dependants is £2 15s.; there is no limit to the number of dependants included in a "family membership"; an adult dependant's contribution is £1 15s. a year, and 10s. is payable for each child under 18. Benefits are also the same: £6 a week for hospital or nursing-home treatment of a member, substantial grants for consultant and other specialist services, and up to £70 for any one operation or illness; and a family may claim benefit up to £105 in any one year. The society's offices are at 10, Duke Street, Edinburgh, 1, and local offices are shortly to be opened in Glasgow and the principal Scottish centres.