

America as to bank reserves, and our own law as to the issues of the Bank of England. We certainly think that the experiences of 1847, 1857 and 1866 (to say nothing of 1890), show that such a law as ours, which gives no power of expansion to the bank, as such, no matter how grave may be the emergency, is one of very doubtful wisdom. It would, we believe, be far more reasonable to adopt something like the plan adopted by the German Bank law of 1875, whereby the bank can issue beyond the usual limit on paying at the rate of 5 per cent per annum to the government on all extraordinary issue, as a sort of penalty—an arrangement which ensures a reasonable charge to the public on such extra issues, and thus compels contraction of obligations by a sort of automatic process. Panic is thus avoided, while a wholesome warning is extended to the trading world, and the money market is brought under the rule of law, and is not, as with us, dependent in the worst times on the caprice of a Chancellor of the Exchequer, who may be a man ignorant of the dangers and difficulties of commerce, or who only knows them vaguely, as set forth in the books of mere theorists. W. F.

✓ **CRISES, PERIODICITY OF.** In the world of physics the idea of "periodicity" of "cycles" is familiar. The twenty-eight years period of the sun is a simple illustration of a regular cycle.

The recurrence of commercial crises over a century, at intervals of ten or twelve years, has been frequently noticed by economists, and the suggestion made that possibly the physical law which, every ten or eleven years, brings good vintage years to Europe and droughts to India, may control the commercial fortunes of men. An enumeration of recorded years of acute commercial distress—1753, 1763, 1772-73, 1783, 1793, 1815, 1825, 1836-39, 1847, 1857, 1866, 1878, 1890—suggests periodicity. During these 140 years trade and banking have been carried on in war and peace, with a silver standard, with a gold standard, under a suspension of cash payments, in times of plenty, and in times of want; but the fatal years have come round with a considerable approach to cyclical regularity. While admitting that the commercial crises to which this generation has been exposed have been less acute than those which afflicted the close of the last and the beginning of the present century, the fact of their recurrence in something like periodicity remains—a fact which it is easier to record than to explain. Space only permits a statement of some of the more important crises, with a reference to works from which fuller information may be derived.

To commence with the beginning of this century, the question of the periodicity of cycles is discussed by Henry Thornton, whose well-known sagacity caused him to be greatly consulted on financial questions by William Pitt,

in his work, *An Enquiry into the Effects of the Paper Credit of Great Britain*, 1802. Thornton speaks of the crisis of 1793 as the first material one of the kind which had for a long time happened. He points out that the panic greatly abated, and mercantile credit began to be restored, so soon as the intention to issue exchequer bills was announced. He also mentions as worthy of notice that, though the failures had originated in an extraordinary demand for gold, it was not any supply of gold which effected the cure, but the idea of general solvency which was created by the promised issue of exchequer bills (pp. 49-51). He further mentions (p. 152) that the fluctuation in the balance of trade with foreign countries which we experience had also become larger than heretofore, in consequence of the greater extent of our population and commerce. "The scale of all things having increased, the scale of this balance may have increased also in a degree unexpected by the bank."

Tooke, in his *History of Prices*, vol. i. p. 176, gives a clear account of the progress of events leading up to the disasters of 1793. Tooke states that immediately preceding that crisis a great revulsion and derangement of commercial credit had occurred, due to a pre-existing and undue extension of credit and paper circulation.

In vol. ii. p. 5, in discussing the causes which led to the discredit of 1816, he explains that the speculation in exported commodities, which had its first rise in the prospect of the downfall of the power of Napoleon I. in Europe, reached its height in the spring of 1814, and that the tardy discovery that the effective demand of the continent had been over-rated precipitated the crisis of 1815-16.

The causes of the crisis of 1825 are discussed by Tooke (vol. ii. pp. 149-159). In 1822, the British 5 per cent had been reduced to 4 per cent; this had led to a general restlessness among those whose incomes were reduced, and a readiness to invest in foreign loans, the principal borrowing states being South American. The South American loans ultimately entailed a loss of nearly the whole of the sums subscribed. The exaggerated views of coming prosperity allowed full scope for an undue enlargement and abuse of credit.

The panic of 1836 is fully described by Tooke (vol. ii. p. 274). It is noticeable that whereas the disasters in 1825 were principally due to foreign speculations, those of 1835 were due to home speculations, an undue extension of credit arising from gambling in shares of railways, joint-stock banks, etc.

In vol. iv., speaking of the crisis of 1847, Tooke says: "In August 1845 the speculation assumed all the apparent characteristics of a mania. Symptoms of an approaching revulsion were, however, then clearly discernible."

It is noteworthy that the gradual develop-

ment and overgrowth of the system, as pointed out by Langton, Jevons, and Tooke.

A variety of causes led to the crash in 1847—rather than the means of the country, but the evidence of developing causes on the others which appeared at that date.

Mr. William Langton, in his *Periodicity of the Manchester Statistics*, says: "These disturbances are another wave which appears in the period, and in the causes have no doubt a prompting cause which appears to lie in the past."

The doctrine of periodicity is supported by Professor Jevons in his *Elements of Economic Science*, time, and with his communication on the British Association says, "There is a commercial distress which occurs at intervals of months (October months) great irregular fluctuations, as in the year 1847, a disastrous breach in the regularity of the market." In elucidation of irregular fluctuations in the paper on "The fluctuations of the market," *Journal of the Royal Statistical Society*, London, 1866, vol. 26, p. 100. "These changes in the harvests, from the demand in any one period of excess from wars and political events, and from fortuitous occurrences upon, and allow of the notion of the *Economy*, 1878, vintage years on droughts in India, years, and it seems that crises are connected with weather affecting probably arising received from the ten years and a half." The influence of the possibility of a period and the period formed a subject and scientific mind reader may be referred to *Currency and Finance*, papers are collected by W. S. Jevons. The invention of

ment and overgrowth of credit indicated by Langton, Jevons, and Mills, are clearly stated by Tooke.

A variety of causes brought about the serious crash in 1847—railway calls in excess of the means of the country, high price of corn, etc.; but the evidence of a culmination of previously developing causes is as clear on this occasion as on the others which have preceded and followed that date.

Mr. William Langton, of Manchester, speaking of periodicity says (*Transactions of the Manchester Statistical Society*, December 1857): "These disturbances are the accompaniment of another wave which appears to have a *decennial period*, and in the generation of which moral causes have no doubt an important part. The prompting cause of these convulsive movements appears to lie in the inordinate use of credit."

The doctrine of periodicity was held strongly by Professor Jevons, who carried his investigations into the subject over a great length of time, and with his noted ability. In a communication on the study of periodic fluctuations, British Association 1862 (Cambridge), Jevons says, "There is a periodic tendency to commercial distress and difficulty during these months (October and November). It is when great irregular fluctuations aggravate this distress, as in the years 1836-39, 1847, 1857, that disastrous breaches of commercial credit occur." In elucidation of Jevons's allusion to "great irregular fluctuations," a quotation from his paper on "The frequent pressure in the money market," *Journal of the Statistical Society of London*, 1866, vol. xxix. p. 235, may be useful. "These changes arise from deficient or excessive harvests, from sudden changes of supply or demand in any of our great staple articles, from periods of excessive investment or speculation, from wars and political disturbances, or other fortuitous occurrences which we cannot calculate upon, and allow for." Still further developing the notion of periodicity, Jevons (*Political Economy*, 1878, Science Primers) says, "Good vintage years on the continent of Europe, and droughts in India, recur every ten or eleven years, and it seems probable that commercial crises are connected with a periodic variation of weather affecting all parts of the earth, and probably arising from increased waves of heat received from the sun at average intervals of ten years and a fraction."

The influence of solar radiation, and the possibility of a relation between the sun-spot period and the price of corn and other events, formed a subject of inquiry suited to the exact and scientific mind of Jevons. For this the reader may be referred to his *Investigations in Currency and Finance*, in which his detached papers are collected, and *Letters and Journal of W. S. Jevons*.

The invention of the term "credit cycle" may

be traced to Mr. John Mills of Manchester (Paper on "Credit Cycles and the Origin of Commercial Panics," *Transactions of the Manchester Statistical Society*, December 1867). Mr. Mills discussed the pathology of crises; and after alluding to "the occult forces which swell or diminish the volume of transactions through a procession of years," thus spoke of periodicity. "It is an unquestionable fact that about every ten years there occurs a vast and sudden increase of demand in the loan market followed by a great revulsion and temporary destruction of credit."

"The periodicity of commercial crises is at any rate a *fact*. The decades interposed between the great commercial crises are normal cycles of development of credit under certain existing conditions; that during each of these decades commercial credit runs through the mutations of a life, having its infancy, growth to maturity, diseased overgrowth, and death by collapse."

Mr. Mills enters into a minute examination of the life-history of a credit cycle in a communication made to the Manchester Statistical Society, *Transactions* 1871. Four years earlier, in his paper read before the Manchester Statistical Society in 1867, Mr. Mills had discussed the possibility of finding remedies for the periodic recurrence of commercial panics, in seeking for which he laid stress on the increased spread of information. Mr. Mills's anticipation appears to have been verified in some measure by the course of events.

[Max Wirth, *Geschichte der Handelskrisen*, 1883.—Clément Juglar, *Des Crises Commerciales et de leur retour périodique en France, en Angleterre, et aux États-Unis*, 1889.] G. H. F.

CROMBIE, ALEXANDER (1762-1842), born at Aberdeen, was for some time Presbyterian minister, and then schoolmaster, in London. He was known for his writings on etymology and syntax, especially for his *Gymnasium*, a book of exercises in Latin composition; but he wrote also on theology, philosophy, and political economy. Apart from his books, he seems to have had a wide personal influence. Major Torrens dedicated to Dr. Crombie his *Essay on Money and Paper Currency* (1812), and speaks of him with great deference in the *Essay on the External Corn Trade* (1815). In 1813 Crombie published, in the *Pamphleteer* (vol. x.) a *Letter to David Ricardo containing an analysis of his pamphlet on the Depreciation of Bank Notes*; but Ricardo did not regard him as a perfectly faithful exponent of his views. Crombie's *Letters on the Agricultural Interest* (1816) would seem to have been the last of his economical writings.

[Ricardo's letters to Malthus, 1887, Clar. Press, p. 82, sub dato 21st April 1815.] J. B.

CROME, AUGUST FRIEDRICH WILHELM (1763-1833), a distinguished German statisti-