the House was only saved from being counted out on two occasions by sufficient members rushing in to form a quorum. The substance of the Bill was given in last week's NATURE. Briefly, it is proposed that at 2 a.m. on the third Sunday in April of each year, all clocks shall be put forward one hour, and shall remain in advance of Greenwich mean time and Dublin mean time by this amount until 2 a.m. on the third Sunday in September, when the hands are to be put back again.

We do not propose to repeat now the substantial arguments against this proposal stated in these columns on July 9, 1908, but we do suggest that the article could be read with profit by the members who voted for the second reading of the Bill, which was for the second time referred to a Select Committee of the House of Commons. During the debate many illustrations were used to convey to the minds of the members some idea of the relation between local time and mean time, and of daylight to business hours. No one pointed out, however, that it would be more reasonable to change the readings of a thermometer at a particular season than to alter the time shown by the clock, which is another scientific instrument. Perhaps it is contemplated to bring in a Bill to increase the readings of thermometers by ten degrees during the winter months, so that 32° F. shall be 42° F. One temperature can be called another just as easily as 2 a.m. can be expressed as 3 a.m.; but the change of name in neither case causes a change of condition.

The argument that inconvenience is not felt by travellers on the Continent changing their watches to mid-European and east-European time, or by the five standard times of America, has little bearing upon the question. The inhabitants of any of these regions use a particular standard time, as we use Greenwich time, but their hours of work and leisure are determined by national custom. The most noteworthy characteristic of life in France and Germany is the earlier hours at which places of business open in the summer compared with those usual in our cities. In Germany many schools open at 7 a.m., and the usual hour is 8 a.m. The people adapt themselves, therefore, to the daylight hours instead of pretending to do so by putting on the clocks by one hour in April and back an hour in September. In all places between the same latitudes as those of the British Isles, the relation of daylight to the time of the standard meridian is the same, so that whatever arguments can be advanced in favour of the proposed seasonal change of time in our country, beyond those of custom, would apply equally to the inhabited zone between fifty and sixty degrees completely round the world.

It is only in a few great cities in England that the waste of daylight described by the supporters of the Bill really exists; and even in these places it is possible for people to rise an hour earlier for work or recreation if they desire to do so. Industries and occupations which can best be carried on in daylight make the fullest use of daylight hours at present, without any legislative compulsion. Agricultural operations begin shortly after sunrise during a large part of the year, and continue until nearly sunset; in the building trades the hours of work vary with the hours of daylight, and the same is true in most engineering shops. But when work or pleasure can be carried on equally well in artificial light, there is a tendency to continue it to the limits of endurance. So it has come about that the bedtime hour in cities has been pushed further and further into the night, and the hour of rising has become later.

All that is needed is for banks, places of business, and schools to open at an earlier hour during the summer months, as they do in most places on the Continent. To introduce confusion into the whole system of time-reckoning because some people in cities have not sufficient strength of mind to make the best use of the daylight hours would be to acknowledge that, as we cannot alter our national habits and customs, Acts are passed by which we pretend to change them while they remain the same.

PROF. JULIUS THOMSEN.

THE two great enrichers of thermal chemistry were Berthelot and Thomsen. Berthelot died in the spring of 1907, at the age of eighty; Thomsen has just left us, at the age of eighty-three. Born at Copenhagen in February, 1826, and educated in the polytechnic there, Thomsen became professor of chemistry in the university of his native city in 1866; he retired from the duties of his post in 1901, but continued to live and work in Copenhagen.

Julius Thomsen devoted his life to the experimental advancement of thermal chemistry. His first memoir on this subject was published in 1853, his last a few years before his death.

The permanent memorial of Thomsen's work is the four volumes of "Thermochemische Untersuchungen," published in the years 1882–86. In the year 1780 Lavoisier and Laplace announced that "all thermal changes . . . exhibited by a system of bodies which changes its state repeat themselves in the opposite direction when the system returns to its original condition." This generalisation was deduced from a theory of heat, and was to some extent verified by experiments. In the years 1839–42 Hess laid the foundations of thermal chemistry, sketched the lines on which the structure should be built, and began the building. Thomsen began his work soon after the appearance of Hess's memoirs. He has formed a stately building—adorned perhaps with too many crockets and pinnacles—resting on the sure foundation of experimentally established facts.

In the preface to his great work, "Thermochemische Untersuchungen," Thomsen tells us that he formed the plan of the whole before he began his experiments, and that he adhered almost rigorously to that plan. When the work was nearly completed, he recognised that the science of thermal chemistry would be benefited by collecting and digesting his materials, and so he published his investigations and his theoretical discussions thereof in the four volumes which have established his fame. In 1905 Thomsen published a *résumé* of his principal experimental results and discussions in one volume. Unfortunately, that book was written in Danish; fortunately for English workers in the field of thermal chemistry, an English translation of it has appeared in Longmans' series of text-books of physical chemistry, edited by Sir William Ramsay.

Thomsen set out with a determination to extend his thermal investigations over the whole field of chemistry. He carried that determination into effect. The first volume of the "Untersuchungen" deals with the thermochemical aspects of the neutralisation of acids and bases. The second volume is devoted to the reactions, and the classification of the affinity-phenomena of the non-metallic elements. The third volume is concerned with measurements of the heats of dissolution in water, with hydration, and with the affinity-phenomena of the metals. The thermochemical investigation of carbon compounds is the subject of the fourth volume.

The most important results of Thomsen's examination of neutralisation were the firm establishment of

the constancy of the heat of neutralisation of strong acids by strong bases, the introduction of the conception of the *avidity* of acids and bases, and the working out of a thermal method of measuring avidity. In his investigation of solution and hydration, Thomsen paved the way for future work, cleared away many misconceptions, and put the thermal aspects of the questions on a secure basis. It is not yet time to interpret the thermal data concerning the classification of elements wherewith Thomsen has enriched chemistry; but the data are there, established by a most careful and ingenious experimenter. In speaking of Thomsen's work on the thermochemistry of carbon compounds, one has to distinguish between the data and the theoretical discussion of them. The data are sure. Personally, I think his theoretical conclusions are inadmissible.

The tremendous question of chemical affinity was attacked, thermochemically, by Thomsen with boldness. So long ago as 1854 he announced his much-discussed generalisation:—"Every simple or complex action of a purely chemical character is accompanied by production of heat." In 1882 he was not quite so sure, and modified his dictum, asserting that "the great multitude of chemical processes which are accomplished without the aid of foreign energy, and are free from by-reactions, are accompanied by production of heat." This form of the law of maximum work is surely a sound generalisation, but it is purely empirical. Thomsen never thoroughly analysed the concept *chemical affinity*. Affinity is only one factor of chemical energy, as quantity of heat is only one factor of thermal energy. Thomsen's great contribution to the subject of chemical affinity is the mass of his well-established thermochemical data.

It seems to me that the two marks of Thomsen's experimental work are its soundness and its orderliness. There is nothing haphazard, nothing slipshod about it. He worked on a definite plan; he worked with all his might; his work must remain to his everlasting honour. M. M. PATTISON MUIR.

NOTES.

THE attention of all who are interested in the work of zoological exploration is directed to the expedition which is now being organised by Mr. W. R. Ogilvie-Grant to explore the Charles Louis Mountains of Dutch New Guinea, which form the highest part of the range extending right across the island from east to west. The highest peaks have an altitude of some 17,000 feet. A rich harvest is expected, for until recently the hostility of the natives has frustrated all attempts on the part of European travellers to enter this territory. This hostility, however, has now been overcome, and no effort should be spared by the naturalists of this country to be the first in the field to tap what will certainly prove to be one of the richest zoological regions in the world. Mr. Grant is endeavouring to secure ample funds in order that both the zoology and botany of this region may be thoroughly investigated. If this is to be done, a sum of at least 3000*l*. will be necessary. A considerable portion of this sum has already been generously provided, but more is yet required, and it is hoped that this will speedily be forthcoming. Those who desire to help should send subscriptions to Mr. C. E. Fagan, British Museum (Natural History), Cromwell Road, S.W. The leadership of the expedition has been entrusted to Mr. Walter Goodfellow, who has already done much valuable work in the exploration of New Guinea. To make the more certain of success he will be accompanied by Mr. W. Stalker and Mr. A. F. R. Wollaston, both of whom have done good work in New Guinea, as well as in other parts of the world.

THE executive committee of the British Empire League is organising a movement to provide London with a monument to Captain Cook. Cook was a man of science as well as an explorer; his hydrographical surveys are excellent examples of the scientific work of our navy, and he contributed also to astronomical and medical science. Last November the British Empire League appointed a sub-committee to promote the object and to form a general committee. We have received a list of the names of distinguished persons who have consented to join the general committee, and these include representatives of Australasia, the Colonial Office, the Admiralty, the scientific societies, the shipping industry, and the Cleveland district of Yorkshire—of which Cook was a native. The general committee will later appoint an executive to collect the necessary funds, to determine the character of the memorial, and to select the best available site. It is estimated that, if the monument be in the form of a statue, 3000*l*. will be needed. Fuller particulars can be obtained from the secretary to the British Empire League, Mr. C. Freeman Murray, Norfolk House, Laurence Pountney Hill, E.C.

ON Monday evening Dr. M. A. Stein read before the Royal Geographical Society a paper on his geographical and archæological explorations in Chinese Turkestan in 1906–8. We have from time to time noticed Dr. Stein's discoveries while his expedition was in progress. His lecture on Monday evening strengthened opinion as to the importance of his researches, and brought out very clearly the widespread influence exercised by Indian and classical art on Buddhistic temple worship throughout Central Asia during the early centuries of the Christian era. Dr. Stein told the story of one important discovery about which until now he has kept a discreet silence. He was greatly desirous of examining a secret store of ancient manuscripts which had been accidentally discovered by a Taoist priest in the Caves of the Thousand Buddhas, south-east of Tun-huang. The priest knew nothing about the character and importance of the treasures he was guarding, but it was only after prolonged discussion that he consented to produce some of the manuscripts for Dr. Stein's inspection. These happened to be fine rolls of paper containing Chinese versions of certain Buddhist texts, which the colophons declared to have been brought from India and translated by Hsüan-tsang, the famous Chinese pilgrim, whom Dr. Stein is wont to call his patron saint. Much impressed by what he regarded as a special interposition by Hsüan-tsang on Dr. Stein's behalf, the priest was induced to show the explorer the secret chamber containing his treasures. These were piled up without any sort of order to a height of 10 feet, and comprised not only written documents, but fine paintings on silk and cotton, ex-votos in all kinds of silk and brocade, and streamers in various fabrics. Dated documents showed that the chamber must have been walled up about 1000 A.D., but some of the records dated back so far as the third century A.D. After prolonged negotiations, Dr. Stein was permitted to make a selection from the documentary and other remains, and filled with them twenty-nine cases, which have now been deposited in London. We hope to return to the subject of Dr. Stein's discoveries at greater length on the publication of his paper.

THE death is announced of Senhor J. Barbosa Rodrigues, director of the botanical garden at Rio de Janeiro, and author of several works on Brazilian flora.