ments. There is an outward movement of the wings at each stridulation, and as the movement reaches maximum position, membranes in the wings vibrate. The graph shown in Fig. 2 indicates the pitch of the stridulation in reference to its periodicity. As the pitch was determined from keys on the piano some variation could be expected as the key indicated was chosen as being nearest to the pitch. It will be noted that a range of one octave on the piano was covered by a change in temperature from 59 degrees to 85 degrees. From the data it is evident that the mechanism that moves the wings as well as the membranes in the wings are very sensitive to temperature, and response to temperature changes is of marked uniformity.

HOWARD D. MATTHEWS

DETROIT, MICH.

THE RELATIVE EFFECTS OF ANOXIA

BECAUSE of recent interest shown in the problem concerning the relative effects of anoxia upon old and young animals, a reference by Moreland[1] to the work of Buffon, of LeGallois and of Edwards[2] should be brought to more general attention. Interest in the work of these early investigators lies in the fact that many recently reported results are substantially in agreement with results reported 125 years ago.

J. M. JOHLIN

SCHOOL OF MEDICINE,
VANDERBILT UNIVERSITY

CALENDAR REFORM AND 364-DAY YEARS

IN SCIENCE of February 20 it is stated that present calendar defects make the arrangement of schedules for industry and education difficult and temporary only, also that there can be no doubt about what would happen in calendar reform, if scientists had their way. A large percentage (76 per cent.) gave affirmative answers to the question whether or not a revised world calendar of 12 months and equal quarters should be adopted.

Some years ago when the Eastern Orthodox Churches changed to our Gregorian calendar, a clause was added expressing hope that Western nations might soon be ready to improve that calendar.

The World Calendar involves the interpolation each year of a so-called *Year day* or *extra Saturday*.

In this connection the possibility of making the astronomical year coincide with the calendar year might be considered. If the change to a calendar year with 12 months and equal quarters is made, the first years might be assigned only 364 days, omitting the disputed *Year day*. After eight such years, the winter solstice (occurring now about December 21) would coincide with the *Year day*. Thereafter the calendar quarters would correspond approximately to the astronomical quarters. The period of eight years would give the world time to experience the greater convenience of the new calendar. Before the end of that period many people might come to favor the new plan who now have never heard of it or are skeptical.

January 1, 1943, comes on a Friday; two years later, on a Monday. With ideas changing from national to international along many lines, perhaps we may now also think about the coming world calendar. To take away a day a year need be no more disturbing than the present adding a day in leap years. We have recently witnessed the ease with which the whole United States can drop or add an hour on a specified day.

ALFRED GUNDERSEN

BROOKLYN, N. Y.

A STUDY OF FAUNAL DISTRIBUTION

I SHOULD like to take the opportunity of acknowledging in SCIENCE the generous support that E. P. Mumford, of Jesus College, Oxford, and I have received in America in connection with a cooperative study of faunal distribution with particular reference to oceanic islands. This comprehensive study of island populations seeks to promote a wider approach to the basic problems of the origin of species. It was initiated at Oxford in October, 1938, with the aid of grants from the Higher Studies Fund, the Royal Society and the British Association for the Advancement of Science. Since the war, the work has been carried on by Mr. Mumford as a member of the faculty at Stanford University, California, in association with Oxford, with the aid of supplementary grants from the Carnegie Corporation of New York, the National Academy of Sciences, the American Philosophical Society, the American Association for the Advancement of Science, the Society of Sigma Xi and the May Esther Bedford Fund, Inc. Mr. Mumford and I are deeply indebted to these organizations for their support as well as to the officers and trustees of Stanford University, where he has been extended every facility in the prosecution of his researches. Among the scientists at Stanford who have been most helpful, mention should be made of Dr. Ray Lyman Wilbur, chancellor of the university, Professor C. V. Taylor, Professor Eliot Blackwelder, Professor E. G. Mears and Dr. H. A. Spoehr, director of the Carnegie Institution there. Thanks are due also to Dr. Frank Aydelotte, of Princeton University, and the Rhodes Trust, for unfailing support.

In view of the importance of Anglo-American rela-

[1] F. B. Moreland, A thesis presented to the faculty of Vanderbilt University, 1936.

[2] W. F. Edwards, "On the Influence of Physical Agents on Life." Translated from the French by Hodgkin and Fisher and published by Haswell, Barrington and Haswell, Philadelphia, 1838.

tionships, it is perhaps of interest to note that Mr. Mumford first went to America with one of the Commonwealth Fund Fellowships, designed for the promotion of "mutual amity and understanding between Great Britain and the United States," after which he was invited to accept the directorship of the Pacific Entomological Survey (*Nature*, 141, 196, 1938). This position he held until he came up to Oxford, at the invitation of my predecessor, Sir Edward Poulton, as a Leverhulme research fellow.

It is to be hoped that this project now being carried on in association with Oxford and Stanford Universities will not only serve the advancement of science as such, but also aid the promotion of cordial relationships between English and American scientists interested in the basic problems of evolution.

G. D. Hale Carpenter,
Hope Professor of Zoology (Entomology)
University Museum,
Oxford, England

SCIENCE TWENTY-FIVE YEARS AGO

THE RELATIONS BETWEEN ENGINEERING AND SCIENCE[1]

As engineering adopts the knowledge which science has correlated it simultaneously unearths new uncorrelated knowledge. Science indeed correlates this in turn, but not instantaneously, so that engineering has always at its hand both that which science has correlated and its own empirical discoveries which science has not yet had time to arrange. As optimists we may well expect that this uncorrelated knowledge will form a gradually decreasing fraction of the whole, but can we expect it ever to vanish completely? Must not science's approach to exclusive leadership be asymptotic?

We begin to get a glimmering of the vastness of the scheme of creation when we remember that every lengthening of man's artificial vision by means of telescope and camera, every new strengthening of telescope, sensitizing of plate, and lengthening of exposure brings a proportional increase in the number of visible suns, telling us that even at that inconceivable distance we have not begun to approach the limit of the discoverable universe. When we turn from telescope to microscope and thence to the inferred constitution of matter, we find with every new refinement of observation and inference a proportional addition of new wonders, a proportional increment in the complexity of natural phenomena. Hence while we may speculate that, as there must be a place where the stars end, so there must be a degree beyond which the subdivision of matter can not go, and a limit to the number of nature's laws, we may well ask whether either that limit or the limit of stellar space will be reached in that little throb in the pulse of the universe which we call the habitable period of this earth. Will man survive long enough to complete the discovery of all laws, so that no uncorrelated phenomena will remain for the engineer to unearth?

The second of the two considerations which tend to postpone the completion of science's leadership is that the beautiful as distinguished from the useful and the good will increase without limit its demands upon the work of the engineer. Though the beautiful itself should in time be capable of complete mathematical analysis, who shall say that that time, now seemingly so inconceivably remote, can arrive during man's earthly stay?

Henry M. Howe

OUR PSYCHOLOGICAL ASSOCIATION AND RESEARCH[1]

It is our business as individuals and especially as united in this American Psychological Association to use all possible efforts at all times, in all places and in all ways to improve the conditions under which research work is done. Science has doubled the length of human life and quadrupled the productivity of labor. A single advance in applied science, such as the Bessemer steel process or the electromagnet, discovered by Faraday in the only research laboratory then existing, may add annually some two billion dollars to the wealth of the world. The psychological and social sciences have already done their share in freeing us from superstition and unreason, in leading us to tell the truth as we see it and in some measure to see the truth as it is. They have repaid many fold their cost in economic applications. An improvement of ten per cent. in the educational work of this country saves us a hundred million dollars a year. But it is to the future that we look to obtain a control over human conduct corresponding to that of physical science over the material world, and more vital. We must eliminate the incalculable waste of preventable idleness, misfit employment, disease, vice, crime and war; we must divide wealth more fairly and use it more wisely, we must alter fundamentally all our institutions, the family, the church, the school, the

[1] Concluding part of the introductory address of the chairman of the Section of Engineering of the American Association for the Advancement of Science, New York, December 29, 1916, printed in the issue of Science for March 23, 1917.

[1] Concluding paragraph of the address given on the occasion of the twenty-fifth anniversary of the American Psychological Association, New York, December 29, 1916, printed in the issue of Science for March 23, 1917.