ASTRONOMY'S CONTRIBUTION

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"OUR present calendar is cumbersome and the uniform World Calendar would be an advantageous revision. It would result in a stable calendar—one better adapted to the needs of people."

This is the opinion of Dr. Russell Tracy Crawford, Chairman of the Department of the Department of Astronomy of the University of California. Dr. Crawford, who also is Director of the Students Observatory, has been closely connected with Lick Observatory on Mount Hamilton, the University's center for astronomical research, home station for expeditions throughout the world to study eclipses, and the scene for many special studies of double stars, comets, and spectroscopic observation of spiral nebulae.

"Let me see," Dr. Crawford sat thoughtfully for a minute. "I've been interested in the subject of calendar reform and especially The World Calendar for more than 20 years. It was back in 1922 that I was Chairman of the Committee on the Reform of the Calendar of the American section of the International Astronomical Union. I surely have a copy of the favorable report made at the meeting of the Union in that year--"

While Dr. Crawford's secretary hunted the report in her files, the thickset astronomer, his eyes twinkling behind his horn-rimmed glasses, leaned back in his chair, recalling his work a score of years ago. The old-fashioned office furniture, the simple setting of the plain little office, only emphasized the more strongly rows and rows of astronomical journals and heavy scientific tomes piled to the ceiling. Outside, the hum of bees was heavy in the purple wistaria vines that covered the low building.

"Here is it, Dr. Crawford."

"'Scientific organizations should be conservative in their advocacy of reforms affecting the every-day live of the people. The governing motive should be the greater convenience of the public. The gross inequality in the length of months and lack of system in assigning the different lengths, justify a modification of the Gregorian calendar in removal of these defects. Advantage should be taken of the occasion to reform the calendar in other respects. We recommend that the representative of the American section of the International Astronomical Union endeavor to secure the adoption and introduction of a calendar having the following specifications--'

"But I needn't read any further," Dr. Crawford said, "for those specifications are exactly those embraced in The World Calendar—such as four equal quarters of 91 days each, a Leap Year Day in leap year. In other words, it would be a perpetual calendar."

The mere mention of the 13-month calendar brought instant criticism from Dr. Crawford. He felt that, while the calendar was in need of revision, a change to 13

months would only serve to make it worse—make an already cumbersome calendar more unwieldy.

Dr. Crawford's service as Chairman of the calendar reform committee of the American section of the International Astronomical Union was a tribute to his long and distinguished career. After receiving his first degree from the University of California in 1897, he served as Fellow at Lick Observatory for several years. He then became an assistant astronomer at the University and joined the faculty in 1903. He really got up nearer the stars when he served as Major in the Air Service during World War I. Among the many learned and professional societies which claim him as a member are: the American Association for the Advancement of Science of which he is a Fellow, the Astronomical Society of America, the Astronomical Society of the Pacific which he has served as President, Sigma Xi and Phi Beta Kappa.

All through the ages the calendar has been the product of astronomers who have brought about its every revision, contributed the fruits of their life study of the sun, moon, and stars to its development. So it is not surprising that a present-day group of astronomers should be concerned with the improvement of our calendar.

"Adjustment of the calendar to the motions of celestial objects has always been regulated by the astronomer," Dr. Crawford emphasized.

If you are planning on making a trip to Mars over the weekend, don't bother to pack a clock or calendar in your baggage. For our clocks and calendars are adjusted to celestial movements as observed on Earth and would be of no value at all on Mars or any other planet. It takes Mars about 687 days to move about the sun, so its "year" would be that long. Also, each of its days would be more than a half-hour longer than one of our days. On Mercury, it would take only 88 of our days for a "year," while on Pluto a "year," or the complete orbit of that planet around the sun, would require the equivalent in time of 247.7 of our years!

"The calendar is such an essential and necessary part of our lives," pointed out Dr. Crawford, "that we may form the erroneous idea that it is something that has always been existent in man's mental equipment and scheme of life. But this is far from the case. It had very crude and simple beginning and went through many changes to arrive in its present form. Certainly it could still further be improved. And in all its evolution, astronomers served as guides and leaders in each transition. "Back in 4700-4550 B.C.E., a time so dim in history that we cannot be definitely sure of the dates, Egyptian priest-astronomers used the pyramids of Gizeh to determine the exact length of the solar year. And another Egyptian astronomer, Amenemhet, in 1550 B.C.E., constructed the first water clock of which we have a description.

"It was a Babylonian astronomer, Nabu-rimanu, who in the sixth century B.C.E. had calculated had calculated the solar year as 365 days 6 hours 15 minutes and 41 seconds—an error of only 26 minutes and 55 seconds."

The Romans in their turn aided considerably in the development of the calendar, Dr. Crawford explained. In 315 B.C.E., Flavius put an end to the secrecy in which the calendar had been held by the College of Pontiffs. The Julian calendar really was the result of the work and study of the Alexandrian astronomer Sosigenes, whom the great Caesar had met on his conquests. It was in this calendar, adopted in 45 B.C.E., that allowance was first made for the fact that the year exceeds an even 365 days by almost a quarter of a day. But this calendar, by adding an extra day each fourth year, figured the difference to be an exact quarter of a day which is not correct, and the Julian year was approximately 11¼ minutes too long. The calendar error, as a result of this miscalculation, gradually increased.

"It was this error," Dr. Crawford continued, "which by 1582 was about 10 days, that was remedied in time by Pope Gregory XIII. We call the resulting calendar Gregorian, but again it was actually an astronomer, Clavius, who made the calculations and planned the change. In this calendar, a leap year is omitted every century year that is not divisible by 400."

This is the calendar we have today. And through many inventions and other changes in our manner of life and civilization have been made in the years since its adoption, we still cling to this calendar which, thought now quite accurate as to length of the year, is nevertheless inadequate and inefficient for our modern needs.

Astronomers themselves have not been content to continue with this calendar. In 1834, almost a hundred years before Dr. Crawford made his report to the International Astronomical Union as Chairman of the calendar reform committee of the American section, the Abbé Mastrofini suggested a perpetual calendar with a "stabilizing day" to the Vatican. In 1887, the Astronomical Society of France recommended the perpetual calendar of 12 months and equal quarters (as in The World Calendar). This same society rejected the 13-month calendar as impractical.

"*Ad astra per aspera*" [(1)] (to the stars through difficulties) runs an old Latin motto. It might well be changed to read "Astra spem dant per aspera" (the stars inspire hope despite difficulties), thanks to the astronomers whose efforts have given us our present calendar and whose continued interest encourages the hopes of The World Calendar.

[(1)] [State motto of Kansas, USA. —Ed.]

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