

## AFFIRMATIVE DISCUSSION

### CALENDAR REFORM<sup>1</sup>

The purpose of a calendar is to measure and register the passage of days throughout each year; and to arrange in advance what dates shall be Sundays, workdays, holidays, etc., for general convenience.

Neither the length of the year, nor that of the day of twenty-four hours can be altered.

Both months and weeks are arbitrarily fixed units used for measuring intermediate periods beyond the day. They are not divisions of time indicated by either the sun, moon or stars. Their usefulness and convenience are increased when the month is an exact multiple of the week, and when the year is as exact a multiple of both the week and month as nature permits.

For more than half a century several bold minds in different nations have recognized the disadvantages of a multiplicity of calendars and the serious imperfections of all, including also the inconvenience of the ever-changing dates for the great religious festivals of Easter, the Passover, etc.

Many suggestions have been made to remedy some or all of such faults.

The answers to the enquiries of the [League] Committee clearly indicated that the simplification of the calendar is almost wholly a question of business, industrial, social and home benefits to be thereby conferred on humanity. Astronomers are interested only like other citizens. The religious organizations are chiefly concerned

<sup>1</sup> From pamphlet "B" by M. B. Cotsworth, Director, International Fixed Calendar League. p. 1-15. Washington, D.C.

about Easter and the orderly succession of Sundays or Sabbaths.

The simple remedy for the confusing defect caused by the practice we needlessly follow every year, of invariably giving a week day name to each year's last day, and likewise each leap year giving an unnecessary week day name to "leap day" is, to stop the practice of giving week-day names to "year day" and "leap day," which could best be known only by those distinctive names. We propose that those days be established as extra international Sabbath days of rest and worship. Such a step, by its ultimate effects, would not only stabilize the calendar, but also help to extend the growing desire for peace and brotherhood among all nations.

Objection has been made to applying this year day and leap day remedy, because those inserted days would interrupt the rigorous succession of Sabbaths, and thus might be regarded by some extreme religionists as constituting a technical violation of the Bible's fourth commandment. However, it now seems proven by the very definite commands of Moses; (as explained in our Pamphlet "C") that the Israelites were, by like means to those we propose, commanded to observe once each year at the Feast of Pentecost, a double Sabbath of two days' duration. The calendar effect of thus using two Sabbaths together was, to cause all Sabbaths of every later year to fall upon exactly the same monthly dates year after year.

That being the evident fundamental provision of the Mosaic law as regards the Fourth Commandment to observe the Sabbath; it now seems plain that in the fourth century A. D., when our present Christian as well as the modern Jewish calendars were formulated in their Sunday and Sabbath arrangements, both Jews and Christians in their zeal to hold fast to their separate Sabbaths and Sundays, were either forgetful or ignorant of that basic Sabbath-fixing requirement in the old Mosaic law

when they altered their calendars, which in our opinion were then unintentionally, and now are, unscriptural in structure.

Therefore, the adoption of the "year day" and "leap day" feature of the thirteen-month calendar, is literally a return to the unaltered principle of the Mosaic law, which fixed all Sabbaths on yearly unchanging calendar dates. For this reason, we are hopeful that the religious authorities and adherents in the Jewish, Christian and Mohammedan religions, who now form the progressive half of humanity, and all of whom accept the truth that Moses was their religious Law-giver, will after reading our Pamphlet "C," realize that with great benefit to all religions, they can all loyally unite in the use of the proposed international Sabbath.

No reasonable excuse can now be successfully pleaded by either Jews, Christians or Mohammedans, against uniting in the mutual use of the international Sabbaths as Moses commanded. Such Sabbaths have brought very great physical and practical religious benefits to the three hundred and thirty millions of Hindoos, Mohammedans, Buddhists and other competitive religionists throughout India and South East Asia, who now unite in using Sunday as their inter-religious rest day, as the Israelites united with their camp followers in mutual rest on the same Sabbath days in every year.

Therefore, we very respectfully suggest that Jews, Christians and Mohammedans should follow the admirable example set by the people of India, who have given practical effect to that eminently desirable law which Moses proclaimed.

We know that the length of the day and the year are inexorably fixed by natural laws: and that humanity will neither tolerate any change in the length of the seven-day week; nor give up the use of some form of month, which should be standardized for universal convenience.

Therefore, simplifications of the calendar which must be beneficial to be acceptable are limited to redividing the 52 whole weeks which should be in every year, into more convenient groups of weeks in the months and quarters of the year.

The twelve-month proposals are nearly all designed to begin each year with New Year day as January "O" preceding January 1st. They all would divide the year into four quarters of three months each, containing 13 weeks. In common years one such quarter, and in leap years two quarters, would have months with 30, 31 and 31 days; the other three quarters would consist of 30, 30 and 31 day months in ordinary years.

To scientists as well as the general public, that part of the plan to call the first day of the year a zero day and number the succeeding days 1, 2, 3, etc. seems a very unscientific and undesirable proposal. It would be like calling the first and last inch on a yard-measure 0 and 35, instead of 1 and 36. In a similar way this proposal would justify calling the first and last months of a twelve month year 0 and 11. The symbol zero (0) in all scientific measurements stands for something smaller than anything we can measure. A whole day *cannot be designated as (0)*.

The symbol (0) can apply only to the infinitesimal instant which marks simultaneously the end of one and the beginning of the next year, month, day, hour, minute and second.

It is difficult to understand how anyone can advocate this part of the proposal, which should be insistently opposed.

In all the present and proposed twelve-month calendars, either with or without the "year day" remedy, the week day names associated with dates in consecutive months, would change and differ from month to month very much as they do now.

Further, their months would be almost as unequal and uncomparative as now. The existing inconveniences

which would be thereby continued are easily indicated in part by the following of many facts we could cite:

- 1st. That the present difference between 30 and 31-day months has caused many business accounts in leading European countries, also nearly all trade accounts and business drafts throughout the United States and Canada, to be paid for on the 30-day basis instead of calendar months.
- 2nd. That for the same reason the United States Government pays its employees on the basis of 30-days per month, and has had to print numerous different sets of wages-table books to overcome such calendar-caused difficulties.

The proposed calendar would divide the year into thirteen equal months, each composed invariably of four full weeks, and therefore 28 days repeating each day name on the same twenty-eight dates in every month alike. The last 13 days of the present month of June, together with the first 15 days of July, would be combined to make up the new month required. It is proposed to name the new month "Sol" because the sun passes its summer solstice denoting the longest day on June 21st which would become the 4th of this proposed month.

The month of February, 1925, is the model for this month, which would always be repeated for dates and day names in the other months.

This plan utilizes the year day and leap day remedy as a very desirable feature, though that remedy can be dispensed with if necessary, but its absence would deprive humanity of about 30 per cent of the total value in benefits which complete reform would confer upon all civilized people.

Because any change from the old to an improved calendar would make some slight break and cause part discontinuity in dates and chronological records, and would in part disarrange some social and statistical affairs for a short time; the introduction of a new calendar must be

justified by reason of the definite benefits its use would confer.

Some advocates claim that 12 months form a better calendar than 13, because 12 is divisible by 2, 3, 4 and 6, while 13 is not. There does not appear to be any important agricultural, commercial, economic, social or scientific needs which require anyone to divide the year by 3 or 6.

On the other hand fourths and halves of the year are almost as well represented by 13 and 26 weeks respectively in the thirteen-month calendar, as by 3 months and 6 months in the 12-month calendar; because by the thirteen-month calendar, the work on monthly and quarterly statements only once come together, at the end of the year. Three of the quarterly statements would fall within their months, and thus distribute the quarterly from the monthly accounting and thereby lessen congestion at busy month-end times. However, this question of indivisibility is *inconsequential*, and nearly all its advantages are afforded by the twelve-month calendar we already have.

Our present calendar and all the proposed ones based on twelve-months are objectionable, because their number of days in the months can never be equal.

Now that, next to the day, the week has become the most used and valued unit of reckoning throughout every nation, the greatest defect of all twelve-month calendars is that their unequal months cannot contain exactly four weeks.

This is the far-reaching defect that causes:

1. Renewal and printing of millions of new calendars annually;
2. Complicates otherwise simple reckoning of days and dates and the passage of time generally;
3. Makes work days, rest days and week ends unequal in consecutive and different months;
4. Makes incomparable the business and industrial activities, including the economic and statistical

data used in agriculture and many scientific investigations;

5. Makes the period for earnings and expenditures of workers, employers and families unequal.

The elimination of this worst of all defects is the great objective of calendar reform.

It is to remedy this calendar defect which is much more serious than all other defects in the calendar combined, that the thirteen equal month plan has been devised. Its practical simplicity is shown, not only by the model month, but by more impressive comparisons.

Only habitual use of the defective old twelve-month calendar by those who are unconscious of, or indifferent to, the needless waste and inconveniences its use incessantly imposes upon humanity, can explain how any one can even temporarily advocate its perpetuation, or that of any other twelve-month calendar with like inherent defects.

On the other hand, only lack of intimate acquaintance with the useful simplicity and great practical benefits that will be conferred upon all civilized people, by the adoption of the much easier and more convenient thirteen-equal-month calendar, will cause any one to oppose its introduction.

The twelve-month calendar with equal quarters as a reform, was first proposed about forty years ago. Changing the various calendars used by humanity at that time was a vastly more difficult reform to make effective than it is to-day. Then the great masses of humanity knew very little of the merits of the practical affairs affected by calendar reform; were wrongly accustomed to think that the lengths of the months were fixed as, or by, the motions of the sun, moon or stars. General international cooperation on a world scale was almost unknown.

The plan then found some favor in the minds of several astronomers and a few frank thinkers, because its

proposed changes from the old twelve-month system were so slight and inconsequential that its introduction was expected to arouse little or no public antagonism. But they were inevitably disappointed when the great railway, commercial and scientific authorities, who had then welcomed the adoption of standard time, would not endorse the inadequate plan.

The situation is very different today. A large part of the public have become practically acquainted with the serious defects of the old calendar, and they appreciate the superior merits of the thirteen-month plan.

The League of Nations, international, commercial, labor, women's and other organizations now cooperating for establishing such mutual advantages are now cordially available.

The equal quarter plan has been a past transition-stage in the evolution of this calendar reform of the twentieth century. It has outlived its embryo purpose.

Its inconsequential changes formerly led some enthusiasts, without critical examination of its defects, to favor its acceptance. Now those inadequate changes are clearly seen by industrial, commercial, government and transportation authorities, to offer such unimportant benefits when compared with the far more useful thirteen month plan as to throw the preference of practical authorities almost unanimously in favor of thirteen months of four weeks each.

The impelling motive in calendar reform is now, and should always be, to secure the simplest and best form of calendar that will bring the greatest permanent benefits. Serious defects in any plan cannot be condoned because its methods may at first seem easier to introduce.

To the masses of humanity who cannot themselves appraise the merits of different plans, one kind of change is almost as easily made as another. About 300 millions of the least changeable races of Asia, Africa and Eastern Europe have very easily changed to the Gregorian calendar since the Great War.



The detailed and specific benefits which would be conferred by the thirteen-month calendar are so numerous and outstanding that it seems best to enumerate those most easily listed as follows:

ADVANTAGES OF 28-DAY MONTHS

*(Not attainable by 30, 30, 31-day months)*

1. All months would be equal; having exactly the same recurring 28 week-days, of equal monthly calendar value.

2. The day of the week would always indicate the monthly date, which conversely would indicate its week-day name. Both day and date would invariably be recorded on clocks and watches.

3. Would save time, and many wasted costs, prevent mistakes, and avoid date-confusing worries.

4. The complete four weeks would exactly quarter all months, harmonizing weekly wages, and expenses with monthly rents, accounts, etc.

5. Pay-days, markets, fairs, meetings, etc., would recur on the same monthly dates. That regularity would facilitate both business and home life.

6. Each week-day would recur on its four fixed monthly dates, thereby making more regular the weekly and monthly work, payments, production, etc.

7. Accounts, drafts, etc., would never come due on Sundays.

8. Permanent monthly dates for recurring public, home, business, school, law, holiday and sport affairs would be established.

9. All periods for earning and spending would be either equal, or exact multiples of each other.

10. Every month-end would coincide with the week-end; most convenient for business, rents and general affairs.

11. Monthly balances of income and expenditure would be easier for public, commercial, financial and

family life, as fractions of weeks at month-ends would cease.

12. Would release us from 5th weekly payments for rents, wages, etc., in unequal months; adjustment of overhead charges, statistics, etc., while saving some expenses and helping progress.

13. Would enable us to instantly know the number of days between any two dates for salaries, interest and other computations; e.g., 1st month, 10th to 6th month, 20th; as  $28 \times 5 = 140$ , plus 10, would be 150 days.

14. These months of equal length and same total week-day values, would give great statistical advantages by truly measuring current fluctuations in government, export, import, business, scientific, health, city and home affairs, at the end of every month, without either adjustments or explanations being required from officials whose time is valuable; and without wasting the more valued time of directors anxious to promptly discern at the end of each month the true trend of business, to guide their decisions.

Statistics have become the guide reins in all such concerns, whose leaders depend upon statistical records to ascertain the facts, upon which they decide what future action should be taken.

15. Half of humanity is composed of women, every one of whom will be greatly benefitted by the 28 days per month calendar in their personal reckonings of exactly one month and 10 months. Every day they will benefit in directing their household affairs and accounts in weekly and monthly terms; also in arranging their public, private and home engagements.

16. Would collectively save great national, business and individual values of time and money wasted in searching for, and referring to calendars, from which suitable days and dates have to be found for work, pay, correspondence, proposed meetings, etc., also in drafting, advertising, printing and law costs of such phrases as

"Tuesday after the 1st Monday," the "2nd and 4th Fridays," etc., in laws, rules, regulations, etc.

An estimate made of such economies in the United States at clerk rates, indicates a yearly saving of about \$30,000,000 in that country alone.

17. By using thirteen months of 28 days, all monthly money values now circulating twelve times per year for labor, salaries, rents, pensions, etc., also for manufacturing, wholesale, retail, railway, shipping, etc., accounts would circulate thirteen times per year. Therefore for each \$30 and \$31 of liquid capital now circulating in that monthly service, only \$28 would be required, as by circulating thirteen times, this sum would do the service for which \$30 and \$31 are now (and would by 30, 30, 31-day months be) required.

The estimates thus far made of the total money values which would be thereby released during the first three months in which 28-day months are used, indicate that about \$2,000,000,000 would be released in Europe for business expansion and improvements and for all nations combined, about \$5,000,000,000.

More extensive investigations are now being made in leading nations to test those estimates.

The resulting benefits to workers in lowering the cost of living, rents, interest on mortgages, city and other taxation, together with the increase in employment that would result, are indicated in my report to the Director of the International Labor Office of the League of Nations at Geneva.

They, with the above recorded benefits of four-week months, would bring the estimated 70 per cent of total value required to achieve the full 100 per cent obtainable by complete reform. Most of the other 30 per cent would be derived by the insertion of year day and leap day.

That would be about twenty times more valuable than the aggregate of benefits 30, 30, 31-day months can bring.

## CALENDAR-CAUSED DEFLECTIONS IN STATISTICS

The monthly *Index of Manufacturing Production* issued by the United States government, is the most elaborately prepared and widest used record of monthly statistical information.

Yet, because American producers usually work eight hours per day from Monday to Friday and only four hours on Saturday, the calendar on that basis of forty-four hours per week, brought 192 hours for production in November, 1923, as against 180 hours in November, 1924.

The above United States index number was published as 113 per cent for November, 1923, and only 110 per cent for November, 1924; the latter showing an apparent reduction of three points, when compared on the basis of the year 1919 monthly average as 100 per cent.

In reality there was an increase of four points, as the following arithmetical adjustment proves, because November, 1923, having 5th Thursdays and Fridays yielded 16 hours for work, against November, 1924, having only 5 Saturdays and Sundays, allowing but four working hours beyond the 4 full weeks of 44 hours each, which regularly total 176 hours as the basis for testing true comparisons of production.

As 180 hours in 1924, were to 192 hours in 1923, so should the 110 points indicated by the unadjusted tabulated totals for 1924 be to  $(192 \times 110) \div 180$ , yielding 117 points as the true comparative index, according to the working hours available in factories working regular weekly hours.

That is evident where regular units of production per hour were collectively maintained. But in those cases, as also for individual factories working over time, or short time, world-wide extra work at statistical adjustments is imposed by the present calendar upon those who strive to find the true monthly trend of business.

Such difficulties and extra work would be abolished by the regular use of four-week months.

To fairly test the comparative business effects of the present unequal calendar months against those of the proposed one for four-week months, we take the case of a factory regularly producing the same quantity of goods per working hour from August 1st to December 31st, 1924, to prove that its monthly comparative production would be August, 100; September, 102; October, 106; November, 96; and December, 106 per cent of August, thereby calendar-causing a misleading decrease of 10 per cent in November, and permeating business statistics with four different ratios of deflections, inherent in those monthly totals.

Further, please note that manufacturers who paid their weekly wages on Saturdays had to provide five weekly pays in each of the two least productive months of August, 100, and November, 96 per cent, while giving monthly credits for the goods they sold.

In other lines of business, such as railways and hotels, the different values of the respective week days show different monthly deflections caused by the calendar.

For example, Horwath & Horwath, the eminent accountants for very many American hotels, estimate that for room sales, Mondays average 17 per cent, Tuesdays 17 per cent, Wednesdays 18 per cent, Thursdays 18 per cent, Fridays 12 per cent, Saturdays 10 per cent, and Sundays 8 per cent.

On that basis a \$10,000 per week hotel in 1925, April would average \$1,453.33 per day; *whereas May with 1 day longer and \$10 more per day received*, would only average \$1,397.10 per day, because the 5th Wednesday and Thursday in April were worth \$3,600, whereas the 5th Friday, Saturday and Sunday ending May were only worth \$3,030.

The total room sales for May were \$290 less, and the average daily sales were \$56.23 less than in April.

All those differences were entirely caused by irregularities in the changing Gregorian calendar, which in the year 1924 indicated August as 100, September 101, October 104, November 97 and December 105 per cent of August, on the basis that weekly sales were exactly equal throughout those five months.

The proposed four-week months to begin the year 1928, would show the true 100 per cent production from August 1st to December 28th, and by that always equal multiple of four times the universal week, would always record the true ratios of actual increases and decreases in production, business affairs and home expenses.

Neither the inadequate 30, 30, 31-day months proposal, nor any twelve-month calendar can bring the numerous and valuable benefits recorded above. The fact is, that they can only be derived by establishing the use of the calendar of thirteen equal months.

Those benefits will only be experienced when the length of each month is internationally established as an exact multiple of the now universal week which is the calendar unit regulating work and rest.

Even if the twelve months were equalized as much as possible, workmen during the 31-day months would suffer a 2 per cent decrease in earnings, against 10 per cent increase in expenditures—totaling a disparity of 12 per cent.

That is because those months would include both a 5th Sunday, during which such workers would earn only on one-half of Saturday; but their expenditures on those two days generally average about twice the amount expended on any other two days of the week, through week-end costs of family requirements, recreation, trade-union, church, club, etc., contributions, and other weekly charges.

Those costs would, by the twelve-month plan, be made much harder for workers to bear, than under four-week months, especially when they accrue at the month-end,

when rents, insurance, hire and purchase of furniture, etc., with other monthly payments become due.

### CALENDAR CHANGE

A change in our present calendar is so inevitable and the opinion of the world is crystallizing so rapidly in favor of a simplified calendar, that I am glad to place before you a few facts which will prove that this great movement is economically sound and internationally practicable.

Before discussing the calendar, let me recall to your minds a similar movement which, as a world topic, developed international success forty years ago.

In 1879 Sir Sandford Fleming, builder of the Canadian Pacific Railway, experienced such difficulties with the different kinds of time then in use in the United States and Canada, that he conceived the idea of "standard time." In New York City there were six different clock times in use; Chicago had seven varieties—most other cities varied.

Despite the public confusion and business wastefulness which that condition imposed upon the nation, it was argued and widely believed that local noontimes could never be changed.

By 1884 the sentiment in favor of standard time was so universal that President Arthur called an international conference. Two years later standard time was adopted by all leading nations with but one exception. Today that international standard time system is used, and has developed great public convenience throughout the world. It is so universal, that most people have forgotten that any other time ever existed.

The present movement to change our calendar is as certain to succeed as was the acceptance of standard time.

<sup>2</sup> From Address by George Eastman, Eastman Kodak Company. Rochester, N.Y., before the United States Chamber of Commerce, October 18, 1927.

It was started by Mr. Moses B. Cotsworth, who is recognized throughout the world as an eminent statistician and practical scientist.

Our company's experience led me to investigate the plan which Mr. Cotsworth had originated. He had studied the practical aspects of this subject for more than thirty years, in as many different countries. He was associated with Sir Sandford Fleming in Canada, and is the recognized international authority on calendar simplification throughout the world.

That an agreement will be easily attained is evidenced by such facts as these:

During the last twelve months Mr. Cotsworth has personally consulted the government, commercial, labor, economic and other experts and organizations in the capital cities of more than twenty European nations, and found them favorable.

A few months ago I sent personal letters to more than one thousand representative men in this country, asking them to give me the benefit of their counsel. The response to this letter was so overwhelmingly favorable; the interest was so genuine and the businesses represented were so diversified that I am here today, not as an individual advocate but as a representative of the considered opinions of these business and professional leaders.

To enable you to realize the considered opinions of these leaders and their eminent standing, I submit typical excerpts from their replies.

Many concerns in this country and throughout the world are already using the thirteen 28-day periods in their own accounting systems. One of the largest distributing companies uses it in its fifteen thousand chain stores. A large motion picture producing corporation uses it in two hundred subsidiaries. All British railway companies unanimously adopted the Cotsworth Plan for cost purposes and indorsed the reform.



The Skoda Works in Prague, employing twenty-two thousand workers, and many German business concerns are now using 28-day periods. As it is in actual use to-day in trade, industry and transportation, the practicality of a simplified calendar is no longer a matter of doubt.

Because official representatives of the great Christian Churches have assured the League that they are in favor of a fixed Easter, there is reason to believe that the date of this church festival (which can only be set by the religious bodies themselves and not by government or business) will fall on April 15th in each year under the proposed calendar.

Some people say that the calendar cannot be changed. What kind of an argument is that? You business men know that the world moves inevitably towards the practical, and this change in the calendar is as practical as was standard time.

There exists today only one obstacle. That is inertia, and that, I am certain, can be overcome. This is an opportune moment for American business to assume the leadership.

### RECOMMENDATIONS OF CHAMBER OF COMMERCE<sup>3</sup>

Your Committee believes that, if changes of the kind opposed by the Committee of Enquiry [of the League of Nations] are eliminated from discussion, attention can be concentrated upon the more fundamental questions. These are three in number, and are:

- A. Should the divisions of the year in the present calendar be so changed that there will be greater uniformity in length and consequently better comparability?

<sup>3</sup> From Report of the Committee on Calendar Reform of the Chamber of Commerce of the United States. p. 7-15. Washington, D.C. April 30, 1929.

- B. Should the weeks be fixed in their relation to the divisions of the year in which they occur?
- C. How should the form for changes be determined?

*A. Revision is Needed: Your Committee recommends that the divisions of the year in the present calendar should be so changed that there will be greater uniformity in length.*

The Committee has reached this recommendation after considering the business difficulties which arise under the present divisions of the year. As has been pointed out in the portion of the report of the Committee of Enquiry the two half-years are not at present equal in length, there is a variation of 3 per cent in the length of quarters, and a variation of as much as 10 per cent in the length of months.

For these computations the total number of days in the months has been used. If Sundays are excluded, the first half of 1929 will contain 155 week-days and the second 158; the quarters of 1929 will contain respectively 77, 78, 79 and 79 week-days, and the number of week-days in the month will range from 24 in February to 27, with two months containing 25 week-days, four months 26 week-days, and five months 27 week-days.

The variations in working days are even more marked. Of course, holidays do not enter structurally into the calendar. In the United States any one of them could be abolished, or changed from one calendar date to another, in the same month or another month, by state legislation and without any alteration in the calendar. Questions about holidays are consequently not before this Committee, but for purposes of information we add something about the variation which now occurs in divisions of the year by reason of holidays.

In effect, holidays increase the variation which occurs by reason of the present divisions of the year. As

legal holidays are a matter of state law, the number of holidays differs in the various states. The holidays common to all of the states are:

New Year's Day	General Election Day
Washington's Birthday	Thanksgiving Day
Independence Day	Christmas Day

In addition, the following are holidays in so large a number of states as to have general importance:

Lincoln's Birthday	Labor Day
Good Friday	Columbus Day
Memorial Day	Armistice Day

Most states have one or more other holidays. If only the twelve named above are considered, however, it is found that they will cause among the months of 1929 a variation between 22 work-days in February and 27 in August. In other words, the number of work-days in February, 1929, will be 18 per cent less than the number in August. The number of work-days in the four quarters of 1929 will be, if these 12 holidays are considered, respectively 74, 76, 77 and 75.

Some emphasis has been laid upon the advantage to business men in having more equal divisions of the year for recording the results of business operations. There would be benefits, too, in collection and use of engineering and scientific data which have a reference to periods of time.

That the recommendation of the Committee is practicable from the business point of view seems to have been demonstrated by the number of American companies that for their own internal purposes are using calendars which give them more equal divisions of the year than the calendar in general use. There are instances in which American companies have used these special calendars over a period of many years.

It will be recognized, also, that there is nothing in astronomical facts to interfere with the Committee's recommendation. The year and the day are astronomically fixed, but months, quarters and half-years are not related to astronomical events.

The Committee's recommendation could be carried into effect, too, without disturbance of existing contracts. An obligation to pay money upon a future date, for example, would in no way be modified; for the corresponding day upon the new calendar would be the same date as the day specified according to the present calendar. Where statutes, national or state, prescribe that an act is to be performed on a date or before a date, a simple piece of amendatory legislation would substitute the corresponding dates of the new calendar. March 4 as the date for the beginning of the term of office of the President of the United States is an example of this kind. For the future, at least, a calendar of the sort recommended by the Committee would make unnecessary such elaborate directions as to the divisions of time as have been placed in some statutes in recognition of the unsatisfactory nature of the present calendar. The federal statute respecting pay of the Army is an illustration. It provides that monthly compensation is to be considered as one-twelfth of annual compensation and daily compensation one-thirtieth of monthly compensation. Such existing statutory provisions, of course, could be made to conform to the divisions of a new calendar.

B. Whether work-days or week-days are considered, the inequalities among the present divisions within a year are not the only disadvantages. There is a further difficulty affecting business calculations and business statistics because of inequalities between the number of such days in a division of one year and in the corresponding divisions of preceding or following years. This is due to the circumstance that in one year a month may have five Sundays and in the next year may have four. As a

consequence, some months in each year, these months varying from year to year, spread into six weeks. In 1927 and 1928, for example, January contained five Sundays but in 1929 it will have four. In 1928 September and December extend into six weeks, and in 1929 March and June will extend into six weeks. The reasons for this failure of the weeks to have fixed places in the divisions of the years are stated in the quotation sent out earlier from the report of the Committee of Enquiry. When it is recalled that for many business purposes—such as sales by retail stores, the passenger business of transportation companies, and hotel business—the days of the week have materially different values, it is apparent that the present changing relation of the weeks to the divisions of the year in which they occur seriously impairs the accuracy of attempts to compare business results in weeks or months of one year with those of another year.

*The Committee accordingly recommends that the weeks should be so fixed in relation to the divisions of the year in which they occur that there may be increased comparability between business results in a division of one year and business results in the corresponding division of other years.*

*C. International Conference Proposed:* The members of this Committee have individual preferences respecting the two plans, and a majority favor a plan for thirteen months of 28 days each. But a majority of the Committee believe also that the time is not yet ripe to suggest that the Chamber commit itself to a choice between the two plans. The Committee believes that decisions should now be attempted only upon the question whether or not the present calendar has such serious defects that it should be altered and respecting the method which should be followed in determining any changes. In modern times of vast international commerce, and of rapid and constant communication and travel, uniformity in calendar among the principal nations is the most important consideration.

When the demand for reform in the calendar has reached such volume that action is to be taken, the action therefore should be upon the part of an international conference. Such a conference could take into account considerations of a religious character that may be advanced in some countries and can work out a plan for change to be put into effect at the same time in all countries which have common interests. Recognition of these factors led the International Congress of Chambers of Commerce, which preceded the International Chamber of Commerce, to adopt resolutions as early as 1907 in advocacy of an international conference with respect to the calendar.

*The Committee accordingly recommends (1) that the present calendar should be changed, and (2) that the government of the United States should participate in an international conference called to formulate a plan for calendar reform.*

#### IMPORTANCE TO BUSINESS<sup>4</sup>

In most lines of industry and commerce the individual days of the week are not of the same value. The best illustration is that of a factory which works only half-days on Saturday. Comparisons between months of five Saturdays and months of four Saturdays are obviously inaccurate. If production in a certain plant were uniform throughout the year 1927, the monthly output in March would show an increase of 19 per cent over February, April output report would show a decline of 6 per cent from March, and the May report a decline of 6 per cent from March. If no adjustments were made for these variations, the plant manager would obtain a false impression of the state of his business.

Take the hotel business as another illustration: Thursday is the best day of the week for the hotel

<sup>4</sup> From article, Revision of Present Calendar Needed, by M. B. Folsom, Eastman Kodak Company, Rochester, N.Y. *Paper Trade Journal*. 88:61-3. January 24, 1929.

business, the average receipts on Thursday equaling 18 per cent of the receipts of the week, while Sunday receipts are only 7 per cent, and Saturday receipts 10 per cent of the receipts of the week. This variation in the number of the days in the month and the difference in the value of the days of the week cause a fluctuation in the value of the months of any one year and also in the value of corresponding months of different years.

Using 1926 as an illustration: If January were considered as 100, February would have a value of 93.5, March a value of 106.5, April 102, May 100, etc. If the hotel manager made no adjustment for these variations, he would get a wrong conception of the course of his business. He would probably make allowance for February, but it is doubtful whether he would make allowance between March and May, for instance. If no allowance were made and if his business were uniform during the year, he would get the impression from the monthly report that the business had declined 6 per cent from March to May and that it had increased 14 per cent from February to March.

The department store gives another good illustration of the difficulties caused by these defects in the calendar. Saturday is the most important day for department stores, Saturday bringing in 22 per cent of the business of the week. In March of this year there were five Saturdays, and in March of last year there were four Saturdays. If a department store manager made no allowance for this fact, he might have obtained a wrong impression as to the actual business increase, this March over last March.

The second defect of special importance to business, is the fact that the month is not a multiple of the week, which causes the occurrence of fractions of a week in a month. All accountants are familiar with the split-payroll difficulty and with the erratic course of the burden and cost statements owing to the fact that some

months have five pay-days and others only four pay-days. This variation in the number of pay-days upsets comparisons not only between months of the same year, but also between corresponding months of consecutive years, because the month does not always have the same number of pay-days in different years.

It is obvious from the illustrations given that, if adjustments were not made for the variations in the number of days and the number of weeks in a month, all monthly reports would be misleading and inaccurate comparisons would be obtained. If adjustments are made, additional clerical help is required.

Of course, any calendar change would cause a certain amount of inconvenience in the first year or two after its adoption because there will be difficulty in making comparisons between the months of the new calendar and the corresponding months of the old calendar. In this respect a calendar change would not be very much different from a change in the accounting system of a plant. All anniversary dates, birth dates and holidays would be changed, but there would be little actual difficulty in determining the new dates from an adjustment table.

There would be no legal difficulty encountered. All that would be necessary, following an international agreement through delegates of the various countries, would be an act of Congress stating that such a calendar would take effect on a certain date probably two or three years in advance. This act would include, as a part of it, an adjustment table and would provide that dates on existing bonds, mortgages, leases, contracts, etc., would be automatically changed to the corresponding dates of the new calendar as determined from the adjustment table. It would therefore be unnecessary actually to recall all bonds outstanding and have the old dates erased and the new dates put in; the maturity date under the new calendar would simply be determined by reference to the adjustment table.



The inconvenience and difficulty which would be experienced during the first two or three years of the revised calendar are slight when compared with the many advantages which would be obtained in the business, social and religious world.

Many people will probably say that, however desirable and beneficial, there is very little chance of a change actually being made in the calendar. This, however, is not the case. It is surprising the extent to which sentiment has already developed in favor of calendar revision. The National Association of Cost Accountants, 4,300 members, has officially endorsed the proposed 13 months calendar, and such labor bodies as the International Association of Machinists have added their approval. The Canadian Government Advisory and Technical Commission states that it "endorses the principle of calendar reform and prefers 13 equal months to the year, 28 days to a month or four weeks." Among prominent Canadians who have endorsed the 13 months calendar proposal are Senator R. Dandurand, president of the Senate of Canada and ex-president League of Nations, Sir Henry Thornton, president Canadian National Railways, E. M. Beatty, chairman and president Canadian Pacific Railway Company, Tom Moore, president Trades and Labor Congress of Canada.

Among the prominent men who have favored calendar change and specifically the 13 months of 28 days plan are:

Pierre S. duPont, chairman General Motors Corporation; Gerard Swope, president General Electric Company, New York; W. C. Teagle, president Standard Oil Company, New York; August Heckscher, banker, New York; William Wrigley, Jr., chairman William Wrigley Company, Chicago; T. Edson White, president Armour & Co., Chicago; Otto H. Kahn, president Kahn, Loeb & Co., New York; C. E. Mitchell, president National City Bank, New York; John McEntee Bowman and E. M.

Statler, executive heads of two of the largest hotel systems in the United States; E. A. St. John, president National Surety Company, New York; L. F. Butler, president The Travelers Insurance Company, Hartford, Conn.; William Fox, Fox Studios, New York; W. W. Atterbury, president Pennsylvania Railroad Company, Philadelphia; Samuel M. Felton, chairman Chicago Great Western Railway, Chicago; J. E. Gorman, president the Chicago, Rock Island and Pacific Railway Company, Chicago; John D. Larkin, Jr., Larkin Co., Inc., Buffalo, N. Y.; C. A. Whelan, president United Cigar Stores Company, New York; H. T. Parson, president F. W. Woolworth Company, New York; Robert Dollar, Dollar Steamship Line, San Francisco, Cal.; L. A. Osborne, president Westinghouse Electric International Company, New York.

A letter of special interest came from the Gardner Publishing Company, of New York:

For many years we have favored calendar change on account of the peculiar conditions obtaining in the publishing business, particularly with magazines. We have two magazines, both of which encounter serious bookkeeping difficulties because of the present calendar. The weekly magazine is published on Monday and is billed as of that day. Our pay-roll is dated on Saturday; we, therefore, have the difficulty occasionally of having five pay-rolls in a month with only four issues of the magazine. Other times we have five issues in the month with four pay-rolls. The result is that it is almost impossible for us to make valid comparisons between months.

It is not general public knowledge that more than sixty industrial concerns in the United States and Canada are already using 13 period calendars of their own, among them being two that have used this method of handling their accounts and records for over 30 years.

A few of these concerns are: American Sales Book Company, Ltd., Elmira, N. Y.; L. L. Brown Paper Company, Adams, Mass.; F. N. Burt Company, Ltd., Buffalo, N. Y.; Cellucotton Products Company, Neenah, Wis.; Champion International Company, Lawrence, Mass.;

Chemical Paper Manufacturing Company, Holyoke, Mass.; T. Eaton Company, Toronto, Canada; Fiberloid Corporation, Springfield, Mass.; International Textbook Company, Scranton, Pa.; United Press Associations, New York; Loew's, Inc., New York; Life Publishing Company, New York; Mercury Mills, Ltd., Hamilton, Can.; Motion Picture News Company, New York; Newton Paper Company, Holyoke, Mass.; John P. Smith Printing Company, Rochester, N. Y.; Southworth Company, Mittineague, Mass.; Crocker-McElwain Company, Holyoke, Mass.; Springfield Glazed Paper Company, West Springfield, Mass.; The Upson Company, Lockport, N. Y.

The thirteen period system is operated as follows:

Each ordinary year has one extra day beyond 13 months of 28 days and leap year has two extra days. The method of taking care of these extra days which is used by the majority of firms is to let these days accumulate and insert an extra week in the thirteenth period every six or seven years. For instance, in the case of a calendar adopted this year, the thirteenth period would end on December 29, and the work calendar for 1929 would commence on Sunday, December 30, 1928. Another day will be accumulated in 1929, so that the work calendar for 1930 will commence on December 29, and so on. It will, therefore, be necessary in 1932 to have five weeks in the thirteenth period. This extra week will be necessary every five or six years, depending upon whether there are one or two leap years in the period. This means that in the fifth or sixth year the thirteenth period will not be comparable with the other periods, and allowance will have to be made for this in comparative statements. This method has an advantage in that the period would always begin with the same day of the week and always end with the same day of the week.

The outstanding benefit of the 13-period calendar is that all months are comparable without any adjustment

being necessary for the unequal number of days or the unequal number of weeks as found in the ordinary 12-month calendar. The advantages of "more accurate cost and production records," "elimination of split payrolls," "assisting budgeting," "having every closing on the same day," "having the end of the week coincide with the end of the period," and "the more effective planning of clerical work in closing the books owing to more efficient scheduling," are among points emphasized by those who employ the 13-period system.

The operation of the 13-period plan in the printing establishment of John P. Smith, Inc., Rochester, N. Y., has resulted in their rendering statements to their clients every four weeks instead of every month, and they have succeeded in inducing the concerns from which they purchase materials—such as paper, electrotypes and half-tones—to render them statements every four weeks. They have eliminated fifth-week payrolls from their accounting, with economy in bookkeeping expense, and altogether produced a uniformity of cost and production averages that simplifies the task of making true comparisons of the course of their business.

Aside from the benefits derived from simplifying interior business operations, the 13-month calendar would benefit the printing industry in another important way.

It should increase your business. When the new calendar is in general effect all monthly periodicals would be issued thirteen times a year instead of twelve.

There will be an increase in the amount of printing of bills, statements, etc.

#### PRODUCTION GEARED TO THE THIRTEEN MONTH CALENDAR<sup>5</sup>

Proposals to change the present calendar have reached a stage where concerted effort is being made

<sup>5</sup> By L. J. Stewart, Comptroller, Western Clock Company, La Salle, Illinois. *Factory and Industrial Management*. 77:469-70. March, 1929.

to determine whether public sentiment favors such a move. It may be of interest, therefore, to set down the Western Clock Company's experience with the 13-month calendar particularly in view of the fact that we adopted it 37 years ago and have been using it ever since.

The purpose of a calendar is to measure time. It is unfortunate, then, from a business standpoint, that the 12 units of the present calendar are unequal in length, that the month is not a multiple of the week. Compare February in an ordinary year with a 31-day month. There is a variation of 11 per cent. Working days in a month may run all the way from 21 to 25—a variation there of 19 per cent. When you consider that most reports in business are compiled monthly, it becomes obvious that these variations constitute serious defects in our present method of keeping track of time. Laborious calculations must be made in order to afford a means of comparison. And even then the picture is not a true one because in any operating statement there are many items that cannot be allocated correctly on a percentage basis.

It was a desire to make quick and accurate comparisons of past and present performance in order to plan intelligently for the future that led us to adopt a 13-month calendar. Such comparisons can be made readily when each month contains 28 days—when, except for holidays, there is precisely the same number of days in one month as in another.

So notable has been our success with operation on a four-week basis that we have never considered returning to the old method. The 28-day month allows for flexible accounting. Each month is constant, invariable, uniform. No longer are our comparative financial reports full of unfortunate "ifs" and "buts." Picture a financial statement, a profit and loss statement showing comparisons with previous periods without the necessity of reconciling reports. Such statements are possible when the year is divided into 13 equal periods. We can compare March 1929, or rather the third period of 1929,

with the same period in 1928 or any other year, and know that there is an equable basis for comparison.

We use the 13-month calendar for all internal records. The plant is run on a budget system. The planning department estimates sales over a given period and divides the estimates into manufacturing cycles of 24 working days each. On that basis production requirements are estimated, manufacturing schedules are set up and followed.

Purchases are governed by these production cycles, by inventories of materials on hand and by prevailing market conditions.

One important advantage of our system is that we can conveniently plan a complete turn-over every 24 days. Which means that capital is tied up 48 days instead of 60 as it would be if we operated on the usual monthly basis. Because of the accuracy with which production schedules can be planned, it is possible to follow them with great exactness. Each foreman knows just how many clocks or how many parts his department should produce each day, and makes every effort to complete the task laid out for him.

We work on a  $5\frac{1}{2}$ -day week. The pay-roll is closed out every two weeks, the office and factory pay-rolls alternating. Employees have been taught to look on every second Saturday as "closing up" day. This practice has an interesting psychological effect. If holidays have interfered with schedules and curtailed production, the extra effort needed to complete schedules and to bring about this closing up is put forth without complaint. Each workman knows he has a certain stint to finish, and he finishes it.

In budgeting expenses departmentally and functionally it is extremely helpful to know that, barring holidays, monthly budgets will be the same. Some 80 departments are budgeted yearly and each budget is then broken down to cover the 13 periods. Right here we

save a tremendous amount of work. How much more difficult it would be if we had to set up 31-day, 30-day and 28-day budgets for each of those 80 departments and for each of the dozen or more classes of expense in each department.

Of course, as long as everybody else uses a 12-month calendar, we must forget our 13-period year in our external relations. This applies to the credit division, sales department and so on. In these departments internal records are kept on the 13-month basis, but bills are sent out, collected or paid at irregular intervals during the period. Merchandise is billed on the date of shipment, and as our terms are 30 days, the 13-month calendar is disregarded. Likewise, it does not affect the handling of bills payable. Cash discounts are taken and bills paid at irregular times. There is no need of making special arrangements with vendors to send statements according to our calendar, because we pay all bills according to the terms of sale and book all purchases on receipt.

For obvious reasons we still use the dates of the 12-month calendar in all correspondence with the trade. "Second period 15" instead of February 10 would mean nothing at all to outsiders. Indeed, we conduct our business in such a way that those with whom we deal do not know whether we use a 12- or a 13-month year.

In setting up a calendar like ours, there is the question of what to do with days over and above the 28 which we use. The answer, of course, is that we carry them over into the following period. For instance, our 1929 calendar began on December 30 and the first period ended on January 26. The remaining days in January and the first 23 days in February constituted the second period. That is, the second period began on January 27 and ended on February 23. And so on, throughout the year.

That accounts for everything except the 365th day in an ordinary year and the last two days in each leap

year. We simply let these days ride until six years have elapsed or until the extra days form a full week. Then we slip in this week during the vacation period which falls in July. In 1924, the last time we had to make this adjustment, our sixth period began on June 15 and ended five weeks later on July 19. That is really our only calendar irregularity, and it is due to the fact that we have to convert a 12-month calendar into one having 13 periods. If the 13-month calendar were universally adopted, such an adjustment would be unnecessary. In the Cotsworth plan, for instance, the extra days are cared for by dating the last day of the year December 29 and calling it an eighth-day extra Sabbath ending the last week. In leap years, leap-day would be another eighth-day extra Sabbath dated June 29.

An interesting point about our 13-month calendar is the effect it has on the community as a whole. Since pay days fall on regular Saturdays, employees have acquired regular buying habits, and—what is more important—have learned to pay their bills more promptly. Many of the local merchants make a practice of sending out their bills not on the first of the month, but on pay day. If we paid as other concerns do, on the first and 15th of each month, employees would wait until the Saturday following pay day to pay their bills, and the merchants would be affected somewhat in consequence. Collections would undoubtedly be slower.

Summing up, the 13-month calendar presents no difficulties. Its chief advantage is that it facilitates the presentation of comparative reports. Numbered among its benefits are more accurate cost and production records because of the greater ease and accuracy with which production can be scheduled, absence of split pay-rolls, more effective planning of clerical work in closing the books. In our experience it has saved an immense amount of time, heartache, headache and numerous other aches, all the way from cost clerk to president. We often



wonder why other concerns stick to the old-fashioned way of measuring time. Presumably it is because they do not appreciate the advantages of the 13-month calendar. If they tried it, I honestly believe they would never have any other.

### IMPORTANCE TO GOVERNMENT<sup>6</sup>

In contrast to the individual business viewpoint let us consider for a moment what the proposed change would mean to the biggest and most comprehensive business of all, namely, the governments of the civilized countries of the world. Take the United States government, for instance, undoubtedly the "biggest business" in existence. Consider its Department of Commerce which, under Secretary—now President-elect—Hoover, has been furnishing the business world with weekly and monthly information on conditions and trends both here and abroad—a service which has had a large part in building up the stability and prosperity of the nation and which, in view of the enormous expansion of business in recent years, is already faced with the need of providing even more exact information than it has hitherto been able to provide. And this more exact service cannot be completely rendered until the sources of information of the Department of Commerce are based upon a calendar in which, in the words of Doctor Burgess, Director of the Bureau of Standards, "nominally equivalent periods of time are actually equal and comparable." The lack of such a calendar seriously inflates monthly export and import totals, because of our unevenly recurring twenty-ninth, thirtieth and thirty-first days and the consequent fifth Saturdays and Mondays which inflate totals as much as 10 to 13 per cent.

<sup>6</sup> From article Progress Toward Calendar Simplification, by Isabel Keith Macdermott, Managing Editor, *Bulletin of the Pan American Union. Bulletin of the Pan American Union.* 62:1234-42. December, 1928.

Consider the Treasury Department with its government pay envelopes, its interest-bearing bonds of many classes, its Treasury certificates and notes, and the consequent strain of its daily, monthly and quarterly payments under the actual uneven-period calendar, and the enormous easement to this strain which would result from the adoption of a "fixed" calendar of 13 months of 4 weeks each! Consider the Department of the Interior with its manifold ramifications and the endless and expensive adjustments now required in the calculation of pensions, salaries, interest, insurance, leases and rents, because of the lack of such a calendar. In the Department of Labor, also, the unequal length of our present months, quarters and half years is a constant source of confusion and uncertainty because the number of working days—the important factor in all labor—is constantly changing. Indeed, Hon. James J. Davis, Secretary of Labor, has but recently quoted and indorsed the statement of his Commissioner of Labor Statistics, Mr. Ethelbert Stewart, that:

No one thing would be so helpful and reduce the cost of gathering labor statistics to the same extent as . . . the simplification of the calendar, making each month of the year the same length.

In general, there is not a department in this "biggest of all big businesses" which would not be benefited, whose work would not be improved and expedited, and whose operating cost would not be decreased by the proposed calendar simplification, which, it is authoritatively estimated, would automatically release as much as \$1,000,000,000 not to mention the saving in time and other important elements. And it is not irrelevant to emphasize here the fact that time saved inevitably results in an increased margin for individual recreation, a margin still further enhanced by the fixing of holidays on Monday—not the least of the benefits of the Cotsworth calendar—thus giving all workers, each holiday, two days of rest and recre-

ation with their families. This has been well expressed by Mrs. Franklin W. Fritchey, president of the National Housewives' Alliance—that enormous and fundamentally significant part of the American body politic—in a recent statement which reads in part as follows: “The arrangement of all holidays on Monday will be a great step forward by giving more time for rest and recreation . . . which will reflect more happiness in the home, and anything that makes for happier homes makes a happier world in which to live.”

Nor is the movement in question limited to the industrial and business world. It appears to be equally favored in the rarer atmosphere of science, both pure and applied, for the National Academy of Sciences, the official advisor to the United States government in scientific matters, placed itself on record February 23, 1928, by a comprehensive resolution of which space permits the quoting of only the following:

... *Resolved*, That the National Academy of Sciences of the United States of America favors a change in the present calendar looking to the establishment of 13 months per year grouped so that the last 13 days of June and the first 15 days of July form the proposed new month, the odd three hundred and sixty-fifth day being designated as “Year Day,” and permitting among other things the establishment of a fixed date for Easter Sunday.

*Resolved further*, That these resolutions be made a matter of record in the academy for use in case the academy is called upon for an opinion either by the United States Government or by bodies interested in the revision of the calendar.

Finally—to return to the first paragraph of this article—it is seen that with the creation of the national committee the question of calendar simplification becomes a national issue. Shall it be done? If so, how? And when? Existing public sentiment would seem to indicate an affirmative reply to the first question. As to the second, the facts assembled in this article indicate a strong predisposition in the business, financial and industrial fields in favor of the Cotsworth plan, with its 13 equal

months of four weeks each. The answer to the third is clearly suggested by the national committee itself in the following words: "The nearest convenient year for putting a new calendar into effect is 1933, in which January 1 falls on Sunday." In other words, the first day, week, month, minute and second of that year will begin together. Moreover, that is the nearest convenient and logical time for calendar change from the viewpoints of the naval observatories of England, France, Germany, Spain and the United States, which work several years in advance preparing the exhaustive international and statistical data for the calendars in use in these and other countries.

### SCIENCE NEEDS THE THIRTEEN-MONTH CALENDAR<sup>1</sup>

Statistical analysis is that branch of science which enables the trained student to impersonally investigate and disclose the complex and obscure relationships between thousands and even hundreds of thousands of fluctuating values which are influenced by numerous causes producing changes. Whenever time is one of the variable elements, as in the case of solar and meteorological observations, crop production, health statistics and the incipency of many diseases, the calendar used in summarizing the data is of great importance.

Only a little more than twenty-five years have elapsed since the science of statistics has been put upon a beautiful and exact analytical basis by the contributions of a long list of eminent mathematicians, such as Charlier, Thiele, Pearson, Yule and others. Armed with the powerful tools of analysis and research thus supplied, a student is discouraged at the outset to find that the data he must use has already been summarized by the present

<sup>1</sup> By Dr. C. F. Marvin, Chief of United States Weather Bureau. From pamphlet *Do We Need Calendar Reform?* by George Eastman. p. 49-52. Rochester, N. Y. 1927?

calendar in unequal monthly and seasonal units. Here at the outset of his research is a false or artificial cause of fluctuations which he must allow to mar his conclusions, or a very great task must be undertaken to recompile new summaries from the original observations.

The inequality of its months is by no means the greatest fault of the Gregorian calendar. The month is quite too long a unit for many civil, social and scientific purposes. The week and the fortnight are both necessary smaller units, but for statistical research they must both be aliquot parts of the month, the season and the year, as well as stand in simple multiple relations to each other. No twelve-month calendar of any kind can possibly satisfy all the above prerequisites. The International Fixed calendar, however, does satisfy all these statistical prerequisites in a very complete manner. In fact, these statistical exactions are just the things which guide Mr. Cotsworth in his reform of the present calendar.

A few examples will help to force home the importance of the statements made above.

Fully ten years ago the increased length of many records then available made it opportune and desirable for the United States Weather Bureau to compute new values of the daily normals of maximum, minimum and mean temperature at many stations. At that time the 13-month calendar was almost unheard of in public circles. The problem of the normals from fifty years of daily observations at more than one hundred and fifty stations is a question of the scientific analysis of over five-million individual temperature readings. All of these had been summarized in unequal monthly groups of the Gregorian calendar. The worst part of it was that the months were not only unequal but were too long a unit to satisfy the statistical standards such a great problem demanded. Here was a dilemma with two horns. Either a great piece of work must be poorly done because

of a bad 12-month calendar, or much time and labor must be expended in a *de novo* computation from the original observations of new averages on a standard schedule of 52 weeks to the year.

Notwithstanding the great additional labor it entailed, the computations were all carried out on the weekly basis, and the present temperature normals of the United States Weather Bureau are not free from the technical errors due to the unscientific calendar we continue to use.

Meteorology can supply many instances where the incommensurate relations between the present time units is wasteful of time or productive of crude and unscientific results. Forty years ago the Weather Bureau began the publication of weekly summaries of weather conditions for agriculture. This schedule of weeks must be shifted one day in advance each year and two days in leap year in order to keep in step with the civil calendar. Not only is needless work required to make the necessary adjustment, but the relations of the week to the solar and astronomical causes, which control the weather, change with each adjustment and impair the comparability of weeks in different years which seem to correspond but really do not.

The mysterious cycle of sunspots is a subject of constant statistical investigation by scientists. What sound conclusions can be drawn from tables of sunspot numbers, areas, etc., when February with only 28 days is sandwiched between January and March with 31 days each, as if all were of equal length?

The science of exact statistics is relatively young, having been put upon a substantial mathematical basis well within the last half-century. Wherever time is a variable element the calendar must give days, weeks, fortnights, months and seasons all in as simple aliquot and multiple relations as possible. The 13-month calendar does this and no other arrangement can. The increasing demands to meet statistical requirements is one of the most weighty reasons for calendar reform.

To those whose daily work brings them face to face with the faults of the present calendar, it seems that only habitual use of it by those who are unconscious of the needless waste it entails can explain how anyone can advocate its perpetuation. On the other hand, only lack of acquaintance with the simple elegance of the 13-month plan, and the scientific and civil benefits that will accrue to all humanity by its adoption, will cause anyone to oppose this reform.

### CALENDAR REFORM AND WORLD PEACE<sup>3</sup>

The vision is seen of a new calendar replacing the many differing ones, now in use throughout the world, in India, China, the Mohammedan countries and Africa, as well as the Gregorian calendar of Europe and the Americas.

It is too much to hope that such a calendar would be universally adopted at once, involving as it would the breaking of deeply rooted religious traditions among some peoples, but hope is high that the Gregorian calendar may be replaced by a simpler and more useful one in the not distant future. Gradually, as our world grows smaller, the remaining peoples would adopt it, just as the Gregorian calendar was gradually adopted in Europe and America, until a measure of time common to all the world is attained.

And the vision is also seen of the international conference setting aside one day of the new calendar as "Peace Sabbath" for common devotion by all peoples to the ideal of perpetual peace.

The fact that the nations are being brought to closer interdependence by swifter communication and interchange of knowledge is primarily responsible for the movement. Its leaders in the different countries empha-

<sup>3</sup> From article by Meredith N. Stiles, of the National Committee on Calendar Simplification for the United States. *Advocate of Peace*. 91:241-5. April, 1929.

size that the Gregorian calendar is a clumsy instrument for an economic and scientific world that is busy with activities incomparably more numerous and intense than those of the world of the ancients who devised it. It fails to meet the high standard of efficiency which modern science and modern education demand of every other instrument they use. As a basis of statistics for measuring the progress of trade and for scientific and educational data, it produces inaccurate and deceptive results. A better one, common to all nations, is sought.

Statistics are dull to most people, but in modern times comparative statistics of commerce and industry, health and disease, educational trends, agriculture, meteorological and other scientific phenomena have become of vast importance to successful progress, internationally as well as nationally. They are essential for control and analysis. All the organized processes of civilization use them. To be comparative they must be based on units of time, and there is none of these processes which does not feel the handicap of the unequal months into which our present calendar is divided, because of the difficulty in making accurate comparisons based on these units. Vital and health statistics, weather records, immigration figures, balance of trade variations, are internationally important illustrations.

Dr. E. Dana Durand, director of statistics for the Department of Commerce, speaking at the Economic Conference that was held in Geneva in 1927 said that the American Government attached great importance to the development of economic statistics and to improvements which would enable more exact comparability, which would facilitate business transactions and develop good understanding.

George E. Roberts, banker and economist, in testimony before the House Committee on Foreign Affairs said:



We know few things absolutely. We measure things almost solely by comparison. And it is a serious fault with our statistics that comparisons from month to month with the corresponding month of previous years are not accurate. A month may have five Sundays this year when it had only four last year. We are interested not only in statistics of our own production and trade, but in those of other countries. We study world statistics, and it is important to us that the statistics of all countries shall be on a comparable basis.

Dr. Fred E. Wright, in the name of the National Academy of Sciences, said to the same Committee:

The present calendar because of its irregularity imposes a heavy burden on the scientist.

Joy Elmer Morgan, Editor of the *Journal of the National Education Association*, said to the Foreign Affairs Committee:

If we could adopt a calendar that would give us thirteen months of equal length, it would mean that in managing education, which is a giant business involving three billions of dollars in expenditures, that in the human factors involved, we would have comparable units of a given period this year with a given period last year, so that we could get the true facts of this great human business. It would mean that in comparisons of our statistics with statistics of other countries, we would have standards which would make these statistics more valuable. If this great conference is called, America will take her part as a great nation in the advancement of a cause which benefits the human race.

## WORLD CONFERENCE TO REVISE CALENDAR<sup>9</sup>

The existence of this favorable sentiment is shown by the large number of communications which I have received from all parts of the country, from individuals and organizations, and by testimony given at the hearings on the calendar resolution which I introduced during the last session of Congress.

The new resolution cites the action of the Pan American Conference at Havana last year in recommending

<sup>9</sup> Text of statement made by Representative Stephen G. Porter, Chairman of the House Committee on Foreign Affairs, in explanation of H. J. Res. 60, 71st Congress, 1st Session. *United States Daily*. 4:502. May 1, 1929.

that all of the 21 Pan American countries prepare for an international conference to determine the best method of calendar revision. Cognizance of the Havana resolution was taken by the Republic of Peru, on February 23, 1929, when a national committee headed by Arch-Bishop Monsignor Lisson was named by the government to study calendar reform.

The present calendar is inadequate for modern requirements in economic, scientific, educational and other spheres of human activity. The calendar's inconveniences have been endured only by reason of custom and tradition which have fixed its use habitually in our lives and which, up to the present time, have kept proposals to improve it from becoming effective.

Universal adoption of an improved calendar would facilitate international intercourse with regard to commercial, scientific, educational and social relations and thereby promote and maintain better understanding, good will and peace.

There are differences of opinion, both religious and civil, as to the best method of change, and they can be adjusted only at an international conference. All these considerations certainly warrant action on the part of the United States, either to propose an international conference itself or to indicate to other nations or groups of nations, which may be considering such a conference, is readiness to participate in one.

The conference ought to be held some time this year because the next convenient year to start a new calendar is 1933, which begins on Sunday, and as much time as possible is needed to prepare for the change. Such action by the United States at this time certainly would serve to hasten it.

This resolution does not commit our government to any particular plan of calendar change. The international conference would consider all plans of calendar simplification and all objections to them, religious and civil.

Religious authorities would, of course, be consulted. From the discussion, the best plan of calendar change would undoubtedly emerge.

