SCIENCE NEWS

Science Service, Washington, D. C.

THE THREE HUNDREDTH ANNIVERSARY OF NEWTON'S BIRTH

SIR ISAAC NEWTON, known to every one for his universal law of gravitation, was born on Christmas day in the year 1642. Naturally we should suppose that Christmas day, 1942, would mark the three hundredth anniversary of his birth. But it is pointed out in the *Journal* of the British Astronomical Association (March) that December 25, 1642, was the date of Newton's birth according to the Old Style or Julian calendar then in use in England. According to the New Style or Gregorian calendar now in use, the date was January 4, 1643, and it is planned to celebrate the anniversary next year.

But is this correct? There can be some doubts about it. It is true that the day Newton was born was designated January 4 by the Catholic countries which had adopted the Gregorian calendar in 1582, at which time, by order of the Pope, ten days were dropped out. But by the time the new calendar was adopted in England in 1752, another day had vanished, because the year 1700 was a leap year in England but not in the Catholic countries. In fact, when the British switched to the new style they dropped eleven days. That would shift the anniversary to January 5.

But there is more. The years 1800 and 1900, which would have been leap years by the old reckoning, were not by the new. Thus two more days have evaporated, and the new calendar is now thirteen days ahead of the old. Thus the Soviet Government when they adopted the new calendar dropped thirteen days, which put the "October Revolution" into November. And this would boost Newton's birthday to January 7.

Thus we have four possible dates for celebration, December 25 and January 4, 5 and 7. Which shall it be?

If we insist that exactly 300 Gregorian years shall have elapsed before we can celebrate the anniversary, then January 7 is the correct date. But many will doubtless feel that since the English were actually celebrating Christmas on the day that Newton was born, it would be appropriate to celebrate his anniversary at the same festival this year, regardless of how the years have since been shortened and the dates shifted. Or, perhaps we might compromise by celebrating so great an event, which has so benefited the world, from Christmas to Twelfth Night.

The Gregorian calendar was adopted by the Catholic Church in 1582 in order to insure that the spring festival of Easter should actually occur in spring, and not get shifted back into winter, as it was already doing. Thus, in that year the vernal equinox, on which depends the date of Easter, occurred on March 11, whereas in the year 327, when the rule for reckoning Easter was established at the Council of Nicaea, the vernal equinox occurred March 21. By dropping ten days, Pope Gregory XIII restored it to that date, where, thanks to the accuracy of the Gregorian calendar, it has ever since on the average remained, and will remain for at least 20,000 years to come. At the end of that time the Gregorian calendar will be in error by only one day. Thus we are now assured that Easter will always come in spring, shortly after the vernal equinox, and Christmas will always come in winter, shortly after the winter solstice.

The Julian calendar was based on the idea that the true length of the year, or the time from one vernal equinox to the next, was exactly 365¼ days. Hence every fourth year, or in years divisible by 4, an extra day was added, making a leap year. But this adds too much, because the true solar year is actually about 11 minutes short of 365¼ days. The Gregorian calendar corrects this by omitting the leap year in the last year of each century. Thus 1700, 1800, 1900, although divisible by four, are not leap years. But now we have omitted too much, so it is further specified that the last year of every fourth century, or every year divisible by 400, will be a leap year. Thus 2000, 2400, 2800 will be leap years. Now we have again added too much, so it is further specified that every year divisible by 4000, that is the years 4000, 8000, 12,000, will not be leap years.

These three rules of 4, 400, and 4000 keep the calendar years now so close to the sun's years that the accumulated error in 20,000 years will not amount to more than a day.
—MORTON MOTT-SMITH.

COMETS DISCOVERED IN FINLAND

APPARENTLY a cablegram sent to Harvard College Observatory last February failed to reach there, for it was not until this month that Harvard Observatory received four routine post cards mailed from the international astronomical union headquarters in Copenhagen last spring. The first of these, circular 900, tells of the discovery of a new comet by L. Oterma at Turku Observatory in Finland. The card is dated February 20, but she made the discovery on February 12. The comet was of the 15th magnitude, which puts it beyond the observation of amateur telescopes. But it is just as important to astronomers as though it were of naked eye brilliance. The other three post cards, circulars 901, 902 and 903, contain further observations of the new comet and a prediction of its future positions.

By a strange coincidence, circular 901 also contains a complete series of predicted positions for comet Schwassmann-Wachmann 1, but the European astronomers apparently overlooked it completely this September, for on September 11 the observatory at Lund, Sweden, sent a wire to Harvard that a new comet of 13th magnitude had been discovered, also by Miss Oterma. However, this turned out to be in precisely the position predicted by circular 901 for comet Schwassmann-Wachmann 1. This occasioned the remark by an American astronomer that this comet ought to carry a red flag, so often has it been mistaken for a new one.

From the elements published by the Turku Observatory on the comet discovered last February, Dr. F. L. Whipple, of Harvard, computes its position to be in the constella-

tion of Cancer, the crab, just east of the cluster which is visible to the naked eye. Cancer rises in the eastern sky about midnight during the next month.

SUGAR RATIONING

SUGAR rationing should, in the interest of national health, proceed to the point of greater restrictions on the use of sugar for candy and soft drinks, in the opinion of the Council on Foods of the American Medical Association. This opinion and reasons for it appear in a report printed in the *Journal* of the association.

The sugar we use to-day, whether from cane, beets or corn, is practically a chemically pure product. It furnishes calories but no vitamins or minerals to the diet. And modern nutritionists know that man can not live by calories alone. In fact, he can not even make fullest use of sugar and other carbohydrate calories without certain of the B vitamins. The more he dilutes the amount of these vitamins with calories from pure sugar, the worse off he is nutritionally.

The suggestion of enriching sugar with vitamins, as flour has been enriched, has not met with favor. Use of sugar to make highly nourishing foods like milk and whey more appetizing, however, is to be encouraged. When sugar is consumed, it would be well, the council advises, to take it in the form of such mixtures as cakes containing milk and eggs, in malted milk and chocolate flavored skim milk drinks, and in candies containing appreciable amounts of powdered milk and nuts.

Care should be taken to keep children from eating candy which spoils the appetite for other more nourishing foods and from substituting sweetened carbonated beverages for milk. Industrial workers who eat candy or take such beverages for between meal snacks are endangering their health because such eating may lessen by 15 per cent. the amount of more nourishing food they should be eating. Between-meal eating is useful for relieving fatigue and increasing productivity, but it should contribute to and not detract from the total daily nourishment.

COFFEE AND TEA PRODUCTION

COFFEE and tea production in this country or a satisfactory substitute is not in the offing despite recent rosy rumors born of war shortages.

Glistening white clusters of bitter crystals are dissolved in every cup of either coffee or tea—caffeine upon which Americans have depended for a physical and mental boost. This stimulating chemical has been found in at least six different families of plants in many parts of the globe. But none can be imported any more easily than coffee; none can be quickly grown here.

When you can't get coffee, however, you might be able to brew a cup of tea. It is said that a strong cup of tea is just as stimulating as a cup of coffee. Tests show that caffeine actually causes a quicker, clearer flow of thought and permits more sustained intellectual effort. As its action creeps down the spinal cord, ease of muscular action increases and we are less easily fatigued. Heart muscle is even affected and the beat is speeded. Hitting the vasomotor nerves, caffeine causes the blood vessels to dilate. This, together with the heart action, increases blood flow. Indirectly this speeds elimination of kidney secretions. These actions are antagonistic to alcohol and explain why inebriates like a nightcap of coffee.

All in all, coffee has earned its reputation as the American "pick-me-up." And science has now pretty well exploded the theory that moderate use of coffee is harmful in any way to the average normal person. Kola, ingredient of many soft drinks, also owes its stimulating properties to caffeine. It comes from the Gooroo nuts of trees in far-off Africa and the West Indies.

The change to hot chocolate, planned by many, will not have the same action as coffee and tea. The active ingredient, theobromine, has little central stimulation or effect on the brain, but has an even more powerful effect on blood flow and muscle. There is a relatively small dose in a cup of chocolate, however, and the quantity consumed is not likely to be as great.

Although the African Gold Coast has sent us about 60 per cent. of the supply of chocolate-laden seeds from cacao trees, it is also being successfully grown in Central America and Mexico. Natives break open the big red melon-like fruits, remove the seeds and place them in the ground. After a fermentation process, the seeds are roasted and the inner seeds ground into chocolate.—GLENN SONNEDECKER.

THE MEDICAL DEPARTMENT OF THE ARMY

THE Army's medical department "is now operating an enormous and far-flung chain of hospitals half girdling the globe," was reported by Major General James C. Magee, the Surgeon General, to the San Antonio meeting of the Association of Military Surgeons of the United States.

Medical supply installations have kept pace with the hospitals, and both the hospital facilities and supply service have functioned without serious difficulty throughout the trying period of Army expansion and war. The weight of medical supplies has been shifted to St. Louis, and the medical depot there is now the largest depot of any army or service of the Army.

The efficiency of the system of the department for sorting and evacuating wounded showed up in the brilliant results after the Pearl Harbor disaster. The sulfa drugs and blood plasma banks got much of the credit for the medical victory there, but General Magee pointed out that without the efficient sorting and evacuation system, which functioned from the earliest phases of the attack, "neither sulfanilamide, plasma, nor surgical skill could have availed to save the lives of the wounded." The newest aids to rapid and efficient evacuation of the wounded with which the Army is experimenting are autogiros and jeeps.

Significant advances in disease prevention during the past twelve months were universal vaccination against tetanus and extension of vaccination against yellow fever to include all military personnel of the first mobilization objective. The jaundice which followed some of these vaccinations was proved definitely not to be yellow fever. He reported that admissions for jaundice associated with vaccinations have now ceased. The type of vaccine has

been changed and vaccinations are given now only to those expected to serve in yellow fever regions. Immunization against bubonic plague, cholera and typhus is being given troops expected to serve where those diseases are endemic.

General Magee paid high tribute to the courage of doctors, nurses and other medical personnel serving at Bataan. He told of one feat in particular, that of Colonel William D. North, "who returned to Fort Stotsenberg after that station had fallen to and was occupied by the Japanese, in order to replenish his store of medical supplies and secure a much-needed sterilizer unit from the station hospital. By what means he accomplished his self-appointed task with the help of a few of his native soldiers and what their experiences were, is a story shrouded in silence.

DEATHS FROM TUBERCULOSIS

AUTHENTIC figures showing increases in deaths from tuberculosis since the war in Paris, England, Wales, Scotland and Canada have been obtained by the National Tuberculosis Association.

Deaths from tuberculosis in Paris during the first six months of 1941 increased 10 per cent. over the deaths in the first half of 1939, and deaths among children from one to nine years increased 28 per cent. This increase is "doubly significant" because the city's population, as shown by the number of food ration cards, decreased by 14 per cent. Requests for sputum examinations in Paris laboratories increased greatly. The average number of positive results, that is, a result showing presence of tuberculosis germs in the sputum, increased from 59.1 per 100,000 examinations in 1939 to 211 per 100,000 in 1941.

The United States is the only nation so far unaffected by a war increase in tuberculosis, so far as authentic reports show. The 1941 rate was 44.4 cases per 100,000 population, a decline from the 45.9 per 100,000 figure of 1940, and preliminary data for 1942 indicate a continued slight decline in the TB death rate for our first year of war.

"Unconfirmed, but repeated, press reports emphasize a pronounced recent increase in the incidence of tuberculosis, diphtheria and scarlet fever in Germany," is stated in its current *Bulletin* of the association. "Detailed reports signed by accredited physicians or statisticians covering vital statistics in Germany for the past year or two are not available." Alarming increases in the disease have also been reported from China, Greece, the Low Occupied Countries and Poland, but no authoritative figures are available. No significant reports on tuberculosis from Russia, Italy or Finland could be found by the association's statistical service.

Between 1939–1941 deaths from tuberculosis in England and Wales increased 10 per cent. In Scotland the increase was even higher, 18 per cent. Canada reports an increase in the tuberculosis death rate in 1941 of 5 per cent. over the 1940 rate, adding that this is the first appreciable increase in the disease in that country in fifteen years.

ITEMS

AFTER the war the numbers of men and women in the country will be practically equal is suggested by a report from Metropolitan Life Insurance Company statisticians. The peak sex ratio of 1,060 males to every 1,000 females was reached in 1910, following a decade of the "greatest voluntary movement of population the world has probably ever seen." Since then the ratio of men to women has been steadily dropping. In 1940 it was 1,007 males to every 1,000 females. Since then (1940), there have been important changes arising from the war conditions. Many areas have suffered a loss of population to newly expanding industrial centers. All areas have undergone a withdrawal of men for military service. The outlook is that our post-war society may be constituted of practically equal numbers of men and women, and without such marked variations in different parts of the country as were found in the past.

SEARCH for the reason why draft boards are having to turn down more men for bad teeth in New England, heart trouble in the Northwest, goiter in the Great Lakes region and blindness in Texas, will soon be started at Columbia University, under the direction of Dr. Harry L. Shapiro, anthropologist of the American Museum of Natural History. He is of the opinion that the geographical distribution of characteristic physical defects is partly due to heredity, partly to social or local geographic conditions, and partly to a mixture of the two. The fact that mental disorders are found most frequently in Maine, Virginia, the Carolinas, Tennessee and Mississippi, and the high incidence of venereal disease, drug addiction and alcoholism in the Gulf States and the Southeast is probably due to environment. But the deafness found in the Northwest and New England and the lack of weight characteristic of the east coast and of California may be hereditary.

GRAPES grew in what is now the western United States in the Miocene times, long before there were any human beings, and the only creatures who might have appreciated them were animals like humpless camels, long-tusked mastodons and giant hogs. Evidence of their existence then is supplied by a bit of petrified grapevine found in western Nevada. It is the first fossil of its kind to be found in this country, though fossil grape leaf imprints have previously been reported. The piece of fossil vine is about 2½ inches long and a little over half an inch in diameter. It has the bases of two stout tendrils wrapped around it, and its internal structure has been so well preserved that the pores in the wood and the pith-rays are plainly visible. The specimen, which was sent to the National Museum by Mark M. Foster, of Denio, Ore., has been studied by Dr. Roland W. Brown, of the U. S. Geological Survey. In the *Journal* of the Washington Academy of Sciences it is given the scientific name, Vitoxylon opalinum.