SCIENCE NEWS

Science Service, Washington, D. C.

THE 1941 APPORTIONMENT BILL

CONGRESS is engaged in a struggle to make democracy work on the best mathematical basis, and mathematicians on the sidelines are rooting for the method of equal proportions instead of the method of major fractions. It is a matter of reapportioning the seats in the House of Representatives, always a sore subject because it may legislate some present representative out of his job or so warp his district that he has to start building his political fences in unfamiliar territory.

Because the number of seats in the House is fixed at four hundred and thirty-five and the country continues to grow in population, new standards should be set with each census. It is now time to make the changes based on the 1940 census.

Determining just what states shall have how many representatives has been done by the method of major fractions in the past. This mathematical procedure has been vigorously attacked by mathematical authorities, led by Dr. E. V. Huntington, professor of mechanics at Harvard University.

The 1941 apportionment bill, H.R. 2665, has passed the House and is about due to come up in the Senate, which is not directly concerned because the number of senators remains two from each state regardless of how the country grows. If this equal-proportions bill does not pass the Senate, however, the now out-dated method of major fractions will be used in allotting the representatives. "The retention of the method of major fractions in the 1941 apportionment would imply the complete abandonment of any attempt to equalize the congressional districts among the several states" in the opinion of Dr. Huntington.

If the Congress desires to equalize both the congressional districts and the number of representatives per million inhabitants among the several states the method of equal proportions will always give a better result on a percentage basis. But it faces a dilemma when it desires to measure the inequalities by absolute differences instead of by the more natural percentage differences. For minimizing the absolute differences between the numbers of representatives per million, the major fractions method is better. For minimizing the absolute differences between congressional districts, the equal proportions method is better.

The mathematicians say that the very plausible desire to make the congressional districts in each state differ as little as possible from a population of 301,164, the average congressional district for the country at large, just won't work because it leads to a mathematical paradox. It is just as easy for the Bureau of Census, which makes the computations, to figure the problem of what states will have the House seats by major fractions or equal proportions.

Here's a test computation under the two methods: Michigan has a 1940 population of 5,256,106, Arkansas has 1,949,387. Under the method of equal proportions, Michigan would have 17 representatives with 309,183 to a district and Arkansas would have 7 with 278,484 to a district. This is an absolute difference of 30,699 and a percentage difference of 11.02 per cent. By the method of major fractions, Michigan would have 18 with 292,006 to a district, and Arkansas would have 6 with 324,898 people to a district. The absolute difference in this case would be 32,892 and the percentage difference would be 11.26 per cent. Thus the inequalities between the congressional districts, whether absolute or relative, is smaller under the method of equal proportions.—WATSON DAVIS.

THE NAUTICAL ALMANAC

DESPITE the war, foreign governments are still collaborating with the United States in producing the astronomer's bible, "The American Ephemeris and Nautical Almanac," published each year by the U. S. Naval Observatory.

The Ephemeris gives detailed tables of the positions of the sun, moon, planets and bright stars, information about eclipses, lists of observatories and other information that is essential to the astronomer. The volume for 1942 has just been released, so students of the heavens can now, if they wish, make plans for the coming year.

The director of the Nautical Almanac Office is Dr. W. J. Eckert, formerly of Columbia University, who assumed this post last year following the retirement of the former head, Dr. James Robertson.

Writing in the preface to the 1942 volume, Captain J. F. Hellweg, U. S. N. (retired), superintendent of the Naval Observatory, states that the tables showing the positions of Saturn's rings, and the times when his moons are best seen, were furnished by the *Berliner Jahrbuch*, the corresponding publication of Germany.

The office of the similar French work, the *Connaissance des Temps*, furnished the tables of Jupiter's satellites. From the British Nautical Almanac office came tables of the positions of the sun, moon and planets. As in the volume for 1941, however, the name of the Spanish Almanaque Nautico is missing. For 1940 they furnished star positions.

Cooperation of the U. S. Nautical Almanac with foreign offices was authorized by the Congress in the 1912 Naval Appropriation Bill. This eliminated much needless duplication of work in the various countries. This act provided, however, that the work on the Ephemeris be so conducted that, in emergency, all the tables needed for the navigation of American ships, both naval and commercial, could be prepared without any foreign assistance. This principle has been carefully followed ever since.

Only two eclipses of the sun are scheduled for 1942, the Ephemeris indicates. One is on March 16–17, visible near the South Pole, the other on September 10, near the North Pole. There will be three eclipses of the moon, two partial and one total on August 26. This will be seen throughout North America. Also, on a number of occasions during the year, the moon will "eclipse," or occult, the bright star Aldebaran.

THE CANADIAN OIL SUPPLY

COMMERCIAL production of oil will soon begin from one of the world's greatest reservoirs, known for a century and a half, but inaccessible until now on account of transportation troubles. This supply is located in northern Alberta, about 300 miles from Edmonton. Within the next few months, the first commercial extraction plant is expected to be in full operation with the production of gasoline, Diesel fuels, fuel oils, asphalt and coke from the oil sands.

The Alberta oil sands, according to Canadian Government geological estimates, contains at least 100 billion barrels of oil. The United States Bureau of Mines estimates the field contains 250 billion barrels. Other estimates place the gasoline supply of this field at 35 billion barrels. Economically it is figured that only one per cent. of the oil reserves of this area can be exploited at present. The field is roughly located along the Athabasca River, and the present industry to extract oil from the sands is at McMurray, at the railhead.

A number of companies have tried to extract the oil from the sands along the shores of the Athabasca River where stripping has shown the oil sands close to the surface. One of these companies has been building a plant near McMurray since 1936, using new processes and machinery devised in the United States. This company expects to start commercial production soon.

It took eleven years of research work to develop the present method of separating the oil from the sand. The oil forms the sole cementing material of the sand and is in the form of a film around each grain of sand. Mild abrasion and warm water break the film and give a pulp of water and sand through which are disseminated particles of oil. In a properly designed flotation cell the oil particles are picked up by air and form bubbles that float to the surface. The froth thus formed is high in mechanically entrained water and mineral matter. It will not settle out on account of the high viscosity and specific gravity of the oil, but does so quickly when the crude oil is diluted with naphtha or kerosene, leaving a clean oil readily pumped through a pipe line.

The deposits have been known since 1788 when the first explorers of the region found Indians using the oil with pitch to caulk their canoes. These oil-saturated sands range in thickness from a few feet to 225 feet, and in oil content up to 25 per cent. by weight. They cover an area estimated variously from 10,000 to 50,000 square miles of northern Alberta.

PLANT FOSSILS IN ARIZONA

CLIMATIC conditions like those in parts of modern Ethiopia prevailed in the American Southwest 170 million years ago, when the long reign of the dinosaurs and their great reptilian kin was just beginning. This is indicated by fossil plant remains in one part of Petrified Forest National Monument in Arizona, of which a study has been made by Dr. Lyman H. Daugherty, of San Jose State College in California. Dr. Daugherty's report has just been published by the Carnegie Institution of Washington, along with a description of the geology of the region by Howard R. Stagner, of the U. S. National Park Service.

Dr. Daugherty states that the forests of Arizona in early dinosaurian days (Triassic, to geologists) were dominated by great tree ferns and relatives of modern conifers. Higher flowering plants of the broad-leaved types were not to make their appearance for many millions of years. However, plant evolution was going on quite rapidly, as the saurians lumbered on to the scene.

Presence of tree ferns argues a warmer climate than that of present-day Arizona; it was a warm-temperate or subtropical world. Conifer tree trunks show very sharply marked annual rings, indicating an abundance of rain during part of the year, followed by a severe dry season in which no growth took place. The great size of the petrified logs indicates a climate far better suited for tree growth than is the present climate of the Southwest.

Dr. Daugherty has come to the conclusion that in Triassic Arizona there were moist stream valleys with thick, jungle-like forests, with plateaus between them supporting lower vegetation with scattered trees. This kind of formation, called savanna by ecologists, is characteristic of parts of Ethiopia and other regions in Africa, as well as of certain areas on the outskirts of the great central tropical forest mass in South America.

Evidence of forest fires in the ancient woods was found in the form of boat-shaped log fragments crusted with fossil charcoal. However, no healed-over fire scars have been found to indicate that trees suffered fire injury while living.

SOY BEAN PLASTIC

"WOOL" from the soy bean will shortly be adopted for automobile upholstery padding, just as plastic fiber panels will replace steel for the automobile body.

Robert Allen Boyer, head of the chemical laboratory established by Henry Ford for research with soy beans, has developed in the laboratory a soy protein fiber processed with sprayed rubber which makes a springy, durable padding for automobile seats.

"The soy wool is the only protein fiber thus far developed from a vegetable source. All other protein fibers come from animal protein. You are reasonably sure of a good crop in virtually all agricultural parts of the world. Two acres of land devoted to sheep grazing will produce eight to ten pounds of wool per year. Two acres of land in soy beans will produce 400 pounds of protein suitable for fiber."

Henry Ford has a suit of clothes in which the material is 25 per cent. soy bean protein fiber.

With the tensile strength of soy bean plastic now about half that of steel, the Ford laboratories are experimenting to develop panels made with plant fiber, held together with a soy bean resin binder, which will resist blows as well, or better, than steel. Fibers of the ramie plant, which have great tensile strength, are being added to the soy bean plastic where the latter needs greater strength.

By way of illustrating what an automobile door panel, made of plant fiber with soy bean resin binder, will stand in resisting a blow, Ford will strike a panel lying convex side up on the floor with an axe head. With the blunt side of the axe, no dent results; with the cutting edge, a clean cut results, without denting the surrounding sur-

face. A similar blow on a steel door panel will cut through the metal, bending in the edges of the cut and making a large dent in the surrounding metal surface.

The fiber panel weighs only half that of a steel panel, of the same pattern. It is composed of 70 per cent. fiber and 30 per cent. resin binder. The fibrous element is compounded of 50 per cent. southern slash pine fiber; 30 per cent. field cereal straw; 10 per cent. cotton, and 10 per cent. hemp.

Henry Ford states that the entire superstructure of an automobile body, except the tubular welded steel frame, will be made from this tough fiber plastic. The first model will be finished this winter.

ANTI-MEASLES VACCINE

MANY hundreds of children in New Jersey and Philadelphia are now being vaccinated with a new and promising anti-measles vaccine, and Army medical authorities are considering the advisability of its use among selective service men now in training camps, where measles cases are on the increase. The vaccine is not yet ready for general distribution and use, according to Dr. Geoffrey Rake, of the Squibb Institute for Medical Research at New Brunswick, N. J. Dr. Rake, with Dr. Morris F. Shaffer, developed the vaccine from measles virus grown on fertile hen's eggs.

The first vaccinations on a small group of children in Philadelphia reported as successful last fall, were conducted under the direction of Dr. Joseph Stokes, Jr., of the Medical School of the University of Pennsylvania. Dr. Stokes is directing the present trials of the vaccine on a wider scale. He is also director of the measles commission of the U. S. Army which is being formed and will at its first meeting consider the use of the vaccine in Army training camps. Dr. Rake and Dr. Shaffer have been asked to join this commission.

The vaccination of children in New Jersey and Philadelphia orphan homes, schools and similar institutions had been planned before the present outbreak of measles started. It was delayed for six or eight weeks, however, by the influenza epidemic which struck all the institutions selected for the measles vaccine trials.

Dr. Rake said that the program is now going ahead and that a good start has already been made. He hopes that the vaccinations, in spite of the eight weeks' set-back due to the flu, will be completed in time to protect the children during the present epidemic. Children in institutions usually get measles six to nine months after children in the rest of the population, because such children are relatively isolated.

The vaccine will be given to half the children in the selected institutions, the other half remaining unvaccinated. This will give a control group against which to check the protective value of the vaccine. Only children who have never had measles have been selected for both control and vaccinated groups. Permission of parents or guardians is being obtained before the vaccination is done, and about half of the parents or guardians have given this permission, so that there has been no need to draw lots or follow any other method for division of the children into vaccinated and not-to-be vaccinated groups.

Among the questions that it is hoped to answer by the vaccine trials is how long and how completely the vaccine protects against measles. Until such questions are answered, the vaccine will not be released for general distribution.—JANE STAFFORD.

ITEMS

CARLILE P. WINSLOW, director of the U. S. Forest Products Laboratory, at Madison, Wis., suggests that hardwoods from the forests of tropical America should be called upon to replace some of the Old World tropical woods now becoming difficult to get because of war conditions. Mr. Winslow recommends a program of research on these woods, to learn their qualities and adaptability to American needs, since with the exception of mahogany, Spanish cedar, several dyewoods and a few other varieties, most of the American tropical hardwoods are still wholly unknown in this country.

TREE surgeons now have available an instrument that will do for them what the stethoscope does for physicians. The new method is a result of the discovery made by Thaddeus Parr, of the U. S. Department of Agriculture, that there is a slight difference in electrical potential between the top and the root of a tree. During the time of fastest growth in spring, this gradient is from top to root; later, it reverses its direction. But in a tree seriously injured by insects or otherwise in bad health, the reaction is abnormal, being either weaker than in a sound tree or reversed in direction. A comparatively simple but very sensitive voltmeter has been developed, that can be carried into the woods, so that field diagnoses will be readily possible.

CARNATIONS are being killed by a new disease, caused by an apparently unknown bacterium. The malady made its first appearance in a greenhouse at Spokane, is reported in *Phytopathology* by Leon K. Jones, of the State College of Washington. Characteristic of the new malady is the production of grayish-green foliage, followed by yellowing and death of the plants, similar to the symptoms commonly associated with the wilt disease. Yellow streaks of frayed tissue in the woody areas, extending 12 to 24 inches up the stems of affected plants, are distinguishing symptoms. The disease is most damaging during warm weather of fall and spring. W. H. Burkholder, plant pathologist at Cornell University, New York, is studying the bacterium to determine its exact identity.

SUCCESS in giving the anti-bleeding vitamin K by injection into the veins of patients too sick to take it by mouth has been announced by Dr. Edward R. Anderson, Dr. John E. Karabin, Dr. Herbert Udesky and Dr. Lindon Seed, of the University of Illinois College of Medicine and Cook County Hospital. In 17 out of 18 patients the injection of a water-soluble compound with vitamin K activity was effective. Failure in the eighteenth case was ascribed to the fact that the patient's liver, necessary for utilization of vitamin K by the body, had been completely destroyed by illness. Injection of the vitamin brings a quick response. The injection eliminates the need for use of bile salts, which must be given with the vitamin when it is taken by mouth.