

MATHEMATICS

Congress Juggling Figures In Struggle With Seats Problem

Mathematicians on the Sideline Are Rooting for Method of Equal Proportions for Reapportioning

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 435 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, Harvard's professor of mechanics.

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 for each state regardless of how the country grows. If this equal-proportions bill does not pass the Senate, however, the now outdated method of major fractions will be used in allotting the representatives.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 Congress desires to equalize both the congressional districts and the number of representatives per million inhabitants among the several states, the methods of equal proportions will always give a better result on a percentage basis.

But Congress 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 the 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%. 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%. Thus the inequalities between the congressional districts whether absolute or relative, is smaller under the method of equal proportions.

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ENTOMOLOGY

Borers-From-Within Menace Supplies for Army and Navy

FOOD, clothing, construction material and other supplies for the Army and Navy are menaced by unseen borers-from-within, warned Prof. W. B. Herms, University of California entomologist. They are the armies of moths, weevils, termites and other destructive insects.

Rats also can rob soldiers and sailors of the things the taxpayers buy for them. To prevent as much of these losses as possible, Prof. Herms recommended attaching trained insect fighters to the Quartermaster Corps. He pointed out that the Sanitary Corps already has its quota of entomologists.

Each year insects damage stored grain and milled products in the United States to an estimated extent of \$300,000,000. That is a greater property damage than was inflicted by the British bombers and torpedo planes on the Italian Navy in the raid on Taranto, hailed as a great victory. Termites annually cause losses of more than \$40,000,000, nearly half the price of a battleship, while clothes moths eat up well over \$20,000,000 worth of woollens, or enough to pay for good-sized cruiser. Total losses traceable to

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insects and rats come close to a billion dollars annually.

One attack on the problem of controlling insects is being made with the aid of the great cyclotron at the University of California. Experimental laboratory feedings are made with foods containing elements given radioactive "tags" with this giant instrument. This, explained Dr. Roderick Craig, College of Agriculture entomologist, enables scientists to trace more accurately the course of poisons used in controlling the pests.

It is even possible that the cyclotron may eventually be used in direct control of certain kinds of insects, for its stream of high-velocity particles constitutes a veritable death ray to them. Other forms of radiation have also been demonstrated as lethal to insects, including high-frequency radio waves, infra-red and ultraviolet radiations, and X-rays. Some of these kill insects by heating their tissues, others sterilize them out of existence.

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ENGINEERING

Magnesium Sulfate Plaster Like Cement in Strength

THOUGH chemically the same as plaster of Paris, a new gypsum plaster, described at the meeting of the American Institute of Chemical Engineers, is about twice as strong as the old-fashioned article. In fact, it approaches Portland cement in strength.

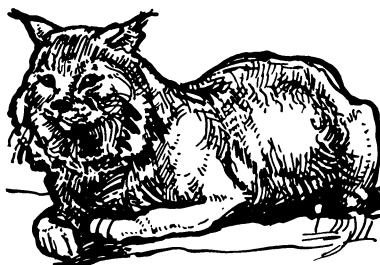
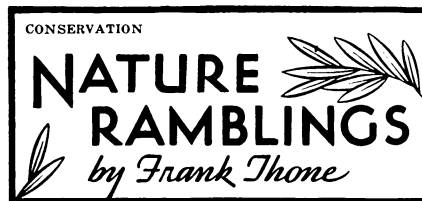
The new product was announced by E. P. Schoch and William A. Cunningham of the University of Texas. It is prepared, they explained, by heating gypsum in a magnesium sulfate solution, whereas plaster of Paris and ordinary wall plaster are made by the dry calcination or burning of gypsum.

Experiments in a small pilot plant indicate, they stated, that it can be made at a cost of \$8.82 per ton.

Science News Letter, March 15, 1941

● RADIO ●

Dr. Karl M. Dallenbach, Cornell University professor of psychology and editor of the *American Journal of Psychology*, will tell of the work of Emergency Committee on Psychology, organized by the National Research Council and national psychological societies, as guest scientist with Watson Davis, director of Science Service, on "Adventures in Science," over the coast to coast network of the Columbia Broadcasting System, Thursday, March 20, 3:45 p.m. EST, 2:45 CST, 1:45 MST, 12:45 PST. Listen in on your local station. Listen in each Thursday.



Predator Problems

PREDATORY animals, like coyotes and bobcats, that prey on game birds, deer and other creatures that sportsmen like to hunt, present some of the most difficult problems with which wildlife managers have to wrestle. They took up a good part of the attention of the recent Sixth North American Wildlife Conference at Memphis. Should they be shot on sight, and trapped, and poisoned, or should they be let alone, so that nature may work out its own balance?

Keep them under control, insisted E. A. Schilling of the U. S. Forest Service. Neglect of predator control, he declared, has often meant severe game depletion, whereas rational control measures have been followed by restoration of good hunting. In support of his contention he cited the comeback of wild turkey in Southeastern woods after some of the bobcats and foxes had been trapped out. Since man has so completely and permanently upset the ancient balance of nature, there is no chance of its restoring itself so long as man remains on the scene, he declared. However, Mr. Schilling emphasized, control of predators does not mean wiping them out completely. No sensible wildlife manager would advocate that, he said, and anyway it couldn't be done even if it were attempted.

Testimony of coyotes' destructiveness to deer, in a quite different type of country, was offered by E. E. Horn of the U. S. Fish and Wildlife Service, who works out of Berkeley, Calif. In the Mono Basin of Santa Barbara County, Mr. Horn stated, a study of stomach contents of 371 trapped coyotes disclosed remains of deer in more than half of

them. This was supported by other field evidence.

However, the question arose as to the desirability of permitting deer to increase greatly in this particular region. The Mono Basin is a watershed, said Mr. Horn; its chief raw crop is water. In such an area, too many deer would be undesirable. If coyotes are to be killed off, deer will increase and more hunting will have to be permitted. But if more hunters go into the area there will be more forest and brush fires—which again is not so good, from the watershed management viewpoint. And so the problem goes round and round. A wildlife administrator's life is not a simple one.

If control of predators is determined upon, it is generally inadvisable to attempt it by means of offering bounties, stated Richard Gerstell of the Pennsylvania Game Commission. Bounty systems shift administration problems into the legislature, where they do not belong, he pointed out. Furthermore, there is a tendency for people to claim bounties on animals they would have killed for sport or for other reasons, which of course is a waste of public money. Worse still is the likelihood of outright fraud, as when bounties are claimed on animals killed outside the areas where the bounty applies. Better results, in Mr. Gerstell's opinion, can be obtained by direct employment of properly trained hunters and trappers, and by the education of the general public through press, radio, motion picture film and other effective means.

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Dogs do not see the world in colors, but fish do.

INTERESTED? in Science



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