mathematicians addressed to all American mathematicians, expressing feelings of scientific unity and a belief in the triumph of our common cause.

Nature reports that the Parliamentary Secretary of the British Ministry of Information (Ernest Thurtle, M.P.) opened a conference of British scientific and technical institutes on March 9 at which Sir John Russell, adviser to the Soviet Relations Branch of the Ministry of Information, took the chair. The conference, which took place in the rooms of the Royal Society, was called to discuss an intensification of the exchange of technical and scientific information between the U.S.S.R. and Great Britain. Some sixty scientific organizations and learned societies of Great Britain sent representatives to the conference, and it was decided to set up a standing committee to assist the Ministry of Information in this work and to act as a clearing-house between organizations in Great Britain and the U.S.S.R. A representative of the Soviet Government will be invited to join the subcommittee.

M. N. SHAFFNER, secretary and treasurer of the Field Conferences of Pennsylvania Geologists, states that the opinion of many of the members appears to be that in view of the accelerated schedule in many schools and the rubber shortage, it is doubtful if a meeting in 1942 would be well attended. Therefore, it has been decided to postpone the meeting until 1943, and probably for the duration of the war.

DISCUSSION

AN UNTRIED METHOD OF FEDERAL REAPPORTIONMENT

SINCE 1928, when SCIENCE opened its columns to a discussion of the best method of Federal reapportionment several problems then before the country have been solved and several new issues raised.[1] Two bills on the subject have become laws[2] and for some years at least no more legislation is likely. The time is ripe, therefore, for a survey of the gains and the outlook.

The gains include:

(a) A guarantee against a repetition of that failure to reapportion after a decennial census which aroused Congress and the country between 1920 and 1930.

(b) A check since 1910, probably a permanent check, upon the steady enlargement of the House under which it grew between 1790 and 1910 from 106 to 435 seats, a decennial average of 27 seats.

(c) A reduction in the number of methods mentioned in the law of 1929 from two to one, thus decreasing the likelihood that Congress will have to struggle again with the troublesome problem of method.

(d) A probability that each future apportionment will be made automatically, thus withdrawing a time-consuming subject from the floor of Congress.

The issues still open concern three questions:

(1) What is the best method of apportionment?

(2) Can a process of slight automatic decrease in the size of the House after each census be started?

(3) Can the rapid growth of rotten borough Congressional districts in a few States which State legislatures have failed to stop be ended by Federal legislation?

I must not ask for space in your columns to explain these gains or even to examine at length the second or third of the open issues. About the second let me say only that if the words in the law of 1929 "under an apportionment of the then existing number of Representatives" should be changed to "under an apportionment of five (perhaps even ten) less than the existing number of Representatives" such a change would not endanger the automatic feature of the law and would start a process of reducing the size of the House towards the three hundred members often mentioned in Congressional debates as a desirable but unattainable goal.

A longer amendment requiring approximate equality in the population of Congressional districts would stamp out the growing evil of rotten borough Congressional districts. That the evil is serious appears from the following figures of the average percentage of excess in the population of the largest Congressional district over that of the smallest in the same State.

Date of census	Average percentage of excess
1900	41
1910	54
1920	86
1930	107

Both of these amendments I may be able to explain and defend in quieter times before the appropriate Congressional committees.

But as neither of these changes is of especial interest to scientists I pass them by to raise again two fundamental questions about method. (1) What should the scholar regard as the best method of apportionment? (2) How would that method be regarded by Congress?

The two outstanding men in American history who have examined the question of method are Thomas Jefferson, who had charge of the first census, and Daniel Webster. The method of major fractions which was introduced in 1910 and has now been super-

[1] For earlier contributions to this discussion see SCIENCE, 67: 509, 1928; 68: 579, 1928; 69: 163, 272 and 356, 1929; *Sociometry*, 4: 278, 1941.

[2] Acts of June 18, 1929, Sec. 22, and amending Act of November 15, 1941.

seded by the method of equal proportions is a modernization of Webster's plan. The method I now prefer, the method of smallest divisors, is a modernization of Jefferson's. Like all modern methods but unlike Jefferson's it starts by assigning one Representative to each State because it interprets the phrase "each State shall have at least one Representative" as requiring that procedure. The seats of these 48 who might be called constitutional Representatives are as much outside the control of Congress as are those of the Senators. It is only after this initial step has been taken that the process of Congressional or statutory apportionment can begin. All modern apportionment tables like those prepared by the Bureau of the Census begin with Representative number 49 not with Representative number 1. If we accept this as a starting point it follows that in every Congress there are two groups of Representatives, a constitutional group—one for each State—among whom population counts for nothing, and a statutory group among whom population counts for everything.

In this group of 48 constitutional Representatives with which apportionment starts the one from New York stands for 122 times as many constituents as the one from Nevada. The object of Congressional or statutory apportionment which then begins should be to reduce this inequality as rapidly and completely as possible. It can best be done by giving each Representative after number 48 to the State which at that point has the largest population per Representative. All methods give seat number 49 to New York and seat number 50 to Pennsylvania, but thereafter the results diverge. The only test by which Congress judges a method is its results. The difference in result of the five methods examined in 1929 by a committee of mathematicians appointed by the National Academy of Sciences appears when we consider how Representatives, numbers 51 and 52, are apportioned by each. After seat number 49 has been assigned to New York and seat number 50 to Pennsylvania the situation is as shown in Table 1.

TABLE 1

State	Number of Representatives	Population per Representative (in thousands)
Nevada	1	110
.....		
New York	2	6,740
California	1	6,907
Ohio	1	6,908
Illinois	1	7,897

The method of greatest divisors and the method of major fractions give seat number 51 to New York, raising its total to 3; each of the other methods gives it to Illinois. Every member of Congress and the overwhelming majority of citizens would probably say that of these four States Illinois has the strongest claim to seat 51 and that any method giving it to New York should be discarded.

After Illinois has received a second seat the other three States would stand as in Table 2.

TABLE 2

State	Number of Representatives	Population per Representative (in thousands)
Nevada	1	110
.....		
New York	2	6,740
California	1	6,907
Ohio	1	6,908

The method of equal proportions and that of the harmonic mean give a third seat to New York before Ohio or California receives a second. Here again the average member of Congress doubtless would regard the claim of both States to a second seat as coming ahead of that of New York to a third. If so, the method of equal proportions and the method of the harmonic mean should also be discarded and that of smallest divisors adopted.

The test of fairness which appeals most strongly to the average Representative probably is the approach to equality in the population or average population per district in the 48 States. Next to this is a wish to keep the average of the State averages as low as possible. Tried by either test the method of smallest divisors comes out better than that of equal proportions. Under the 1940 conditions the average of the State averages by the method of equal proportions is 294,000, by that of smallest divisors 283,000, and the range between the average population per district in the State where it is largest and that where it is smallest under the method of equal proportions is 249,000, but under that of smallest divisors 207,000.

A disadvantage of the method of smallest divisors is that it transfers to the group of small States several seats which by any other method would go to the group of large States. This results from the advantage it gives to the small States in the group of 48 constitutional Representatives, an advantage not counterbalanced later as from that point on no advantage is given to either group. Whether this disadvantage would outweigh the advantages already mentioned must be left for Congress to decide. Here we are concerned only with theoretical considerations and those I believe count heavily in favor of this novel method.

A closing word about nomenclature. I have accepted the names preferred by mathematicians, although to the average Representative they carry no meaning. For that reason mainly I prefer the following:

The Thomas Jefferson approach 1790–1830	= method of greatest divisors
The Daniel Webster approach 1840	= method of major fractions
The Samuel Vinton approach 1850–1900	= Vinton method
The sliding divisor approach 1910–1930	= modernized Webster method
The mathematical approach 1940	= method of equal proportions
The double method approach ?	= modernized Jefferson method

WALTER F. WILLCOX

ITHACA, N. Y.

TICK PARASITES ON CAPE COD

DURING the summer of 1926 the chalcid fly *Hunterellus hookeri* How., with which *Ixodiphagus caucurtei* du Buyson has been shown to be identical,[1] was released on the island of Naushon in southern Massachusetts by Larousse, King and Wolbach,[2] in an attempt to control the American dog tick, *Dermacentor variabilis* Say. Specimens of this fly were taken on the island the following summer. Furthermore, a parasitized tick was found there in 1929 by Hertig[3] in a lot of some 400 nymphs of *D. variabilis*. The parasites were not identified.

In July and early August of 1940, 1,470 engorged immature ticks were collected on Naushon Island. Of these 90 per cent. were *D. variabilis,* 513 larvae and 841 nymphs, and the remainder were of the genus *Ixodes,* 113 larvae and 23 nymphs. The *Ixodes* that reached the adult stage proved to be *I. ricinus scapularis,* and it is believed that the others were the same. One larva of *D. variabilis* yielded two specimens of *Ixodiphagus texanus* How. This is believed to be the first report of this species as a parasite of the American dog tick. But it is not the first record in this part of the country, for the U. S. Department of Agriculture, Bureau of Entomology and Plant Quarantine, has a number of records from Oak Bluffs, Massachusetts, in *Haemaphysalis leoporis-palustris* and *Ixodes dentatus.*

Hunterellus hookeri was not found parasitizing any of the above-mentioned ticks. However five adults were collected in the hair of a Setter dog, two about July 28 and three about August 20. Since the average life of an adult is about forty-eight hours, there probably is a fairly large population of the fly on the island, which is principally parasitizing some species other than *D. variabilis.* The only previous report of adults seen in nature is by Cooley.[4] It is felt that the introduction of *H. hookeri* is not a useful measure for the control of the American dog tick.

I am indebted to Dr. A. B. Gahan and Dr. C. N. Smith, of the Bureau of Entomology and Plant Quarantine, for assistance with the identifications; and to Dr. H. S. Forbes for hospitality and assistance.

SIDNEY COBB

HARVARD MEDICAL SCHOOL

[1] A. B. Gahan, *Proc. Ent. Soc. of Wash.,* 36: 89, 1934.
[2] SCIENCE, 67: 351, 1928.
[3] A. Hertig, personal communication.
[4] *Onderstepoort Jour. Vet. Sci.,* 3: 23, 1934.

THE EFFECTIVE PRESENTATION OF SCIENTIFIC REPORTS

CONGRATULATIONS to Professor E. F. DuBois, of Cornell University Medical School, for the intriguing and worthwhile discussion which he has precipitated by his note of March 13 in SCIENCE on the effective oral presentation of scientific material.

The additional comments of John B. Lucke, Gilbert Dalldorf and Jean Broadhurst in SCIENCE for April 10, reveal further thinking on this truly commendable topic of discussion.

Perhaps no group of men in the country are more aware of the deficiencies of scientific papers, as read at many science meetings, than are the members of the National Association of Science Writers; those professional journalists who devote their full time to the reporting of the news of science and who attend, constantly, the major science meetings of the nation.

As a member of the National Association of Science Writers, and with the past benefit of many discussions with its members on this very subject, the following suggestions are offered for the research scientists.

The greatest fault of scientists would appear to be that they try to present material orally which is intended primarily for publication in a technical magazine.

No matter how skilled an orator a man may be, the unwise choice of words for spoken delivery can not overcome this basic handicap. The technical terminology of almost any phase of science is certainly near the peak of boredom for the human ear.

Lack of skill in oral presentation is a handicap, but one can not chide the research scientist too much on this score, for he has other things to do beside taking elocution lessons.

Nor can one expect a scientist to rehearse his address with the intensity of the director of a radio program who has nothing else in the world to do.

What scientists can do, however, is to rise above the laziness whereby they try to kill two birds with one stone. More effort needs to be made to tell their research story simply and with a minimum of technical terms which seem to be the trademark of any technical report at a scientific meeting.

If reports to scientific meetings are intended for later publication, as many of them are, let there be two drafts made of them; one to be mailed to the editor of