during the war; the administrative office has been moved to Trinity College, Cambridge, and it is probable that the meetings of the society will be held in that town.

THE celebration of the centenary of the Royal Microscopical Society in October has been postponed. It may be found necessary for the time being to curtail the number of ordinary meetings normally held in London during the session. Arrangements are being made to continue publication of the society's journal as usual.

THE new mechanical parts plant of the Spencer Lens Company was opened formally on October 26. The operations of each department were demonstrated, and there was an exhibit of scientific optical instruments.

DISCUSSION

THE WAR AND CHRONICA BOTANICA

THE impact of the European war on science has already been felt in the United States through the cancellation of foreign subscriptions to American scientific journals and to services like *Biological Abstracts*. The same is true in other neutral nations as well as among the belligerents, no doubt. An obligation rests upon every scientific society and association in this country to consider the effects of the war situation and to join forces in preserving, as far as may be possible, essential scientific publishing and abstracting services until normal conditions return.

A colleague permits the writer to quote from a letter from the editor of *Chronica Botanica,* the international plant science news-magazine. The letter is signed by Dr. Frans Verdoorn, who writes in September from Leiden, Holland (Postoffice Box 8) as follows:

> The present war which is expected to be a lengthy one makes it impossible for me to continue *Chronica Botanica.* About a fortnight ago my morning mail dropped from about 60 pieces to 12 and hardly any information or money is being received. I can still finish this year's *Chronica* and am doing so, but that will be all. This country of course is neutral and there is a fair chance that it will remain so, but that does not help me much as I am wholly dependent on information and subscriptions from countries now in war, from which I do not hear anything.
>
> My wife and I gave 5 years to building up the *Chronica* and we are in great distress that we should have to stop it. And I will have to do so as the post which I will have to accept under the circumstances in the very near future, is in Java, . . . but one can not do any international work there. It is out of question to continue the *Chronica* there.
>
> I feel, however, that it would be possible to continue the *Chronica* in some form in the States. Even if the States would be involved in a war, I could continue it there with the aid of North and South American editors, and it would still remain self-supporting. But I would need some kind of post for my own living, as—at least during the war—there will be hardly any profits on the *Chronica.* . . .
>
> Even if I had a minor post to start with, I would be able to continue my *Chronica* in the States during the war, and that is the only thing that matters at present.
>
> I am asking this not on behalf of myself, as there are for me personally suitable posts, but on behalf of the *Chronica* which during the past year has become a symbol to its 2,000 readers, a symbol of good will and cooperation, which I am most anxious to continue.

Any suggestions which may disclose possibilities for the continuance of *Chronica Botanica* should be sent immediately to Dr. Frans Verdoorn, Editor, *Chronica Botanica,* P. O. Box 8, Leiden, Holland. Dr. Verdoorn's ability as a plant scientist is widely recognized and the unique editorial services he has rendered to his professional colleagues all over the world through the medium of *Chronica Botanica* are deeply appreciated. It would be a permanent international scientific loss if *Chronica Botanica* should be forced to suspend on account of the war. Is there not a way out?

ROBERT F. GRIGGS

REMARKS ON THE CENTER OF POPULATION

THIS note is written to draw attention to an erroneous statement made at the end of the paper on "Centers of Population of Learned Groups," by C. B. Read.[1]

In the paper referred to the center of a population the n members of which have rectangular coordinates (x_i, y_i), $i = 1, 2, \ldots, n$, is defined as the point with coordinates

$$x = \frac{\Sigma x_i}{n} \qquad y = \frac{\Sigma y_i}{n}$$

that is, the point (x, y) is the center of gravity of the distribution. A statement is made implying that the sum of the distances of the members from this point is minimum. This is not true in general; (x, y) is the point for which the sum of the *squares* of the distances is minimum.

The distinction is clear in the special case of a population distributed on a straight line. The mean point is the center of population as here defined, while the median, a point such that the same number of members lie on each side of it, has the property that the sum of the distances from it is minimum. These points do not in general coincide; for many distributions the median is between the mean and a point of greatest population density, the mode. As a definite example consider the seven points having coordinates 0, 1, 2, 3,

[1] SCIENCE, 90: 61–63, July 21, 1939.

4, 10, 15. The median is at 3, with the sum of distances 26, while the mean is at 5 with the sum of distances 30.

If a point may be discussed when no direct means for obtaining it are given (at present), a point in the plane of a distribution such that the sum of the distances from it to the members is minimum may be called a median. An example of a triangle consisting of two nearby points and a third point remote from them shows that the median and the center of population do not in general coincide, and the difference can by no means be neglected. The special distribution on a straight line and simple examples of plane distributions make it seem reasonable to believe in the absence of more complete information that the median is frequently closer to the center of greatest population concentration than the center of population is.

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THE criticism offered by Dr. Church is certainly justified, since the center of population as determined by the method described or by that of the Bureau of the Census does not give the point the sum of whose distances from the stated address of members of the group is a minimum. Without question it should have been clearly pointed out that the points determined are centroids and only roughly satisfy the minimum distance criterion. The actual determination of such points did not seem to be a feasible problem; the centers of population as determined do allow direct comparison with various positions of the center of population of the United States as determined by each federal census, the primary purpose of the study.

A method by which one might attempt to approximate the location of the point Dr. Church calls a median would be to locate what the Census Bureau designates as a "median point," that is, the point of intersection of a north and south line which divides the population into two equal parts, with an east and west line which likewise divides it into two equal parts. For the groups mentioned the median line running east and west is usually from ten to fifty minutes of latitude north of the center of population. The line running north and south may be through the center of population as with the American Speech Correction Society; about a degree and twenty minutes (roughly sixty or seventy miles) east as in the Mathematical Association of America; perhaps three degrees east in the American Association for the Advancement of Science; other groups range from no change to about two and a half degrees east. For exact determination of a mathematical point, these are large variations, but for locating a convention city various factors make the difference relatively unimportant.

Even if one knew the location of the ideal point with sums of straight-line distances of members from this point a minimum, if the problem of a proper place for a convention of the group is involved, air-line distances should be corrected to distances by a regularly traveled route (and, shall this be by rail, bus, plane, private car or steamer?). If this can be determined, there arises the need for some reasonably large city in the vicinity. The relatively small variation of median lines from centers of population make it seem probable that the centers of population determined give a sufficiently accurate general location from the point of view of minimum travel requirements. Such cities as Cincinnati, Columbus and Dayton seem well located; for most groups Chicago is to the northwest and Pittsburgh slightly to the northeast.

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THE FIRST DATING OF PRESERVED WOOD IN NEW ENGLAND

THE principle of cross-dating wood of unknown age by comparing the sequence of its ring widths with that of an acceptable record of dated rings has not been hitherto applied in the New England area. An opportunity to test the method came in 1938, when the September hurricane felled some virgin white pine not far from Wolfeboro, N. H., where buried logs of the same species were uncovered in an excavation at the site of an ancient bridge abutment. The skeleton plot method of Douglass has given the date of 1806 for the last ring formed in the trees used to build the bridge. This solution is very reasonable in the light of Wolfeboro history.

Sections of three trees were removed from a level several feet below the water line at the bridge. The wood and bark had been very well preserved in the saturated soil. The rings of each tree were measured by methods previously described.[1] The mean ring width was calculated for each of the 153 years represented by at least two trees, while the third tree had 189 rings. The growth was semi-complacent but small minima and maxima in the composite graph, found also in two or more of the individual graphs, were located on the skeleton plot[2] for comparison with the sequence of dated rings.

A record of white pine ring widths for a 260-year period was obtained from three trees at North Sutton, N. H., 39 miles southwest of the bridge at an elevation slightly higher. A cross-identification was established between this record and that of the buried pine when the outer 128 rings of the latter overlapped the inner rings of the Sutton trees. Although not sufficient in

[1] C. J. Lyon, *Ecology*, 17: 457–478, 1936; *Tree-ring Bull.*, 5: 27–30, 1939.

[2] W. S. Glock, "Principles and Methods of Tree-ring Analysis," Part I., Carnegie Institution Pub. 486, 1937.