INCREASING THE USEFULNESS OF MAPS

THE practice of making maps divided off into arbitrary regions indicated by A-1, 2, 3, 4; B-1, 2, 3, 4, etc., as a means of locating points, does not meet present needs. Who has not had to scan minutely over such an area on many occasions in search of some town, and after finding it spent additional time in determining its distance from some point of reference by the use of a scale of miles at the bottom of the map? Perhaps the point of reference is on a different map with a different scale of miles, or perhaps other regions on independent maps intervene, in which case the investigation becomes increasingly complex and inaccurate as well. Even if a single map is found which includes the two points in question, distances so measured are only approximate, and they are increasingly inaccurate if one of the points is near the edge of a map representing an area appreciable in comparison with the size of the earth, for the projection of spherical areas on plane surfaces necessarily involves distortion. In any case, knowing that a city is located in C-5 on a particular map gives no information concerning its position on another map or on the earth's surface.

Instead of listing cities and towns in such arbitrary regions, let their latitudes and longitudes be specified; then the simplest space interpolation immediately locates their positions on the map. Determination of approximate distances would be greatly facilitated. Each degree of latitude is almost 70 miles (more nearly 69 miles), and while the linear distance represented by a degree of longitude changes gradually with latitude, those values should be marked on the right and left borders alongside the numbers of the parallels. Not only would we be able to establish quickly approximate distances and directions without even finding the points on the map, but also remembering that each fifteen degrees of longitude represents an hour of difference in sun time, a simple mental calculation instantly establishes the probable difference in standard time between the two regions.

This reform would be advantageous to the tourist and would be an aid to scientific thinking on the part of the layman. Not the least important advantage would be to the grade-school student of geography whose interest would be greatly increased in studying positions of countries and cities with respect to his own position instead of with respect to some locality he has never visited and in which he has little interest. There is, of course, nothing to prevent the scientifically minded student from noting the approximate latitude and longtitude of the places he finds on a globe or map, since lines of latitude and longitude are shown on maps in geographies and encyclopedias in general use, but there is a tendency for one to think he has located a place when he has found it on a map without having made any determination of its absolute position on the earth's surface. Relatively few people are accustomed to making any use of latitude and longitude in the interpretation of maps.

The objection may be raised that it is less simple to list the position of a town as 42° 44′ N, 93° 17′ W than to write it merely as C–5. But obviously the N or S, E or W can be omitted from the individual listings, except for regions near the equator, prime meridian or 180 degrees longitude. Further simplification would be accomplished by recording the nearest tenth of a degree instead of minutes of angle. The illustration above would then appear as 42.7, 93.3 under columns headed, degrees north, degrees west. On the very largest scale maps of small areas, the use of hundredths of degrees might be warranted, but in that case hundreds, tens and possibly units of degrees need not be repeated.

It is true that the general public is not quick to welcome unfamiliar innovations, but most people have learned to interpolate in the use of measuring rods, and an increasingly large number are becoming familiar with the more difficult interpolations in using a slide rule. After a single use few persons would desire the present style of listing of points; but for the convenience of those who still preferred the graphical determination of distance, a scale of miles should be retained to supplement the proposed scheme.

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SPECIAL ARTICLES

MANGANESE DEFICIENCY FOR CITRUS IN CALIFORNIA

MANY investigators of plant physiology have shown that a deficiency of manganese causes abnormal development of plant foliage. Camp and Reuther[1] have described deficiency symptoms on orange and grapefruit trees in Florida soils, while Taylor and Burns[2] have reported them on oranges in New Zealand. Haas[3] has described symptoms on citrus grown in nutrient cultures. Extension and clarification of descriptions of deficiency symptoms on citrus, especially on lemon

[1] A. F. Camp and Walter Reuther, *Florida Agr. Expt. Sta. Ann. Rpt.*, 1937, pp. 32–135.

[2] G. G. Taylor and M. M. Burns, *New Zealand Jour. Sci. and Technol.*, 20(2): 115A–119A, 1938.

[3] A. R. C. Haas, *Hilgardia*, 7(4): 181–206, 1932.