DISCUSSION

AIR-AGE TEACHING OR MISINFORMING?

THE tremendous impetus given to aviation by the war has resulted in a veritable flood of books covering every possible phase of aviation, and ranging from popular treatises to text-books to be used for instructional purposes. One of the most ambitious of the latter is an entire series of books published by Teachers College, Columbia University, under the editorship of Dr. Ben Wood, professor of psychology. The editor writes in his introduction that this "Air-Age Education Series represents a major step in providing schools with teaching materials." One can certainly have nothing but praise for such a purpose, especially since the series is attractive in appearance and well written. However, a little closer examination of some of the volumes in this series reveals that their authors may have been enthusiastic but that they were also woefully uninformed about many fundamentals.

To wit: In "The Air-Age We live in," by Renner-Bauer, the following picture is drawn for us: The earth is not 8,000 miles but really 50,000 miles in diameter, the atmosphere ends at 21,000 miles above the solid surface because gravitation stops abruptly at that point. Oxygen and nitrogen cease to exist at altitudes higher than 80 miles, above which one finds only hydrogen and helium. At the top of the atmosphere the particles of air may be many feet apart, perhaps even miles, and the temperature up there is the same as that of interplanetary space—absolute zero. If a man were hauled up to the top of the atmosphere he would explode.

All these statements are not only wrong but they present striking evidence that the authors do not understand the principles of the physical universe. Thus, to mention but one point, they appear to confuse the average distance apart between particles with the mean free path, and when they give the pressure exerted by the ocean on a fish at a depth of five miles as 11,458 pounds per square inch, the 8 may be correct but the 4 is certainly wrong.

In "Globes, Maps, and Skyways" by Bauer the statements are made: ". . . that the shortest air route from Buenos Aires to Melbourne or from Auckland to Cape Town leads almost directly across the South Pole was perhaps an unexpected discovery." Very unexpected indeed because in both cases the great circle route misses the pole by more than 1,000 miles. The usually accepted dates of equinoxes and solstices are March 21, September 23 and June 22, December 22, not September 22, June 21, December 21. The "small correction" due to the fact that the Pole Star is not at the Pole is not small, but may amount to 70 miles. On page 62 the author makes the flat statement (and even draws a figure to "prove" it) that "the latitude of the observer equals the observed altitude of the sun plus its declination." If true, this would place the sun overhead at the North Pole on March 21—such a howler would by itself alone condemn the book and when the author modestly pontificates that the "principles of global flight which we have discussed in the preceding pages of this book should from now on be used in all geography courses so that revolutionary changes in world traffic may be fully understood," one can only comment: God forbid.

In "Human Geography and the Air Age" by Renner we are dealing with the outpourings of that great self-confessed genius who considers himself superior to all the "amateurs in the State Departments" in planning the post-war world and who thus, from all this wisdom, proposed to end all future trouble in the Balkans by giving Italy the entire Dalmatian Coast—doubtless as a reward for having first massacred most of the inhabitants. To find a person who claims to be a geographer, economist, historian, political scientist, linguist and transportation expert stating that the British built the Suez Canal, and that the Rhine Valley lies in Austria is quite a record. Mr. Renner is wont to complain about the fact that the British control all but one of the bottlenecks between oceans. The "bottleneck" between Cape Agulhaes and the Antarctic Continent is some 2,400 miles wide—"some neck," as Mr. Churchill might say—and it is also a good deal wider than that between Brazil and Dakar, which is not mentioned at all doubtless because it is not controlled by the hated British.

In the latitude of Hammerfest—70.7 degrees north—the earth's rotational speed amounts to about 340 miles per hour, instead of 250, and hence the entire elaborate simile built up on this falls flat. The statement about the aviator flying westward from Oslo on March 21, and thus having a day of 16 hours, and a night of only 8 hours shows a complete lack of understanding of relative motion.

"The World created by the Airplane can best be shown on a map which radiates outward from the North Pole." This would be fine for the Isolationist Eskimo Aviation Corporation with headquarters on an icefloe at the north pole, but since it is obvious that in the immediate post-war world air transportation will be centered around the U. S. the map should be drawn with the U. S. as center—if at all. The type of map claimed as "new" by Renner has been used by astronomers for centuries—only astronomers are well aware of its imperfections and distortions. On the map as given by Renner the distance from Cape Horn to Hobart, *e.g.*, appears to be 18,000 miles—

actually it is only 4,600. There are few places on a Mercator map that are as badly off as that.

A large part of the book is given over to a discussion of the war and its strategy. Herr Doktor Renner, who likes to refer to our general staff as composed of "admirals, generals and similar elderly people" assures us that these people suffer not from being blind but merely from hindsight, whereas it is intimated that the author combines the foresight of Columbus, Major General Haushofer and General Billy Mitchell. Mr. Renner speaks feelingly about illiteracy when referring to people who do not agree with him, and about "Tragic maps," *i.e.*, all maps that do not have the north pole at the center. The only statement that I can heartily agree with is his: "The ideas of uninformed people do not have much shape or dimension." Certainly the ideas of the uninformed amateurs of Teachers College are sometimes badly misshapen.

The authors of these three books have made a great discovery: the earth is round. So now they want to share this discovery with the rest of us who are merely illiterate believers in the tragic Mercator maps, and who possess only hindsight, if any. And all this has to be done with the magic word "global." The real tragedy lies in that these books come dressed up with copious references to the Civil Aeronautics Administration which will be mistaken by many still less-informed people as indication of approval by the C.A.A. There probably are few fields of education where the need for good, simple, but correct texts is as great as it is in aviation—in all of its aspects. If books such as these, containing a vast amount of misinformation, should be adopted in many schools, they could warp the thinking of countless students, and do untold harm to the future of aviation.

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SOMATIC MUTATIONS IN THE APPLE

SOMATIC mutations in apple varieties resulting in a change in the distribution pattern of the color in the epidermal cells of the fruit are quite common. Certain of these mutations are of increasing importance in nurseries and orchards. Most of these differ only in fruit color pattern and can not be identified by tree characters. Van Buren, which is reported to be a somatic mutation of the Duchess of Oldenburg variety, is an exception. It differs in many characters from its supposed somatic parent.

The McIntosh variety has produced many color mutations. Color patterns vary from distinctly striped to uniformly red with no trace of stripes or splashes. The type almost always comes true in asexual propagation. The striped form is generally regarded as the original, but there is evidence that the original McIntosh tree bore apples that were of a uniform red.

There are under propagation at the Massachusetts Experiment Station a considerable number of reputed mutations of the McIntosh apple. Two of them have been in nursery propagation for several years and produce apples that are of a uniform red and very similar if not identical in all fruit characters. They can not be distinguished by vegetative characters. Budded on most stocks, they behave alike, though one type known as Type G is sometimes a little slower than the type called R in starting growth from the inserted bud.

These two types were budded in 1941 on a clonal stock known as Spy 227. Both started growth normally in 1942, but by midsummer all the budlings of Type R were dead or dying, while those of Type G grew normally all summer. The varieties Stayman and Winesap, both on this stock, behaved much like Type R, Stayman budlings dying even earlier than Type R, while Winesap lived a little longer. It is remarkable that these two types, very similar and probably indistinguishable in all external characters, show such a striking difference in behavior when budded on this particular stock. The test is being repeated, including several additional types of McIntosh and varieties more or less related to the Winesap and Stayman.

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FRANZ BOAS, HIS PREDECESSORS AND HIS CONTEMPORARIES

IN her appreciation of Franz Boas (SCIENCE, 97: 2507, 60–62, 1943) Professor Benedict properly stresses the progressive shift in his anthropological interests and his unusual capacity for formulating problems so as to bring them nearer solution. However, two points in her article require further elucidation: one of them concerns Ratzel; the other, Boas's relations to predecessors and coevals.

So far as I can discover, Ratzel lectured at Munich and Leipzig, whereas Boas studied at Heidelberg, Bonn and Kiel. It is thus not clear how Ratzel can be called "his teacher." Incidentally, Ratzel was not nearly so intransigent an environmentalist as is commonly supposed.

Far more important is the second issue. We read: "He [Boas] found anthropology a collection of wild guesses and a happy hunting ground for the romantic lover of primitive things; he left it a discipline in which theories could be tested and in which he had delimited possibilities from impossibilities." Professor Benedict is of course entitled to her own reading of history. But unfortunately her statement might be mistaken for the general sentiment of a Boas