

individual student on the other hand. It is hard to see how cut and dried laboratory experiments, with all materials measured out in advance ready to be put together, can interest an intelligent student so much as experiments performed on the lecture table.

The writer realizes that many will deem him guilty of heresy even for putting the question: Do we give too much laboratory work in our science courses? If it becomes necessary on account of expense to so standardize the laboratory work that it loses nearly all its stimulus, were it not better to omit laboratory from the program until at least the point is reached where experiments described earlier as of the sustained type apply?

Some students are at school or college for a general liberal education—not to specialize in science. How shall they be treated if they elect to study the elements of chemistry? Is the expense of even a standardized and denatured laboratory course justified? When chemistry is chosen mainly for the object of intellectual development does not the class room work without the laboratory serve the purpose? Indeed does it not require a higher order of intelligence to visualize a chemical phenomenon from a text-book statement alone, than from a laboratory demonstration?

The writer has ventured to raise questions in the foregoing some of which have an obvious answer, others of which have been viewed for more than a generation in a uniform dogmatic manner, but ought now to be reopened and reconsidered on their real merits. The Freas System involves these questions, and it constitutes a compromise between two unreconcilable conditions. So far as the evidence presented in the article referred to goes, it seems like the case in which the compromise was effected by one party acceding to all the demands of the other. However, a misconception may have been gained from the first article of the series and the other numbers should be awaited with interest.

Furthermore, if an issue seems capable of adjustment only through an unsatisfactory compromise, is it not the part of wisdom to reexamine the conditions underlying the issue

to see if perhaps the issue itself ought not be reconstructed in such a manner as to avoid the necessity of a compromise.

ARTHUR A. BLANCHARD

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

METEOROLOGY AND THE TRANS-ATLANTIC FLIGHT

WITHIN the past few months many millions of people have had their attention directed, as never before, to the importance of meteorological conditions in connection with the question of trans-Atlantic flight. A popular interest has thus been aroused which has been but partially satisfied by the often contradictory and usually rather meager information supplied by the daily newspapers. Many persons doubtless have a real desire to inform themselves more fully in regard to the weather conditions which are likely to be met with at various altitudes over the North Atlantic Ocean. A recent paper on "Trans-Atlantic Flight from the Meteorologists' Point of View"¹ brings together, in compact form, just the sort of information of which the intelligent public is in search. The author, Willis R. Gregg, of the Weather Bureau, was actively concerned as a meteorological expert in connection with the flight of the U. S. Navy planes. The fact that Mr. Gregg's article was in print before the recent trans-Atlantic flights were accomplished does not in any way detract from its interest or value.

Mr. Gregg's chief conclusions are as follows: Favorable conditions of wind and weather are necessary for the safety of airplanes which attempt the trans-Atlantic flight. In order to obtain the requisite knowledge of the prevailing atmospheric conditions, frequent and widely-distributed observations are necessary. When a favorable day comes, the meteorological expert can indicate the successive directions toward which the airplane should be headed in order to keep to any desired course, and can also calculate the assistance which the winds will furnish. Favorable conditions for an eastward crossing are found at 500-1,000

¹ *Mo. Wea. Rev.*, Vol. 47, 1919, pp. 65-75.

meters during about one third of the time. The percentage of favorable days increases materially at greater altitudes, especially along the northern route. The percentage of favorable days for the westward trip "is so small as to make trans-Atlantic flight in this direction impracticable until the cruising radius of aircraft is increased to such an extent that they are relatively independent of weather conditions."

As to the season, there is little choice. The prevailing westerly winds are stronger in winter than in summer, but there are more storms in the colder months. The greater prevalence of fog in summer is a disadvantage at that season which about offsets the greater amount of cloudiness in winter. The fogs of Newfoundland are generally of but slight vertical extent, and as they do not extend far inland they ought not to interfere with a landing if such is attempted some distance from the coast. The most important thing of all is the need of a comprehensive campaign to secure meteorological and aerological observations over the North Atlantic.

R. DEC. WARD

QUOTATIONS

BRITISH SCIENCE AND INDUSTRY

THE speakers at the opening of the British Scientific Products Exhibition emphasized different aspects of the same truths. When the war came, England was deprived of many scientific products which she had been content to receive from Germany. English scientific men and inventors had long been in the forefront of discovery, but English manufacturers had taken little advantage of their achievements. We had not the industrial processes for making high explosives from coal-tar nor the methods of making optical glass for gun-sights. In a thousand ways, great and small, we were unready for the ordeal. The unlimited valor of our fighting men and the unswerving resolution of the people alone carried us over the dead point. The exhibition of British scientific products, made in Britain, for the first time during the

war, shows the splendid progeny of the *liaison de convenance* hurriedly arranged between science and industry. It is to be hoped that it will lead to a more permanent union.

The war is over, and there is more than a fear that the soporific effect of the cry "Business as usual" may again be felt. Business will not be as usual. The old British way of being content with large-scale manufacture of the "good enough," of seeking the easy market and the repeat order, is gone for ever. Even the best is not good enough, for there is always a better. As Lord Moulton said, Divine discontent must have its place in our industries. The manufacturer must keep in touch with the inventor and the scientific student. The men of the laboratory must keep aware of the industrial processes to which they can so largely contribute. The seller of British goods must have a better weapon than blandishment; he must be able to explain why his goods are the best, and to stimulate the imagination of his customers by the assurance of better. Lord Crewe rightly laid stress on the part of education in the new orientation of our scientific and industrial effort. He referred with legitimate pride to the associations of manufacturers and investigators that are being organized by the Council of Scientific and Industrial Research. But there is still a long way to go. In one sense, the lean years that lie ahead of us are less favorable to continued effort, although they require it even more urgently. During the war an imperative stimulus quickened our common purpose. Money flowed like water for the experiments of the laboratory and the workshop, and the operations of war supplied the swiftest and surest test of efficiency. We must lose none of the organizing and self-sacrificing spirit that we gained when our need seemed greatest.—The London Times.

SCIENTIFIC BOOKS

The Turtles of New England. By HAROLD L. BABCOCK, M.D. Mem. Boston Soc. Natural History, VIII., No. 3, 4to, pp. 325 to 431, plates 17 to 32, April, 1919.