

just over six months would, in the graph, appear as one year, since fractions of a year are not shown. There is, accordingly, some uncertainty as to the precise significance of the findings expressed by this graph. We present the facts and figures here for the study and consideration of our readers, without bias. Parallelism such as this must be viewed with some caution, but it certainly seems very suggestive.

That there should be a relation between rainfall and the deathrate from typhoid fever is in itself plausible, though the precise nature of the relation may be somewhat complicated. For, on the one hand, in an exceptionally wet year the rising level of the ground water is liable to sweep contaminating matter into sources of drinking water that in ordinary times are relatively pure. On the other hand, in very dry weather, consumers may be induced by shortage at their customary sources to draw upon other sources which they would ordinarily avoid. So two conflicting influences may be at work, and it is difficult to say *a priori* just what their resultant effect would be.—*Statistical Bulletin, Metropolitan Life Insurance Company, Sept., 1927, Vol. VIII, pp. 5-9.*

OCEAN TEMPERATURES AND LAND TEMPERATURES

Because my statement on page 149 of the October BULLETIN that the air moves from continent to ocean in summer and back again in winter was misunderstood by at least one person, it seems well to amplify the statement somewhat so as to make my meaning clearer. What I had in mind was the air mass movement as indicated by the atmospheric pressure. As the temperature rises over the interior of the continents in summer the pressure falls and rises over the oceans in corresponding latitudes. This means that a large mass of air has moved from the continent to the ocean. The movement probably takes place in the upper currents of the atmosphere. After the differences of pressure are established, a surface current arises directed from the ocean to the land in the effort to restore equilibrium. But as long as the temperature remains high over the land the low pressure is maintained. When winter comes the land surfaces become cold and the pressure becomes higher over the continents and lower over the oceans at corresponding latitudes. In each case I am speaking of surface pressures reduced to sea level. This fact indicates that an immense mass of air has moved back from the ocean to the land. If another explanation of this change of pressure is found, other explanations of the facts will be possible.—*H. Helm Clayton.*

WORK OF THE COMMITTEE ON AERONAUTICAL METEOROLOGY

Though this committee sponsored by the Daniel Guggenheim Fund for Promotion of Aeronautics has existed only since the end of July, it has already embarked energetically upon its duties. One of its first

steps was to undertake a survey of the present status of meteorological instruction in the United States. It is well known that meteorology has received but little attention in most of the educational institutions in this country. The relatively few courses offered in the subject deal, as a rule, with its descriptive or statistical aspects rather than with its fundamentals as questions of physics or dynamics. The committee recently addressed a questionnaire to leading universities and technical schools concerning the amount and character of the instruction now given in this field. As soon as an analysis of the replies has been made the committee will draw up recommendations looking to the more adequate teaching of meteorology in American institutions.

Recognizing, however, that a long time would be involved before trained meteorologists would be available by this means, the committee has also suggested the giving of courses of instruction in aeronautical meteorology at the Central Office of the Weather Bureau. The Chief of the Bureau has not been in a position to approve this course, for two reasons: (1) the activities of the Bureau are distinctly undermanned at the present time, and personnel are not available to be assigned to courses of instruction; (2) trained personnel is needed in all branches of Weather Bureau activities as well as in aeronautics. A plan favored by the Chief of Bureau is in accord with one formerly practised at a time when the activities of the Weather Bureau were not so undermanned as at the present time. Efforts are being made to remedy this condition, however, and as soon as a small number of the younger employees of the Bureau who have had sufficient preliminary education are available they will be given intensive training for a limited time and assigned to regular duties, to relieve another group. Thus, after a series of rotations, the Bureau will be able to gradually improve the quality and experience of the considerable number of workers it needs to man its rapidly expanding activities.

Another problem attacked has been that of making local forecasts of fog and haze. As work of this character has been carried on intensively in Norway, it was recommended that the Weather Bureau select one of its men for temporary assignment to that country and to other countries in Europe for the purpose of studying the forecast methods there employed. Gladly complying with this suggestion, the Weather Bureau designated two persons as qualified for such an assignment. Mr. Hurd C. Willett, of the Central Office, was selected by the Fund and will be furloughed for one year, during which time he will carry on his work under a grant from the Guggenheim Fund.

Mr. Willett will spend about six months at Bergen and two at the main meteorological offices of other European countries, returning then to Norway for special studies of forecasting in summer in connection with thunderstorms and other local disturbances. At the conclusion of this detail he will return to the Weather Bureau and prepare a report of his studies and conclusions for use in the development of similar service for airways in this country.

On November 14th, most of America's noted flyers assembled in the office of Assistant Secretary McCracken, to give their experiences and recommendations concerning weather forecasting for the benefit of the Guggenheim Foundation's Meteorological Committee.

Bert Balchen, the only member of Commander Byrd's party who was able to attend, was the first speaker. "We are trying," he said, "to get a better weather service commercially and for flying across the ocean." After describing the clouds and fogs encountered at different stages of the Byrd flight, Mr. Balchen said they could have gone on to Germany if they had known what the weather conditions in Europe were. Radio trouble, he added, had interfered with getting signals, due probably to a short circuit resulting from the heavy rain. He believed if they could have had two radio beacons they could have made it into Paris on dead reckoning. Mr. Balchen praised the United States weather service.

Dr. Rossby, who followed, said it was practically impossible at present to forecast, from this side, what the weather in England or France might be fifty hours ahead. He said the problem of forecasting for transoceanic flying was a great one yet to be solved.

Dr. Kimball said that there were no facilities for getting weather information over Europe, it being necessary to judge from conditions on this side and from such meager information as could be obtained from ships on the North Atlantic. He explained that it was possible to talk with mariners in terms they understand, like speaking of winds of "force 4" and the like. "We have not yet come to an understanding with transatlantic flyers on such terms," he said. "I presume the storm that Miss Elder went through would yield force 4, or 5, or 6. The difficulty arose from our not talking the same language."

Captain Haldeman said that the weather map obtained from Dr. Kimball held good for 1,500 miles out and then they struck a low pressure area. He described the trouble that led to their downfall as the low pressure area got worse. He believed that if they could have gone to 15,000 or 18,000 feet they would have avoided the trouble they had. They found sleet on their plane and soon, though their motor was wide open, they could not maintain their altitude. Between ten and two o'clock at night they went from 10,000 to 7,000 feet. They flew out of the storm into the moonlight, but were soon back in another cloud when they lost oil and altitude and they finally went down to 500 feet at three o'clock. He said their motor did not stop, he did not know why, for it was knocking and pounding before they landed beside the ship that rescued them.

Clarence D. Chamberlain said the weather was found all along as it had been predicted. "About all we need," he concluded, "is more facilities for weather reports from ships and men to take care of this data."

Weather reports on the Hawaiian flight were very accurate, Arthur Goebel testified. He paid a tribute to the radio beacons.

Lieutenant Hegenberger wanted better reports on winds and more

accurate barometer readings. He said that shipping people were not now ready to go to the expense of putting the proper instruments on their ships for obtaining information valuable in flying. He wanted fog soundings, and also information as to where cirrus clouds were to be found.

Lieutenant Maitland said that to have ships give accurate information was the first step. He added that "they don't do it now."

Dr. Rossby made public the recommendations of the committee for an experimental weather reporting service between Chicago, Cleveland and New York. It was proposed that each airport be surrounded by a dense local network of meteorological stations that will gather constant information on flying conditions.—Condensed by *L. R. S.* from *New York Times*, Nov. 15, 1927.

FIRST PILOT CHART ON WINDS OF THE UPPER AIR OVER THE ATLANTIC OCEAN

"The first pilot chart of the upper air for the North Atlantic Ocean was issued by the Hydrographic Office of the Navy on Nov. 29th. It is for the month of December, inaugurating a series which will be issued each month, and is the first of its kind ever published for the upper air of any area, land or sea. The charts will be sold at the Navy Hydrographic Office at ten cents each.

"The chart shows wind currents at the surface and at 2,500, 5,000 and 10,000 feet altitudes, based on data furnished by the Weather Bureau from nineteen stations, including two in Spain, two in Holland, one each in the Canary Islands, Porto Rico, the Dominican Republic, Jamaica, and the Panama Canal Zone, and ten along the Atlantic coast of the United States.

"The chart shows that changes in the winds on the upper air of the North Atlantic during December are much less than at the surface, and that at from 5,000 to 10,000 feet there is almost a stable condition, with the winds of an unvariable character. It indicates that for aviators flying across the North Atlantic during the month, the Southern routes, 1,790 miles long, between the Azores and Bermuda, would be desirable."—*New York Times*, Nov. 30, 1927.

SAFE FLYING IN FOG

Pilots flying on the London-Continental air routes are enabled to keep to their course in foggy weather by an efficient direction-finding system, in operation on both sides of the Channel. A pilot, during flight, can get his bearing from a single station on the ground, or his absolute position, as determined by cross-bearings, from two or more stations.

Having requested such information by radio, he is instructed to talk by radio-phone or transmit by Morse for 30 seconds. The stations listen to his signals and his direction or position, as the case may be, is re-