the complete results of a pilot-balloon ascent at Croydon or Lympne are appended whenever available. Every statement is suffixed by the latest Meteorological Office estimate of the probable weather during the remaining hours of daylight. Reports of a similar character are also issued on the same wave length from Le Bourget seven times daily, the observations transmitted in this case being derived from St. Inglevert, Abbeville, Maubeuge, Havre, and Le Bourget.[1]

HIGH-ALTITUDE METEOROLOGICAL SERVICE BY WIRELESS.

(Reprinted from *Aeronautics*, London, Apr. 21, 1921, p. 285.)

Meteorological bulletins for aeronautical purposes, prepared by the High-Altitude Meteorological Department of the Prussian Aeronautical Observatory at Lindenberg, are now spread by wireless from the Königswusterhausen Radio Central Station by a 3,200-meter wave (undamped) at the following times: 6:50–7 a. m., 10:40–10:50 a. m., 5–5:10 p. m.. 9:15–9:25 p. m. Each of these bulletins comprises: (1) A résumé of high-altitude data as derived from pilot- and captive-balloon ascents as well as airplane observations, and expressed in a special code; (2) a summary of barometer readings over the whole of Europe; (3) weather bulletins for Central Europe; (4) a prognosis for Central Europe, special regard being taken to the requirements of aeronautics.—*A. G.*

DISTRIBUTION OF WEATHER INFORMATION, FORECASTS AND WARNINGS BY NAVAL RADIO FOR THE BENEFIT OF AVIATION AND MARINE INTERESTS.

In cooperation with the Office of Communications of the Navy Department, the U. S. Weather Bureau will issue a special bulletin containing surface weather observations from regular Weather Bureau stations, upper air observations from aerological stations maintained by the Navy, Army, and Weather Bureau, and a summary of weather conditions, forecasts, and warnings. The bulletin is for the benefit of marine and aviation interests, but is designed especially to meet the needs of the latter. The bulletin will begin June 1, 1921, and will be broadcast from the naval radio station at Arlington, Va., each morning at 10:30 o'clock (75th meridian time), Sundays and holidays included. This service is in addition to the distribution now being made each night from the naval radio stations at Arlington, Va.; Key West, Fla.; Point Isabel, Tex.; Great Lakes, Ill.; and San Juan, P. R., as described in Weather Bureau circular of October 26, 1920.

Full details of this new service, including code used, may be obtained by addressing the Chief of the U. S. Weather Bureau, Washington, D. C.

Beginning June 10, 1921, in cooperation with Office of Communications of the Navy Department, there will be a systematic broadcasting of wind and weather forecasts, storm and hurricane warnings, and advices relating thereto from naval radio stations on the south Atlantic and Gulf coasts, in the Caribbean Sea, and on the Great Lakes. This distribution will be in the nature of a localized service, and supplemental to the general broadcasting of weather forecasts, warnings, and bulletins from the high-powered naval radio stations at Arlington, Va.; Key West, Fla,; San Juan, P. R.; Point Isabel, Tex.; and Great Lakes, Ill., as described in Weather Bureau circulars of October 26, 1920, and May 16, 1921.

Whenever storm or hurricane warnings are issued in the forenoon (based on 8 a. m. observations), they will be broadcast at the same time as the wind and weather forecasts. When issued in the afternoon (based on special observations), they will be broadcast at the evening hours indicated.

Vessel owners and others desiring to receive these reports should make every effort to obtain them on regular schedules, as repetitions, except as indicated, will be made only in unusual circumstances.

A circular, containing a table showing the naval radio stations which will transmit forecasts, the wave-lengths employed by each station, the hours of distribution, etc., may be had upon application to the Chief of the U. S. Weather Bureau, Washington, D. C.

AIRCRAFT AND LIGHTNING.

An experienced flier discusses the possibility of airplanes in flight being struck by lightning during a storm in a recent issue of *Illustrierte Flug-Welt*. His remarks are based on some 70 flights under such circumstances and on general principles. He shows that no danger is to be expected in the first place if the machine is not in the direct line of the discharge, and in the second place, even if it is, it is not likely from the nature and distribution of the conducting metal portion that danger due to fire will arise. Out of 30 cases where the machine was struck directly, the writer maintains that there were no evil effects, while in all known cases in Germany where a machine fell during a storm there was no evidence of scorching or parts or melting of metal.—*Sci. Am.*, Feb. 12, 1921, p. 123.

Lightning struck two kite observation-balloons operating with the Atlantic Fleet off the Chesapeake capes last night. Both were destroyed, but they were not manned.—*Evening Star* (Washington, D. C.), June 9, 1920.

LIGHTNING PLAYS HAVOC WITH BALLOONS AT GUANTANAMO.

There is a balloon school, too, in which observers are taught to ascend in captive balloons—the "sausages" of the war—but Guantanamo's neighborhood seems to be dangerous to these craft. Last year three were brought down by lightning.—*Herbert Cory*, in *National Geographic Magazine*, Washington, June, 1921, p. 591.

POTENTIAL GRADIENT AND THUNDERSTORM FORECASTING.[1]

By A. HÖLZEL.

(Reprinted from *Science Abstracts*, Sect. A., December 30, 1921, §1540.)

Records of potential gradient and thunderstorms at Leipzig are examined with a view to determining whether any useful warning of the approach or formation of a thunderstorm may be obtained from observations of potential gradient. The records extend over the period January, 1913, to July, 1914, inclusive. The first dis-

[1] A British flying weather forecast (7 p. m., Aug. 15, 1920) is published in *Aviation*, etc., No. 1, 1920, p. 224.—EDITOR.

[1] Annal. d. Physik, Nov. 27, 1919, 60:1521–547. Disertation, Leipzig.