Summary of losses by tornadoes, etc., May and June, 1917.

The losses of life and property follow in tabulated form, by States.

State.	Date.	Lives.	Property.
Kansas	May 20	24	$650,000
Northern Illinois	May 26	1	800,000
Northern Indiana	do	6	400,000
Central Illinois	do	101	2,200,000
Central Indiana	do		300,000
Arkansas	May 27	18	55,500
Kentucky	do	60	1,000,000
Tennessee	do	24	420,000
Alabama	do	40	430,000
Mississippi	do		20,000
Missouri	May 30	40	500,000
Oklahoma	May 31-June 1	8	550,000
Kansas	June 1	6	160,000
Kansas	June 5	8	1,000,000
Missouri	do	14	200,000
Michigan	June 6	5	1,500,000
Kentucky	do	5	
Total		360	10,185,000

While these storms of 17 days were quite numerous, it does not appear that occurrences of this character are increasing in number as a whole, nor is there any special region of greatest frequency. The whole question is one of the occurrence of the contributing distribution of pressure, temperature, and moisture, and certainly the observation and experience of the past do not warrant the conclusion that any one *limited* area more than another within the severe storm field is more subject to the requisite distribution of the formative causes. It can also be said with reference to increasing frequency that the storms are not more numerous than heretofore; but as former sparsely settled districts become more densely populated and facilities for intercommunication become multiplied, the details of the storms are made available more rapidly and losses of life and property increase, because there are more of both exposed to the fury of these unpreventable storms.[2]

METEOROLOGICAL COURSES FOR AERONAUTICAL ENGINEERS.

The National Advisory Committee for Aeronautics, cooperating with the United States War Department, arranged in May, 1917, with a number of leading universities and schools, for courses designed to specially further the education and training of aviators. These courses, technically known as "Ground Schools in Military Aeronautics," include such subjects as elementary meteorology, astronomy, engineering, internal-combustion engines, etc., and they are now being offered at the following institutions: Massachusetts Institute of Technology in cooperation with Harvard University (Cambridge, Mass.), Princeton University (Princeton, N. J.), Cornell University (Ithaca, N. Y.), Ohio State University, (Columbus, Ohio), University of Illinois (Champaign, Ill.), University of Texas (Austin, Tex.), University of California (Berkeley, Cal.).

Prof. Robert De C. Ward is giving the course in meteorology at the Massachusetts Institute of Technology, and also a more extended course forming part of the requirements leading to the degree of aeronautical engineer. He has kindly communicated the syllabus of the longer course and permits us to publish it here, as it is sure to prove helpful and stimulating to others who may have similar tasks assigned them.—*Chief of Bureau.*

[2] For an article on tornado insurance, which discusses frequency in the several States up to and including 1896, see this REVIEW for December, 1905, 33:534-539; see also Flora in this REVIEW, December, 1915, 43:615-616, for statistics on Kansas, including 1915.—C. A., jr.

SYLLABUS OF LECTURES ON METEOROLOGY GIVEN IN THE COURSE IN AERONAUTICAL ENGINEERING AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY IN COOPERATION WITH HARVARD UNIVERSITY.

I.

Ten lectures by Robert De C. Ward, Professor of Climatology, Harvard University.

Introductory.—Importance of meteorology in aviation; aircraft and weather in war:

(*a*) General climate.

(*b*) Weather and weather forecasts; military field meteorological services.

The atmosphere.—Composition; height; "troposphere" and "stratosphere"—general characteristics of each.

Temperatures in the free air.—Vertical temperature gradients; temperatures at various heights; inversions; stable and unstable conditions in relation to flying.

Pressure.—Importance; comparison with water; decrease with altitude; physiological effects of diminished pressure; measurement; mercurial and aneroid barometers and barographs: use, errors, corrections; determination of altitudes by means of barometers; isobars; pressure gradients.

The wind in relation to pressure at earth's surface.—Wind direction; deflection of winds from gradient; Earth's rotation and friction; cyclonic and anticyclonic wind systems; "Gradient wind"; Buys Ballot's Law; isobaric types.—Wind velocity; general relation to gradient; Beaufort Scale and its equivalents in force and in velocity in miles an hour; anemometers: Robinson and Dines; gustiness of wind.

Conditions of the atmosphere affecting aviation.—General and local.—(*a*) General air movements, essentially horizontal; atmospheric layers and waves. (*b*) Local convectional currents, essentially vertical, due to thermal controls: causes and conditions. (*c*) Effects of topography upon air movements, combining both horizontal and vertical elements, due to mechanical controls: effects of friction, topography, and character of surface; vertical and horizontal movements in general in relation to flight.

Weather forecasting.—Explanation of daily weather map; principles of forecasting explained by reference to type maps, for United States and for Europe; general characteristics of cyclones and anticyclones; tracks; velocities of progression.

Noninstrumental local forecasts.—Barometric tendency; veering and backing winds; changes in wind velocity; weather proverbs.

Clouds.—Types; cloud classification; methods of determining cloud heights and velocities, and results; value as weather prognostics; fair and wet weather clouds; fog; special consideration of cumulus and cumulo-nimbus.

Forecasts of wind velocity and direction aloft.—Direct observation by means of pilot balloons, kites, and cloud movements; directions of cloud movements in cyclonic and anticyclonic systems in the United States and in Europe; estimates based on surface conditions and on general knowledge of upper air currents; "Gradient wind"; diurnal variation in wind velocity and direction; changes due to progression of cyclones and anticyclones; wind and cloud directions and night flying.

Favorable and unfavorable weather for flying.—Wind; clouds; haze, etc.

II.

Laboratory Work at Blue Hill Observatory (10 hours). Alexander G. McAdie, Abbott Lawrence Rotch Professor of Meteorology, Harvard University, and Director of the Blue Hill Meteorological Observatory, Readville, Mass.