FURTHER EXPERIMENTS IN WEATHER FORECAST.

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Since the early part of February, I have received from the Signal Service Bureau the tri-daily weather reports, as well as the daily weather maps. I have also extended my comparisons to Caswell's Meteorological Observations at Providence, from December, 1831, to May, 1860. The reports, the maps, and the comparisons, all show that the Haverford tests, in my "Experiment in Weather Forecast" (this JOURNAL, April, 1885), are by no means exceptional, but that similar results are probably attainable in all parts of the United States. I therefore venture to formulate some of the principles of astronomical weather forecast, as follows:

1. The lunar modifications of barometric pressure tend to produce, *a*, high barometer and westward pressure at syzygy; *b*, low barometer and eastward pressure at quadrature; *c*, falling barometer between syzygy and quadrature; *d*, rising barometer between quadrature and syzygy.

2. The solar modifications, through the combined action of heat, attraction and "relative motion," tend to produce, *a*, high barometer and southward pressure at the octants before syzygy; *b*, low barometer and northward pressure at the octants after syzygy; *c*, falling barometer between *a* and *b*; *d*, rising barometer between *b* and *a*.

3. The influences may be most equally divided by counting as fair all weather which is either fair or clearing, and by counting as stormy all weather which is storm-breeding (including "pet days"), lowering or stormy.

4. Precipitation, during stormy periods, produces a partial vacuum, which is often supplied by an inrush of dry air, producing pet days.

5. The exceptional storms or stormy tendencies, during the prevalence of fair indications, are mostly anti-cyclonic in their origin.

6. The general tendencies, independent of local and monsoon influences, are, *a*, fair for the octants following quadrature; *b*, variable, with predominant anti-cyclonism, for the octants preceding syzygy; *c*, stormy for the octants following syzygy; *d*, variable, with predominant cyclonism for the octants preceding quadrature.

7. The tendency to increasing dampness is greatest, *a*, from the Atlantic Ocean, between two days before and three days after syzygy,

with a prevalence of anti-cyclonic currents; *b*, from the Gulf of Mexico, between two days before the first and fifth octants and one day before quadrature, if cyclonic currents prevail; *c*, from the Lakes, between quadrature and syzygy, when the prevailing currents are anti-cyclonic.

8. The reversals of tendencies are mostly due to long continued polar or equatorial currents. These currents are not apt suddenly to change their character. Therefore, by watching all the influences, sufficiently to see which are normal and which are abnormal, it becomes possible to make forecasts for two or more weeks in advance, which will be verified in four cases out of five.

9. The relations of the daily to the annual barometric oscillations, which were used in 1863 as a ground for estimating the Sun's distance ("Proc. Amer. Phil. Soc.," ix, 283-8; x, 375-6), seem to account for an average daily eastward movement of about 1° in monsoon influences, which has been pointed out by L. A. Sherman, editor of the "Port Huron Times" ("Amer. Meteorolog. Journal," Nov., 1884; "Port Huron Daily Times," Feb. 11, 1885).

The following summary shows the influences, for an entire month, which may be looked for between May 15 and June 15, 1885. It will give readers of the JOURNAL an opportunity to judge for themselves to what extent these influences may be used as a basis for forecast. Observers will confer a favor by communicating the results of their observations to the Secretary of the Franklin Institute.

May 15-17, May 28-June 1, June 12-15, 1 *c*, 2 *c*, 3 (stormy), 4, 6 *c*, 7 *a*, 7 *b*.

May 18-21, June 1-5, 1 *c*, 2 *d*, 6 *d*, 7 *b*.

May 21-24, June 5-8, 1 *d*, 2 *d*, 3 (fair), 5, 6 *a*, 7 *c*.

May 25-28, June 8-12, 1 *d*, 2 *c*, 6 *b*, 7 *a*, 7 *c*.

On account of the friction of surface winds, the influence of accelerating and retarding pressures (1, 2), is most often shown by the upper currents, when cirrus clouds are visible.

LIGHT CLOUDS OF THE UPPER ATMOSPHERE.—A. Badoureaux supposes that in the upper regions of the atmosphere the temperature may be reduced nearly to absolute zero, and although the temperature is correspondingly reduced he thinks it probable that carbonic acid, nitrogen and oxygen may be there condensed into clouds analogous to those which are formed by watery vapor in the lower atmosphere.—*Comptes Rendus*, Oct. 20, 1884. C.