

Bureau, Mr. Gregg also classified the daily weather maps of the North Atlantic for a ten-year period into days when wind conditions were excellent, good, fair, or poor for the journeys both ways and both routes. Grouping the excellent and good days together, the average number of days in May favoring Newfoundland to Ireland flight is 12, Newfoundland to Portugal, 11, and return on both routes, only 2. For June, the corresponding figures are 10, 6 and 2. While on the average there should be plenty of favorable days, individual months vary greatly. Thus, in July, 1906, there were 28 favorable days for the trip to Ireland, but in July 1907, only 4.

Mr. Gregg's general conclusions are worth quoting:

CONCLUSIONS

1. In the present stage of their development and until improvements give them a much larger cruising radius than they now have, airplanes can not safely be used for trans-Atlantic flight except under favorable conditions of wind and weather.

2. Observations of conditions over as great an area as possible, and particularly along and near any proposed course, should therefore be available at as frequent intervals as possible, these observations to include free-air as well as surface conditions.

3. With such observations at hand the meteorologist is able quickly to determine the current, and probable future, wind conditions along a proposed route and to advise an aviator as to the suitability of a day for a flight.

4. If a day is favorable, the meteorologist is able to indicate the successive directions toward which an airplane should be headed in order to keep to any desired course; also, to calculate the assistance that will be furnished by the winds.

5. Inspection of marine weather maps shows that at an altitude of 500 to 1,000 meters conditions are favorable for an eastward trip approximately one third of the time, the percentage being slightly greater along the northern than along the southern route. At greater altitudes the percentage of favorable days materially increases, especially along the northern route. For the westward trip the percentage of favorable days 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 wind conditions.

6. All things considered, conditions for an eastward flight are most favorable along the northern course; for a westward flight they are most favorable along the southern course; that is, the prevailing westerlies are less persistent along this course than farther north.

7. There seems to be little choice as to season, for, although the prevailing westerlies are stronger in winter than in summer, yet, on the other hand, stormy conditions are more prevalent in winter, and the net result is about an equal percentage of favorable days in the two seasons. Moreover, the greater fog percentage in summer just about offsets the greater percentage of cloudiness in winter. Fog is a disadvantage chiefly because of its interference in making observations with drift indicators. The Newfoundland fogs in general are of small vertical extent and do not extend far inland. They should not, therefore, prove a hindrance to landing, if the landing field is located some distance from the coast.

8. Most important of all, there is need for a comprehensive campaign of meteorological and aerological observations over the North Atlantic in order that aviators may be given data for whose accuracy the meteorologist need not hesitate to vouch, instead of information based on so small a number of observations, particularly of free air conditions, that the deductions, including some of those in this paper, are assumed and not proved, are given with caution, and are "subject to change without notice."

How some of these conclusions have worked out in actual practise is being discussed in contributions to be published in the *Monthly Weather Review*.

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SPECIAL ARTICLES

A CHART OF ORGANIC CHEMISTRY, AROMATIC SERIES

THE following chart was made and is used in connection with the elementary organic chemistry course given at the university. The heavy type lines in the benzene rings indicate the double bonds while the light lines indicate the single bonds. In order to emphasize certain characteristic groups, position of substituents in the rings, etc., red lettering was used. In the following miniature

chart the corresponding red lettering can not be shown.

The chart is 98" $\times$ 75".

An analogous chart of the aliphatic series was described in SCIENCE.

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THE KENTUCKY ACADEMY OF SCIENCE

THE Kentucky Academy of Science held its sixth annual meeting at the University of Kentucky on Saturday, May 3, 1919, with J. E. Barton, president, in the chair. After a brief business session at which a number of new members were elected, the following program was presented:

President's address, by J. E. Barton, "The relation of private forestry to the economic interests of Kentucky."

It was brought out that there are no public forests in Kentucky, the large bodies of forest lands being privately owned, mainly by coal companies. The preservation of timber in Kentucky is therefore a problem in private forestry. It was considered desirable that the legislature should pass some law regulating private forests and stimulating timber development by suitable modification of the methods of taxing timber land.

New fossil invertebrates from a new fossil horizon in the coal measures of eastern Kentucky: W. R. JILLSON, state geologist. A new fossiliferous limestone horizon in the Coal Measures of eastern Kentucky has been discovered by the author who has done sufficient field work on it to demonstrate that it possesses features of fundamental stratigraphic importance to the unmapped geology of this section. A comprehensive collection of invertebrates taken by the author from an outcrop of this horizon on the Dr. G. T. Kendrick farm on the headwaters of Cow Creek, Floyd county, and identified by Professor Charles Schuchert, shows an incomplete list of about forty species of which ten are new and about sixteen very rare. It is a very unusual Pottsville fauna with the characteristic index forms absent. Three other widespread fossiliferous limestones in this same area are noted, all of which possess virgin stratigraphic potentialities. The author tentatively correlates them into the Norton (Middle) and Wise (Upper) Pottsville.

A phase of evolution: W. S. ANDERSON. In every breed of animals it is found that a few are exceptionally potent in passing on their good quali-

ties. The author illustrated this from certain families of horses and advanced some speculations as to the possible cause.

Electrolytic solution glow: DEAN W. MARTIN. In December, 1917, the author observed a glow on the aluminum terminal of an electrolytic rectifier with lead and aluminum electrodes in a 10 per cent. solution of sodium phosphate. It was found possible to produce the glow with solutions of many different salts, of different concentrations, at temperatures from 0 to 100° and with electrodes of aluminum, zinc or magnesium and with voltages ranging from 80 to 1,500. A simple apparatus was exhibited and production of the glow was demonstrated. The observation is published for the purpose of learning whether others have noted or investigated the phenomenon.

The bacteriological descriptive group number: D. J. HEALY. The author has found it necessary to develop the group number of the Society of American Bacteriologists in such a manner that it will indicate the action of soil bacteria on nitrogenous compounds, organic acids and sulfur. The group number, enlarged in this manner, has proved valuable in the study of soil bacteria.

A brief discussion of Lexington sewage purification: H. D. SPEARS. A modern sewage-disposal plant operated by gravity takes care of 3,000,000 gallons containing 2½ tons of suspended solids. The sewage passes through bar screens and grit chambers into Imhoff tanks, where bacterial action takes place and sludge is deposited. The effluent passes into "dosing tanks" which empty automatically every 15 minutes into filter beds, 2 acres area, of coarsely broken limestone covered with broken granite, together 6 feet deep. Thence the effluent passes through secondary sedimentation tanks and into a near-by stream. It is clear, odorless and has a "relative stability" of about 95 per cent. The sludge from the Imhoff tank is drawn off periodically into drying beds whence it is returned to the soil, when spadable.

A specimen of lodestone from Kentucky: A. M. PETER. A specimen of titaniferous magnetite possessing polarity was exhibited, which had been sent in from Edmondson county.

The composition of the ash of crab grass (Digitaria sanguinalis) as affected by the soil in which it is grown: G. DAVIS BUCKNER. Crab grass (*Digitaria sanguinalis*), when grown in garden soil, contains an ash which is 16.1 per cent. larger than the ash of the same species when grown in a 4-inch limestone roadway. The comparative composition