aries of private claims, — often a difficult task, owing to their distance from shore.

The laws relating to shell-fish, passed since the date of the last report, are appended. The only one of general importance makes the rights to oyster-grounds personal estate, and not realty, in settling property of deceased owners.

The example of the state of Connecticut, in full accordance with the business sagacity which characterizes her citizens, might well be followed by other states even more deeply interested in oyster-culture. The natural beds of Maryland and Virginia are being rapidly destroyed for commercial purposes, and only a prompt attention to the subject can secure their rescue from impending destruction.

DATE OF VINTAGE.

M. ANGOT contributes a long discussion of the date of vintage in France to the annals of the *Bureau central météorologique* for 1883, issued with date of 1885. His data for some stations reach back to the fourteenth century, and, for a good number, back well into the eighteenth century. His conclusions may be briefly summarized as follows: 1°. The date of vintage varies greatly from year to year, and may in a single country differ by more than seventy days in different years. 2°. The date of maturity depends chiefly on the vines having received a certain quantity of heat, well determined for each species. 3°. Slight variations in the mean date of vintage are found; but these variations are unlike in neighboring regions, and they show no persistent deterioration of climate. 4°. No relation is found between the date of vintage and the sun-spot cycle. 5°. Abundant vintages occur in rather warm years, with nearly normal rainfall: they are less dependent on a concurrence of favorable conditions than on the absence of frosts, hail, diseases of the vines, etc. 6°. Years of good wine have a notable high temperature from June to September, and generally a slightly deficient rainfall. 7°. Years of poor wine are cool in the summer, with rain a little above the normal. Since 1880, detailed observations have been made on the vintage in France, and in future it will be regularly discussed.

The accompanying cuts are reduced from Angot's plates. Fig. 1 shows the budding of the vine in spring-time, as determined by the arrival of the mean diurnal temperature of 9° C. (48° F.), which is provisionally accepted as the time of the beginning of its vegetation. The position of this isotherm for every ten days of February, March, and April, is given by heavy lines; for some intermediate dates, by finer lines. The epoch of vintage in the autumn is similarly expressed in Fig. 2.

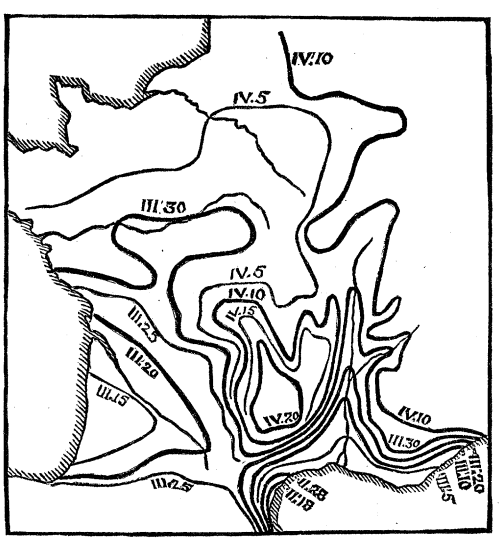

FIG. 1.

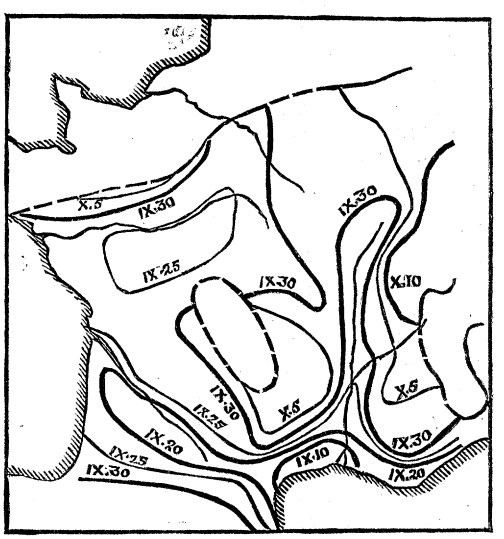

FIG. 2.

The same author has also attacked the distribution of heat on the earth as directly furnished by the sun, giving the basis of what Hann calls the solar climate. Meech is most frequently quoted on this question, and Ferrel has lately discussed it; Angot adds the consideration of various coefficients of atmospheric transparence, and thus makes a step from the theoretical towards the actual. For example: according to Meech, the

heat received in twenty-four hours from the sun on the summer solstice is not greatest at latitude $23\frac{1}{2}°$, where the sun is vertical, but has two maxima farther north, — one at 43° ; the other and greater at the pole, with a faint minimum at 66° ; because the sunshine at the pole through twenty-four hours, at a constant altitude of $23\frac{1}{2}°$, is greater than the sunshine in the twelve-hour day at the tropic, with the sun vertical only at noon. But this gives a very erroneous idea of the temperatures at these latitudes. Now, on the assumption that two or three tenths of a vertical ray are absorbed by the atmosphere, Angot finds the maximum of heat received at the bottom of the atmosphere on the solstice has its maximum at 35°; farther north, the heat received diminishes continuously to the pole, rapidly at first, then slowly beyond the polar circle ; and this is fairly conformable to the distribution of temperature. An interesting calculation shows, that, on account of our less distance from the sun in December than in June, the latitude circle about $2\frac{1}{2}°$ north, and not the equator, receives the same amount of heat on the two solstices : the equator, therefore, belongs in this respect to the southern hemisphere. The memoir is illustrated by an instructive series of curves showing the distribution of heat over the earth at numerous dates. W. M. D.

SODA AND POTASH IN THE FAR WEST.

IN view of the large quantities of soda and potash in various forms that are imported into this country, it is surprising that the abundant supplies of these alkalies within our own borders are not more extensively utilized.

It is probably known to all American geologists that there are extensive deposits of the chloride, sulphate, and carbonate of soda at many points in the arid regions of the far west, which may be had for the trouble of gathering. These deposits occur in the desiccated beds of ancient lakes in Nevada, Arizona, western Utah, and portions of California and New Mexico. There are certain lakes, also, which are valuable brines.

In the basins where evaporation has been nearly or quite complete, the alkaline salts occur either at the surface, when they appear like fields of snow frequently many square miles in extent, or they may be concealed beneath the layers of fine mud known as playa deposits. Again, large areas in Nevada and Arizona are white with alkaline salts that have been brought to the surface in solution, and deposited when the waters evaporated. These efflorescences are frequently rich in sodium carbonate, sulphate, and borate, and have been utilized to a limited extent at a few localities.

The lakes of the far west which are likely to become of commercial value on account of the alkaline salts they contain are Great Salt Lake, Utah ; the Soda Lakes, near Ragtown, Nevada ; Mono and Owen's lakes, California ; and Summer and Abert lakes, in Oregon. All of these are without outlet, and owe their high percentage of mineral matter to the concentration by evaporation of the waters of streams and springs with which they are supplied. Their chemical composition is shown in the following table : —

CONSTITUENTS.	1 Great Salt Lake, Utah (1869).	2 Soda Lake, Nevada (1883).	3 Mono Lake, California (1883).	4 Owen's Lake, California (1876).	5 Abert Lake, Oregon (1883).
Sodium (Na)	49.690	40.919	18.100	21.650	2.773
Potassium (K)	2.407	2.357	1.111	2.751	10.637
Calcium (Ca)	0.255	.....	0.278	trace	.....
Magnesium (Mg)	3.780	0.245	0.125	trace	0.002
Lithium (Li)	trace	.....	.....	trace	.....
Chlorine (Cl)	83.946	40.851	11.610	13.449	8.220
Bromine (Br)	trace	.....	.....	.....	.....
Carbonic acid (CO_3)	.....	16.854	11.465	13.140	4.547
Sulphuric " (SO_4)	9.858	11.857	6.520	9.362	0.497
Phosphoric " (HPO_4)	.....	.....	.....	trace	.....
Nitric " (NO_3)	.....	.....	.....	trace	.....
Boracic " (B_4O_7)	trace	0.286	0.153	trace	.....
Silica (SiO_2)	.....	0.278	0.268	0.164	0.064
Alumina (Al_2O_3)	.....	.....	.....	trace	.....
Total parts per thousand	149.936	113.647	49.630	60.507	26.740

1 Analysis by Prof. O. D. Allen, U. S. geol. explor. of the 40th par., vol. ii. p. 435.

2 Analysis by Dr. T. M. Chatard, Bull. No. 9, U. S. geol. surv., p. 25.

3 *Ibid.*, p. 26.

4 Analysis by Dr. Oscar Loew, Ann. rep. chief of eng., U.S.A., 1876, p. 190.

5 Analysis by Dr. F. W. Taylor, Fourth ann. rep., U. S. geol. surv., 1882–83, p. 454.

It is safe to predict that Great Salt Lake will not only be of great value in the near future on account of the immense quantities of common salt it is capable of producing, but also for the sodium sulphate it contains. When the temperature of the lake-water is reduced to 20° F., the separation of sodium sulphate takes place as a flocculent precipitate, which increases in quantity with decrease of temperature. This should suggest to manufacturers a method of obtaining the salt in a pure state and on a large scale. When the temperature of Great Salt Lake is lowered on the approach of winter, its waters become opalescent, owing to the precipitation of sodium sulphate in an extremely finely divided state. During the winter months the temperature of the air in the region of the lake sometimes falls to 20° or more below 0° F., and at such times the separation of sodium sulphate takes place on an immense scale, and it is thrown up on the shore in thousands