

TABLE 3.—Comparison of Angström's pyrheliometers.

Pyrheliometer No. 28. Ammeter No. 4315.					Pyrheliometer No. 34. Ammeter No. 4306.					
Oct. 29, 1901, Time, p. m.	Temperature, C.	Band exposed to sun.			Q. Cal. per sq. cm. per min.	Temperature, C.	Band exposed to sun.			Q. Cal. per sq. cm. per min.
		Both A and B.	A.	B.			Both A and B.	A.	B.	
	°	<i>Gal. zero.</i>	<i>Amp.</i>	<i>Amp.</i>	°	<i>Gal. zero.</i>	<i>Amp.</i>	<i>Amp.</i>		
1:30	31.6	126	.308	.340	21.2	117	.339	.350	.854	
1:37	31.6	134	.305	.333	21.0	106	.341	.350	.864	
1:40	31.5	126	.339	.345	21.0	111	.330	.350	.835	
1:45	31.4	138	.308	.335	21.0	88	.345	.352	.874	
1:47	31.6	126	.300	.340	21.5	95	.347	.341	.855	
1:52	31.9	141	.303	.335	21.9	89	.344	.343	.825	
1:54	31.5	128	.305	.330	21.9	144	.352	.343	.870	
1:57	31.7	145	.305	.330	21.9	148	.341	.341	.841	
2:00	31.1	125	.325	.325	22.0	153	.331	.335	.778	
2:05	31.0	150	.303	.315	22.0	134	.331	.335	.787	
2:09	31.0	134	.327	.310	21.0	126	.315	.325	.885	
2:13	31.1	149	.302	.310	21.7	165	.307	.304	.816	
2:18	31.0	129	.320	.310	21.6	165	.327	.362	.855	
2:23	31.5	150	.352	.306	21.2	130	.300	.357	.777	
2:26	31.5	139	.323	.317	21.2	138	.330	.320	.762	
2:31	31.2	150	.325	.312	21.0	110	.353	.318	.815	
2:34	31.4	142	.322	.312	21.0	116	.345	.298	.758	
2:39	31.2	143	.320	.305	21.0	157	.293	.230	.616	
2:40	31.2	142	.323	.308	21.1	160	.306	.335	.749	
2:44	31.1	152	.275	.301	21.0	113	.330	.333	.790	
Mean of 10 pairs of observations...					.7424	.8096				

The constants of the instruments were very carefully determined by Knut Angström, and are combined in the following table :

TABLE 4.—Constants of pyrheliometers.

	No. 28.	No. 31.	No. 34.
Electrical resistance of the bands at 20° C. ( <i>r</i> ).....	0.0810	0.0731	0.0751
Coefficient of variation of resistance with temperature....	.00045	.00045	.00045
Width of bands ( <i>b</i> ) centimeters.....	0.130	0.150	0.152
Absorbing power of the surfaces ( <i>a</i> ).....	0.98	0.98	0.98

The intensity of radiation is given by the relation

$$Q = \frac{r i^2}{4.19 b a} = 60 \text{ gram-calories per min. per cm.}^2$$

Or  $Q = k i^2$ . (*i* = intensity of the current in amperes.)

The coefficient *k* has, at different temperatures, the following values:

TABLE 5.

Temperature, C.	<i>k</i> .					
	-10°	0°	10°	20°	30°	40°
Instrument.						
No. 28.....	7.80	7.88	7.87	7.90	7.94	7.97
No. 31.....	7.02	7.06	7.09	7.13	7.16	7.19
No. 34.....	7.12	7.15	7.19	7.22	7.26	7.29

NOTES BY THE EDITOR.

WEATHER BUREAU MEN AS INSTRUCTORS.

Mr. George E. Franklin, Local Forecast Official, Los Angeles, Cal., has given instruction to the class in physical geography of the Los Angeles High School in the construction and use of meteorological instruments and the general work carried on at stations of the Weather Bureau. For this purpose the class, which numbers about 150, visited the local Weather Bureau office in sections on different days during the latter part of the month. Similar instruction is to be given to the pupils of other schools during the winter.

Mr. A. E. Hackett, Section Director, Columbia, Mo., has undertaken the instruction of a class in climatology in the Missouri State University. The class meets each Friday during the first semester and a greater portion of the time will be devoted to the study of the more important climatic features of the various sections of the United States. This course is now required in the Missouri State University for the degree of Bachelor of Science in Agriculture.

Mr. H. W. Richardson, Local Forecast Official, Duluth, Minn., reports that on October 24 he addressed the senior class of the Convent of the Sacred Heart at his office, the topic being the United States Weather Bureau. On October 29, the senior class of young ladies from the Cragcroft Private School, Duluth, Minn., visited the office and after explaining the various instruments, Mr. Richardson addressed them upon Weather Forecasting and the Work of the United States Weather Bureau.—H. H. K.

APPLIED CLIMATOLOGY.

By practical climatology we ordinarily mean the observing and recording of the weather, the preparation of mean values and the application of this climatological knowledge to the benefit of mankind. Practical meteorology implies similar observations but a different form of record, i. e., the daily weather map and the study and prediction of storms and changes in the weather.

There are many other fields for the application of our knowledge of climatology and one of the most interesting is that branch of geography called physiography or the study of the action of the atmosphere in altering the surface features of the earth.

As many of the readers of the MONTHLY WEATHER REVIEW are teaching geography, climatology, and physiography, we believe that they will often find opportunity to utilize ideas drawn from the following outline of the subjects treated of by Prof. Dr. George B. Shattuck of Johns Hopkins University in his recent course of public lectures in Baltimore.

GEOGRAPHY OF NORTH AMERICA.

LECTURE I.

SUBJECT.—PHYSIOGRAPHIC FEATURES OF NORTH AMERICA.

*Relations of continental plateaus and ocean basins.*—Methods of sounding; lead line; Sigsbee sounding machine. Contour of ocean bottom: levels; ridges; deeps. Contour of continental plateaus: continental shelf; submarine earthquakes; cable ruptures.

*Relations of North America to the other continents and to the surrounding ocean basins.*—Atlantic basin; Pacific basin; Arctic basin; Antillian basin.

*Hypsometric features of North America.*—Atlantic Plain: position; extent; characteristics; subdivisions—Coastal Plain, Piedmont Plateau. Appalachian Mountain System: position; extent; characteristics; subdivisions—Blue Ridge, Appalachian Valley, Cumberland-Allegheny Plateau. Great Central Plain: position; extent; characteristics; subdivisions—Laurentian Highlands, Mackenzie River Basin, St. Lawrence Valley, Mississippi Valley, Prairie Steppes, Black Hills, Ozark Mountains, Llano Estacado, Bad Lands. Cordilleran Mountain System: position; extent; characteristics; subdivisions—Rocky Mountains, Plateau Country, Great Basin, Coast Ranges. Antillian Mountain System: position; extent; characteristics; subdivisions—Greater Antilles, Lesser Antilles, Bahamas, Trinidad-Tobago group, Mountains of Central America.

LECTURE II.

SUBJECT.—CLIMATOLOGY AND HYDROGRAPHY.

*Climatology.*—Definition of climate: precipitation: evaporation; circulation; condensation; storms; distribution of rainfall. Temperature: heat in atmosphere; ocean currents—horizontal, vertical; mean annual temperature; variation in temperature.