

Doctor Kassner's book suggests the need for a similar work in English, based upon the wealth of experience that is surely to be found among meteorological workers in English-speaking countries. It is a valuable contribu-

tion to the literature of meteorology in a field untouched by others. It should be read by professionals and laymen whose interests carry them into legal and administrative activities likely to employ meteorological data.

DRY SEASON, 1921-22, IN THE CANAL ZONE.

By R. Z. FITZPATRICK, Chief Hydrographer.

The 1921-22 dry season began about January 7 and ended about May 4, 1922. It was of shorter duration than those of 1919-20 and 1911-12, which were, respectively, the driest and next to the driest since the American occupation of the Canal Zone.

Comparative rainfall figures for these three periods are given below.

Rainfall, inches.

Stations.	1921-22, Jan. 7 to May 4, inclusive.	1919-20, Dec. 16 to May 13, inclusive.	1911-12, Dec. 1 to May 7, inclusive.
Porto Bello.....	13.92	10.18	5.74
Colon.....	5.39	5.26	6.37
Gatun.....	7.41	3.37	10.30
Mount Lirio.....	4.75	2.41	9.29
Gamboa.....	3.56	2.52	3.03
Alhajuela.....	1.22	1.78	1.02
Vigia.....	1.22	1.51	1.60
Culebra.....	2.68	2.79	3.85
Empire.....	1.69	3.02	3.20
Pedro Miguel.....	5.64	6.15	6.29
Balboa Heights.....	3.69	4.46	4.76
Total.....	51.17	43.43	55.45

The Chagres River discharge was 48 per cent above the 21-year four-month dry season average, or 1,893 c. f. s. against a mean of 1,279 c. f. s. The minimum discharge of the Chagres for the four months was 555 c. f. s. on April 25; the maximum discharge for the same period was 29,100 c. f. s. in the freshet of January 2, during which, in order to control Gatun Lake, it was necessary to open seven spillway gates with a maximum momentary discharge of 92,778 c. f. s., the highest momentary spill- ing on record.

Gatun Lake fell to elevation 84.47 feet during the four-month period and continued to recede to elevation 84.27 feet on May 7, from which date the recovery of storage was begun. A loss in storage of 11.65 billion cubic feet occurred during the dry season, compared with 22.8 billion cubic feet for last year and 24 billion cubic feet for 1920. There being no necessity for conservation of water, as was necessary in 1920, little if any effort toward this end was made. Evaporation from the lake's surface was 24.59 inches, approximately the entire storage depletion. The water necessary for useful losses was considerably less during the past dry season than that of 1921.

The following data show the net inflow into Gatun Lake for the dry-season months since the formation of the lake:

Net yield in C. F. S.<sup>1</sup>

	Dry seasons of record.											Average for month.
	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	
Dec. 2.....	2,690	5,335	4,397	7,010	7,673	4,986	3,218	2,158	4,930	3,698	7,649	5,424
Jan.....	400	2,583	1,739	2,570	1,863	1,111	3,023	1,541	709	1,216	8,641	2,314
Feb.....	271	1,298	744	4,207	1,320	139	431	73	-287	651	1,482	966
Mar.....	-392	678	167	823	698	-182	35	-50	-385	-121	190	133
Apr.....	-363	567	308	5,400	1,076	447	1,119	3,230	-706	214	210	1,050
May.....	2,771	4,992	3,219	6,111	4,033	3,635	7,364	4,352	583	2,109	.....	4,080

<sup>1</sup> Net yield is the total yield minus the evaporation on Gatun Lake.  
<sup>2</sup> Decembers are of previous year; i. e., December, 1911, is in 1912 dry season.

Figure 1, page 256, accompanying this report, gives the hydrology of Gatun Lake for the four-month dry season, January 1 to April 30, 1922.

NOTES, ABSTRACTS, AND REVIEWS.

WEEKLY WEATHER AND CROP REPORTS.

Beginning with the first week of July the system of collecting information respecting the effect of weather on crops hitherto in vogue will be broadened to include the several first and second class Weather Bureau stations in each State. These stations will report direct to the section center. The Section Director will continue to summarize all of the data received and telegraph the results to the Central Office in Washington Tuesday mornings throughout the year. The release of the information to the public has been set for 10 a. m. Wednesday mornings.

PHOTOGRAPHIC SPECTRUM OF THE AURORA OF MAY 13-15, 1921, AND LABORATORY STUDIES IN CONNECTION WITH IT.

By LORD RAYLEIGH.

[Abstracted from *Proceedings of the Royal Society*, A101, 114-124, 1922.]

Exceptionally fine photographs of the auroral spectrum obtained by Rayleigh during the brilliant display of May 13-15, 1921, show quite definitely that the chief auroral line is quite out of coincidence with the krypton line, the

whole spectrum being accounted for by the auroral line, of unknown origin, and the negative bands of nitrogen, the latter predominating. An attempt was made to reproduce the nitrogen bands as they appear in the aurora by a discharge tube in the laboratory, but without complete success. So far as it goes, however, the evidence gathered would favor the idea, which has sometimes been advocated, that rays of atomic nature, not electrons, from the sun, give rise to the aurora.

The photographs clearly confirm all previous evidence that the lines of those elements ordinarily supposed to constitute the high atmosphere are not present. If hydrogen is really present, a formidable difficulty is therefore encountered, for according to all laboratory experience even a trace of hydrogen asserts itself in the spectrum of any kind of electric discharge through air under any conditions of pressure. However, on the suggested hypothesis of atomic rays, it is also difficult, in the light of the evidence afforded by specially devised experiments, to explain the absence of helium and nitrogen lines. It would seem best not to lose sight of the possibility that the mode of excitation may be something entirely different from either electronic or atomic bombardment.—E. W. W.