NOTES AND REVIEWS

J. DURWARD, *Upper Winds at Wadi Halfa (Sudan)*. Meteorological Office Professional Notes No. 72. London. 1936. (*Abstract*).

Geographically, Wadi Halfa is located at 21° 55′ N., 31° 19′ E., height 421 feet; meteorologically it is between the high pressure system, which lies to the north over the desert west of Egypt throughout the year, and the Sudan pressure system to the south which undergoes a marked annual fluctuation.

Pilot balloon observations were begun at Wadi Halfa, which is the only such station between Cairo and Khartoum, in July 1934. The publication of a summary of the results after only a year of observation is considered to be justified in view of the fact that the pressure distribution varies so little throughout the year.

The surface wind rarely blows from any quarter other than the north at any time of the year and the upper winds are also characterized by great constancy of direction. The velocity and constancy are at a minimum between 5,000 and 6,000 feet. On about 17 occasions during the 12 months of observation, the wind at 2,000 feet was SE. to S.; the majority of southeasterly winds were due to a LOW, generally associated with a depression farther north over the western desert; in other cases, they were due to a northward extension of the Sudan LOW or to the small shallow depressions that form over the desert in May and October. In the former case the change from SE. to N. or NE. is nearly always accompanied by sandstorms but in the latter cases the wind is light and is not followed by any marked influx of cold air. Compared to the other levels, the winds at 2,000 feet are also the strongest. The highest velocities, considering all levels, occur in April and the lowest velocities in summer and autumn.

The wind from ground level up to a height of about 4,000 feet is nearly always between N. and NE. In the months of December to February the wind usually backs above this height to about WNW. at 10,000 feet and then continues without much change to 13,000. In July to September the backing is much greater, the wind becoming SW. to W. at 10,000 feet. In the transitional period March to June the wind does not as a rule back beyond north and particularly in June there is very little constancy of direction at high levels. The same applies to the winds during the second transitional period, October to November.

The annual variation of average wind speed at the four levels recommended by the International Commission for Air Navigation is:

Feet	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Range
1,500	19	21	19	20	16	17	15	15	23	19	16	17	8
3,000	18	22	22	26	19	19	19	18	27	21	18	19	9
6,000	15	17	17	23	16	16	17	12	12	12	10	15	13
10,000	22	18	22	21	13	14	16	12	16	9	13	14	13

Wadi Halfa is in the Nile Valley and therefore far removed from the northeast trades which would otherwise account for the constancy of the wind. The winds are therefore associated rather with the etesian winds of the Mediterranean and Egypt.

The observations at Wadi Halfa do not agree with the values expected from theoretical computations. In Shaw's Manual of Meteorology III, first edition, pages 259–265, the isobars indicate winds at about 90° variance to the observed wind directions except for the 2 km level in July, which agrees very well with the observed winds; a comment by Shaw on this discrepancy appears in Nature, May 29, 1937, page 926.—*C. M. L.*

L. WEICKMANN and K. KEIL, editors. *Results of the Aerological Ascents on International Days. International Polar Year 1932–33.* International Aerological Commission, Berlin SW. 11. Berlin, 1936.

This publication is now appearing in installments. At the moment the first two quarters of the year 1932 are available; when complete this work will consist of eight quarters.

This publication contains nearly all the upper air observations made in any part of the world on international days during the 2-year period. Never before has such an abundance of observations been brought together for the use of the investigator of the free air. The work consists entirely of numerical tables; the first three pages explain how to use the tables and as these are in German a translation is printed below:

EXPLANATIONS

In the publication of the results of aerological ascents of the time of the polar year, the observations are grouped according to the day on which they begin. In the year 1932, the following days were so-called "international days":

1932										
January	6	7	13	14	20	21	27	28		
February	3	4	10	11	17	18	24	25		
March	2	3	9	10	16	17	23	24	30	31
April	6	7	13	14	20	21	27	28		
May	4	5	11	12	18	19	25	26		
June	1	2	8	9	15	16	22	23	29	30
July	6	7	13	14	20	21	27	28		
August	3	4	10	11	17	18	24	25	31	
September	1	7	8	14	15	21	22	28	29	
October	5	6	12	13	19	20	26	27		
November	2	3	9	10	16	17	23	24	30	
December	1	7	8	14	15	21	22	28	29	

For each one of these days, the aerological observations are summed up in five groups, namely:

A. The measurements of pressure, temperature, and humidity in the free atmosphere.

From them are tabulated:

(1) Geopotential, temperature, and relative humidity at the principal isobaric surfaces ($\Phi\ TU/P$)

(2) Pressure, temperature, and relative humidity at specified geopotentials (PTU/Φ)

(3) Geopotential, pressure, temperature, and relative humidity of the outstanding points ($\Phi\ PTU$)

B. The measurements of upper winds according to direction and velocity for definite geopotentials (dv/Φ)

C. Additional observations to the measurements under A and B; observations of clouds and observations at mountain stations.

In the parts A and B, symbols are used at the headings of the tables and signify:

Φ = Geopotential (in dynamic meters).
T = Temperature (according to tercentesimal scale).
U = Relative humidity (in percent).
P = Pressure (in millibars).
G = Time of observation (according to Greenwich mean time G. M. T.).
d = Wind-direction (in degrees; 90 = east, 180 = south, 270 = west, 360 = north, 0 = calm).
v = Velocity (in meters per second).

A period (.) before the name of a place indicates that for the observation concerned, complementary observations are to be found in part C.

A star (*) signifies that in place of dynamic meters, geometric meters have been employed (height instead of geopotential).

Under the observations of part C are entered:

(*a*) Additional observations to part A. Therein belong:
(1) Data on the wind at the surface.
(2) Data on amount of clouds, cloud type, cloud direction, and cloud height.
(3) Data on technical details of the registering balloons. In that connection the following abbreviations have been employed:

Akg = Weight of the balloon in kilograms.
Afa = Free lift of the balloon in kilograms.
Jty = Type of meteorograph used.

Jkg=Weight of the meteorograph used including accessories (basket, cords, parachute, and the like), in kilograms.
Akm=Distance of the starting place from the landing place in kilometers.
Ad=Direction from the landing place to the starting place (given in degrees as in (*d*)).

(*b*) Additional observations for part B. Therein belong besides the above-named date under (*a*) 1 and 2, primarily data on the wind at natural levels.

(*c*) Cloud observations from such stations which have provided no measurements for group A or B. The data proceed in the same form as was described under (*a*) 1 and 2.

(*d*) Observations at mountain stations. These observations are set off by the symbol M before the name of the station. They give pressure (reduced to standard gravity and 0° C.), temperature, and relative humidity; thereafter data on wind and clouds as explained under (*a*) 1 and 2.

The following abbreviations are used for the kinds of clouds:

Ci=Cirrus.	Ac=Altocumulus.
As=Altostratus.	Sc=Stratocumulus.
St=Stratus.	Cb=Cumulonimbus.
Ns=Nimbostratus.	Ce=Cirrocumulus.
Cs=Cirrostratus.	Cu=Cumulus.

The star (*) before the name of the place is used in the meaning above-mentioned (height instead of geopotential).

There follow now examples of the data in part C.

(*a*) Dallas 1351 158/2; 1 Ci 315/5, 1 Ac 315 (4200); Akg 0.92; Afa 0.6; Jty Fergusson; Jkg 0.2; Akm 106; Ad 65

Means: Observation at Dallas at 13:51: Wind at the surface from direction 158, velocity 2m/sec; 1/10 Cirrus from direction 315, angular velocity 5, 1/10 altocumulus from direction 315, cloud height 4,200 gdm. The weight of the balloon used was 0.92 kg; the free lift 0.6 kg; the instrument of the Fergusson type weighed 0.2 kg; the starting place was 106 km distant from the landing place and lay in direction 65° from it.

(*b*) Blue Hill 1240 201–801: 290/14; 801–1524: 300/16; 1524–2582: 290/12; 3200: 280/22; 1 Ac 280/10 (4000), Sc (1150)

Means: Observation at Blue Hill at 12:40: Wind at level from 201 to 801 gdm from direction 290° at 14 m/sec; in the level from 801 to 1,524 gdm from direction 300° at 16 m/sec; in the level from 1,524 to 2,582 gdm from direction 290° at 12 m/sec; wind in 3,200 gdm from direction 280° at 22 m/sec; 1/10 altocumulus coming from direction 280°, angular velocity 10, height of the altocumulus 4,000 gdm, stratocumulus lie at 1,150 gdm.

(*c*) Aviano 1300 7 Ac —/3, Cu 270 (900)

Means: Observation at Aviano at 13:00: 7/10 altocumulus, direction not known, angular velocity 3, cumulus from direction 270 blowing at 900 gdm height.

(*d*) M Obir 0600 796.7 74.4 73; 2 Cc 270, Sc 270

Means: Observation at the mountain station Obir at 6:00: pressure: 796.7 mb, temperature 74.4°, relative humidity 73 percent; 2/10 cirrocumulus coming from direction 270°, stratocumulus likewise from 270°.

In this publication the following symbols are employed:

P=Pressure in millibars (mb).
T=Temperature in degrees of the tercentesimal scale (temperature in centesimal degrees plus 270°. minus 200°).
U=Relative humidity in percent.
Geopotential in geodynamic meters.
d=Wind direction in 360°.
v=Wind velocity in meters/second (m/sec).
G=Time in mean Greenwich time (M. G. T.).
Cloud-drift direction in 360°, as wind direction, cloud-drift velocity in angular velocity (1,000 v/h).
Weight in kilograms.
Distance in kilometers.

The arrangement of the individual stations proceeds according to regions, as below:

Region A=North and Central America.
Region B=South America.
Region C=Europe, North Africa, Siberia.
Region D=India and East Africa.
Region E=West and South Africa.
Region F=Australia and Oceania.
Region J=Japan and China.

Within each region, the stations lying farthest north always begin at the same north latitude, the station lying farther west comes first.

An index of all contributing stations with coordinates makes up the conclusion of the 1932 annual of this publication.

Special comment on the sounding balloon observations made in the United States during this period is in order. Sounding balloon observations were not made on each one of the international days but only on the days as shown in the table below. It should be emphasized that the figures in the third column represent the number of sounding balloons released and not the number of instruments returned.

Day	Number of balloons released	Day	Number of balloons released	Day	Number of balloons released
1932		*1932*—Contd.		*1933*—Contd.	
Aug. 10	3	Dec. 15	6	Apr. 26	3
Aug. 11	6	Dec. 28	3	Apr. 27	6
Aug. 24	3	Dec. 29	6	May 10	3
Aug. 25	6			May 11	6
Sept. 14	3	*1933*		May 24	3
Sept. 15	6	Jan. 11	3	May 25	6
Sept. 17	1	Jan. 12	6	June 7	3
Sept. 28	3	Jan. 25	3	June 8	6
Sept. 29	6	Jan. 26	6	June 21	3
Oct. 5	1	Feb. 8	3	June 22	6
Oct. 12	3	Feb. 9	6	July 12	3
Oct. 13	6	Feb. 22	3	July 13	6
Oct. 26	3	Feb. 23	6	July 26	3
Oct. 27	6	Mar. 8	3	July 27	6
Nov. 9	3	Mar. 9	6	Aug. 9	3
Nov. 10	6	Mar. 22	2	Aug. 10	6
Nov. 23	3	Mar. 23	5	Aug. 23	3
Nov. 24	6	Apr. 12	3	Aug. 24	6
Dec. 14	3	Apr. 13	6		

In all previous sounding balloon campaigns made in the United States by the Weather Bureau the detailed results of the observations have been published in a Weather Bureau publication. The sounding balloon observations of these 2 years in the United States make an exception as the detailed results are available only in the publication here being reviewed.—*Richmond T. Zoch.*

BIBLIOGRAPHY

[RICHMOND T. ZOCH, *in Charge of Library*]

By AMY D. PUTNAM

RECENT ADDITIONS

The following have been selected from among the titles of books recently received as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies:

Abbot, Charles Greeley.

On the corrections to be applied to silver-disk pyrheliometry. Washington. 1937. (*In* Smithsonian inst. Smithsonian miscellaneous collections, v. 95, no. 23). Publication 3409. 7 p. 24½ cm.

American national committee. World power conference.

Third World power conference, Washington, D. C., September 7–12, 1936. Washington. 1936. 62 p., tabs. 30 cm.

Bennewitz, Kurt.

Aeronautical instruments. Washington. 1923. 13 p. figs., diagrs. 26½ cm. (Extract from Technische Berichte, Vol. III, No. 5.). [Mimeographed.]

Blair, Thomas A.

Weather elements. A text in elementary meteorology. New York. 1937. 401 p. illus., maps, tabs., diagrs. 23½ cm.

Carroll, Thomas, & McAvoy, Wm. H.

The formation of ice upon exposed parts of an airplane in flight. Washington. 1928. 10 p. pl., diagrs. 26½ cm. (National advisory committee for aeronautics. Technical notes, no. 293 July 1928.) [Mimeographed.]