"METEOROLOGICAL MAGAZINE"

October 1942

The World's Leading Storm Laboratory.

by Michael Lorant.

World's highest fixed laboratory, especially constructed and suited to the study of great storms and cosmic rays is anchored on the very top of Mt. Evans, Colorando, U.S.A Scientific researchers working in this unique research station are thoroughly equipped with highly specialized instruments and patience in abundance which is so much needed to their work.

Scientific research work on the summit of Mt. Evans started as early as 1931 when A.H. Compton did his first field work in cosmic rays at Summit Lake, which is 1,000 feet below the peak of Mt. Evans. The early researchers and their associates used tents for laboratories and living quarters. The wind velocity on the peak of Mt. Evans is excessively high and there are frequent afternoon sleet and heavy snow storms. The wind velocity at night was often sufficient to level tents and scatter equipment of the early researchers. Also, the fire hazard prevented safe heating of tents, and the indoor temperatures often fell to 30 degrees F. or lower, consequently, both apparatus and workers were without protection from the frequent great electric storms.

Yet the scientists have carried on their investigations in meteorology, astro-physics as well as in cosmic rays. Among others, much highly valuable data have been secured by the United States Weather Bureau. Later it became evident that if any prolonged or accurate observations were to be made, a certain sort of adequate shelter must be provided for the researchers and scientific apparatus. Finally, the Massachusetts Institute of Technology collaborated with the University of Denver, erected the present unique building, which is aptly called world's finest storm laboratory.

This second to none laboratory is not only the highest fixed scientific research station in the world but it is the highest easily accessible mountain peak in the United States.

...

There are to-day, for instance, living accommodations on the highway, leading to the laboratory, at altitudes of 10,600, 8,000 and 6,000 feet respectively.

Mt.Evans is 65 miles from the city of Denver, at the terminus of the highest automobile road in the United States. The altitude of the peak is 14,260 feet and the intensity of the cosmic rays at this altitude is five times that at sea level, offering a unique opportunity for an otherwise unattainable increase in the rate of collection of data in the studies of meteorology. Here, on the peak of Mt.Evans there is seldom a day which does not present a sample of all the seasons known.

The laboratory consists of two rooms, one room being used as the actual place for research work and the other one for living quarters. To withstand the high wind velocity, a roof truss construction is employed, which made the omission of side walls possible. Cables fastened to the floor joists run through the pillars of the foundation to heavy metal plates cemented into the rock. The building is thermally insulated and is provided with a perfect "no draft" ventilation.

For protection against lightning, the end walls and roof are covered with thin copper shingles, and the lower side of the floor is covered with metal hardware cloth. The copper and hardware cloth are joined and earthed, thus converting the whole building into a Faraday cage. The copper of the roof is not thick enough to materially interfere with cosmic ray measurements.

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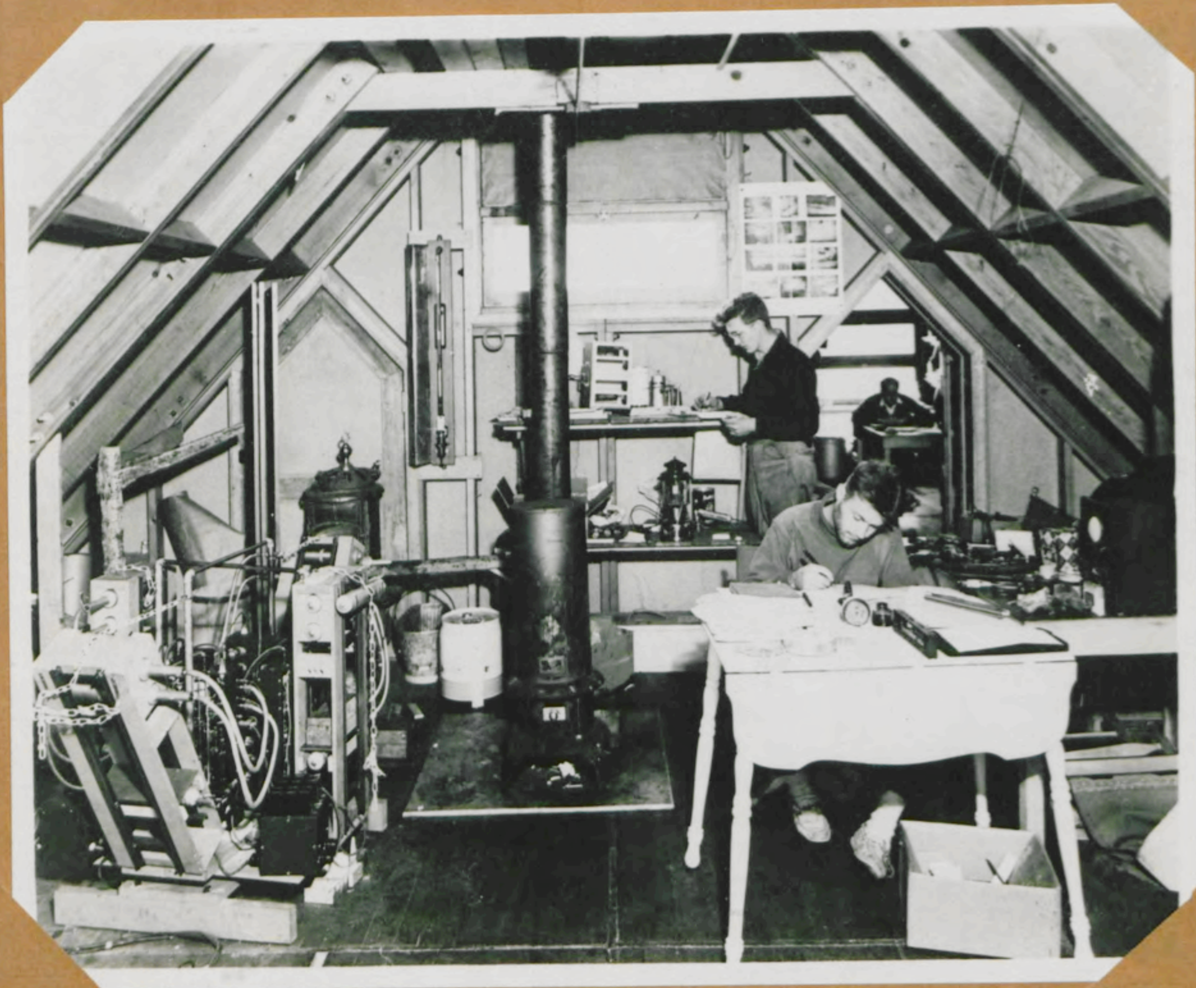
PHOTO BY O. ROACH

WORLD'S FINEST STORM LABORATORY LOCATED ON THE PEAK OF MT. EVANS, COLORADO, U.S.A. ON THE LEFT, LIVING QUARTERS, ON THE RIGHT, ACTUAL RESEARCH LABORATORY



PEACEFUL WORK INSIDE THE STORM LABORATORY

Serial monthly values of windiness over British Isles.

The need has been felt for some indication of the relative windiness of each month over the country generally and the serial values below have therefore been prepared. Each value is the mean of the number of hours with gusts exceeding 38 mi/hr. at the various stations included in Table XIIA of the Annual Summary to the Monthly Weather Report. The values give, for example, some indication of the relative windiness, or gustiness, of the various months during the war period, compared with earlier months. The table was used in the case of the recent gales of July to find earlier occasions of gales in July. The largest value in the table for July is in 1936, the Monthly Weather Report for July 1936 was then looked up and this gave the reference to the article in the Meteorological Magazine 1936 p.155 on The Gale of July 18th, 1936.

Mean number of hours with gusts exceeding 38 m.p.h.*

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	YEAR†
1934	138	78	62	71	54	15	19	38	56	129	38	84	781
5	99	170	59	90	34	31	25	10	67	141	78	74	843
6	86	74	26	34	16	10	28	13	31	100	84	156	659
7	191	119	64	20	12	15	11	7	28	28	35	58	594
8	147	120	79	32	26	60	18	16	13	102	100	86	798
9	106	79	78	42	9	19	15	2	10	61	100	45	567
1940	50	37	60	44	1	10	13	45	51	61	103	90	491
1	53	65	48	29	15	8	5	34	7	72	87	90	451

* See Table XIIA, Annual Summary Monthly Weather Report.

† the values are means of annual values and not the sums of monthly values.

J. Glasspoole.

Monthly frequencies of the number of days with maximum and minimum temperatures between certain limits.

Table IX of the Annual Summary to the Monthly Weather Report gives statistics of the annual frequency of days with maximum and minimum temperatures between certain limits. The mean values over at least 20 years of observations have been extracted for 18 stations.

Monthly frequencies have been published in the monthly supplement to the Daily Weather Report since 1917 and statistics are available on the "B forms" filed in M.O.3. From the latter information mean values have been extracted for 23 stations mainly for the period 1914-1940.

It seems desirable to place on record the fact that these mean frequencies are available in M.O.3 for answering enquiries. The discussion of these summaries can be undertaken later.

"Very Nearly"

Some time ago, while engaged in some calculations connected with the weight of water in the atmosphere, I hit, with a sense of discovery, on the pleasing fact that 1 gram per cubic metre is equal to 1 ounce per 1,000 cubic feet, to a very close approximation.

A fact of this sort has the merit of being very easily tucked away in one's mind, to be pulled out when occasion demands. It takes its place with the facts that a metre is equal to 3 feet, 3 inches and 3 eighths, which I first heard from the lips of the late Prof. John Perry, and that a cube of air 10 yards each way weighs a ton (Sir Napier Shaw).

The first of these is very nearly exact; the second is on rather a different plane, and makes no claim to exactitude, but it gives a good mental picture of the density of air under normal conditions and it is the sort of picture that one does not forget easily.

/I ...

"Very Nearly" (Contd.)

I expect many people build up little collections of these "mnemonic" facts. I give below a few more which happen to have come my way. It is in no sense an exhaustive list, and I have no doubt that many readers will already be familiar with some or all of them. I hope some at least will be stimulated to add to the list from their own private collections.

Area. Area of a square of side one furlong (220 yards) = 10 acres. (exactly).

Density of Liquids. Weight of one gallon of liquid in pounds = specific gravity multiplied by 10. (This follows from the better known rhyming mnemonic "A pint of pure water weighs a pound and a quarter".)

Rainfall. 1 inch of rain = 100 tons per acre.

Humidity. Moisture content in grams per cubic metre = three fourths of vapour pressure in millibars. (This is exact at 61°F.: the factor actually decreases with rise of temperature, and the approximate relationship gives a value about 5 per cent too small at 32°F, and about 5 per cent too great at 90°F.

Geo-strophic Wind. Wind velocity (m.p.h) = 15 x pressure gradient in millibars per 100 km. (very nearly).

E.G.B.

The Hydrology of the Great Lakes.

The collection of run-off records is more highly organised in the U.S.A. than in this country. It is interesting to see therefore that a Symposium of the American Society of Civil Engineers was published in 1939, dealing with the hydrology of Lake Superior. The area makes interesting study because the water surface covers nearly 40 per cent of the whole catchment area. One of the published papers is part of an unpublished "Hydrology of the Great Lakes". The full data should be very useful because the area is well provided with rainfall records, lake levels and run-off records, although the interpretation of the results will be complicated by the snow and ice of the severe winters. The catchment area of the Great Lakes is small compared with the water surfaces, although sufficient surplus water is accumulated each year to maintain the Niagara Falls. The object of this note is to draw attention to the publication of which a review is given in the Geographical Journal for August 1942. It is clear from the review that there is much to learn before consistent and precise values can be given for the evaporation or for the underground flow from springs into the lakes.

The results of the measurements of evaporation present some unusual features in that the greatest monthly evaporation occurs later in the year than we expect in this country. This may be due to the considerable seasonal lag in the time of the maximum temperature attained by the mass of water in the lake. It is noted, however, that the evaporation tanks, which are 6 ft. or 8 ft. in diameter by 4 to 5 ft. in depth are "located on some projecting pier or on the shore." There is nothing to indicate that these tanks (in which rain of course falls) catch a similar sample of the precipitation as the rain-gauge, a necessary criterion before reasonable values for the evaporation can be obtained.

J.G.

Post-War Development.

The Institution of Civil Engineers has published a report (1942) on Post War National Development of which Report No. IV deals with Inland Water Survey. This report recommends:-

"that legislation be introduced setting up a Central Inland Water Survey Authority, working possibly under the direction of the D.S.I.R., for the collection and publication of data regarding surface water ...."

"that the collection of data recording rainfall and underground water be continued by the British Rainfall Organization (Air Ministry) and the Geological Survey respectively, as at present ...."

"that, pending the setting up of a new Central authority, the Ministry of Health and the Scottish Office be urged to ensure, as far as possible, the recommencement of the work as soon as circumstances permit, and to deal with the accumulation of data during the war period ....."

Start here *

It is satisfactory to note that the report includes the following statement:- "In regard to rainfall, the Committee is of opinion that the British Rainfall Organization, now under the Air Ministry, is well qualified to carry on its records, which have now been taken for many years and have become useful and valuable ......"

Unusual rainfalls on August 29th-30th, 1942.

The heavy rainfall reported from Burnham-on-Sea and Pontypridd are worthy of note.

At Burnham-on-Sea 4.05 in. fell between 4 p.m. on August 29th and 5 p.m. on August 30th; 2.27 in. of this amount fell between 4 p.m. and 4.50 p.m. on August 29th. In the Pontypridd area the rainfall appeared to be concentrated on the east side, the greatest fall being at Llanfabon where 3.17 in. in 3½ hours was reported on August 30th.

(At Stonehouse, ~~Gloster,~~ Gloucestershire, the amounts for the 29th, 30th and 31st were 1.67, 1.11 and .52 in.)

Obituary

Dr. Albert Peppler. We regret to learn of the death of Dr. Albert Peppler, joint editor with Dr. W. Peppler of the Zeitschrift fur angewandte Meteorologie (better known as Das Wetter).

Dr. A. Peppler was born on April 30th, 1882 at Grünberg, Hessen and educated at Darmstadt, Munich and Giessen. ~~In 1901 he was in charge of Zugspitz Observatory and from 1904 to 1915 of the Giessen.~~ In 1901 he was in charge of the Zugspitz Observatory and from 1904 to 1915 of the Giessen Meteorological Observatory. In 1910 he obtained his Doctorate with a thesis on the "North Atlantic Trade wind region, on the basis of aerological observations". Since 1919 he has been Professor of Meteorology in the University of Giessen and Director of the Baden Landeswetterwarte; he was also appointed Honorary Professor of Meteorology in the Technische Hochschule Karlsruhe.

His long list of published papers deals with a considerable variety of subjects, many of which were connected with studies of upper winds, and others with problems of radiation. He compiled a valuable series of data on fluctuations in the energy of the North Atlantic circulation, 1881-1923, which he studied in relation to sunspot numbers, and for a number of years he edited the Baden section of the German Meteorological Yearbook.

C.E.P.B.