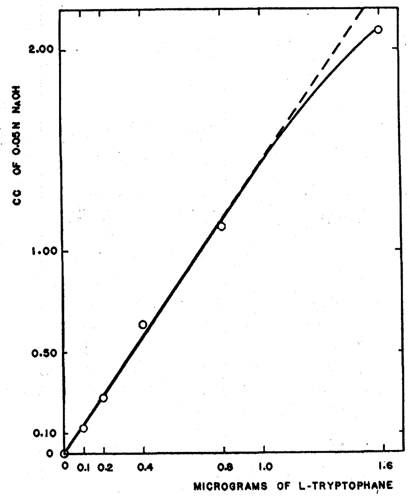

FIG. 1. Proportionality between the amount of L-tryptophane added to the basic medium and the amount of 0.05 *N* NaOH used to bring the pH back to 6.0 after incubation with *Lactobacillus* (each point represents the mean of two titrations). The straight dotted line shows that the curve actually bends above the level of 1.0 μg of tryptophane.

cedure was somewhat refined over those previously described (*7, 8*). The basal medium[1] used has a pH of 6.0 instead of 6.8. Into each test tube was pipetted 0.5, 1.0, or 1.5 ml of the plant extract, and the volume was completed to 3 ml with the correct concentration of basal medium. After autoclaving for 10 min, the tubes were inoculated and incubated 36 hr at 37° C. At the end of this period, the acidity was titrated with 0.05 NaOH to 6.0, using a Koch microburette, reading to 1/100 cc. At least 4 titrations (using 2 different concentrations of NaOH) were made on each unknown sample. Quantities as low as 0.1 μg of L-tryptophane can be quantitatively measured by this method, the proportionality between the amount of tryptophane and the volume of NaOH used remaining linear between 0 and about 1.0 μg L-tryptophane (Fig. 1) in 3 ml of solution (*9*).

The results obtained by this method with 14-day-old seedlings of *L. albus* are summarized in Table 1.

TABLE 1

"FREE" L-TRYPTOPHANE CONTAINED IN VARIOUS PARTS OF THE SHOOT OF 14-DAY-OLD *L. albus* SEEDLINGS

Plant part	Dry wt/ plant (in mg)	L-tryptophane μg/100 mg dry wt	μg/plant
Apical meristem*	0.007	140.0	0.0098
Leaf primordia*	0.023	60.6	0.0139
Unfolded, hairy leaves	13.0	38.6	5.018
Large, expanded leaves	146.0	16.9	24.67
Stem (epicotyl)	7.64	69.6	5.317
Cotyledons	154.8	276.6	428.18

* Indole and anthranilic acid not removed.

[1] Sold by H. M. Chemical Co., 1651 Eighteenth St., Santa Monica, Calif.

The concentration of a given compound in the tissues is often more important, physiologically speaking, than its total amount for the whole organ. The data of the third column which compare concentrations of tryptophane may, therefore, be more significant than those of the fourth column. The third column shows that the apical meristem—which is known to produce large amounts of auxin—is also well supplied with tryptophane. On the other hand, cotyledons seem to constitute an enormous reservoir of tryptophane, a fact of importance in the study of the tryptophane-auxin metabolism.

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Minimum Night Temperatures at or Near Full Moon

Herbert Henstock
Glengariff, Caerwys, North Wales, Great Britain

Daily records of minimum temperatures have been kept during many years by observatories and meteorological stations, but such records have appeared in the form of long columns of numbers, among which an abnormality might remain unnoticed, unless special search were made for it. In a previous publication (*1*) from similar lists of minimum night temperatures taken in North Wales, monthly graphs were drawn, with temperatures as ordinates and days of the month as abscissae, for each of the years 1947, 1948, and 1949. When temperature curves were drawn, there appeared a regular fall in the minimum night temperature at or near the date of full moon at each lunation during the three years. This regularity was not noticed in the lists of numbers, but only in the monthly temperature curves. In order to conserve space, these were condensed to yearly graphs, which do not lend themselves to demonstration in so efficient a manner.

The temperature fall was sometimes gradual, its incidence being as much as a week before and its lowest point occurring on the date of full moon, or generally within 48 hr of it. Mostly, however, the curve of the fall was more sudden, being limited to 2 or 3 days. The lowest point of fall did not always coincide with full moon date, but happened within 2 or 3 days before, or occasionally after, it; so that, on that date, there was sometimes an incipient rise in the curve, or

TABLE 1

Minimum Temperature Records at Various Stations

Station	Country	Year of record	Year's temperature fall (°F)	Altitude (ft)	Latitude	Longitude	Monthly rainfall (in.)
Mount Palomar Observatory, Calif.	USA	1949	15.7	5598	33° 21′ N	116° 51′ W	—
Central Sierra Snow Laboratory, Calif.	"	1949	12.8	6902	39° 20′ N	120° 22′ W	—
Joseph, Ore. (district)	"	1950	—	4500	—	—	—
Aklavik, North West Territory	Canada	1947	15.7	Sea level	68° 14′ N	—	0.9
Victoria, Vancouver Island, B. C.	"	1947	5.0	" "	48° 25′ N	—	2.2
Old Glory Mountain, B. C.	"	1947	11.8	7700	49° 9′ N	117° 55′ W	1.45
Banff, Alta.	"	1947	19.7	4521	51° 12′ N	116° 4′ W	1.3
Port Elizabeth	South Africa	1950	12.0	Sea level	33° 59′ S		1.9
Pretoria, Transvaal	" "	1950	10.7	4491	25° 45′ S		2.2
Melbourne, Victoria	Australia	1950	9.0	Sea level	37° 50′ S		1–2
Perth, Western Australia	"	1950	8.8	" "	32° 0′ S		1–2
Brisbane, Queensland	"	1950	5.3	" "	27° 24′ S		4
Dehra Dun	India	1949	8.0	2000	30° 24′ N		—

sometimes the fall was continued beyond full moon. Subsequent records in North Wales for the years 1950–51 agree with the previous ones, making a five-year period for this locality.

Inasmuch as this phenomenon might have been a purely local one, minimum temperature records were obtained from stations situated in both the Northern and Southern Hemispheres all around the globe. Through the good offices of John Leighly, of the University of California, and the kindness of the respective directors, yearly records were supplied by Mount Palomar Observatory (*2*) and the Central Sierra Snow Laboratory (*3*). Also, through the Scientific Liaison Office, London, other records were obtained from Canada (*4*), South Africa (*5*), India (*6*), and Australia (*7*). The names and particulars of stations that supplied minimum temperature records are given in Table 1.

Most stations sent statistics for several years, which permitted some choice (in order not to have the evidence confined to a single year for all stations). The choice was made at random, but all the records of each station yielded confirmatory evidence of the minimum temperature fall. This evidence may be readily tested by an inspection of Tables 2, 3, and 4, in which the daily lists have been condensed to monthly ones, only the dates of full moon, the temperature fall in °F around full moon, and the dates between which the fall occurred being given.

In general, this fall is greater in winter than in summer, and the difference is well exhibited in the curve in Fig. 1, and perhaps even better in Fig. 2, each of which was drawn from the records supplied by Mount Palomar Observatory and by the station at Banff, respectively. The rise of the whole curve in spring and its fall in autumn are well marked in both

TABLE 2

Minimum Temperature Fall Near Full Moon (1949)

Date of full moon	Mount Palomar Observatory: Temperature fall (°F) near full moon	Mount Palomar Observatory: Between dates	Central Sierra Snow Laboratory: Temperature fall (°F) near full moon	Central Sierra Snow Laboratory: Between dates	Dehra Dun: Temperature fall (°F) near full moon	Dehra Dun: Between dates
Jan. 15	13	14–16	25	8–10	5	10–13
Feb. 13	19	11–13	40	10–12	11	12–15
Mar. 15	9	11–12	7	12–13	11	10–15
Apr. 13	12	12–16	4	9–10	15	10–12
May 12	17	12–14	4	12–13	10	10–12
June 11	1	10–11	4	10–11	8	7–12
July 10	3	11–12	11	3– 5	5	8–12
Aug. 9	23	3–10	9	5– 9	5	6– 9
Sept. 7	6	2– 6	14	1– 7	2	7– 8
Oct. 7	31	5– 9	22	5– 7	2	5– 7
Nov. 6	21	3– 9	6	1– 5	5	3– 6
Dec. 5	34	1–12	7	5– 6	19	Nov. 30–Dec. 5
Av	15.7		12.8		8.0	

TABLE 3

Minimum Temperature Fall Near Full Moon (1947)

Date of full moon	Aklavik: Temperature fall (°F) near full moon	Aklavik: Between dates	Victoria: Temperature fall (°F) near full moon	Victoria: Between dates	Old Glory Mountain: Temperature fall (°F) near full moon	Old Glory Mountain: Between dates	Banff: Temperature fall (°F) near full moon	Banff: Between dates
Jan. 8	10	6– 9	2	5– 6	15	4– 7	15	4– 5
Feb. 6	35	Jan. 30–Feb. 5	5	2– 3	5	5– 8	50	5– 8
Mar. 7	34	Feb. 28–Mar. 4	6	3– 5	19	3– 5	39	1– 4
Apr. 5	40	Mar. 31–Apr. 3	5	1– 2	21	Mar. 28–Apr. 5	18	3– 5
May 5	9	6–10	6	2– 3	7	2– 3	17	4– 6
June 3	1	2– 3	3	1– 3	7	May 30–June 2	8	1– 3
July 3	10	3– 6	1	2– 3	1	5– 6	5	2– 5
Aug. (1) 2	11	July 30–Aug. 2	5	July 31–Aug. 2	5	July 31–Aug. 2	15	3– 6
“ (2) 31	7	29–31	3	30–31	15	29–30	7	Aug. 30–Sept. 1
Sept. 30	8	29–30	8	22–30	12	Sept. 30–Oct. 2	14	28–30
Oct. 29	7	27–29	2	28–29	4	28–29	14	28–30
Nov. 29	21	23–27	10	26–29	18	Nov. 28–Dec. 2	19	26–29
Dec. 28	11	24–28	9	27–29	24	26–30	35	27–30
Av	15.7		5.0		11.8		19.7	

figures, but this does not interfere with the periodical falls at full moon, except in their lesser depth in summer. A less accentuated curve, from the Port Elizabeth records (Fig. 3), shows the yearly rise inverted, as well as giving a more regular minimum temperature fall as between summer and winter. Each of the monthly curves is made up of the initial minimum temperature fall at full moon, with a following rise and subsequent fall, sometimes greater or less than the previous one, which was noticed to occur almost invariably; intermediate temperature fluctuations have been neglected but are indicated by dotted lines. When the average, yearly, normal temperature fall for each station is compared with the fall at or near full moon (Table 5), it is evident that the latter is always the greater of the two, and in most cases considerably so; this excess of temperature fall over that of the normal would be still greater if the fall at new moon were not included in the normal. At first glance, the fall at new moon seems to be almost as regular, though not as great, as the one at full moon; but this has not been closely investigated.

TABLE 4

Minimum Temperature Fall Near Full Moon (1950)

Date of full moon	Perth: Temperature fall (°F) near full moon	Perth: Between dates	Brisbane: Temperature fall (°F) near full moon	Brisbane: Between dates	Melbourne: Temperature fall (°F) near full moon	Melbourne: Between dates	Port Elizabeth: Temperature fall (°F) near full moon	Port Elizabeth: Between dates	Pretoria: Temperature fall (°F) near full moon	Pretoria: Between dates
Jan. 4	19	3– 6	2	3– 6	4	2– 3	18	5– 7	6	4– 5
Feb. 2	3	Jan. 31–Feb. 1	7	Jan. 26–Feb. 1	6	1– 3	3	1– 3	4	Jan. 31–Feb. 2
Mar. 4	16	Feb. 28–Mar. 4	4	1– 4	4	2– 3	16	1– 3	4	1– 4
Apr. 2	8	1– 3	3	Mar. 29–Apr. 1	7	Mar. 29–30	5	2– 3	13	3– 6
May (1) 2	5	Apr. 29–May 1	3	Apr. 30–May 1	13	Apr. 30–May 2	15	Apr. 27–May 1	11	3– 5
“ (2) 31	2	27–31	5	27–30	11	25–28	10	28–30	21	May 31–June 2
June 29	21	June 27–Jul. 1	12	June 29–Jul. 1	11	27–30	12	29–30	1	28–29
July 29	8	28–31	2	28–30	11	28–30	19	25–29	7	28–29
Aug. 27	6	28–31	6	25–28	17	26–29	5	27–28	14	28–31
Sept. 26	11	22–25	2	22–23	4	25–27	8	26–28	27	Sept. 30–Oct. 2
Oct. 25	1	21–26	9	26–27	9	24–26	18	22–26	18	21–26
Nov. 26	6	21–29	6	25–28	17	24–27	12	23–26	10	24–27
Dec. 24	11	23–25	9	23–26	4	24–25	8	24–27	4	21–24
Av	8.8		5.3		9.0		12.0		10.7	

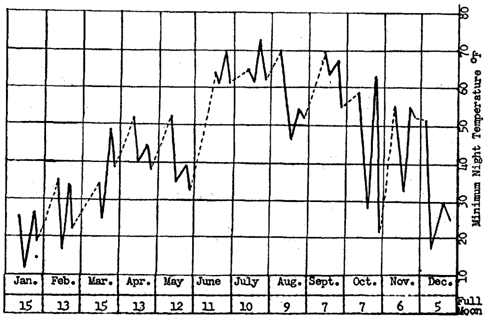

FIG. 1. Mount Palomar Observatory, Calif., 1949. Fall of minimum night temperature at full moon.

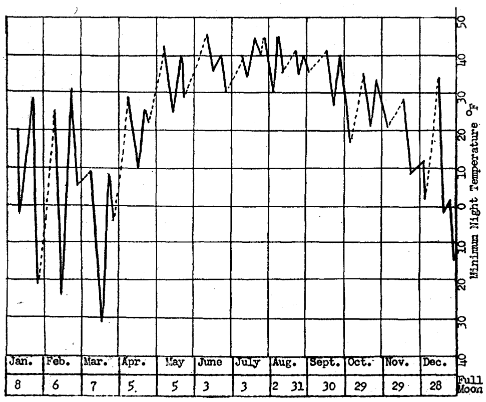

FIG. 2. Banff, Alta., Canada, 1947. Fall of minimum night temperature at full moon.

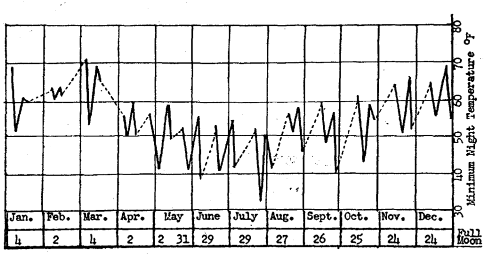

FIG. 3. Port Elizabeth, South Africa, 1950. Fall of minimum night temperature at full moon.

Of these meteorological stations, six are situated at sea level, the remainder being at varying altitudes. They are nearly equally divided between the Northern and Southern Hemispheres, yet each record agrees with all others in demonstrating the fall of minimum night temperature at or near the date of full moon. The occurrence of this regularity is independent of latitude, longitude, altitude, hemisphere, cloud, rain, climate, or humidity; nevertheless, other small regularities have been noticed, which depend to some extent on one or the other of these factors. Neglecting all but humidity, when the stations at sea level (Table 1) are arranged in the order of their respective monthly rainfall, then the order of this rainfall is in the inverse order of the average yearly temperature fall at full moon; that is to say, the minimum temperature fall is greatest where the humidity is least. This might be expected, since the temperature of dry air would fall more rapidly than that of moist air, because of the high specific heat of aqueous vapor. Further, from an inspection of the latitudes and temperature falls of Aklavik and Victoria in the Northern Hemisphere, and of Melbourne, Perth, and Brisbane in the Southern, it might be concluded that "the higher the latitude the deeper the fall of minimum temperature at full moon." Port Elizabeth does not fit well into this scheme. Its higher value of temperature fall may be due to local conditions, for it is on the open coast with little protection from south polar winds, whereas Melbourne is situated on a long inlet of the sea, and the whole coast is protected by Tasmania and smaller islands. Admittedly, these two minor regularities are based on somewhat meager data and may be disproved or substantiated by further research. High altitude stations seem to yield no regularities dependent on either climate or latitude, but solely on altitude. Taking the four stations included between 115° and 120° W Long.—(*a*) Old Glory Mountain, (*b*) Central Sierra Snow Laboratory, (*c*) Mount Palomar Observatory, and (*d*) Banff—it is seen that as the altitude increases the value of the minimum temperature fall decreases, so that $ht = \text{constant}$, where $h =$ altitude above sea level in kilometers, and $t =$ average fall of minimum night temperature (°F) at full moon during one year. This gives a constant in the region of 26.9, but only for these stations. Further work is in progress.

TABLE 5

MINIMUM TEMPERATURE FALL NEAR FULL MOON COMPARED WITH AVERAGE YEARLY FALL AT EACH STATION

Station	Year of record	Temperature fall near full moon (°F)	Av normal temperature fall (°F)
Banff	1947	19.7	14.6
Old Glory Mountain	ʻʻ	11.8	10.3
Aklavik	ʻʻ	15.7	9.5
Mount Palomar	1949	15.7	8.9
Central Sierra Snow Laboratory	ʻʻ	12.8	8.1
Port Elizabeth	1950	12.0	7.8
Melbourne	ʻʻ	9.0	7.1
Pretoria	ʻʻ	10.7	6.2
Perth	ʻʻ	8.8	6.0
Dehra Dun	1949	8.0	4.9
Victoria	1947	5.0	4.7
Brisbane	1950	5.3	4.0

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