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About the Institute
The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

Puukapu Homestead
Waimea, Hawaii
1/16/67

WSH 3000 ± 14

1/16/67

Lichen-Covered Wires in Hawaii

by

Otto & Isa Degener and William MacKenzie

Lichens are not individual plants ~~at all~~ but consist of a fungus and an alga, ~~mostly a green and less commonly a blue-green,~~ growing intimately associated with one another. A lichen hence is what we would call a consortium ~~or~~, (in Hawaii, a hui), the two distinct kinds of organisms living symbiotically ~~with one another~~. ~~This mode of existence has such unusual advantages that~~ neither fungus nor alga alone could survive under many of the circumstances that are suitable for them when combined as lichens.

Various kinds of lichens can survive and grow on practically ~~a fact known to~~ the earliest lichenologists. They grow on bare rock, bark, leaves, ~~on~~ sterile ground; even on substrata not ordinarily ~~suspected for~~ any plant, such as iron, glass, bone, leather, newspaper, animal excrement, living molluscs, and the rough backs of certain large New Guinea beetles. Richard as early as 1833 in his "Etude sur les Substratums [sic] des Lichens" gave an imposing list of such unusual places on which lichens could grow. Nowhere in lichen literature, however, have we come across a report that a lichen will live - ~~similar to~~ some tropical American Bromeliaceae - on electric wires.

In May, 1966, ~~the~~ Degeners rented a cottage at "29 Miles," Volcano, Puna, Island of Hawaii, ~~at~~ about 3,900 feet elevation. The cottage ~~was surrounded on three sides by~~ metrosideros trees and Sibotium treeferns. The fourth side was clear of vegetation and, ~~there~~, phone and other utility wires ran between house and pole ~~on~~ the side of the road. ~~They~~ were attracted by a pale lichen growing scattered on the electric wire, ~~while~~ the telephone wire was bare. ~~As~~ the dependent lichen was an ~~//////~~ interesting sight, stiff in the morning sun and flexible with the coming of clouds in the afternoon, ~~they~~ with some difficulty scraped against the wire with a brooom held at arms' length. ~~Just~~ a few of the stubbornly attached lichens finally dropped to the ground. These (under No. 30,682) were air-mailed to

Leutkirch-Eisenbach, Bavaria, ~~so~~ the lichenologist Oscar Klement. Dr. Klement identified the material as the endemic Usnea hawaiiensis Mot.

Because ~~of the~~ difficulty ~~of~~ collecting ~~adequate material~~ of this beard lichen for study, ~~help was~~ we solicited help from Mr. William MacKenzie, Manager of the Hilo Electric Light Company. He procured a five-foot length of wire covered with 343 easily recognizable lichens (No.). ~~for study. This wire is~~ (electrical engineers know as Triple-Braid Weather-Proof Copper Wire. It is solid copper No. 6 AWG, ~~covered with an insulating material of~~ woven or knitted braids saturated with high-melting-point asphalt and finished with a mineral-filled coating material such as pitch or asphalt. The braids are then coated with mica flake.) Dr. Klement noted not only the yellow-green U. hawaiiensis growing ~~there~~ but also the gray-green U. poliotrix (((Authority????). ~~This~~ latter Central and South American lichen has never before been recorded from the Hawaiian Islands. Besides these two lichens, the wire harbored some blue-green algae that appear to be Scytonema or dome related genus.

Dr. Klement's drawing shows that the lichen haustorium (the feeding organ of a parasite) with strengthened, interspersed hyphae strands (subepidermal filaments) only penetrates ~~but~~ a quarter of a millimeter into the insulation, though in pulling it free ~~such~~ the penetration seems much deeper. ~~This illusion is caused by the hyphae being~~ because the strands are so intimately intertwined with the fabric that the latter tears out with ~~it~~ them. No wonder ~~the~~ we Degeners had so much difficulty freeing the lichen from the wire with sweeps of a broom!

Usnea ~~was not observed~~ we did not observe on bare copper electric wires, ~~even though these had been strung~~ which ran parallel to the telephone wires. The reason ~~at present~~ for its absence is not clear. ~~As~~ many lichens, particularly crustose kinds, can grow on copper, ~~we~~ so suspect our usnea is not poisoned by this element nor by its oxides. Perhaps the bare copper wire is too smooth for lichen propagules (soredia) to attach themselves to it, particularly as moisture tends to drop or dry off and not linger as on the mica-covered fabric of the telephone wire.

~~Observations of alien wiring~~ while driving along the "Belt Road" of the Island of Hawaii, ~~shows~~ usnea growing on similar, older but covered wires at about 1,000 feet elevation ~~mauka~~ makai (oceanward) of Kurtistown to about 4,000 feet in Hawaii Volcanoes National Park. ~~Then~~ as the elevation, and consequently the moisture content of the air, decline in the District of Kau just beyond Park Headquarters, and in the District of Kona, usneas no longer grow on the wires. In ~~approaching~~ the approach to Waimea (Kamuela), where rain and fog drive through the gap made by the Kohala mountain mass on one side and Mauna ~~Loa~~ Kea on the other, the lichen appear in particular profusion.

Old, lichen-covered wire apparently loses none of its efficiency in ~~the~~ transmi~~ssion of~~ ting electricity. The lichen, however, is a nuisance in ~~it~~ humid weather ~~as~~ because its drenched body increases the wire's weight ~~to induce its sagging~~ and causes it to sag between poles; in windy weather, ~~it~~ the lichen catches the breeze, ~~inducing the~~ and the wire ~~to~~ swings back and forth, perhaps into tree branches. Hence this picturesque sight of pale lichens hanging from black wires is becoming increasingly rare. ~~It~~ This wire is being gradually replaced by neoprene- or polyethylene, ~~plastic~~ coated, copper or aluminum wire, ~~this~~ which apparently does not furnish the proper moist hold for lichen propagules.

Lichen-Covered Wires in Hawaii

by

Otto & Isa Degener and William MacKenzie

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1161 6M

Legends for Dogs. on Wires

Usnea hawaiiensis Hot. X 7½ (Photo H. Ulrich)

Usnea species on wires at Mountain View, Island of Hawaii, Jan. 20, 1967. (Photo R. Walkida)

Usnea species on wires at Pundapu, Waimea, Island of Hawaii, Jan. 16, 1967. Photo R. Walkida)

Usnea hawaiiensis Hot.; longitudinal section showing penetration of haustorium into fabric of wire. X 100 (Drawn by O. Khemont) — to follow later

Although the growth of Usnea on wiring apparently has never been reported before, such an occurrence is not surprising. This huge genus of lichens of practically cosmopolitan distribution is known to occur in foggy regions, without particular preference to the kind of material upon which it grows. the species take nothing from the substratum, whether it is a plant or more rarely a rock, depending upon the wind and light to bring salts and nourishment. Of prime importance for such lichens is moisture in the form of vapor. This is precisely what wires as a substratum in Hawaii's fogbelt furnish. Though Usnea hawaiiensis and U. polietrea are not known to fruit, they produce soralia. These consist of fragments of fungus hyphae enclosing one or more algal cells, that break out of the outer "bark" of the lichen. Such a propagule, blown by the wind, may readily stick to the surface of a moist, roughly insulated wire and, in time, "seed" its entire length with additional soralia.

This habit of Usneas using wires in Hawaii as a substratum for growth is probably not an isolated case. Other species, not yet reported, may well do likewise in other foggy regions.

u.s. weatherproof wire

urc type | **copper conductor**

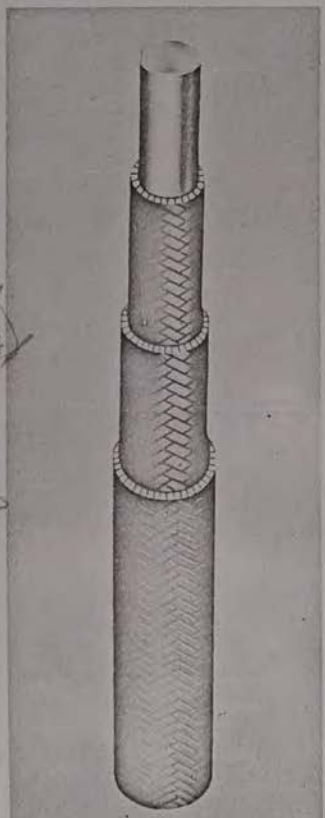
A solid or stranded conductor of soft, medium-hard or hard-drawn copper forms the base of this construction. The conductor is covered with two or three closely woven or knitted braids thoroughly saturated with high-melting-point blown asphalt and finished with a mineral-filled, dark-colored flexible coating material, such as stearine pitch or high-softening-point asphalt. The braids are then coated with mica flake.

Meets A.S.A. Specification C8.18.

This wire is made in accordance with National Electrical Code Standard Type WP in the triple-braid construction.

Used for overhead primary and secondary power transmission.

U.S. Rubber Company
Specification No. 100



SOLID

Size AWG	Double Braid Net Wt. lbs./M'	Triple Braid Net Wt. lbs./M'	Standard Package
14	20	25	*2000' Coil
12	30	35	*2000' Coil
10	46	53	*2000' Coil
8	66	75	*2000' Coil
6	100	112	*1500' Coil
4	151	164	*1000' Coil
3	185	199	1000' Coil
2	239	260	*1000' Coil
1	294	316	800' Coil
1/0	377	407	2500'–36" Reel

* Also supplied in 500' coils.

STRANDED

Size AWG or CM	Stranding*	Double Braid Net Wt. lbs./M'	Triple Braid Net Wt. lbs./M'	Standard Package
8	7	68	78	2000' Coil
6	7	103	115	1000' Coil
4	7	155	170	1000' Coil
3	7	190	206	1000' Coil
2	7	246	270	1000' Coil
1	7	303	328	1000'–30" Reel
1/0	7	388	424	2500'–42" Reel
2/0	7	482	522	2000'–42" Reel
3/0	7	604	653	2500'–48" Reel
4/0	7	745	800	2000'–48" Reel
250,000	19	907	985	2000'–48" Reel
300,000	19	1083	1174	2000'–48" Reel
350,000	19	1248	1345	1500'–48" Reel
400,000	19	1436	1553	1500'–48" Reel
450,000	37	1601	1724	1000'–48" Reel
500,000	37	1765	1894	1000'–48" Reel
600,000	37	2093	2235	1000'–48" Reel
700,000	61	2471	2650	1000'–60" Reel
750,000	61	2635	2822	1000'–60" Reel
800,000	61	2799	2992	1000'–60" Reel
900,000	61	3127	3332	1000'–60" Reel
1,000,000	61	3456	3674	1000'–60" Reel
1,250,000	61	4264	4508	750'–60" Reel
1,500,000	61	5098	5380	600'–60" Reel
1,750,000	91	5894	6193	500'–60" Reel
2,000,000	91	6690	7008	500'–60" Reel

* Class A Stranding.

Legends for Degs. on Wires

Yellowish green Usnea hawaiiensis Mot. X 1½ (Photo H. Ullrich)

Grayish green Usnea poliotrix Kremp. (Photo H. Ullrich)

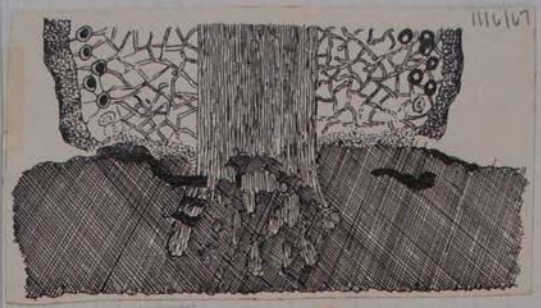
Usnea species on wires at Mountain View, Island of Hawaii, Jan. 20, 1967. (Photo R. Wakida)

Usnea species on wires at Puukapu, Waimea, Island of Hawaii, Jan. 16, 1967. (Photo R. Wakida)

Usnea hawaiiensis Mot.; longitudinal section showing oenetration of haustorium into fabric of wire. X 100 (Drawn by O. Klement)

Please set type and insert in proper place of drawing:

Cortex	Alga
Pith	Axis
Fiber of wire	Insulating material of wire



Usnea hawaiiensis — longitudinal section showing penetration of haustorium into fabric of wire. (Drawing by O. Klement.)

1/16/67

dele

Usnea hawaiiensis Mot.

Längsschnitt durch das Haftorgan

Schematisch - Ca. 100fach

dele

Rinde
Mark
Fasern

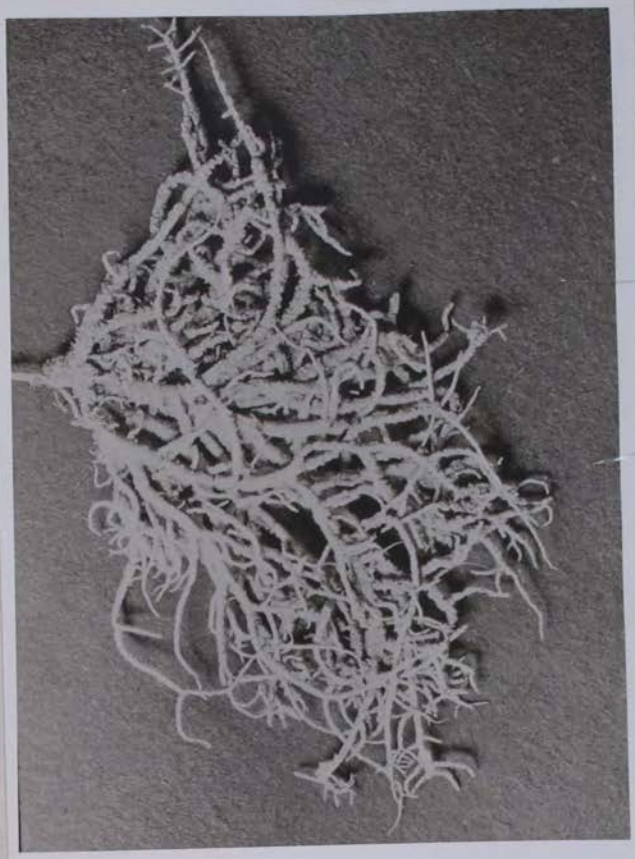
Cortex
Pith
Fiber of wire

dele 1/16/67

Alge
Zentralstrang
Isoliermasse

Alga
Axis
Insulating material of wire

Please set words in italics.



Usnea polietrix Krempo.
Hawaii-Archipel. Hawaii: Waimea (Kamuela) an Leitungsdrahten.
20.12.66 leg. Drs. O. et J. Degener
det. O. Klement.

#31 p. 163 Toy

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This picture was published in TNYBG
NEWSLETTER GARDEN JOURNAL
Year 1967 Vol. 17 No 5 & 6 Page 162-163
Elaine C. Cherry, Editor

Waimea, Hawaii
1/16/67

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#30 p. 163

This picture was published in TNYBG
NEWSLETTER GARDEN JOURNAL
Year 1967 Vol. 17 No. 5&6 Page 162-163
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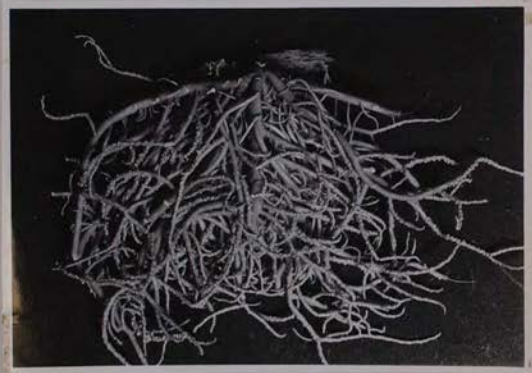

Foto: H. Ullrich
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Urnea hawaiiensis

1/10/67

#29 p.162

Top

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This picture was published in TNYBG
NEWSLETTER (HARBOR JOURNAL)
Year 1967 Vol. 17 No. 5+6 Page 162-163
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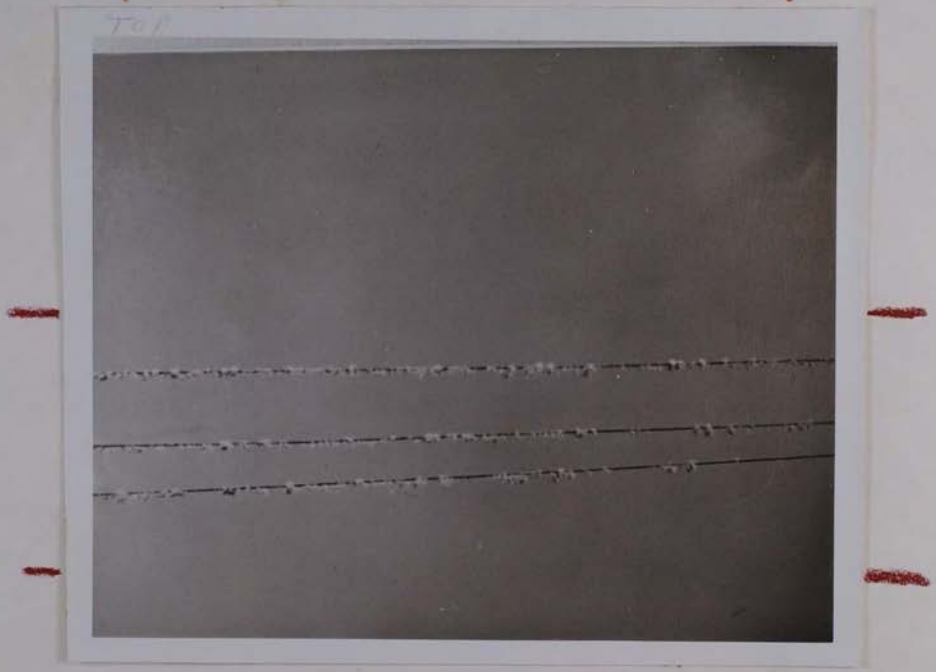

Just View
1/20/67

Alternation of Generations and The Mode of Nutrition

by Robert K. Zuck

DREW UNIVERSITY STUDIES NO. 6

September 1953

Volume 41, Number 3, of the Drew University Bulletin

11/8/68

RESPONSES TO DREW UNIVERSITY STUDIES NUMBER SIX

There has been a most gratifying response to the Drew University Studies No. 6, Alternation of Generations and The Mode of Nutrition by Robert K. Zuck. The following excerpts from letters received indicate the kind of comment received. Also, the general idea of a Drew Studies seems to have impressed the recipients. In addition, former students and fellow scientists have talked with me from time to time. These comments rather parallel the written words.

I think the administration and reviewing board at Drew should be commended for their effort and the allocation of funds in making the Drew Studies a reality.

Robert K. Zuck

* * *

Thanks for your recent reprint on the problems of alternation of generations. It contains some very interesting ideas. Dr. H. W. Rickett (New York Botanical Garden, New York 58, N.Y.) and I have been having some recent discussion along certain lines. The ideas you set forth, while not exactly along the lines of our discussions, do have bearing on certain things. Would you please be kind enough to send him a reprint for his perusal?

You have, as you are fully aware, gotten into what certainly is a problem that has been perplexing biologists (and especially botanists) for a long time. Human beings being what they are, controversy is rarely settled by sound argument, but, as Max Planck once remarked, by the dying out of the old generation with its prejudices and fixed ideas, and the coming in of another generation which was not exposed to the old concepts. The teaching continuity in our universities makes the turn over of new concepts a painfully slow one!

In passing I'd like to say that for some time I have been casting about among the vascular plants for a valid example of saprophytism. So far, I have not found a single instance! The vascular plants listed as "saprophytes" have so far proved to be at least fundamentally parasites. In the case of the Monotropeae, the plants are basically parasitic on fungi, although I have suspected a sly hint of symbioticism, for the fungal mats close to the plant bases always seem to be most vigorous. Could this mean that the fungus gets some (even most) of its growth hormones from the Pinesap, etc.? I have long tried to get my friends among the physiologists to work on this whole problem, but--Woe--O Woe!--it involves working with actual plants, a thing which they seem most reluctant to do in these times.

Wendell H. Camp, Curator
Academy of Natural Sciences of Philadelphia

* * *

I was interested in the copy of the paper which you recently sent me on "Alternation of Generations and The Mode of Nutrition." I think this is a well done job and it certainly is provocative. Thank you for sending it.

Charles E. Olmsted
Chairman, Dept. of Botany, University of Chicago

* * *

Thank you very much for sending your paper on "Alternation of Generations and the mode of nutrition," which I read with great interest.

H. W. Rickett
New York Botanical Garden

Many thanks for your very interesting paper - "Alternation of Generations and The Mode of Nutrition". You have, I believe, worked out a hypothesis that is very stimulating to thinking about evolutionary development among organisms.

Ernest A. Bessey, Professor of Botany, Emeritus
Michigan State College

* * *

I want to thank you for a copy of your paper - Classification of organisms based on their feeding habits. I read it with much interest and handed it to those in active service. If I recall correctly you didn't mention the "Slime Molds".* You would have to class them with the animals. That grates harshly on me. But this difficulty speaks strongly for evolution. I want to read it again.

A. R. Bechtel, Professor Emeritus of Botany
Wabash College

* I did!

* * *

Thank you for sending me your paper on "Alternation of Generations and the Mode of Nutrition." As you suggest, I am greatly interested in this sort of discussion. In the very nature of the case, conclusions cannot be final, but for that very reason may serve a useful purpose in stimulating us to reorient our thinking.

It is difficult to write a thing of this sort and relatively easy to criticize it. There are a few points which occurred to me as I read it through. I will not mention them now since I propose to turn this over to one of our graduate students to review in our mycology seminar. It may be that I shall be moved to write you at greater length later.

G. W. Martin, Head of Dept. of Botany
State University of Iowa

* * *

Your paper "Alternation of Generations and The Mode of Nutrition" has been received and I wish to thank you for sending it to me. I have been interested in the higher fungi for a long time and this paper of yours points up a belief I have held yet puzzled about the more I've studied the fungi.

Bonnie C. Templeton, Curator of Botany
Los Angeles County Museum

* * *

Thank you very much for your remembrance in the interesting paper you sent.

E. S. Barghoorn, Associate Professor of Botany
The Biological Laboratories, Harvard University

* * *

I have read the pamphlet with much interest, and am sending it on to Professor Robert Lepper, Head of our Department of Botany, who will be glad of the opportunity of reading it.

Harold W. Browning, Dean, College of Arts and Sciences
University of Rhode Island

* * *

Thank you for the copy of your paper entitled, "Alternation of Generation and the mode of Nutrition." I found it very interesting and stimulating.

E. B. Lambert, Principal Plant Pathologist
Plant Industry Station

Thanks very much for the reprint - I've been reading it during free time at lunch and it holds the answers to a great many questions that have been plaguing me.

Peter Jennings, Drew '53, Graduate Student
Plant Pathology, Purdue University

* * *

Thanks for your philosophical treatment of "Alternation of Generations". Since botanical journals do not publish papers of this sort,!! it is fine that your University does so. I strongly believe that few botanists will disagree with your interpretations. I've been trying to find publishers for a couple of papers that represent a small minority opinion. They may be published within the next 9 months. If so, I shall send your reprints. I'll admit that even if I do not agree with your point of view, you may be 100% correct.

Frederick A. Wolf, Professor of Botany
Duke University

* * *

May I express my sincere appreciation for the copy of Alternation of Generations and the Mode of Nutrition. I have read this publication with great interest.

H. M. Phillips, Dean, Emory University

* * *

Your "Alternation of Generations and the Mode of Nutrition" has been nutritious for many days, with alternations of my mental metabolism. I read it with such understanding as my unbotanical vocabulary permitted. I am impressed not merely with your erudition, but more important, with your skill in expression. It was well written.

Fred Pohl, Author of The Lost Discovery - and others

* * *

One of my colleagues called attention to Prof. Robert Zuck's article "Alternation of Generations and the Mode of Nutrition" which was recently published as Drew University Study Number Six. It is an excellent article and contains many important observations concerning the evolution of plants. I would appreciate receiving a copy for my personal reference library.

H. K. Brooks, Department of Geology and Geography
University of Tennessee

* * *

Thank you very much indeed for your kindness in sending me your paper on Alternation of Generations. I have looked over this paper with interest and see that it is something that I shall have to spend some time on during the holidays since there is so much throught-provoking material in it.

F. K. Sparrow, Professor of Botany
University of Michigan

* * *

Thanks very much for your very enjoyable reprint. Must read it again to digest it further.

Samuel Caplin, Ass't. Prof. of Botany
University of Rochester

The preceding are excerpts from letters received in 1953 and 1954, soon after publication. Requests continue to come in from various parts of the world. One was from the head of the botany section of the museum in Prague, Czechoslavakia, another from a professor in a university in South Africa.

Following is a paragraph from a letter from Dr. E. J. H. Corner, of the Botany School, University of Cambridge, England, dated November 21, 1963: (Dr. Corner organized a symposium on the Conservation of World Vegetation at the Xth International Botanical Congress at which the author of Drew Studies #6 gave a paper on the "Botanical Values of a Swamp".)

"Thank you for your letter of 11 November. I am so sorry that I failed to acknowledge the safe receipt of your publication, 'Alternation of Generations and the Mode of Nutrition.' Indeed, I have read it with great interest and have enjoyed the point of view which you bring out so clearly. The problem of alternation of generations is being forgotten in modern botany which wants always to simplify the higher plant to the equivalent of an animal. The subject must be reviewed, and so I am very glad to have your paper to work up and into what lectures I give."

RKZ

10/19/67

Thank you very much for the reprints. I am very interested in the topics covered, especially the one on "Alternation of Generations and the Mode of Nutrition." The approach you take seems excellent and quite logical. Unfortunately, we seldom think of this aspect of living organisms when we consider their evolutionary capabilities.

As you may know, I completed my graduate work at the University of Iowa and had considerable contact with Dr. Martin; thus, I am quite cognizant of the fungal level of organization relative to that of plants and animals. In fact, since coming to N. C. State in 1954, I have dealt with fungi in our General Biology course as fungi rather than as plants in the usual sense of the word and have, for the past several years referred to them as being lysotrophic in contrast to phagotrophic animals and autotrophic plants. Whether this approach ahs developed from my own background in Iowa or indirectly from your paper I cannot say. However, I most certainly agree with your concepts.

Ernest O. Beal, Professor of Botany
North Carolina State Univ.

Letter received 10/21/67

* * *

The two words, lysotrophism and phagotrophism, were unknown to me in 1952 when I wrote "Alternation of Generations and the Mode of Nutrition". They did not appear in any standard dictionary, including the Oxford Dictionary, nor in any compendium of biological or scientific terminology. So far as I can determine, these words were not in existence until I created them.

On page 24 of "Fungi in the Laboratory" (The Book Exchange, Chapel Hill, 1966), the author, Prof. Wm. J. Koch, of the Department of Botany, University of North Carolina, uses these words in a key to differentiate organisms. My Drew Studies #6 is listed in the bibliography, so I presume he got them from that. I wrote Dr. Koch about a year ago, but received no reply from him on this point.

Seymour Hutner, of the Biology Department, Fordham, in an article about three years ago in the Garden Journal, published by the New York Botanical Garden, used phagotrophism. He replied to my letter that he thought this word had been around a long time. However, he could not recall where he had seen it before.

Judging from Dr. Beal's reference to Dr. Martin, who wrote me soon after publication (1953), the latter had been using these terms. At least he was aware of them from my publication! (See letter from Martin in preceding pages.)

Harold Ward, of Funk and Wagnalls, in writing to Prof. Robert Chapman of our University, was not aware of these words and could not find them in any of the sources immediately available to him.

10/22/67

- - - - - - -

Thank you for your exciting piece on Alternation of Generations. It offers fresh insights and rationalizes a lot of superfluous terminology with your logical trinity.

The enclosed manuscript must be considered as tentative since it is in f formative stages and I hope to polish it with maybe a bit of expansion and elaboration for printing in some Journal of general circulation such as Bio Science.

Your helpful comments will be very much welcomed. I hope it proves as interesting to you as yours did to me!

Wm. I. Illman, Department of Biology
Carleton University
Ottowa, Canada

10/23/67

* * * * * *

The creation of three kingdoms of life, based on mode of nutrition, seems to be fairly well established through the publication of Drew Studies #6. More and more people are referring to fungi as members of a third kingdom. It would also appear that phagotrophism and lysotrophism have become rather widely accepted as part of the scientific vocabulary.

Writing is in progress in greater detail on possible explanations of the origin of the fungi. This seems to be a neglected area of botanical thought and interpretation.

R. K. Zuck

10/8/68

Responses
111568

THE UNIVERSITY OF NORTH CAROLINA
AT
CHAPEL HILL
27514

PARTMENT OF BOTANY

Note: This letter responds to Response to Drew Studies No. Six. I think you will find interesting. Dr. Koch is a professor at the University of North Carolina RKZ

29 October 1968

Dear Dr. Zuck:

Thank you for sending me the sheets of comments others have made about your "Alt. of Gen." paper. I certainly agree with most of them.

I was a graduate student when the paper was published. I found it inspirational, used it as the basis of a seminar and now refer to it each year in my fungi courses. I much prefer to classify modes of nutrition into the three categories you use: Auto-, Phago-, Lyso-.

Are you planning to come forth with a new version of your provocative thesis? I hope you do. Best wishes,

Bill Koch

Office: Dominion Life Arcade
Willis St., Wellington, C.1,
New Zealand.
P.O. Box 149
Telegrams and Cables: "Newcoach"
Telex: N.Z. 3462
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DAY 1 AUCKLAND/WAITOMO CAVES/ROTORUA

At 8.45 a.m. we leave Auckland Coach Depot and travel south on the Motorway, passing through Hamilton, main centre of the rich Waikato district, and Te Awamutu. We arrive Waitomo in time for lunch and afterwards have a guided excursion through the world famous Glowworm Grotto. We continue via Arapuni Hydro to Rotorua, arriving late afternoon.

Stay overnight at TRAVELODGE MOTEL

DAY 2 AT ROTORUA

A full days sightseeing today includes Whakarewarewa Maori Village and Rotorua Maori Arts and Crafts Institute. We also visit the Blue and Green Lakes, Paradise Valley and Ohinemutu. If possible a Maori Concert will be arranged this evening.

DAY 3 ROTORUA/CHATEAU/WANGANUI

9.00 a.m. we leave Rotorua and travel South visiting Waiotapu en route. A short stop is made at Wairakei to view the Geo-thermal project and at Taupo before continuing on to the Chateau for lunch.

In the afternoon we take the Parapara Road to Wanganui arriving for Dinner.

Stay at GRAND HOTEL

DAY 4 WANGANUI/WELLINGTON

After a short sightseeing drive around this city we travel south via the fertile district of Bulls, Foxton and Levin, reaching Wellington late morning. After lunch a sightseeing drive is arranged in the Capital City. Tour terminates after the afternoon sightseeing drive in Wellington.

1-69

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Due to certain airline schedules being infrequent, some passengers may be, by prior arrangement, staying more than one night. Those passengers will know of this from the time of booking and by their flight arrangements from Christchurch. This mainly applies to passengers travelling on KT5 24.

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DATE ITINERARY

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- Ovid

300 SERIES

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At 8.45 a.m., following your Courier-Driver's customary welcome aboard, your tour commences along the Main Highway north from Christchurch, passing through Kaiapoi and the rural towns of Amberley and Culverden. The road now bears westward, tracing the course of the Waiau River and rising to the summit of Lewis Pass (2,840 ft). After lunch at Maruia Springs, a thermal spa, your route crosses the Rahu Saddle to Reefton. Once a thriving gold-mining centre, Reefton was the first New Zealand town to be lit by electricity. The remainder of your first day takes you over a first-class highway to Greymouth, arriving in time for dinner.

Overnight stop at KINGS HOTEL

DAY 2 — GREYMOUTH/FOX GLACIER

Your camera should be well-primed for today! First to the 'Wheel of Fortune' gold claim at Goldsborough, where you can pan for gold - success guaranteed! Later we pass through Hokitika, where the landscape still bears a reminder of the 1860's gold rush, when the population of this now peaceful town soared to 50,000. The mighty Alps dominate the road south, complementing peaceful lakes, gleaming jewel-like in their native bush settings. After lunch at Hari Hari (a farming and sawmilling centre) we continue via Whataroa to Westland National Park and Franz Josef Glacier.

We stay for two nights FOX HOTEL

DAY 3

A fascinating day is planned to include a morning trip to Lake Matheson, world famous for its mirrored reflections of Mounts Cook and Tasman. This beautiful bush-bordered moraine lake will thrill the camera-enthusiasts. In the afternoon an experienced guide conducts us over the Fox Glacier's awesome expanse of ice.

DAY 4 — FOX GLACIER/QUEENSTOWN

Leaving the Fox, we travel the new Haast Pass Highway with the road steadily rising to Knight's Point, overlooking the Tasman Sea. This scenic highway was opened in 1965 and provides an important link with Otago and Southland. By easy stages we descend to sea level and reach Haast Township for lunch. Next we follow the broad gravel reaches of Haast River, with its many beautiful waterfalls, until a sharp incline

DAY 4 continued

FOX GLACIER/QUEENSTOWN

heralds our arrival at the summit of Haast Pass. At 1,847 ft this is the lowest of the trans-alpine passes. Our surroundings undergo a startling transition as the lush sub-tropical growth gives way to stately beech forests. The upper reaches of Lake Wanaka are skirted for a while, then we turn off past Lake Hawea and on to Cromwell. A short journey through the Kawarau Gorge brings us finally to Queenstown, our home for two nights.

Stay at VIEW MOTEL

DAY 5

There is time this morning for a launch excursion across Lake Wakatipu to Cecil Peak Station. This interesting trip gives us an insight into life on a high country sheep station. In the afternoon we visit Coronet Peak, a veritable magnet for winter sports enthusiasts in the skiing season.

DAY 6

QUEENSTOWN/TE ANAU

First of all we cross the Kawarau Dam, then travel along the eastern shore of Lake Wakatipu to Kingston at its southern extremity. The rolling countryside that follows is not unlike the English South Downs and this brings us on to Te Anau, where we join our launch for the excursion to Te Ana-au Glowworm Caves and our stop for lunch. On our return to Te Anau Township we have a short drive to Te Anau Downs.

We stay for two nights at TE ANAU DOWNS ROAD HOUSE

DAY 7

Today our tour provides for an awe-inspiring drive to Milford Sound. Acknowledged as one of the greatest among the world's scenic wonders, this would be the highlight of any tour, embracing as it does the enchanting beech forests of the Eglinton Valley, the rugged grandeur of the Hollyford Valley, the Homer Tunnel, the Chasm, and finally Milford Sound itself. After lunch we embark on a cruise of the Sound, returning to Te Anau for dinner.

DAY 8

TE ANAU/DUNEDIN

We now leave the mighty Fiordland area and head firstly for Mossburn and continue across the rolling country of Southland to Gore our stop for lunch. Our route this afternoon takes us via Balclutha and Milton and we arrive in Dunedin late afternoon.

Stay at LAW COURTS HOTEL

DAY 9

DUNEDIN/CHRISTCHURCH

This is the last day of the Tour and we leave beautiful Dunedin and travel north on the No. 1 State Highway through the country towns of Palmerston and Hampden as we head for Oamaru, the main centre of North Otago, thence across the Waitaki River to Waimate our stop for lunch. Leaving Waimate we skirt the Canterbury Plains en route to Timaru an important sea port. Here we turn inland and passing through Ashburton we are nearing the end of our journey which terminates on arrival at Newmans Depot at 5.30 p.m.

P.O. Box 154, Volcano, Hawaii 96785.
Oct. 30, 1969.

Dear Sherwood:

We are back at Volcano, and discovered that someone had committed an act of "vandalism" and attempted burglery to our house. As the intruder climbed to the second story with some agility, we suspect a juvenile was involved. That we are covered by insurance does not change our being disturbed by this act. Some youngster might be careless with a cigarteg or flirt with arson the next time. Police Officer Kalawe took fingerprints from windowsill and from drawers in the hallway.

Some time a forty year old officer connected with our district died in the line of duty - chasing a suspect induced a fatal heart attack - and since that time we are short one man on the force. According the newspaper accounts you augmented the police force in Kona to offset the hippie invasion. How do we augmentbor at least get our police force up to the normal strength? Please remember that we are not the only tax-paying home owners in the district who have been subjected to similar harm during the last year or two.

n One sad joke is that we apparently have no police protection at all from about 7.30 P.M., until the next morning.

Isa & I are perfectly willing to contribute to a special fund set up to maintain an extra man on the force to patrol the Volcano area at night. We personally are ready to pay a reward for the arrest & conviction of the individual or individuals involved on our property during this month of October.

When you & Lois happen toa pass to & from between Hilo & Capt. Cook detour a couple of blocks and drop in at our place. Perhaps by the time you come, we shall have wooden shutters for the downstairs windows. We ordered them of pliwood.

When in Fiji, Isa & I collected a maile which was so unusual in that it had hardly any milky sap at all - it seemed dry!

Aloha,

Otto

MARGARET MEAD
515 MADISON AVENUE
NEW YORK, N. Y. 10022

October 14, 1969

Dear Friend:

"There was no food in the house and I didn't want them to go to school hungry and then come home hungry too. I felt that if I kept them home with me at least when they cried and asked for a piece of bread I would be with them and put my arms around them." (from Hunger, USA 1968)

For ten million Americans -- nearly half of them children -- hunger is a daily fact of life. Untold numbers are actually starving, without food for days at a time, subsisting on starch and Kool-Aid, tar and tree bark. Severe malnutrition -- which shortens lives and limits physical and mental growth -- is evident throughout this land of plenty.

Here, as in all nations, hunger and large numbers of children go hand in hand: the larger the family the greater the risk of hunger and privation. Nearly half of all impoverished children come from families of five or more and the size of these families makes escape from poverty extremely difficult. Without proper care and schooling children have little or no future. They marry early and are soon ground down by the struggle to support more children than they can afford. By 27 half of all poor women have at least three children -- with 17 child-bearing years to go -- and each new birth drives them still further into poverty and frustration.

Forty percent of the children born to the U.S. poor are unwanted: a total of 450,000 a year. They are tomorrow's dropouts and delinquents -- the new generation of underprivileged. Planned Parenthood/World Population is helping to break the cycle of misery and want in the U.S. and abroad. Here PP/WP Affiliates provide 400,000 low-income women with comprehensive birth control services -- protecting them against unwanted pregnancy -- through a network of 472 clinics in 38 States.

Family planning cannot relieve today's hunger, but it is unquestionably the surest, fastest and most economical way to avert hunger and reduce poverty in days and years to come. Of the 5.3 million "medically indigent" women who need subsidized family planning, only one in six is being helped by public or private agencies. Closing the gap so that every woman has the freedom to choose the number of children she wants and can afford is Planned Parenthood's goal. It will cost $150 million a year. Your support is essential if we are to save millions from the tragic dilemma of "too many mouths to feed."

Today PP/WP is supporting programs in 101 nations: in many it is the only help available. From Hong Kong to Barbados, from Turkey to Tobago people are eager to limit births. The next years are crucial. In Asia, Africa and Latin America populations grow two-and-a-half times faster than food supplies. Only large scale birth control can stave off the mass famine that is inevitable. In 1969 PP/WP will need $24.5 million for overseas and domestic programs. Please send your tax-deductible gift today to help win the race between too little food and too many people.

Sincerely,

Margaret Mead

P.S. If you have already contributed to your local PP/WP Affiliate, please share this appeal with a friend. We are grateful for your interest and support.

EXECUTIVE CHAMBERS

HONOLULU

JOHN A. BURNS
GOVERNOR

November 11, 1969

Dear Dr. Degener:

Thank you for your letter of November 1, 1969, regarding the need for increased police protection and for a higher standard of financial remuneration for police officers.

It is certainly true that changing times and court decisions of the past several years have made it necessary for us to learn new police methods and put much more emphasis on the training and education of the officer than in the past. The policeman's job was always hazardous; now it is both hazardous and demanding, and it deserves the kind of remuneration commensurate with such requirements and with dedication to public service that good policemen have.

I shall be interested in action in this area which may be initiated by the counties, under whose jurisdiction lie our law enforcement agencies.

Warmest personal regards. May the Almighty be with you and yours always.

Sincerely,

John A. Burns

S. Kimura

Dr. Otto Degener
P. O. Box 154
Volcano, Hawaii 96785

Nov. 16, 1969.

Dear Mr. Kimura:

Mrs. Degener & I, "worried tax payers" with letters in the Tribune Herald and Honolulu newspapers Nov. 5 and 7 respectively, thought our Island of Hawaii representatives would act of their own accord to increase our police protection.

Over a week has passed since our letters have appeared, and we have noted no action. What is your personal reaction to using some of our surplus dollars in the treasury in increasing the pay of our County police force and in actively hunting for recruits?

When I get a concrete, favorable answer with guarantee of action, I wish to write Governor Burns as, according to his recent letter, he states: "I shall be interested in action in this area which may be initiated by the counties, under whose jurisdiction lie our law enforcement agencies." As Governor Burns was long connected with the Police Department, we believe he is truly interested.

Aloha,

Otto Degener