# Staff Meeting Bulletin
# Hospitals of the » » »
# University of Minnesota

## Seasonal Pollinosis

Volume X | Friday, March 17, 1939 | Number 21

STAFF MEETING BULLETIN
HOSPITALS OF THE . . .
UNIVERSITY OF MINNESOTA

Volume X | Friday, March 17, 1939 | Number 21

INDEX



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Financed by the Citizens Aid Society.

William A. O'Brien, M.D.

I. LAST WEEK

Date: March 10, 1939

Place: Recreation Room
Powell Hall

Time: 12:15 to 1:15 P.M.

Program: Movie: "Nostradamus"

Announcements

Vesical Calculi
Frank D. Naegeli

Discussion
C. D. Creevy
J. L. McKelvey

Present: 137

Gertrude Gunn,
Record Librarian

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II. MOVIE

Title: "Ski Rhythm"

Released by: The Columbia
Picture Corporation

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III. ANNOUNCEMENTS

1. TIME MARCHES ON

June 2, 1938 the Bulletin of the staff meetings of the Hospitals of the University of Minnesota recorded the wedding of Leonard Lang and Carmen Frazee. Among other comments is the following: "Yesterday, as the day wore on the 'bustle' slowed down to a walk and his ears grew deaf with advice. Long active in superintending the results of other men's work there was a glint in his eye as he accepted the good wishes of his friends." March 14, 1939, baby boy Lang arrived at 8:30 a.m. The anxious father was just as anxious as the common garden variety and just as curious as the rest of us. They are receiving the congratulations of a host of friends.

2. MORE TIME MARCHES ON

One year ago today, Patrick James O'Brien arrived. Today the Man of Destiny has one lone green candle on his cake as he looks for worlds to conquer.

3. MORE TIME MARCHES ON

The Charlie Rea's are listening to the birdies sing.

4. PATHOLOGICAL SOCIETY

The Minnesota Pathological Society
Institute of Anatomy
Tuesday, March 21, 1939
8:00 P.M.

Relation of age and site of operation to postoperative pulmonary embolism.

Dr. J. S. McCartney

Role of the lymphocytes in acute inflammation.

Fred Kolouch, Jr.

5. WEDDING

Louis Sperling and Ruth Figur were married February 12. The wedding trip was South.

Congratulations!

6. SURGICAL RADIOLOGICAL CONFERENCE

Will now be held in Todd Amphitheatre on Saturdays, 9:00 to 11:00.

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## IV. SEASONAL POLLINOSIS

R. V. Ellis

The earliest reference in a scientific paper of a notion crediting the pollen of plants with an etiological role in the causation of human maladies was recorded by Elliotson[1] of London in 1831. Although Bostock[2] just prior to this date had already described under the title of Catarrhus Aestivus, the more important clinical manifestations resulting from pollen so accurately and completely that later writers have not been able to add much of importance, he did not concur with Elliotson in regard to the etiology. However, Bostock's contributions aroused the interest of the profession and during several decades numerous other writers detailed their observations and experiences, and although there was general disagreement with Elliotson's idea of the etiology, no contribution of value in this regard was made during the next forty years. In 1872 Morril Wyman[3] of the Harvard Medical School published an excellent monograph entitled autumnal catarrh and was probably the first to identify the pollen of ragweed as one of the causative agents in seasonal allergic rhinitis. The classical experimental proof that pollen is the cause of hay fever is usually credited to Blackley[4] because of the accuracy and completeness of his experiments although his work was published a year later (1873) than that of Wyman. In spite of the excellency of their experiments, the conclusions of Blackley and Wyman were not at once generally accepted. These works were published at the beginning of a new era in medical history and the spectacular work of Pasteur and Koch contributed to the birth of the idea that hay fever might be an infectious disease. Research in this direction, however, proved fruitless.

In 1903 Dunbar[5] confirmed and added to the experiments of Blackley and established beyond doubt that pollen is the cause of hay fever.

The failure to demonstrate a toxic substance in pollen in respect to animals and also for normal human beings probably delayed the acceptance of the work of Blackley and others. With the discovery of anaphylaxis, the suggestion by Wolff-Eisner in 1906 of anaphylaxis-like hypersensitiveness as a possible explanation of pollinosis aroused increased interest in the problem and undoubtedly paved the way for what is commonly referred to as desensitization therapy.

### The Clinical Manifestations

As previously stated the more important clinical manifestations of pollinosis were accurately and completely described by Bostock[2] in (1819) (1828). He suggested that the disease be divided "into four varieties according as the eyes, the nose, the fauces or the lungs is the part more immediately affected." The syndrome typical of hay fever, includes lachrymation and itching of the conjunctive, sneezing, serous rhinorrhea and nasal obstruction. Conjunctival symptoms may occur independently of nasal symptoms and vice versa. Asthma frequently accompanies hay fever but asthma on the basis of pollinosis also occurs as a primary affliction without symptoms of hay fever.

Skin manifestations of pollinosis may occur in conjunction with those of the mucous membranes just described but may also occur independently. Urticaria due to pollen has been described although infrequently. Dermatitis of the contact type due to pollen is now a well established fact. Elliotson[1] was probably the first to record this condition. As early as 1831 he cites an instance of dermatitis venenata caused by the handling of the inflorescences of grasses.

### The Nature of the Excitant and the Pathogenesis of Pollinosis

No pollen thus far investigated contains a toxin or other pharmacologically active substance when exhibited upon normal persons. Yet the allergenic principle of pollen is considered as one of the most potent of all substances known to induce biochemical changes in the human mechanism. Our knowledge concerning the nature of this active substance

is as yet incomplete. On the basis of analogy with the phenomena of anaphylaxis, the active substance was for long assumed to be a protein. Coca and Grove[5], however, reported the preparation of highly potent extracts which were protein-free. This work has been confirmed by Black[6], Caulfield[7], Stull[8], et al. These workers believe the active substance of ragweed pollen to be a polysaccharide. More recently, however, on the basis of experimental work, Caulfield[9] and coworkers conclude that ragweed pollen contains several allergically active substances and that likewise the serum of hay fever patients contains more than one specific reagin.

The excitant responsible for pollen dermatitis is not the same as that responsible for the hay fever and other respiratory symptoms. Brown, Milford and Coca[10] showed this to be the oily constituent of pollen and that this is present in the plant as well.

Chemical studies thus far have been chiefly confined to ragweed pollen and even these results are still in a state of controversy. Obviously this phase of the problem is of great importance and has as yet been scarcely touched.

## The Pathogenesis in Pollinosis

The condition of pollinosis implies a state of peculiar hypersensitiveness to a specific substance or substances native to the pollen granule. Although earlier considered as a manifestation of anaphylaxis, objections to this concept were first raised by Coca[11] on the basis of certain technical grounds and it must be admitted that the breach thus created between the mechanisms of the two conditions cannot be satisfactorily bridged with knowledge now extant. The controversy is too involved to permit discussion in the time available here. Suffice it to say that the mechanism in the more important manifestations of pollinosis involves the presence of humoral antibodies usually termed reagins, which transferred to the skin of a normal person through intracutaneous injections of the serum renders the local site hypersensitive. The same serum, however, fails to passively sensitize laboratory animals.

The altered physiology in the mucous membranes resulting from the inhalation of pollen appears to be the same as that induced in the skin reaction with pollen or pollen extract and results from an increased permeability of the capillaries. The mechanism of this reaction is believed to be due to the liberation or formation of a histamine-like substance as a result of the interaction of the antigen and specific antibody or reagin, which idea was first expressed by Sir Thomas Lewis[12] in 1927.

## Plants Responsible for Pollinosis in Minnesota

Although Blackley's work which so conclusively established the proof of the etiologic role of pollens in hay fever was done with grass pollen evidence quickly accumulated that pollen of other plants was also involved.

The presumption arose that any plant producing pollen is a potential cause of hay fever, giving origin to many erroneous notions which still prevail not only among the laity but unfortunately also among some members of our own profession. The next great advance following Blackley's contribution came with the realization that only those plants which pollinate through the agency of wind are important causes of pollinosis, which fact was pointed out by Scheppegrell in 1917. Plants with showy flowers such as roses, goldenrods, dandelion, daisies, et al, which up to that time had received much attention were automatically eliminated for the pollen and flowers of such plants possess characteristics which preclude the probability of any important pollution of the air. Scheppegrell's contribution is of especial significance as it provided the basis for numerous surveys which have been published in the last fifteen years. Essentially these surveys consist of lists of wind pollinated plants together with approximate periods of bloom as observed in the field. These compilations furnish information in regard to the potential sources of air-borne pollen. While this work is not without value, it

Table 1

A LIST OF HAY FEVER PLANTS BY GROUPS WITH APPROXIMATE DATES OF POLLINATION

| COMMON NAME | BOTANICAL NAME | BLOSSOMING SEASON |
|---|---|---|
| **1. MAPLE GROUP - ACERACEAE** | | |
| Soft or Silver Maple# | Acer saccharinum | Mar. 12 - Apr. 18 |
| Red Maple# | Acer rubrum | Apr. 12 - 25 |
| Box Elder#* | Acer Negundo | Apr. 12 - 30 |
| **2. BIRCH GROUP - BETULACEAE** | | |
| Hoary or Speckled Alder# | Alnus incana | Mar. 25 - Apr. 12 |
| Common Hazel#* | Corylus americana | Apr. 1 - 20 |
| Beaked Hazel | Corylus rostrata | Apr. 5 - 25 |
| Green or Mountain Alder# | Alnus crispa | Apr. 15 - May 20 |
| Ironwood or Hop Hornbeam#* | Ostrya virginiana | Apr. 22 - May 16 |
| Paper or Canoe Birch#* | Betula papyrifera | Apr. 25 - May 10 |
| Sweet Fern (1) | Comptonia asplenifolia | Apr. 25 - May 30 |
| Bog Birch* | Betula pumila | Apr. 26 - May 10 |
| Yellow Birch | Betula lutea | May 1 - 15 |
| River Birch | Betula nigra | May 1 - 15 |
| Sweet Gale (1) | Myrica Gale | May 1 - 25 |
| Blue or Water Beech# | Carpinus caroliniana | May 5 - 25 |

(1) Belongs to the Myricaceae, a separate but closely related family.

| | | |
|---|---|---|
| **3. POPLAR-WILLOW GROUP - SALICACEAE** | | |
| Poplar, Trembling Aspen#* | Populus tremuloides | Apr. 3 - 22 |
| Pussy Willow | Salix discolor | Apr. 5 - 25 |
| Large-toothed Aspen | Populus grandidentata | Apr. 8 - 25 |
| Cottonwood#* | Populus deltoides | Apr. 8 - 30 |
| Balsam Poplar* | Populus balsamifera | Apr. 15 - 30 |
| Prairie Willow | Salix humilis | Apr. 15 - 30 |
| Heart-leaved Willow | Salix cordata | Apr. 20 - May 10 |
| Peach-leaved Willow | Salix amygdaloides | Apr. 25 - May 12 |
| Crack Willow | Salix fragilis | Apr. 26 - May 15 |
| Golden Willow | Salix alba var. vitellina | Apr. 26 - May 15 |
| **4. ELM-NETTLE GROUP - URTICACEAE** | | |
| American or White Elm#* | Ulmus americana | Apr. 3 - 24 |
| Slippery Elm#* | Ulmus fulva | Apr. 4 - 25 |
| Cork Elm | Ulmus racemosa | Apr. 10 - 30 |
| Siberian Elm | Ulmus pumila | Apr. 10 - 25 |
| Hackberry#* | Celtis occidentalis | Apr. 20 - May 15 |
| White Mulberry | Morus alba | May 15 - 30 |
| Stinging Nettle#* | Urtica gracilis | June 1 - Aug. 15 |
| Hops | Humulus lupulus | July 15 - Aug. 5 |
| Hemp#* | Cannabis sativa | July 15 - Aug. 10 |
| Wood Nettle | Laportea canadensis | July 5 - Aug. 15 |
| False Nettle | Boehmeria cylindrica | July 20 - Aug. 15 |

| COMMON NAME | BOTANICAL NAME | BLOSSOMING SEASON |
|---|---|---|
| **5. SEDGE-BULRUSH GROUP - CYPERECEAE** | | |
| Peduncled Sedge | Carex pedunculata | Apr. 8 - May 3 |
| Pennsylvania Sedge#* | Carex pennsylvanica | Apr. 10 - May 20 |
| Long-beaked Sedge#* | Carex longirostris | Apr. 28 - May 15 |
| Tussock Sedge* | Carex stricta | May 1 - 30 |
| River Bulrush | Scirpus fluviatilis | June 9 - July 20 |
| Great Bulrush* | Scirpus validus | June 15 - Aug. 10 |
| Western Bulrush | Scirpus occidentalis | June 15 - Aug. 5 |
| Cat Tail#*(1) | Typha latifolia | July 5 - 30 |
| **6. ASH GROUP - OLEACEAE** | | |
| White Ash# | Fraxinus americana | Apr. 15 - May 10 |
| Green Ash#* | Fraxinus lanceolata | Apr. 17 - May 10 |
| Black Ash#* | Fraxinus nigra | Apr. 18 - May 15 |
| **7. OAK GROUP - FAGACEAE** | | |
| Bur Oak#* | Quercus macrocarpa | Apr. 30 - May 29 |
| Black Oak | Quercus velutina | May 1 - 15 |
| Hills Oak#* | Quercus ellipsoidalis | May 2 - 22 |
| Red Oak#* | Quercus borealis | May 5 - 25 |
| Scarlet Oak | Quercus coccinea | May 7 - 20 |
| White Oak#* | Quercus alba | May 16 - 27 |
| **8a. SWEET VERNAL GRASS GROUP - TRIBE PHALARIDEAE** | | |
| Holy Grass, Seneca Grass* | Hierochloe adorata | May 8 - 30 |
| Sweet Vernal Grass# | Anthoxanthum odoratum | June 1 - July 1 |
| Reed Canary Grass#* | Phalaris arundinaceae | June 5 - July 20 |
| **8b. TIMOTHY GROUP - TRIBE AGROSTIDEAE** | | |
| Mountain Rice | Oryzopsis asperifolia | May 20 - June 10 |
| Meadow Foxtail# | Alopecurus pratensis | May 25 - July 15 |
| Porcupine Grass | Stipa spartea | June 1 - 20 |
| Timothy#* | Phleum pratense | June 10 - July 25 |
| Red Top#* | Agrostis alba | June 15 - Aug. 1 |
| Canada Blue-joint* | Calamagrostis canadensis | June 15 - Aug. 1 |
| Long-leaved Reed Grass | Calamovilfa longifolia | July 1 - Aug. 10 |
| Satin Grass* | Muhlenbergia mexicana | Aug. 1 - Sept. 1 |
| Wild Timothy* | Muhlenbergia racemosa | Aug. 1 - Sept. 1 |

(1) Not closely related to the Sedge-Bulrush family, but arbitrarily included here to avoid multiplication of groups.

| COMMON NAME | BOTANICAL NAME | BLOSSOMING SEASON |
|---|---|---|
| **8c. BLUE GRASS GROUP - TRIBE FESTUCEAE** | | |
| Low Spear Grass#* | Poa annua | May 22 - Sept. 10 |
| June Grass#* | Poa pratensis | May 28 - July 10 |
| Hungarian Brome Grass#* | Bromus inermis | May 29 - July 15 |
| Crested Koeleria# | Koeleria cristata | June 1 - July 15 |
| Canada Blue Grass# | Poa compressa | June 5 - July 15 |
| Orchard Grass#* | Dactylis glomerata | June 5 - July 15 |
| Slender Fescue | Festuca octoflora | June 5 - July 15 |
| Reed Meadow Grass | Glyceria grandis | June 5 - July 15 |
| Fowl Meadow Grass* | Poa triflora | June 10 - July 20 |
| Sheep's Fescue Grass# | Festuca ovina | June 15 - July 25 |
| Cheat, Chess | Bromus secalinus | June 20 - July 20 |
| Meadow Fescue# | Festuca elatior | June 25 - July 30 |
| **8d. RYE GROUP - TRIBE HORDEAE** | | |
| Rye#* | Secale cereale | June 1 - 20 |
| Quack Grass#* | Agropyron repens | June 10 - Aug. 1 |
| Slender Wild Rye | Elymus striatus | June 15 - July 15 |
| Squirrel Tail Grass#* | Hordeum jubatum | June 20 - Aug. 1 |
| Awned Wheat Grass (1) | Agropyron caninum | July 1 - Aug. 5 |
| Slender Wheat Grass# | Agropyron tenerum | July 1 - Aug. 10 |
| Nodding Wild Rye | Elymus canadensis | July 5 - Aug. 10 |
| Virginia Wild Rye | Elymus virginicus | July 5 - Aug. 15 |
| Corn, Maize#*(1) | Zea Mays | July 20 - Aug. 20 |
| **8e. MILLET GROUP - TRIBE PANICEAE** | | |
| Scribner's Panic Grass | Panicum Scribnerianum | June 5 - July 10 |
| Switch Grass | Panicum virgatum | July 1 - Aug. 10 |
| Pigeon Grass* | Setaria glauca | July 1 - Aug. 30 |
| Finger Grass, Crab Grass#* | Digitaria sanguinalis | July 1 - Aug. 30 |
| Barnyard Grass#* | Echinochloa Crus-galli | July 1 - Aug. 20 |
| Small Crab Grass | Digitaria humifusa | July 10 - Sept. 10 |
| Green Foxtail# | Setaria viridis | July 15 - Sept. 1 |
| Sandbur#* | Cenchrus carolinianus | July 20 - Aug. 15 |
| Italian Millet | Setaria Italica | Aug. 20 - Sept. 20 |
| **8f. OAT GROUP - TRIBE AVENEAE** | | |
| Oat Grass | Arrhenatherum elatius | June 15 - July 15 |
| Wild Oat Grass | Danthonia spicata | June 15 - July 20 |
| Purple Oat Grass | Melica striata | June 15 - July 20 |
| Wild Oats# | Avena fatua | June 20 - July 20 |
| Oats# | Avena sativa | July 1 - 30 |

(1) Does not belong to the Rye Tribe, but is inserted here to avoid multiplication of groups.

| COMMON NAME | BOTANICAL NAME | BLOSSOMING SEASON |
|---|---|---|
| **8g. GRAMA GRASS GROUP - TRIBE CHLORIDEAE** | | |
| Hairy Mesquite Grass | Bouteloua hirsuta | July 1 - Aug. 10 |
| Racemed Grama Grass | Bouteloua curtipendula | July 5 - Aug. 5 |
| Beckmannia# | Beckmannia crucaeformis | July 10 - Sept. 1 |
| Tall Marsh Grass | Spartina Michauxiana | July 15 - Aug. 15 |
| Goose Grass# | Eleusine Indica | July 20 - Sept. 15 |
| **8h. WILD RICE GROUP - TRIBE ORYZEAE** | | |
| Indian Rice, Wild Rice#* | Zizania palustris | July 5 - Aug. 10 |
| Wild Rice# | Zizania aquatica | July 10 - Aug. 1 |
| Rice Cut Grass# | Leersia oryzoides | July 20 - Aug. 10 |
| **8i. SORGHUM GROUP - TRIBE ANDROPOGONEAE** | | |
| Blue Stem#* | Andropogon furcatus | July 15 - Aug. 15 |
| Indian Grass# | Sorghastrum nutans | July 15 - Sept. 10 |
| Broom Beard Grass*# | Andropogon scoparius | July 20 - Aug. 20 |
| Sorghum#* | Andropogon sorghum | July 25 - Aug. 30 |
| Sudan Grass | Andropogon sorghum var. sudanensis | July 25 - Aug. 30 |
| **9. WALNUT GROUP - JUGLANDACEAE** | | |
| Butternut#* | Juglans cinerea | May 10 - 26 |
| Black Walnut# | Juglans nigra | May 15 - 30 |
| Pignut Hickory | Carya cordiformis | May 20 - June 5 |
| Shellbark Hickory# | Carya ovata | May 20 - June 5 |
| **10. PLANTAIN GROUP - PLANTAGINACEAE** | | |
| Rib Grass#* | Plantago lanceolata | May 20 - Aug. 1 |
| Common Plantain#* | Plantago major | June 1 - Aug. 15 |
| Pursh's Plantain | Plantago Purshii | June 1 - July 15 |
| Large-bracted Plantain | Plantago aristata | June 15 - Aug. 1 |
| Pale Plantain | Plantago Rugelii | June 20 - Aug. 10 |
| **11. DOCK OR SORREL GROUP - POLYGONACEAE** | | |
| Sheep Sorrel#* | Rumex acetosella | May 20 - July 1 |
| Rhubarb | Rheum rhaponticum | May 25 - June 20 |
| Curled Dock#* | Rumex crispus | May 29 - July 15 |
| Peach-leaved Dock | Rumex altissimus | June 1 - July 15 |
| Golden Dock | Rumex persicarioides | June 1 - July 30 |
| Pale Dock#* | Rumex mexicanus | June 6 - July 20 |
| Knot Grass, Door Weed | Polygonum aviculare | June 20 - Oct. 15 |
| Bitter Dock# | Rumex obtusifolius | July 10 - Aug. 15 |
| Great Water Dock | Rumex Britannica | July 10 - Aug. 15 |

| COMMON NAME | BOTANICAL NAME | BLOSSOMING SEASON |
|---|---|---|
| **12. ALFALFA GROUP - LEGUMINOSAE** | | |
| Alfalfa# | Medicago sativa | June 4 - Sept. 15 |
| Sweet Clover# | Melilotus alba | June 6 - Oct. 1 |
| Red Clover# | Trifolium pratense | June 12 - Sept. 15 |
| **13. PIGWEED GROUP - AMARANTHACEAE** | | |
| Pigweed, Red-root#* | Amaranthus retroflexus | June 15 - Sept. 15 |
| Green Amaranth | Amaranthus hybridus | June 15 - Aug. 30 |
| Tumbleweed#* | Amaranthus graeccizans | June 20 - Aug. 30 |
| Prostrate Amaranth | Amaranthus blitoides | July 1 - Aug. 20 |
| Water Hemp | Acnida tuberculata | July 1 - Aug. 20 |
| Cockscomb | Celosia argentea | July 1 - Sept. 10 |
| **14. RUSSIAN THISTLE GROUP - CHENOPODIACEAE** | | |
| Lamb's Quarter#* | Chenopodium album | June 15 - Sept. 30 |
| Strawberry Blite | Chenopodium capitatum | June 30 - Aug. 15 |
| Narrow-leaved Goosefoot# | Chenopodium leptophyllum | July 1 - Aug. 15 |
| Red Goosefoot | Chenopodium rubrum | July 1 - Aug. 20 |
| Maple-leaved Goosefoot* | Chenopodium hybridium | July 1 - Sept. 15 |
| Russian Pigweed | Axyris amaranthoides | July 1 - Aug. 15 |
| Western Blite | Dondia depressa | July 1 - Aug. 15 |
| Russian Thistle#* | Salsola Kali var. tenuifolia | July 5 - Aug. 30 |
| Kochia, Burning Bush#* | Kochia scoparia | July 12 - Aug. 30 |
| Winged Pigweed | Cycloloma atriplicifolia | July 15 - Aug. 30 |
| Shad Scale# | Atriplex patula | July 25 - Aug. 30 |
| **15. SAGE-WORMWOOD GROUP - COMPOSITAE (ANTHEMIDEAE)** | | |
| Common Mugwort* | Artemisia vulgaris | July 6 - Sept. 1 |
| Absinth# | Artemisia absinthium | Aug. 1 - Sept. 15 |
| Wild Wormwood* | Artemisia caudata | Aug. 1 - Sept. 10 |
| Linear-leaved Wormwood#* | Artemisia dracunculoides | Aug. 1 - Sept. 15 |
| Pasture Sage# | Artemisia frigida | Aug. 5 - Sept. 20 |
| Prairie Sage#* | Artemisia ludoviciana (incl. gnaphalodes) | Aug. 5 - Sept. 20 |
| Saw-leaf Wormwood* | Artemisia serrata | Aug. 10 - Sept. 15 |
| Biennial Wormwood#* | Artemisia biennis | Aug. 10 - Oct. 1 |
| Canada Wormwood | Artemisia canadensis | Aug. 15 - Oct. 1 |
| **16. RAGWEED GROUP - COMPOSITAE (AMBROSIACEAE)** | | |
| Western Ragweed#* | Ambrosia psilostachya | July 28 - Sept. 1 |
| Giant Ragweed#* | Ambrosia trifida | Aug. 2 - Sept. 15 |
| Common Ragweed#* | Ambrosia artemisiifolia | Aug. 5 - Oct. 15 |
| False Ragweed# | Franseria acanthicarpa | Aug. 10 - Sept. 10 |
| Marsh Elder#* | Iva xanthifolia | Aug. 10 - Oct. 1 |
| Beach Clotbur | Xanthium echinatum | Aug. 10 - Sept. 10 |
| Cocklebur# | Xanthium canadense | Aug. 15 - Sept. 15 |
| Cocklebur# | Xanthium speciosum | Aug. 15 - Sept. 20 |

*Marks the species which are of such general distribution and are sufficiently abundant to produce such quantities of pollen as to constitute a serious menace as hay fever species in most localities of the state.

#Indicates those species used in the clinical phase of the University of Minnesota hay fever study.

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is at best a kind of circumstantial evidence and not only fails to demonstrate the actual fact of air pollution by the pollen of species listed but in addition furnishes no basis for evaluating the amount of pollution contributed by each.

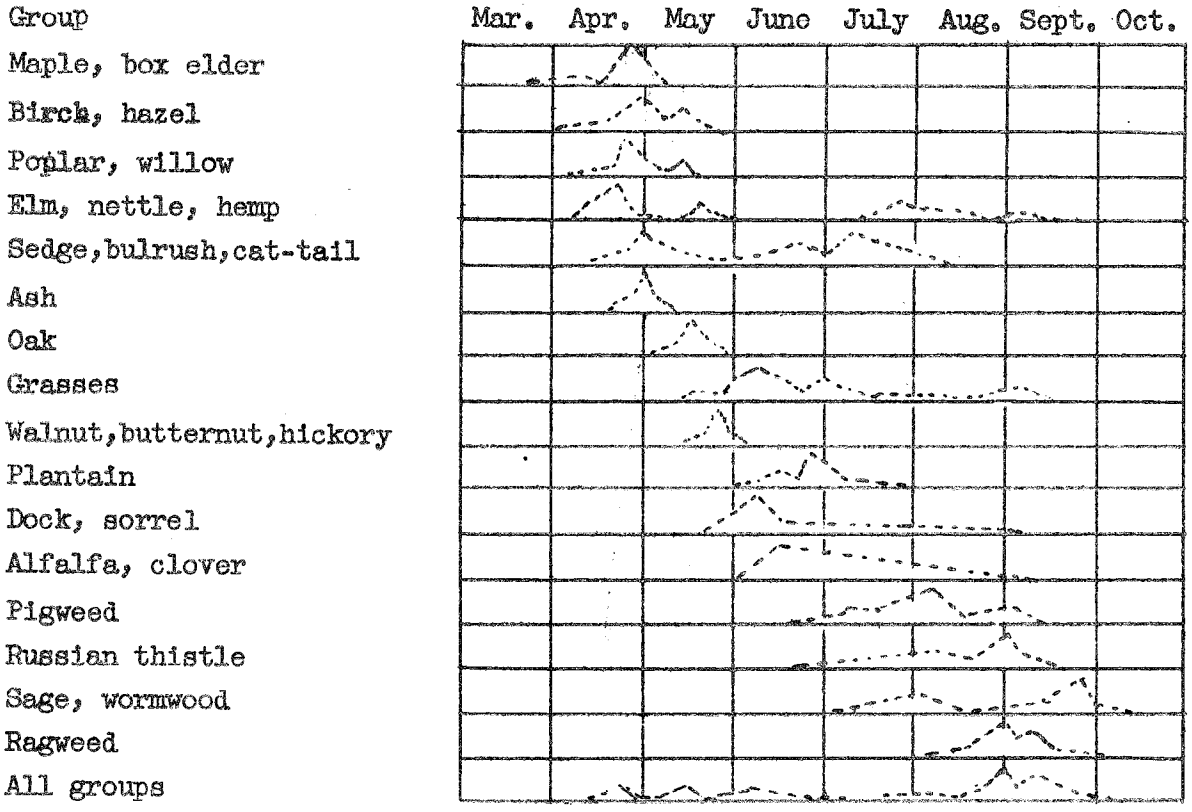
Ellis and Rosendahl[13] in 1933 compiled a list of the wind pollinated plants for Minnesota with dates of pollination as determined by careful field studies carried out over many years. (Table 1.)

In 1932 studies were instituted to obtain more exact information concerning pollen pollution of the air for the region of the Twin Cities and other stations in Minnesota. These studies have been continued each year since that time. The method involves exposure of slides coated with a viscous material for a definite time period (24 hours), identification and numeration by microscopy of the pollens present on a definite area of surface and the calculation from these data the amounts per cubic yard of air. These studies should obviate guesswork in the etiological diagnosis, for they determine exactly which pollens pollute the air, and the exact period or season during which this occurs. At the same time a reasonably accurate index is available concerning the amount of pollution.

## Specificity of the Allergenic Properties of Pollen and the Group Principle

More than 150 species of wind pollinated plants occur either native or are cultivated in the region of the Twin Cities. In our own work, although we earlier considered each of these to be specific, one of our first steps consisted in arranging these into taxonomic groups. The pollen of each species was treated as a specific entity and tests carried out accordingly. It soon became evident that the excitant is either the same or very similar in character in the pollen of species belonging to the same taxonomic group. A patient sensitive to the pollen of one oak for example without exception gave reactions to the pollen of all other oaks tested including oaks not occurring in this region. Similarly patients sensitive to tall ragweed gave positive reactions to pollen of all other members of the same genera as well as to closely related genera. The same results were obtained in regard to members of the grass family and others. On the basis of these results, it seemed to us that the problem of diagnosis of the causes of pollinosis for the individual patient as well as the preparation of the treatment materials might be greatly simplified if this could be reduced to a group basis. At least it seemed well worth a trial. The pollens were therefore arranged in sixteen natural groups. Smoothed curves indicating the period and quantitative air pollution appear in Chart 1. Two exceptions demand important consideration, which fact we[13] have previously pointed out. Group 5, a relatively unimportant one in regard to the number of cases affected, is composed of pollens ecologically but not taxonomically related. It is therefore recommended only as a group test. In case the test is positive and believed to have etiological importance, tests should be made with individual members of the group. Also while Group 4 contains only members of the same family, these are two distinct sub groups in regard to the pollination periods, the first consisting of trees closely related and the second embraces weeds. When considered of etiological importance tests should be made with the sub groups or with the individual members.

CHART I




Duration of Pollination together with Time of Greatest Pollen Production of Each Group

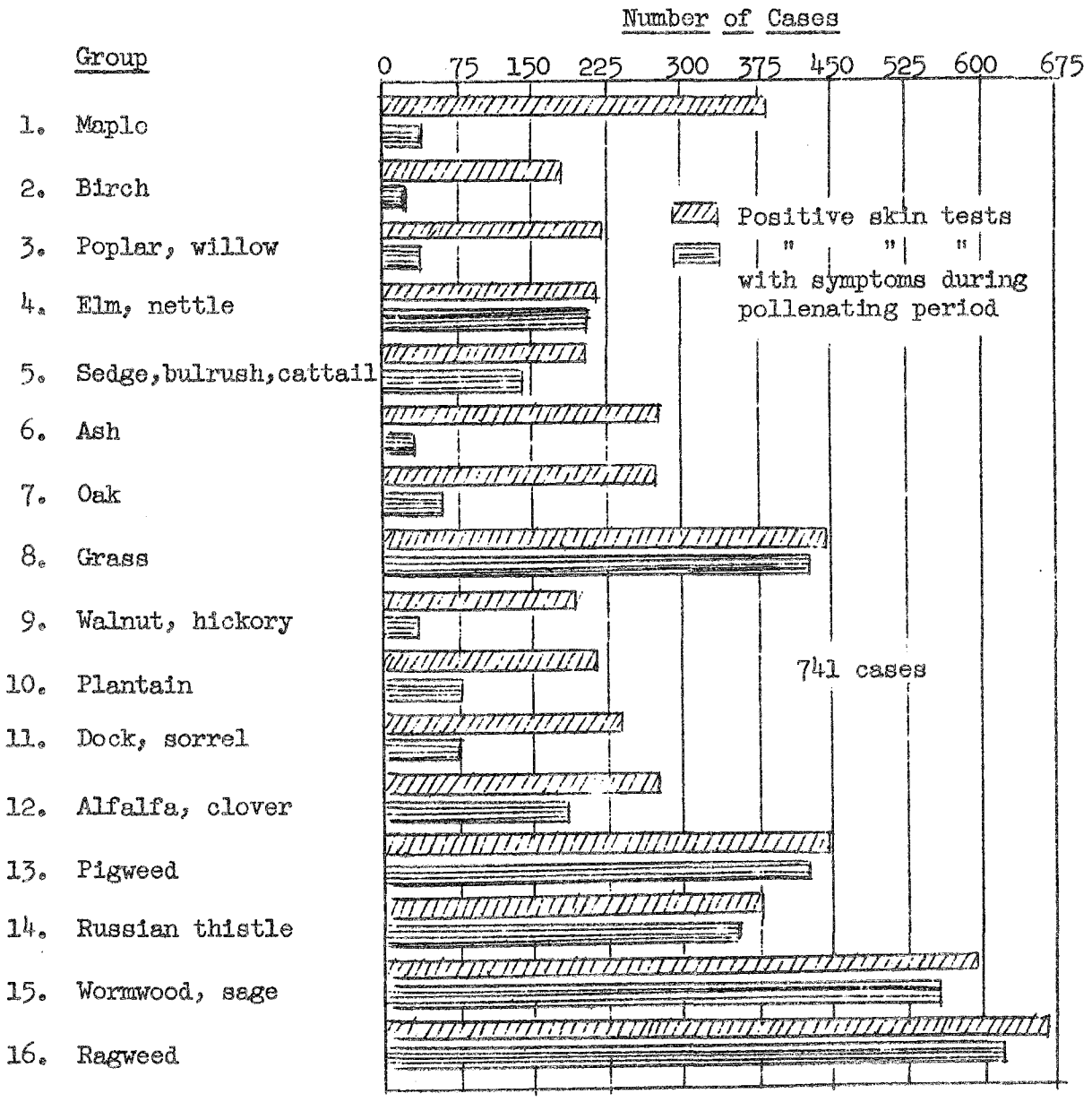
## The Etiologic Diagnosis

The skin test which is the most commonly used technique in the diagnosis of pollinosis is based upon the fact that the skin is usually sensitive to the allergenic substance even though skin manifestations are not a part of the clinical picture. We shall presume that the techniques used in skin testing need not be described here. It may be important to point out, however, that the skin sensitivity does not always parallel in degree the clinical sensitivity. The skin reaction may be marked and the clinical condition mild and vice versa. The skin sensitivity may in occasional cases be so slight as to result in negative tests by the scratch technique requiring intradermal injection for its demonstration.

Another and very important point which deserves more general recognition than thus far attained is that skin sensitivity may exist in marked degree without clinical sensitivity. See Chart 2.

CHART 2

Relative Importance of Pollens as Cause of Hay Fever




This serves to emphasize the importance of the knowledge in regard to atmospheric pollution (Chart 1) in connection with the etiologic diagnosis and to stress the fallibility of conclusions based upon the results of skin tests alone. A pollen which evokes a reaction upon the skin of a given patient can be considered etiologically significant only if the period of atmospheric pollution by this pollen coincides with the period of symptoms of the patient. Notwithstanding the obviousness of this fact it seems not to be generally recognized.

## Multiple Sensitivity

Much misconception leading to errors in the diagnosis and treatment has arisen through the classification of hay fever into certain types as spring, summer, and fall. By tradition these types are caused by trees, grasses, and ragweeds, respectively. This teaching overlooks

many important causes. Furthermore, little consideration is given to multiple sensitivity which is the rule rather than the exception and the overlapping periods wipe out such classification as spring, summer and fall types for the majority of patients. See Table 2.

TABLE 2

Season of Symptoms and Causes for 300 Patients

| Apr. May June July Aug. Sept. Oct. | Number | Percent | Causes |
|---|---|---|---|
| ...———... | 3 | 1. | Trees |
| ——— | 2 | .66 | Trees |
| ....———.... | 12 | 4. | Grass |
| ..———..... | 20 | 6.66 | Weeds (not ragweed)* |
| ..———..... | 10 | 3.33 | Ragweed |
| | | 15.65 | Total |
| ....———... | 118 | 39.33 | Ragweed and weeds* |
| ....———... | 71 | 23.65 | Grass, weeds* & ragweed |
| .....———... | 61 | 20.32 | Trees, grass and weeds |
| .....——— ——..... | 3 | 1. | Trees, weeds |
| | 300 | 99.95 | |

*Includes chiefly members of the amaranth, chenopod, dock and plantain groups.

Treatment

The relief of hay fever by subcutaneous injections of pollen extract was first favorably reported by Noon[15] in 1911. Others were quick to try the method and among the earlier reports in this country was one by a member of our own staff, Henry Ulrich[16], in 1914. Although in a goodly percentage of cases, encouraging reports were made, general dissatisfaction currently prevailed in this locality at least at the initiation of our study.

Circumstances favored Noon's success in that hay fever in England is caused chiefly by the pollen of grasses. Since there is little evidence of any specific differences in the hay fever causing substances of the various grass plants there is little opportunity for error in the specific treatment of grass pollinosis. In our own region as we have seen the problem is much more complex, but this is greatly simplified when the causes have been reduced to a few groups.

Our pollen antigens for treatment as well as for testing are prepared on a group basis. Specific pollens are purchased or collected separately. Each is carefully examined as to correctness and purity and mixtures prepared according to the following formulae.

TABLE 3

COMPOSITION GROUP POLLEN ANTIGENS
IN USE AT THE UNIVERSITY OF MINNESOTA

| | | |
|---|---|---|
| Aceraceae | 1. Maple Group | |
| Acer saccarinum | 25% | (Soft or silver maple) |
| Acer negundo | 75% | (Box elder) |
| Betulaceae | 2. Birch Group | |
| Corylus americana | 25% | (Common hazel) |
| Ostrya virginiana | 25% | (Ironwood) |
| Betula papyrifera | 50% | (Paper or canoe birch) |
| Salicaceae | 3. Cottonwood Group | |
| Populus tremuloides | 20% | (Trembling aspen) |
| Populus deltoides | 50% | (Cottonwood) |
| Populus balsamifera | 20% | (Balsam poplar) |
| Salix fragilis | 10% | (Crack willow) |
| Urticaceae | 4a. Elm Group | |
| Ulmus americana | 80% | (Elm) |
| Morus alba | 10% | (Mulberry, white) |
| Celtis occidentalis | 10% | (Hackberry) |
| Urticaceae | 4b. Nettle Hemp Group | |
| Urtica gracilis | 50% | (Nettle) |
| Cannabis sativa | 50% | (Hemp) |
| Cypereceae | 5a. Sedge-Bulrush Group | |
| Carex stricta | 30% | (Tussock Sedge) |
| Carex longirostris | 30% | (Long-beaked sedge) |
| Scirpus validus | 40% | (Great bulrush) |
| Typhalatifolia | 5b. | (Cat tail) |
| Oleaceae | 6. Ash Group | |
| Fraxinus pennsylvanica (var. lanceolata) | 50% | (Green ash) |
| Fraxinus nigra | 50% | (Black ash) |
| Fagaceae | 7. Oak Group | |
| Quercus macrocarpa | 30% | (Bur oak) |
| Quercus ellipsoidalis | 30% | (Hills oak) |
| Quercus rubrum | 20% | (Red oak) |
| Quercus alba | 20% | (White oak) |

| | | | |
|---|---|---|---|
| Gramineaceae | 8. | Grass Group | |
| Poa pratensis | 50% | | (June Grass) |
| Phleum pratense | 10% | | (Timothy) |
| Agrostis alba | 5% | | (Red Top) |
| Bromus inermis | 5% | | (Brome grass) |
| Andropogon sorghum | 5% | | (Sorghum) |
| Eleusine indica | 5% | | (Goose grass) |
| Zea Mays | 5% | | (Corn) |
| Echinochloa Crus-galli | 5% | | (Barnyard grass) |
| Anthoxanthum odoratum | 5% | | (Sweet vernal) |
| Juglandaceae | 9. | Walnut-Hickory Group | |
| Juglans cinerea | 60% | | (Butternut) |
| Juglans nigra | 25% | | (Black walnut) |
| Carya ovata | 15% | | (Hickory, Shellbark) |
| Plantaginaceae | 10. | Plantain Group | |
| Plantago lanceolata | 50% | | (Rib grass) |
| Plantago major | 50% | | (Common plantain) |
| Polygonaceae | 11. | Dock-Sorrel Group | |
| Rumex acetosella | 40% | | (Sheep sorrel) |
| Rumex crispus | 30% | | (Curled dock) |
| Rumex mexicanus | 30% | | (Pale dock) |
| Leguminosae | 12. | Alfalfa-Clover Group | |
| Medicago sativa | 50% | | (Alfalfa) |
| Meliolatus alba | 50% | | (Sweet clover) |
| Amaranthaceae | 13. | Pigweed Group | |
| Amaranthus retroflexus | 75% | | (Pigweed, red-root) |
| Amaranthus graecizans | 25% | | (Tumbleweed) |
| Chenopodiaceae | 14. | Russian Thistle Group | |
| Chenopodium album | 40% | | (Lamb's quarter) |
| Salsola Kali | 40% | | (Russian thistle) |
| Kochia scoparia | 20% | | (Burning bush) |
| Artemisiaceae | 15. | Wormwood Group | |
| Artemisia vulgaris | 20% | | (Common mugwort) |
| Artemisia Dracunculoides | 50% | | (Dragon sage) |
| Artemisia ludoviciana | 20% | | (Prairie sage) |
| Artemisia frigida | 10% | | (Pasture sage) |
| Ambrosiaceae | 16. | Ragweed Group | |
| Ambrosia artemisiifolia | 50% | | (Common ragweed) |
| Ambrosia trifida | 25% | | (Giant ragweed) |
| Ambrosia psilostachya | 10% | | (Western ragweed) |
| Iva xanthifolia | 10% | | (Marsh elder) |
| Xanthium | 5% | | (Cocklebur) |

The question is frequently asked whether single members of a group should not suffice to desensitize to all members of the same group. At present the question cannot be satisfactorily answered. It is evident that members of the same group possess an excitant in common but it can neither be affirmed nor denied that in addition to this common excitant, additional specific excitants may reside in each. In any case the question is mainly of academic interest for the preparation of group mixtures entails no additional work other than identification of a greater number of pollens. After the dried pollens have been mixed in the proper proportions the extract is prepared in the same manner as would be the case with single extracts.

Success with pollen therapy depends upon the correctness of the diagnosis of the causes. Treatment material for the individual patient must contain antigen representative of all pollens which are demonstrably of clinical importance.

In the case of sensitivity to a single pollen group, the prescription is obviously simple. When two or more groups are involved the question of the proper proportion of the antigens from each in the Rx. naturally arises. No absolute rule can be given, inasmuch as there is no means of accurately determining which has the greater importance in the clinical condition for the patient under consideration. At this point experience and judgment become important and as always these are not infallible. There is, however, one factor which is fairly constant and is of some value as an index to the proper proportions of each group antigen to be used in the compound prescription. This index relates to the relative amounts of atmospheric pollution by each group and therefore the relative amounts to which the patient is naturally exposed. For this purpose we have used the mean of the highest counts observed for each group during several years. Since the ragweed pollen occurs in greater amounts than others, and since comparisons are more easily comprehended on a decimal basis we have given it the value of 100 and calculated the ratio of each of the others accordingly. These ratios are shown in the following table.

TABLE 4

Ratio (approximate) of the Highest Counts of Each Group to That of Ragweed
(Ragweed = 100)

| Group No. | Group | Ratio | Pollen gr. in cu. yd. of air |
|---|---|---|---|
| 16 | Ragweed | 100. | 1036 |
| 15 | Wormwood-Sage | 10. | 101 |
| 14 | Russian Thistle | 7. | 70 |
| 13 | Pigweed | 5. | 53 |
| 12 | Clover-alfalfa | .02 | 2 |
| 11 | Dock | 12.5 | 125 |
| 10 | Plantain | 2.5 | 28 |
| 9 | Butternut | 1.5 | 15 |
| 8 | Grass | 15. | 165 |
| 7 | Oak | 60. | 586 |
| 6 | Ash | 12. | 117 |
| 5 | Bulrush-Sedge | 1. | 10 |
| | Cat-tail | 5. | 50 |
| 4a | Elm | 45. | 461 |
| 4b | Nettle | 12.5 | 125 |
| 3 | Poplar | 65. | 654 |
| 2 | Birch | 12.5 | 127 |
| 1 | Maple-Box Elder | 7.5 | 76 |

While we do not suggest that the proportions for each antigen be calculated strictly on a percentage basis in accordance with these data, it is useful in distributing the emphasis when choosing materials for treatment if more than one antigenic group is to be used in the same prescription.

It is poor practice to include in the same prescription antigenic groups which occur at different seasons. Obviously such a mixture does not permit flexibility of dosage to the separate groups. For example, consider a patient sensitive to oak and ragweed. The symptoms due to the first occur in May, to the second in August to Frost. If the two were included in the same prescription, it is necessary to give a large amount of ragweed antigen in May when it is not needed, and also a continuation of a large amount of oak pollen antigen when this is not needed.

## The Mechanism of Action of Pollen Injections

In the early period of the use of this method, pollinosis was considered a form of anaphylaxis, and desensitization comparable to that which had been demonstrated in experimental anaphylaxis was anticipated. Eventually it became evident that the process of desensitization in pollinosis must be different from that of animal anaphylaxis. When a guinea pig recovers from sublethal anaphylactic shock, it is refractory to further injections. However, reactions of comparable severity occasionally produced unintentionally do not result in this refractory state. Furthermore in the case of anaphylactic desensitization the circulating anaphylactic antibodies either disappear or are greatly reduced whereas in the case of pollinosis, actual increase in the reagins have been observed following shock of extreme severity.

In view of these differences the term hyposensitization was suggested to meet this situation. It was believed that the sensitivity of the patient was gradually lowered but not abolished by neutralization of the reagins.

Another possible explanation is that an increased tolerance results in much the same manner that drug tolerance is acquired. Recently however Cooke and coworkers[17] have concluded on the basis of experiment that as a result of the injection of pollen antigen there develops a specific protective factor, which they termed a "blocking" or "inhibiting antibody." They transfused at the beginning of the pollen season, into untreated patients the blood of successfully treated patients sensitive to the same pollens. Good clinical results were claimed for the recipients of the transfused blood. More recently Longner and Kern[18] have reached the same conclusions based on results with passive transfer tests.

## Results of Treatment

Irrespective of the manner of action there is little room for doubt that good clinical results are obtained with the injection treatment of pollen extracts, or that even complete removal of sensitization apparently does occur in some patients.

The group approach which so greatly simplifies the problem of diagnosis and the choice of materials for treatment has been amply justified by results of prophylactic treatment during several seasons. (See Table 5.) The results shown in this table were obtained by a number of private practitioners located in various parts of the State of Minnesota with pollen antigens prepared at the University. Yet they exceed the results reported by well-known allergists in areas with much less pollen than our own. (See Table 6.)

TABLE 5

Results of Treatment

| Year | | 1935 | 1936 | 1937 | 1938 |
|---|---|---|---|---|---|
| No. Patients | | 143 | 271 | 456 | 520 |
| Relief | Complete | 40% | 58.6% | 51% | 45.6% |
| | Marked | 31% | 26.5% | 30.7% | 34.4% |
| | Fair | 16% | 12.2% | 15.8% | 14% |
| | Slight | 9.5% | 2.2% | 1.7% | 3.6% |
| | None | 3.5% | .4% | .8% | 2.4% |

TABLE 6

Specific Treatment of Hay Fever

| | * | Percentage Results | | |
|---|---|---|---|---|
| | | Excellent | Satisfactory | Poor |
| Cooke and VanderVeer | (3) | 12 | 52 | 36 |
| VanderVeer | (3) | 23 | 49 | 28 |
| Walker | (3) | 25 | 52 | 23 |
| Rackemann | (2) | 10 | 66 | 24 |
| Piness | (1) | 29.6 | 61.5 | 9.1 |
| Ellis, et al | (4) | 49** | 45** | 6** |

* Relative Amounts of Pollen

(3) New York City

(2) Boston

(1) Los Angeles

(4) Minneapolis

** Average for 4 years.

A second factor important to success in pollen therapy concerns the dosage. It is important to remember that although pollen extracts may be standardized with reasonable accuracy patients cannot be. There is at present no means by which we can determine in advance what amount of pollen extract will need to be administered to relieve the symptoms of the patient. Of patients sensitive to the same causes an occasional patient may be relieved on a maximum dosage level of 5000 pollen units* or even less, while another may require ten times as much. See Table 6.) On the average we now attempt to attain a dosage of 15,000 to 20,000 pollen units just prior to date of expected symptoms and to maintain this at weekly intervals for the period during which symptoms have occurred in previous years. In occasional cases we

* A pollen unit represents .00001 mg. of pollen nitrogen.

have found it necessary to give doses of as much as 30,000 units.

Whereas until recently we discontinued treatment at the end of the season of pollination we now advise the continuous or perennial method of treatment. Under this method the tolerance of the patient is maintained at a high level by injections at monthly intervals in the interval between pollination seasons, and at or just prior to the following season a weekly interval of dosage is resumed. This method has certain advantages to both the doctor and the patient. The number of treatments per annum are no greater and are distributed throughout the year.

TABLE 7

Results of Treatment in Relation to Dosage (1938)

| Dose in units | Total cases | Excellent | Good | Satisfactory | Poor |
|---|---|---|---|---|---|
| 5000 or less | 28 | 10 | 9 | 4 | 5 |
| 5000 to 9000 | 108 | 43 | 40 | 21 | 4 |
| 10000 to 14000 | 140 | 63 | 50 | 21 | 6 |
| 15000 to 19000 | 47 | 22 | 15 | 5 | 5 |
| 20000 to 25000 | 86 | 42 | 33 | 8 | 3 |
| 25000 or over | 4 | 2 | | 2 | |

### Phylactic Method of Treatment

Many patients do not seek treatment until the pollen season and the consequent symptoms have already been established. Co-seasonal treatment, consisting of daily injections of small doses is highly recommended by some workers, but our own experience has not been very encouraging and we prefer to emphasize the prophylactic or preseasonal method of treatment followed by the continuous or perennial method.

## ORAL ADMINISTRATION

### Oral Pollen Therapy

No discussion of therapy would be complete without a reference to the oral administration of pollen or pollen extracts. Although no pharmaceutical house of recognized standing has as yet placed a product for oral administration on the open market, some reputable firms have been supplying them to certain clinicians for trial purposes. Other less scrupulous concerns have been offering them for sale, and have circularized the profession with supporting statements from the literature carefully selected to suit their purposes.

The idea is not a new one. Occasional reports have appeared during the past fifteen years. Touart (New York M.J. 116:199, Aug. 16, 1922) treated six hay fever patients by daily ingestion of a phenyl salicylate coated tablet containing 0.1 mg. of pollen protein. While those who were sensitive to grass pollens obtained relief only one out of the six ragweed patients was benefited. Black (J.Lab. & Clin. Med. 12: 1156, Sept. 1927), experimenting on himself, found that ragweed antigen could be demonstrated in the blood and urine after the ingestion of large amounts of ragweed pollen extract. Subsequently (J. Lab. & Clin. Med.13:709, May, 1928) he used oral therapy in a number of grass or ragweed sensitive patients. Complete failures occurred in 20% with oral therapy as against 6% with the injection method. In pollen asthma oral therapy failed completely in 22.2%, while with the hypodermic therapy no complete failures were noted.

Thommen (Asthma and Hay Fever in Therapy and Practice, Springfield, C. C. Thomas, 1931, p.764) cites a satisfactory result in one case with oral pollen therapy, but such attempts in other cases gave variable results. Thommen mentions as disadvantages the large amounts of extract required and the variability of enteral absorption by oral administration of specific peptones. Urbach (Klin. Wchnschr. 10:534, March 21, 1931) succeeded in alleviating the symptoms of a man sensitive to the pollen of the horse chestnut by the oral use of the pollen peptone of the latter. Later he (Wien. klin. Wchnschr. 47:1073, Aug. 31, 1934) wrote more broadly of this type of pollen therapy. He later (Klin. Wchnschr. 12:1797, Nov. 18, 1933) reported similar results by the use of peptones made from the entire pollinating flower.

In 1933 Gatterdam (Southwest. Med. 17:199, June, 1933) reported on oral pollen therapy, which subject he elaborated in 1934 (ibid. 18:130, April, 1934). In his series of 85 hay fever patients treated with pollen orally from 75 to 85% were markedly relieved. He stated further that "where results are not obtained by oral administration alone it can be used as an adjunct along with parenteral injections." The doses were given twice daily, with additional doses for attacks. The usual amount used was from 3 to 15 drops of the 3% extract, diluted in one-fourth glass of water. Mild urticaria or hay fever reactions occasionally resulted from overdosage. The pollens used were cottonwood, ash, Bermuda grass, rabbit bush and the false ragweeds.

The fact that a number of hay fever sufferers had stated that they obtained relief by the eating of honey produced in their vicinity led McGrew (Mil. Surgeon 80:371, May, 1937) to suspect that the pollen in the honey was responsible for the result. He therefore instituted oral pollen therapy. The average dose was four drops of a 1% extract three times daily. Excessive doses caused aggravation of symptoms. Of 33 patients thus treated, 29 were improved. Those with multiple allergy or with asthma did not do well.

Urbach (Munchen. med. Wchnschr. 84: 488, March 26, 1937) reported co-seasonal treatment with proteins of the appropriate grass, grain or flowers (not the pollens, though these were used for testing). Good results are claimed.

Finally, Stier and Hollister (Northwest. Med. 36:166, May, 1937) observed 383 cases extending over three years and found that the oral administration of pollen extracts gave about as good results as were obtained by the hypodermic method. They emphasized the ease of administration of the oral method and the wider margin of safety and stated the co-seasonal treatment was as effective as preseasonal. Their data were obtained largely by the questionnaire method." (J.A.M.A. 109:376, 1937).

The most favorable reports emanate chiefly from the Northwest, Southwest and Europe--areas with relatively less pollen pollution than is general east of the Rocky Mountains. Furthermore, the information in regard to atmospheric pollution as indicated by available published reports is not as complete as it should be.

The few reports from areas grossly infested with ragweed and heavily polluted atmosphere are not especially favorable.

Bernstein and Kirsner (J.Allergy 8: 221, March, 1937) in a recent paper on experimental consideration of oral pollen therapy attacked the problem by passive transfer of blood serum from patients with ragweed hay fever to normal skins. Five grains (0.3 Gm.) of ragweed pollen was then given by mouth to these subjects and no positive skin test occurred at the sensitized sites: this demonstrates that enteral absorption of pollen, in the dosage used, is so slight as to be nondetectable by passive transfer. They also showed that peptic digestion of ragweed pollen, either whole or as extract, does not destroy its activity. This is important as indicating that pollen may be given by mouth without destruction by the gastric juices. This does not agree, however,

with the observations of Moore and Unger (J.Allergy 5:338, May, 1934), who found that pepsin and papain digested timothy and short ragweed pollen to such an extent as to lessen materially the activity of the pollen extract. Bernstein and Kirsner also pointed out that the pollen therapy by mouth has the disadvantaggs of greater expense, of too great a variability of intestinal absorption and of inability to observe local reactions in the matter of dosage.

Bernstein and Feinberg (Archives of Internal Medicine, Aug. 1938) reported on the treatment of twenty patients with ragweed pollen extracts administered orally with complete failure in eighteen cases and partial relief in two cases.

During the season of 1938 we administered pollen extracts orally to fifteen patients. Complete failure was reported by all except one patient who stated that the period of hay fever was shortened by approximately 50%. Among these patients were three who had been completely relieved by pollen injections for two or more seasons previously, and it seems especially significant that hay fever returned in these cases with usual severity.

The dosage in all of our fifteen cases was carried to 100,000 pollen nitrogen units prior to the period at which symptoms were anticipated. No untoward symptoms resulted from oral administration of these large doses, is the best that can be said for the experiment.

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V. GOSSIP

## ST. PATRICK'S DAY, 1939

Today the feast day of the patron saint of the Irish is remembered in every country in song, story, and dance. While all the races have their patron saints the beloved leader of the Celts towers above the others; he is the best known of all of them, because of the imprint he made on his adopted people. Through St. Patrick, the Irish received faith and understanding which, in spite of their mingled bloods, has made them a distinctive people. For centuries, civilization has witnessed the great movement of the Irish race to all countries, the migration being the result of physical limitations in their home land and political and religious persecution. The majority of the Irish in our state belong to the "Potato Famine" group.

During his early years, St. Patrick must have come under the influence of the Roman invaders. His analytical mind always kept his objective within sight. Historians record his efforts as a brilliant example of a first rate tactition. From his family, he inherited religious zeal. At the age of 16, he was captured and sold as a slave to a young Irish prince. The majority of men in his lot would have rebelled against his captors, but he found them intensely interesting. Early in his captivity he determined to evangelize Ireland. For thirty years he studied people's superstitions, customs, and traditions. Following his escape, he entered the religious life. After a few years, he organized a band of 20 followers and returned to Ireland. Realizing that the best defense is a good offense, he immediately started his religious mission on landing in Ireland. His first opponent was the aged Prince Milchu-Mac-Huanan. He defeated his adversary in debate and converted the family. Joining a caravan to the south, he arrived in the spring of the year. There was a great conclave near the River Boyne just outside the great Hall of Tara. While the pagan leaders deliberated as to the exact time to start the great fire on the mountain, St. Patrick started it, thus defying their gods. As he won, he collected more followers. From then on he won controversy after controversy. In Christianizing Ireland, historians record his campaign as the most rapid bloodless advance of the faith ever known. And, true to the great principles taught them by their leader, the Irish have remained good tactitions. Another interesting result of their rapid conversion was the retention of many of their natural characteristics in the new setting. The Irish are the most adaptable of all races. Irish names are to be found in lists of scholars, religious and political leaders, statesmen, and military geniuses of all the races. They preserved the culture of Europe for nearly six centuries. Their music is adapted to ears of all races. In sports they are outstanding. The early history of scientific medicine in Europe is studded with their names, especially in the field of Internal Medicine. In this country, they settled near the seaboard so that unusual numbers are still to be found in the East. Many came directly West about the time of the Civil War. The celebration of St. Patrick's Day is carried on wherever Irish are found. In the early days of our country, these occasions were memorable ones and often accompanied by physical strife. Credited with a great sense of humor, the Irish are thought to be indifferent to the serious things of life. Their sense of humor is apparently the result of taking themselves a little less seriously than most people. They have little interest in occupying the high places except when such high place is occupied by another Irishman. Improvident, thrifty, emotional, calm, excitable, meek, hot-tempered, teetotalers, alcoholics, illiterate, scholars, mystical, practical leaders, followers, in every occupation, social place, and country they are always Irish, thanks to St. Patrick, who secured their destiny for them.

* * *