

formed to contract, and air was admitted through the mercury trap, therefore the resulting gas volumes are contaminated with some air.

ACTION OF LIGHT UPON AN AQUEOUS SOLUTION OF CITRIC ACID AND FERROUS HYDROXIDE.

The ferrous hydroxide was prepared by treating a ferrous sulphate solution with ammonia water in molecular quantities and washing the resulting precipitate by decantation. The precipitate was protected from the air as much as possible, but some ferric hydroxide was formed. The product was assayed by converting the ferrous hydroxide to ferric chloride and then determining the amount of ferric iron according to the U. S. P. method for ferric chloride. (U. S. P., 8th revision, p. 152.)

Two nitrometers were charged with ferrous hydroxide (0.15 Gm.) and citric acid solution (0.3 Gm. in 25 cc H₂O) held over chloroform.

A clear light green solution resulted. The nitrometers were exposed to sunlight for about a month, but no gas was formed. The solution became colorless and clear. Apparently there was no decomposition as in the case of ferric hydroxide and citric acid.

REFERENCES.

1. B. Chilson, U. W. thesis, 1914. (Under the direction of Dr. Langenhan.)
2. The iron assay was carried out according to the U. S. P., 8th revision, p. 161.
3. PROC. A. PH. A., 45, p. 231.
4. 'About 38° according to the U. S. P., p. LIII.

THE DIAGNOSIS AND TREATMENT OF HAY FEVER.*

BY IVOR GRIFFITH.

Newer developments in the field of hay fever diagnosis and therapeutics have completely eclipsed the theories and practices indulged in when this field was first cultivated. This, of course, is the general turn of affairs when any new medical idea is promulgated, for it is only by experience and experiment that the true value of medical discoveries may be obtained.

Formerly it was held that hay fever or pollinosis was due to the unusual sensitiveness, or idiosyncrasy, of the sufferer to the pollen of a vast variety of plants out of Nature's garden. But Nature's garden is expansive, and the old conception of diagnosis meant that a large analytical botanical chart was followed in order to establish the sensitiveness of the person under examination. As time went on, however, it was found that a real majority of patients responded uniformly only to a small class of pollen proteins. Then, again, when closer study was made of pollination methods, it developed that comparatively few plants use the simplest way of broadcasting their pollen grains; namely, by trusting it to the wind. And it is wind-borne pollen that is responsible for most hay fever infections.

So we found, as time went on, that the diagnosis and treatment of hay fever causes became more simplified, and particularly so by the brilliant conception of a "grouping" of the pollen extracts. Investigation proved conclusively that patients who are sensitive to pollens may be "botanically" classified according to plant families.

* Read before Section on Practical Pharmacy and Dispensing, A. Ph. A., Cleveland meeting, 1922.

This botanical relationship of the pollens has even been carried so far as to conceive that patients who are sensitive to more than one pollen of the same family may be treated (or desensitized) by using a pollen extract belonging to only one member of that family, the one chosen being generally the one affording the most pronounced reaction in the diagnostic test.

Scheppergrell, the pioneer in this field of investigation, reduces the principal hay fever pollens into four groups as follows:

- Group 1—Gramineae (the grasses).
- “ 2—Ambrosiaceae (the ragweeds).
- “ 3—Chenopodiaceae (the chenopods).
- “ 4—Artemesias (the wormwoods).

This is a natural botanical grouping; Scheppergrell further summarizes the gross characteristics of hay fever plants as follows:

- (1) They are wind pollinated.
- (2) They are prolific.
- (3) The individual plants are inconspicuous as to color and odor, and pollen formation is very active.

Now, then, the simplified character of present methods of hay fever diagnosis and treatment may be exemplified thus. If a given person is sensitive to corn pollen or red top or orchard grass, he may be desensitized with the most prolific member of that group (the gramineae), namely, timothy. This class or group is generally termed the spring group, and is responsible for the early hay fever. Thus again ragweed will desensitize not only against ragweeds but also against closely related plants of the same group such as cockleburs, golden rod and red root. Sometimes, however, in the case of multiple sensitiveness it is necessary to use, in addition to the class or group representative, the other members of this group to which the patient displays insensitiveness. This is not resorted to until it is established that the patient is not deriving any benefit from treatment with the group representative.

The botanical grouping referred to has displaced the older seasonal grouping, and it is no longer considered good practice to label the treatment products as Fall, Mixed Fall, Spring or Summer extracts.

Group 1 and Group 2 are the more common offenders. Group 3 includes a heterogeneous collection of plants of wide distribution, the commonest being the docks and the amaranths and the true chenopods which are important contributing agents in the perennial hay fever cases. Group 4 includes the several species of the prolific wormwoods which are the chief causes of hay fever in the Pacific and Rocky Mountain states.

In preparing these agents for the market, the pharmaceutical houses have used several methods, each manufacturer selecting a special procedure and insisting that the chosen procedure is best. There is, therefore, a wide disparity in the potency and dependability of pollen proteins. It is our experience, however, in using these pollen extracts in the laboratory, that the acetone-insoluble pollen of the alkalinized aqueous extract of the sifted dried pollen yields best results for both diagnosis and treatment. The protein nitrogen content is high and they are more uniform and stable. Knowledge of the protein nitrogen content¹ is valuable since

¹ Noon establishes the following factor for all pollen proteins: 0.001 = 1 pollen unit.

it is necessary to use this datum in order to establish the pollen unit. A word or two in regard to the conduct of the test and the mode of treatment.

DIAGNOSTIC TESTS.

The technic of the cutaneous test, which is by far the preferable, is as follows: Cleanse patient's forearm with alcohol and rinse well with sterile water. With a sharp needle make a small linear scratch about $\frac{1}{8}$ inch long on the skin of the forearm and avoid drawing blood. Place a small drop of a *N*/100 NaOH solution on the scarified area. Over this dust some of the pollen extract and rub gently but thoroughly into the scarified area. This is repeated at 2-inch linear intervals with the other extracts. It is always necessary to run a control scarification, using only the *N*/100 NaOH. The results are recorded 20 to 30 minutes after applying the tests.

Positive reactions vary in their intensity and no reaction is considered positive that is not definitely larger than the control reaction. A marked positive reaction consists of a definite urticarial wheal with a surrounding area of erythema. A moderately positive reaction shows a similar picture, except that the characteristics are not so pronounced. A mild reaction shows very little of the wheal but a distinct area of erythema. The protein or proteins giving reactions are usually the cause of the symptoms. After ascertaining the cause in this manner, the treatment is next considered.

PROPHYLACTIC TREATMENT.

Prophylactic treatment should begin 4-6 weeks before the attack is scheduled, and from 12-20 injections given. As soon as the specific pollen occurs in the atmosphere, however, the dose must be reduced, as the patient is additionally exposed to atmospheric pollen.

The injecting solution is prepared from the pollen extract, so that a cc represents about 100 units (calculated on the basis of *N* times 6.25 content). These solutions may be procured from the manufacturers and so may all of these products, both diagnostic as well as the treatment agent.

The accepted scheme of dosage is as follows:

Dose.	No. of pollen units.	Dose.	No. of pollen units.
1	12.5	6	125
2	25	7	150
3	50	8	175
4	75	9	200
5	100	10	225
		11 to 20	250

In conclusion our experience has been that a large percentage of hay fever infection can be modified, if not cured, by the pollen extract treatment.

LABORATORY, STETSON HOSPITAL,
PHILADELPHIA, PA.
