

the action of thermal and acutic agencies: the cellular degeneration and destruction which ensue result in the formation locally of substances, derivatives of protoplasm, which are inimical to the welfare of the unaffected tissue; hence inflammation occurs.

Given an area of skin within which a chemical irritant acts and we have all the necessary elements for the development of a dermatitis; there is a stimulation of sensory nerves, reflex response in vessel dilatation and cellular secretion, migration of leucocytes to the site of irritation, development of an exudate, and, lastly, repair of tissue destroyed. We find in chemical irritation, therefore, the answer to the second question: It is the factor needed to induce and to supplement nerve action in the production of inflammation.

With respect to the pathogenesis of the various types of herpetic disease it may be said that the theory of the development of toxins at the site of lesion as the result of cellular disintegration has not been given the attention it merits. Granting that degenerative changes have been found in the spinal ganglia and in nerve trunks at considerable distance from the herpetic eruption: these can not directly produce the latter by conducting, as it were the pathologic condition inflammation from one part of a nerve to its terminations, leaving the intervening section of the nerve trunk intact. The more rational explanation is that these changes in nerve ganglia and trunk modify in some manner the normal trophic impulses, thereby leading to necrotic or necrobiotic alteration in the part innervated where, as suggested by Blaschko,<sup>9</sup> the products of disintegrating protoplasm alone suffice, without the help of secondary infection, to exert a local toxic action and to develop an inflammatory lesion.

#### SUMMARY.

To recapitulate:

1. The idea that nerve impulse alone can initiate inflammation is widespread in dermatology and forms the basis of the explanation of the pathogenesis in several conditions.

2. Reflex action is the form of nerve influence most frequently set forth as the originator of inflammation.

3. A reflex requires for its production two kinds of nerve fiber, sensory and motor, a receiving center, and a stimulus applied at a sensory termination. The sensory impulse thus created is converted at the center into a motor impulse which, passing to the terminations of the motor fibers, causes the organ innervated to perform its function. Any nerve impulse to be directly effective in producing inflammation through reflex action must be motor in nature.

4. Inflammation is a complex which when complete presents the following stages in its development: Dilatation of the blood vessels, slowing of blood stream and margination of leucocytes, diapedesis of cellular and fluid constituents of the blood, with formation of an exudate, and proliferation of fixed tissue elements.

5. Authorities differ in their conception of inflammation. In the broadest view taken, tissue proliferation is always present, migration of leucocytes usually is found, and vascular changes may occur. In the most restricted view, vascular phenomena must be present; in other words, all the stages enumerated must be found. Tissue proliferation and leucocytic migration, therefore, are common to all conceptions of the process.

6. Of the stages mentioned, direct motor impulse can

produce: dilatation of the blood vessels and secretion of fluid by the endothelium. It is possible that it may influence indirectly the slowing of the blood stream, the margination of the leucocytes, and the readiness of passage of the latter through the vessel walls. Motor impulse has no direct relation to the migration of leucocytes and proliferative tissue changes, and hence is not sufficient to produce inflammation unaided and alone.

7. The factor necessary to supplement nerve action must embody the requirements of chemotaxis, the power of attracting leucocytes. This embodiment is found in external irritation.

8. The four sources of irritation, chemical, mechanical, thermal, and actinic, by analysis, may be narrowed to one, namely, chemical. In chemical irritation reside all the essentials for the production of the full inflammation complex; it can initiate the requisite nerve action and can supply those factors which are necessary in addition thereto for the complete development of the process.

9. The products arising from the degeneration or destruction of protoplasm, whether from trauma, perversion of trophic nerve influence, or disturbance of cellular nutrition, may be toxic to living cells, and so furnish the chemical irritation requisite for the initiation of inflammation. This is probably the *modus operandi* in the various forms of herpes.

10. Finally, a purely reflex dermatitis is an impossibility, for the reason that every inflammatory skin lesion, because of the nature of the pathologic process involved, must have in its etiology the factor, local toxic irritation.

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#### PERSONAL EXPERIENCE IN PREVENTING SPREAD OF YELLOW FEVER.

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The control of epidemics of yellow fever has resolved itself into a very simple method, that of adopting measures based on the doctrine of the transmission of yellow fever by means of the *stegomyia* mosquito alone.

During the past summer a number of instances occurred in which an epidemic was controlled long before cold weather set in, but was not entirely eradicated. To entirely eradicate the disease from a community requires a prolonged campaign on the same lines and often waits for the aid of winter weather so inimical to the life of the mosquito.

It was my province to advise authorities in fever-stricken communities as to the best methods to be adopted in order to prevent an epidemic. In this it was always advisable to enlist the co-operation of the public, and for this purpose lectures were given explaining the method of spread of this disease by means of the *stegomyia* and the measures necessary to prevent its spread.

Probably the most serious task was to convince the people that the *stegomyia* mosquito was the only means by which yellow fever is spread. It was recognized that in order to be successful in carrying out the measures to be adopted an educational campaign must be instituted. The convincing experiments of Surgeon Walter Reed and his colleagues were explained and personal observations regarding the spread added much interest to the subject and gave added confidence.

9. Blaschko: Mracek's Handb. d. Hautkrankh., vol. 1, art.: Herpes.

I have had an audience where 90 per cent. were non-believers in the theory of the transmission of yellow fever by the mosquito alone, and when I had finished but few "doubting Thomases" remained, and the new disciples became willing and enthusiastic workers along the lines indicated.

The measures for prevention of spread were then presented and given in the following line of argument:

An epidemic is dependent on three elements for its spread or continuance, viz.: 1, a case of yellow fever; 2, stegomyia mosquitoes; 3, non-immunes.

Without any one of the three elements the disease would cease. Measures for preventing the spread or propagation of yellow fever are, therefore, based on or dependent on the control of any or all of the elements.

- For the first element:—Report every case and screen all cases of fever.

- For the second element:—Destroy the mosquitoes by destroying the breeding places and by killing all mosquitoes which are at large.

- For the third element:—Screen the non-immune or limit his movements as much as possible in order to reduce the chances of his becoming bitten by infected mosquitoes.

Effectually carrying out the first two provisions will give added security to the non-immune.

Could we be sure of knowing every case of yellow fever it would be an easy matter to eradicate the disease.

Here is where we wish to have the public with us. Report every case of illness and treat by screening all such cases of sickness from the bite of the stegomyia mosquito. It is during the first three days of illness that a mosquito can become contaminated, so that the sooner the individual is screened the less time is given for the infection of mosquitoes.

Of course, failure to report or to take such precautions causes the possible continuance or increase of infection.

The second measure which is directed against the mosquito is for the purpose of reducing the number of mosquitoes to a minimum, thereby reducing the chances of any one being bitten by a mosquito.

These measures take into account two conditions: (a) The mosquitoes which are breeding; (b) the adult mosquito at large.

Class A. For the breeding places, oil is used. By covering the surface of water with a film of oil, mosquito larvæ which may be in such places are killed. The larger number of mosquitoes are killed by this process. This oiling reduces the number of mosquitoes to be added and afterward to be considered with Class B.

Whenever practical the breeding place should be screened to eliminate this place from again becoming a breeding place. This screening simply prevents the mosquito from reaching the water for the laying of its eggs, where they will develop into larvæ, pupæ and mosquitoes.

Class B. There are stegomyiæ which are infected, some infective and some which are apt to become infected by biting a known or unknown case of yellow fever, hence measures for the destruction of all such are adopted.

For this purpose fumigation is done with some insecticide. This measure is used at once where a known case of yellow fever has occurred in order to destroy a pos-

sible new focus, that is, kill the mosquitoes which may have become infected by biting this known case. As the mosquito does not fly great distances, the immediate neighborhood is also fumigated to kill any mosquitoes which may have left the known infected residence.

Could the stegomyia mosquito be absolutely stamped out, this element, No. 2, so necessary for the propagation of yellow fever, would give the ideal result, and no more fever or epidemic need be feared. This is, however, much more difficult to accomplish than one would think.

It is evident from this that when sporadic cases occur every stegomyia, i. e., infected stegomyia, has not been eliminated and that measures must be continued.

The reduction of mosquitoes to a minimum is the best that can be accomplished for immediate results, namely, the control of an epidemic.

So much accomplished, assurance may be given the people that there is no more fear from an epidemic and that but few cases will occur.

Practical demonstrations of this were numerous during the past year.

At Tallulah, La., where an epidemic was raging, a campaign conducted by me will show the results which can be accomplished by following the lines indicated in the foregoing. The following account is from an official report I submitted to the surgeon general, Public Health and Marine-Hospital Service:

From Tallulah, La., appeals for help were made to the State Board of Health and I was directed by Surgeon White to proceed at once to that place. I arrived at Tallulah on the afternoon of Sept. 12, 1905, and there I met Dr. Charles Chassignac, representing the State Board of Health.

After a conference with him and the local board of health it was decided that Dr. Chassignac have supervision of the hospitals, physicians and nurses for the treatment of the sick, and that I assume charge of all sanitary matters.

After an inspection of the town and a study of the situation I found that thirty-six blocks out of forty were infected with primary and secondary cases in many houses.

A public meeting was held on the same afternoon at the courthouse, where Dr. Chassignac and I made some remarks on the transmission of yellow fever by means of the mosquito and on the measures to be adopted for its eradication.

I formulated a plan of campaign which consisted of the fumigation and refumigation of every house in the town, the oiling of every cistern, barrel and other breeding place for mosquitoes every five days, and such other sanitation as might be required.

An office with records and supplies was established, fumigating and oiling crews organized and the work started at once under my personal supervision Sept. 13, 1905.

The doctors constituted the inspectors and later a special sanitary inspector was appointed. Two hospitals, one for whites and one for colored, were screened and fumigated and made ready at once for the reception of the sick. For this purpose two hotels were converted into hospitals.

The town was divided into ten districts and the fumigation and oiling forces assigned their work by district each day. Five fumigating gangs of five men and one gang boss in each were employed.

The outfit for each crew consisted of the following:

Cart or wagon.	Measure to hold 2 lbs. sulphur.
Bucket of paste.	Alcohol in small oil can.
Whitewash brush.	Knife.
Ladder.	Matches.
Paper.	Pots and pans.
Flowers of sulphur.	Plank.

Each crew was carefully instructed in every detail regarding the work of fumigation. They were told to first close every window and door on entering a house to be fumigated, and were shown how to make houses airtight by pasting paper over all openings. In order that the work would be clean and that paste might not be smeared over the woodwork, and to avoid spilling of paste on the floors, the men were required to spread the paste over a smooth plank, thoroughly wetting it, then place the strips of paper on this and, when required, the strip of paper was removed and applied. The "boss" of each crew was directed not to do any work himself except to give his entire attention to the details of the work. He had been instructed as to how to light sulphur and the quantity to be used, and what articles should be removed to avoid damage by fumigation.

Personal attention and inspection of the work was made by me during the day.

Sulphur, two pounds per 1,000 cubic feet for two hours, was used in every instance except in some large stores, where two pounds of pyrethrum per 1,000 cubic feet was used for four-hour exposure.

In work of this character my plan was to avoid or reduce every source of error possible in killing out the stegomyia mosquito, so prevalent in this community, and for this reason sulphur was generally employed in the fumigation.

Sources of error in this work are usually two:

1. In pasting up some places may be overlooked through which a mosquito may escape. This error must be accepted, as the best man may overlook something.

2. The agent to be used in fumigation should insure the death of the mosquito. With sulphur in the proper quantity and time of exposure this is certainly sure and simply requires removal of the sulphur pots.

In the use of pyrethrum the mosquito is stunned, and the laborer who does not appreciate the importance of this work in every detail is depended on to kill the mosquito after careful sweeping. This requires also additional time, and the employé usually does such work hastily to accomplish a record for number of houses fumigated.

Two oiling crews of two men in each were instructed to oil all cisterns, barrels, wells, tanks and any other breeding place for mosquitoes.

For this purpose refined oil was used at the first oiling. This oil spreads quickly and forms a good film over the surface of water to be covered. The object was to insure destruction of larvæ as early as possible. Crude oil has a tendency to form large globules and thus leave spaces for the larvæ to reach the surface, where they can obtain air to breathe. At the first oiling a quart of refined oil was used for each cistern, a pint for each barrel and well, a smaller quantity for smaller receptacles. This work was accomplished on the first day by three crews; afterward two crews were operating. On the third day I had a survey taken of known breeding places of mosquitoes which had been oiled, and the following data obtained:

Tanks or cisterns above ground .....	102
Barrels oiled 1st day and emptied on 3d day .....	145
Wells .....	48
Cisterns under ground .....	11
Buckets oiled 1st day, emptied 3d day .....	37

The oiling, as previously stated, was repeated every five days. One crew using refined oil and one crew crude oil for standing water or any possible breeding places covered the town during the intervals. As outhouses might become places for standing water where mosquitoes might deposit their eggs, a crew was formed to do liming of every such closet in the town, and continued to do this until about the end of the campaign.

Mosquito bars were depended on for isolating sick at their houses. Whenever one could be persuaded to go to the hospital this was done. Under the circumstances it was impracticable to employ any other means of screening.

At the end of nine days considerable work had been accomplished and mosquitoes were noticeably reduced in numbers. The effect on the reduction of the fever cases followed the marked reduction in the number of mosquitoes. There remained several houses infected which could not be fumigated on account of serious illness in the house, so that it was fourteen days after the work began before every house had been at least once fumigated.

An incident was noted toward the end of the epidemic. A young man, Mr. S., had taken every precaution against the bite of a mosquito by remaining behind screened doors and windows until one day he was required to go to the postoffice for a money order. This house was badly infected with stegomyia, but could not be fumigated on account of a severe case of yellow fever in the house. While the young man was waiting he suddenly felt a mosquito biting his hand, which he killed when nearly full of blood. He recorded the time, and four days and five hours after the bite went down with a sharp attack of yellow fever. The house was fumigated a few days later.

While the number of cases were being reduced in the town of Tallulah cases were increasing in the surrounding plantations from one to four miles distant until work on the same lines given above was adopted.

Wherever yellow fever was found to be spreading there invariably the *Stegomyia fasciata* was also found. In a number of scattered houses 300 to 400 yards apart I often found barrels full of larvæ, and the stegomyia the only prevailing mosquito.

The following information was obtained from a house-to-house inspection in the town of Tallulah proper, on Sept. 23, 1905:

Whites who have had yellow fever .....	66
Colored who have had yellow fever .....	234
	300
Whites who have not had yellow fever .....	48
Colored who have not had yellow fever .....	144
	192
Total .....	492

It will be understood that the list of those who have had yellow fever means all persons who had been sick any time since August, when the epidemic started. This census does not include refugees nor persons living on the adjoining plantations.

A report of new cases for this period will show the marked decline in number as sanitation progressed. Beginning with September 19 new cases in Tallulah and adjoining plantations were reported and included in this report (given on the next page).

A total of 163 cases were reported between September 13 and 27, which includes the plantations.

It may be stated that approximately 140 of these cases occurred in Tallulah in fifteen days, of which number ninety occurred during the first four days and were probably in the incubating period of the disease when

the work started, and fifty thereafter. This would give 160 cases scattered over thirty-six blocks as having occurred previous to my arrival, Sept. 12, 1905.

No. of day.	Date.	No. new cases.	Deaths.
1	September 13	29	1
2	September 14	26	0
3	September 15	19	0
4	September 16	16	1
5	September 17	9	0
6	September 18	10	0
7	September 19	6	1
8	September 20	12	0
9	September 21	6	0
10	September 22	6	0
11	September 23	5	0
12	September 24	4	0
13	September 25	1 & 7 on plantations.	0
14	September 26	2 & 3 on plantations.	0
15	September 27	1 & 1 on plantations.	1
Total		163	4

The sanitary measures adopted, namely, the extermination of the stegomyia mosquitoes, was the only plan followed for controlling the epidemic. That this was effectual may be seen from the data submitted: that on the fifteenth day only one new case was reported in Tallulah, and this case was the one cited with an incubation of four days and five hours.

Before my departure, September 27, written instructions were left for the continuance of the work in and outside of Tallulah, as follows:

MEMORANDUM.

TALLULAH, Sept. 27, 1905.

- Oil every cistern, barrel of water and other breeding places with refined oil every Saturday.
- Oil every cistern, barrel, etc., on surrounding plantations every Thursday.
- Fumigate as soon as possible all houses with sick, and the two houses on either side, if on same square, and one house immediately across street and the two houses on either side of it if in the same square.
- Lime all closets, particularly if there is water.
- Oil with crude oil any collections of standing water under houses.
- Remove new patients to hospital, if possible, and fumigate residence.
- Screen all new cases.

There remained 190 persons out of the 492 in the town of Tallulah who had not been sick any time during the epidemic, and with the disease practically eradicated few would probably suffer an attack of the disease.

A large number of persons living on the surrounding plantations were also saved from an attack of this disease; how many is unknown.

I was informed by mail under date of Oct. 10, 1905, by Parish Health Officer G. W. Gaines that "only a case shows up averaging town and plantations about one per day." It must here be stated that a new plantation was found to be infected subsequent to my departure, but measures as adopted in others were enforced, which soon controlled its spread.

In conclusion I must say that the successful and favorable termination of the epidemic is rightly due to the hearty co-operation of the physicians and the people in carrying out and submitting to all the measures employed.

**The "Queen of Old Age".**—Under the heading "La Reina de la Vejez", the *Siglo Medico* publishes the portrait of Maria Santos, who is living in good health as a protégée in a Madrid hospital, and celebrated her one hundred and twenty-fourth birthday eight months ago. Her baptismal record is duly attested on the parish register, dating from 1781. She supported herself and her children by peddling vegetables until she lost her eyesight by an accident a few years ago.

GASTRIC ULCER.

SOME SPECIAL FEATURES; BASED ON THE STUDY OF ONE HUNDRED SPECIMENS.

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With the causes of perforation, duration, morphology, and location of gastric ulceration in mind, we studied one hundred pathologic specimens with the hope of adding to what is already known in these lines. We have also included some observations with reference to the occurrence of hemorrhage and peritonitis at different ages in the two sexes.

The following are the results of this work. In 97 ulcers, in which the location could be definitely made out, it was as follows:

	Cases.	Per cent.
Lesser curvature	47	48
Posterior wall	30	31
Anterior wall	17	17
Greater curvature	3	3

The lesser curvature has heretofore been spoken of by writers without a definite understanding as to its limits. It must certainly be considered as more than a line along the upper edge of the organ. We wish to describe it as the space between the orifices and extending 2 cm. both anteriorly and posteriorly. Of the 47 ulcers on the lesser curvature, 25 exceeded these limits on both surfaces and were considered as saddle or horseshoe ulcers.

As to location with reference to orifices, we have followed Mayo's<sup>1</sup> division of the stomach into two parts, a pyloric or grinding portion lying to the right of a line drawn vertically from the right of the cardiac orifice, and a cardiac part to the left of this line. In the pyloric part were 94.3 per cent. of the ulcers, while 5.7 per cent. were in the cardiac part.

Of all the ulcers 73.3 per cent. were on the lesser curvature and posterior surface, which is recognized as the area of chronic ulceration. In seeking an explanation for this part of the stomach being especially liable to ulceration, we were led to consider the influence of the change of position of the organ when filled to that when empty. "The stomach varies greatly in size, position, direction and relations under normal physiologic conditions. . . . As the stomach is distended its fundus fills the left cupola of the diaphragm, pushing the left lobe of the liver toward the right side and tilting up the apex of the heart, while the lower part of the greater curvature lies so as to come in contact with the anterior abdominal wall below the left costal wall and the liver. . . . This movement of the pylorus to the right side is accompanied by one of rotation so that the orifice which, in the empty stomach, is directed toward the right side, looks backward."<sup>2</sup>

It will be seen that the two orifices are the most fixed points of the stomach, the pylorus rotating on distension and pointing backward. As a result of this rotation the greater curvature comes in contact with the anterior abdominal wall, the lesser curvature and orifices are fixed, the posterior wall near the pylorus becomes lower than when empty. It seems reasonable that these fixed points are less able to withstand the dragging from the currents and pressure of food than the more mobile ones. The lesser curvature and posterior pyloric wall would bear more of the wear and tear of the gastric peristalsis. These reasons may be advanced as partial explanations

1. Mayo, W. J.: St. Paul Medical Journal, February, 1904.  
 2. Quain: Dictionary of Medicine.