

## Closing in on the Wicked Germ that Makes Little Cripples



Drilling a Class of Girl Victims of Infantile Paralysis to Correct Spinal Curvature and Other Deformities Caused by the Dreaded Disease.

*New Experiments on Monkeys Have Demonstrated Exactly How the Cruel Disease Reaches the Brain and How, in Some Cases, the Virus May Be Stopped in Transit*

**A**n important announcement just made by the Rockefeller Institute, New York, indicates that science is rapidly gaining ground in its campaign against infantile paralysis.

Infantile paralysis is not only one of the cruelest of diseases, finding its victims mainly in infants and young children and either killing them or crippling them for life, but it has been one of the most baffling.

For a number of years scientists working under the auspices of the Rockefeller Institute have conducted a succession of experiments on monkeys and other animals in an effort to shed further light on the nature and characteristics of this disease, the ultimate object being, of course, to find a preventative or a cure.

Although these experiments and similar experiments conducted by other scientific workers the world over have not yet enabled us to stamp out the disease nor resulted in the discovery of a cure, they have, nevertheless, proven of the greatest value.

They have demonstrated, for instance, that the microbe which causes the disease enters the body by way of the upper respiratory mucous membrane. This fact at once led hospital authorities having infantile paralysis cases under their charge to see to it that the disease was not spread through infected nasal discharges, and in that way the communication of the scourge through doctors and nurses has undoubtedly been averted to a considerable extent.

Describing infantile paralysis, or epidemic poliomyelitis, as it is technically called, Professor Simon Flexner, of the Rockefeller Institute, whose research on the subject is principally responsible for what we know of it to-day, recently declared:

Epidemic poliomyelitis (infantile paralysis) is pre-eminently a disease of early childhood and finds the highest percentage of its victims in the first five years of life, but does not wholly spare older children or even adults. It is admittedly infectious, and while it is true that many more instances of single than of multiple cases occur, yet multiple ones are

not by any means rare. The period of greatest prevalence is during the months of August, September and October in the northern hemisphere and the corresponding months in the southern hemisphere, but the epidemic begins in the early Spring and Summer months, and the disease does not wholly disappear during the Winter months. It does not, therefore, necessarily die out at any period of the year.

Dr. Flexner, in conjunction with Dr. Harold L. Amoss, now announce the result of a series of experiments which not only demonstrate exactly how the virus reaches the brain and spinal column, but how it may be neutralized while in transit from the blood through the cerebro-spinal fluid to the substance of the spinal cord and brain by an injection into the spine of an immune serum. In this way the production of paralysis is averted.

Since the virus was known to pass successively over several days from the blood to the cerebro-spinal fluid, in which it seems not to accumulate,

immune serum was available from several monkeys which had recovered from infantile paralysis and had been subsequently reinforced by large injections of the virus under the skin.

Experiments conducted on monkeys showed conclusively that the virus injected into the veins of the subjects was completely neutralized by the immune serum injected into the spine. No symptoms developed, and the animal remained normal, while monkeys who had received no im-



Diagram Showing the Most Common Route of the Infantile Paralysis Virus. Entering the Nasal Passages at A, It Travels the Olfactory Fibres Until It Reaches the Olfactory Lobe of the Brain, B. Whence It Is Readily Conveyed to the Medulla Oblongata at C, and Invades the Spinal Column.

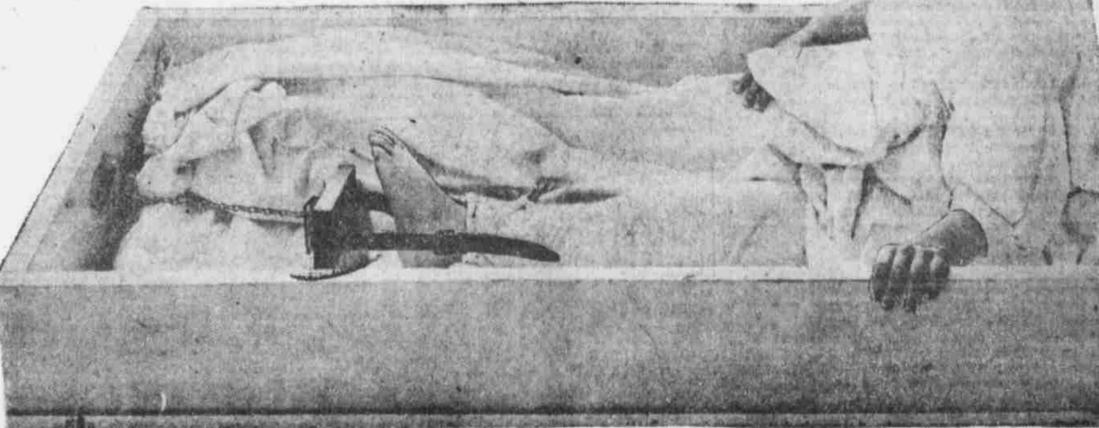


A Spinal Nerve Centre, Showing Diffuse Inflammatory Process and Beginning Death of Nerve Cells. Recent Experiments Show That No Matter Where the Disease-Virus Enters the System, It Ultimately Travels the Spinal Column.

but from which it is transferred to the nervous tissues, it was thought that the introduction of a potent immune serum into the meninges, the membrane enveloping the brain and spinal cord, at intervals over a number of days would suffice to neutralize the translated virus and thus prevent infection. For this purpose im-

fection of the immune serum developed typical poliomyelitis.

Further experiments were conducted to ascertain whether a similar neutralization could be effected in a case in which the virus was introduced directly into the meninges by means of lumbar puncture, and the results were most satisfactory.



One of the Pitiful Victims of Infantile Paralysis Undergoing Stretching Treatment to Lengthen a Shortened Limb.

Discussing the various experiments performed, Drs Flexner and Amoss declare:

"We are confronted with the problem as to the site of entrance of the virus of poliomyelitis into the human body, as well as the manner in which the specific lesions of the disease are produced. The latter question has already been cleared up in large measure. It is now sufficiently obvious that the virus possesses affinity for nervous tissues in general, but for no element of those tissues in particular. On the basis of actual observations it cannot be stated that virus is attracted by the nerve cells, either alone or necessarily in advance of the other structures mentioned, while the experiments show that it is only when the virus is brought to the nervous organs otherwise than by the general blood that the tissues composing them are able readily to remove and attach it to themselves.

"This latter fact is a cardinal point, and one from which we may derive valuable information on the pathogenesis and mode of infection of the disease."

Infection by way of the nerves, it is pointed out, is the more certain the nearer they are to the brain. Where the inoculation is by way of the spine it is sometimes rendered ineffective by reason of the fact that a part, sometimes perhaps all, of the

virus may be carried into the general blood before it can reach and become attached to the nervous tissues.

That is why infection by way of the nasal membrane is more certain in its results than inoculation subcutaneously, the distance between the short olfactory nerve fibre and the brain tissue being very short. Sometimes germs entering the nose never result in infection, however, because they are washed away before they reach the olfactory fibres through which they would be carried to the brain.

Under natural conditions, the investigators point out, it is the upper respiratory mucous membrane that is most often contaminated with the virus and most readily favors its conveyance to the brain.

That the virus never passes direct from the blood to the nervous organs, but finds its way there through the cerebro-spinal fluid, is taken as established, not only by the finding of the virus in the cerebro-spinal fluid after an injection into the blood, but also through the prevention of infection by the injection of immune serum into the spine after infusion of the virus into the veins under conditions insuring infection, but for the protection afforded by the immune serum.

"Thus the experimental evidence

which is upheld by observations in human cases of poliomyelitis," declare the investigators, "supports the view that epidemic poliomyelitis is caused by the entrance into the body of its specific microbial cause or virus, through the upper respiratory mucous membrane to the olfactory lobes of the brain, from which by means of the cerebro-spinal fluid it is distributed throughout the substance of the nervous organs; but, since the virus may reach the brain by way of any nervous channel, and even, although with great difficulty, from the blood, it is, of course, possible that in exceptional instances other modes of infection may arise."

Another important point verified by the experiments was that when the virus within the blood fails to gain access to the central nervous organs, and to set up paralysis, it is destroyed by the body, in the course of which destruction it undergoes, as a result of the action of the spleen, and, perhaps, other organs, diminution of virulence, and the general conclusion is reached that infection in man is local and by way of the nerves rather than general and by way of the blood.

Whether or not the immune serum which enabled the scientists to arrest the development of the disease in experimental cases in which the virus had not yet reached the brain may

be eventually utilized to cure human patients, has yet to be ascertained. No cure has been yet discovered, but science is on the right path, and the near future may witness the discovery of an absolute remedy. In any event, much will have been achieved if the spread of the disease is prevented by the use of immune serum. Poliomyelitis is not a disease with a very high mortality; its chief terror lies in its appalling power to produce deformities. When death does occur it is not the result, as in many infections, of a process of poisoning that robs the patient of strength and consciousness before its imminence, but is caused solely by paralysis of the respiratory function, sometimes with merciful suddenness, but often with painful slowness, without in any degree obscuring the consciousness of the suffocating victim until just before the end is reached. No more terrible tragedy can be witnessed.

When the acute disease has passed away and deformities have begun to make their appearance, it is necessary to resort to mechanical treatment. The Rockefeller Hospital doctors give many suggestions as to the character of this treatment. Massage is said to be a most helpful aid in the treatment. Heat, and especially baking, exert a good influence on the circulation. Of all methods by far the most valuable one is muscle training.

The slow recovery often continues for a very long time, and to be sure that the muscles have regained all the power they are capable of conscientious treatment ought to be continued for a year and a half or two years.

## Your Tongue Shows What You Are

**H**ARDLY any form of amusement is more popular wherever young people get together than that called "Reading Character." This is one of those professional occupations which attracts armies of amateurs of both sexes. Characters in the hands, the face, the shape of the head, in handwriting, in the voice, the walk and the way of wearing one's clothes, all are fascinating subjects for study and practise as a social diversion as well as a means of livelihood.

The newest discovery in the way of character reading is called "Glossomancy"—a sort of twin sister to Chiromancy, in which the tongue plays traitor to its owner, revealing all the merits and deficiencies of his character to the expert.

"Put out your tongue," says the doctor to his patient—and he has been saying so for centuries. The reason for that, as everybody knows, is that the condition of the tongue is a fairly accurate indication of the state of the stomach and the rest of the digestive tract. It is the earliest and simplest means of diagnosis.

It seems strange, therefore, that professional readers of character have not long since discovered the tendency of the tongue to "give away" its owner with respect to personal traits as well as to his ability to digest Welsh rabbits.

In the first place the "Glossomancer," as readily as the doctor, can determine unerringly by a glance at your tongue what is your physical temperament, the foundation of your physical temperament, whether acid or alkaline. A superfluity of hydrochloric acid (gastric juice) in the system produces physical disturbances that are reflected in habitual irritability, a pessimistic view of life and spells of melancholy.

tongue the directions are much simpler than the test for irritability and melancholy just given. The shape and general dimensions of the tongue are relied upon to tell the story. Here are the general rules governing the science of Glossomancy:

A long tongue is indicative of a frank and open nature.

A short tongue reveals a habit of dissimulation, concealment, if not downright deceit.

The broad tongue denotes an unreserved, generous nature.

A narrow tongue indicates a great power of concentration, which is of more importance than the suspicion it suggests that its owner is of a close and grasping nature.

When the tongue is long and broad its owner stands convicted of being a gossip; but when the tongue is long and narrow he is likely to be only moderately outspoken.

Those with the misfortune of a short and broad tongue are by nature untruthful.

The most unfortunate tongue of all is the short and narrow one. Its owner is bad tempered, and of a sly, scheming nature.

It should be understood that there is no authority yet for cataloguing Glossomancy as a "science." You can, perhaps, satisfy yourself about its value by practising on your friends, with whose characters you are already familiar. Parents, by systematically experimenting on their children develop, may perhaps discover another guide as to what traits are to be watched for and influenced into worthy channels.

It is apparent, however, that Glossomancy ought to supply a new and amusing "parlor game." And it should teach bad tempered, sly, deceitful and otherwise detrimental persons to "hold their tongues"—that is, keep them carefully concealed from public view.



Anna Held Showing the Long, Broad Tongue That Denotes Generosity.



Anna Held Imitating the Short Tongue That Denotes Untruthfulness.