INFANTILE PARALYSIS HAS LONG BEEN A PUZZLE TO SCIENTISTS

Disease Which Has Collected Awful Toll of Children Is Caused by Minute Organism That Attacks the Spinal Cord and May Turn a Healthy Baby Into a Cripple Over Night—Picks Strong and Well Children in Preference to the Weak.

New York.—The condition known as infantile paralysis is the result of an attack by an organism or minute parasite on the contents of the spinal cord, into which it makes its way. The spinal cord becomes filled with blood and the sensory and motor cells, as they are called, become disorganized and broken. A healthy baby may be turned into a cripple over night by the disease, which for a long time baffled the most expert skill in therapeutics.

Dr. Simon Flexner, head of the Rockefeller institute, and the man whose discoveries in connection with the disease have given him an international reputation, declares, reports the New York Times, that, according to all records, infantile paralysis seems "to pick the stroug and well children in preference to the weak. Vigorous health seems to be no protection against the disease."

"The infectious agent enters the body chiefly, if not exclusively, through the mucous membranes of the nose and throat," he says. "Poliomyelitis, or infantile paralysis, affects chiefly, but not exclusively, young persons; it may and not infrequently does affect adults and no age is absolutely free of danger of infection."

Doctor Flexner appeared before a meeting of physicians in Brooklyn and explained to them how the disease could be contracted.

"The virus of infantile paralysis exists in the secretions of the nose and throat and in the intestines," he said. "Hence the mode of spread may be by kissing, coughing, and sneezing, which carry the secretions of the nose and throat from one person who may be infected to other persons.

"Since the disease attacks by preference young children and infants whose nasal and mouth secretions are wiped away by mother or nurse, the fingers of these persons readily become contaminated. The care of other children by persons with contaminated fingers may, therefore, lead to the conveying of the infectious micro-organism indirectly from the sick to the healthy. This danger also exists in connection with vendors of food which is eaten uncooked. The existence of cases of infantile paralysis in the homes of vendors of food is, therefore, a perpetual source of danger. Dissemination can be made by means of house flies.

As to Treatment.

"Treatment involves isolation of the acutely ill, proper care and destruction of contaminated discharges, supervision of persons in contact with the ill and of all vendors of food, exclusion of all flies, and general sanitary control of the personnel and habitations of families in which the disease exists.

"No age is absolutely free of danger of infection, although infantile paralysis affects chiefly young persons. It not infrequently affects adults. Moreover, as indicated, the disease is one that can be communicated by healthy persons who have been in contact with the sick, but who are themselves well."

Reports of clinical cases indicate that the onset of the disease is likely to be insidious. Parents paying little heed to slight spasms in their children are in due time shocked by the slow withering of limbs and the beginning of a state which in many instances is indistinguishable from physical helplessness. Then, when it is too late, the question of contagion is raised. On this last point, Doctor Flexner has written:

Of Infectious Origin.

The idea of contagion in respect to epidemic poliomyelitis is not a new one, but appeared in the literature of more than a quarter of a century ago, and of late has been frequently invoked. The clinical course of the disease indicated an infectious origin, but up to very recent times no convincing knowledge concerning the nature of the agent causing infantile paralysis existed. The epidemic of 1907 in this country, in France and in Germany led to a renewed study of the nature of the infection, in the course of which the more subtle and recent methods of bacteriology were employed.

These methods led almost simultaneously, in the United States, by Doctor Lewis and myself, and in France, by Landsteiner and Levaditi, to the discovery that the infectious agent was an extremely minute micro-organism that readily passed through the pores of earthenware filters and constituted, therefore, an example of the so-called filterable viruses, of which at the present time several examples are known to cause infectious diseases in man and the lower animals. The filterable nature of the virus has now been confirmed wherever the subject has been accurately investigated. On acquisition of the fact of the nature of this virus, and of the further fact, on which the discovery of the nature of the virus actually depends, that both the higher and lower monkeys are subject to the experimental disease, rest the recent great advances which have been made in the investigation of infantile paralysis.

Proved by Experiments.

Experiments with monkeys conducted with extreme care proved that infantile paralysis could be transmitted from one patient to another. The disease, moreover, is caused by a most minute organism or germ, as the popular phrase has come to be.

"It is, so far as we can now judge, one of the most minute organisms known to cause disease," says Doctor Flexner. "This conclusion follows from the fact that in aqueous suspension, such as is secured through preparing an emulsion of the spinal cord in distilled water, it passes with great readiness and little or no loss of potency through the pores of the densest and finest porcelain filters, namely, the so-called Chamberland filter. It passes with even greater ease through the somewhat less dense Berkefeld filter. It is extremely doubtful whether the virus has actually been seen. On staining film preparations of the filtrate with mordanting dyes, preparations are secured which under the highest powers of the microscope exhibit minute points, circular or slightly oval in form, which possibly, although not certainly, represent the stained parasite.

Filtrates Highly Potent.

"When the filtrates are examined under the dark microscope, innumerable bright dancing points, devoid of definite size and form, and not truly motile, can be discerned. That these particles represent the micro-organism of poliomyelitis cannot be affirmed, since similar particles are present in filtrates obtained from nervous and other tissues which can be viewed also as consisting of simple protein matter.

"The filtrates are highly potent. Quantities as small as one one-thousandth to one one-hundredth of a cubic centimeter suffice to cause the disease in monkeys after the usual incubation period, when injected into the brain. The virus is highly resistant to exter-

Dr. Simon Flexner.

nal agencies and conditions. It withstands glycerination for weeks or months, very much as the virus of vaccinia or rabies does. It withstands drying over caustic potash for weeks without any or marked reduction in potency, showing a greater degree of resistance than the virus of rabies."

Doctor Flexner has discussed the disease before numerous medical societies, both in this country and Europe, and the following paragraphs are taken from some of his papers:

A Living Organism.

That the virus is a living organism must be concluded from the fact that such minute quantities of it suffice to carry infection through an indefinite series of animals. We have propagated the virus now through 25 generations, representing 25 separate series of monkeys, and as many removes from the original human material supplying it, and the activity of the virus for the monkeys has increased rather than diminished in the course and as the result of the successive transplantations. Whether the virus has been or is to be cultivated outside of the body is still an undecided question.

The spinal cord of a paralyzed monkey always contains the virus we are considering. If a camel's hair pencil or pledget of cotton is covered with some of the broken up tissue of such a cord and painted upon the mucous membrane of monkeys these animals will develop in due time the paralysis and other symptoms of poliomyelitis.

The chief terror of the disease 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.

The employment for treatment of the immune serum, taken from monkeys or from human beings, exercises a definite if not very strong protective action upon inoculated monkeys. Either the disease is prevented altogether, or its evolution is modified in such a manner as to diminish its severity. When the virus used for inoculation is highly adapted to the monkey and thus very virulent, it is more difficult to control the result than when it departs less from the original type and is less active.

How It Acts.

The immune serum has thus far acted best when it was injected into the subdural space on several successive days. This is in conformity with the fact that however introduced into the body the virus establishes itself in communication with the cerebrospinal liquid where it propagates for a time. Later the virus localizes in the nervous tissue itself and becomes accessible not from this liquid only but, probably, from the general blood also.

The serum introduced into the subdural space soon escapes into the blood; and thus a double action is secured; on the one hand it reaches the nervous tissue directly from the cerebrospinal liquid, and on the other indirectly with the blood. An immune horse serum at first gave disappointing results, but latterly its employment by intramuscular injection has given more promise.

The point of departure which we have adopted is the drug hexamethylenamin, (urotropin,) which possesses a degree of antiseptic action in the body and is known to be secreted into the cerebrospinal liquid. When the drug is administrated by mouth it can be detected by chemical tests in the liquid in a short time. When inoculation of virus and administration of the drug are begun together and the administration continued for some days afterward, the development of the paralysis is sometimes but not always averted.

Hexamethylenamin lends itself to modifications by the addition of still other antiseptic groups to its molecule. We have tested a large number of such modifications and have found certain ones to exceed the original compound in protective power, and others to promote the onset of paralysis. None is wholly without some degree of injurious action upon the sensitive and vital organs of the body. But manipulative skill has already succeeded in eliminating the objectionable and improving the valuable features of certain drugs so that they exert action but little upon the organs and severely upon the parasite, when they become useful therapeutic agents.

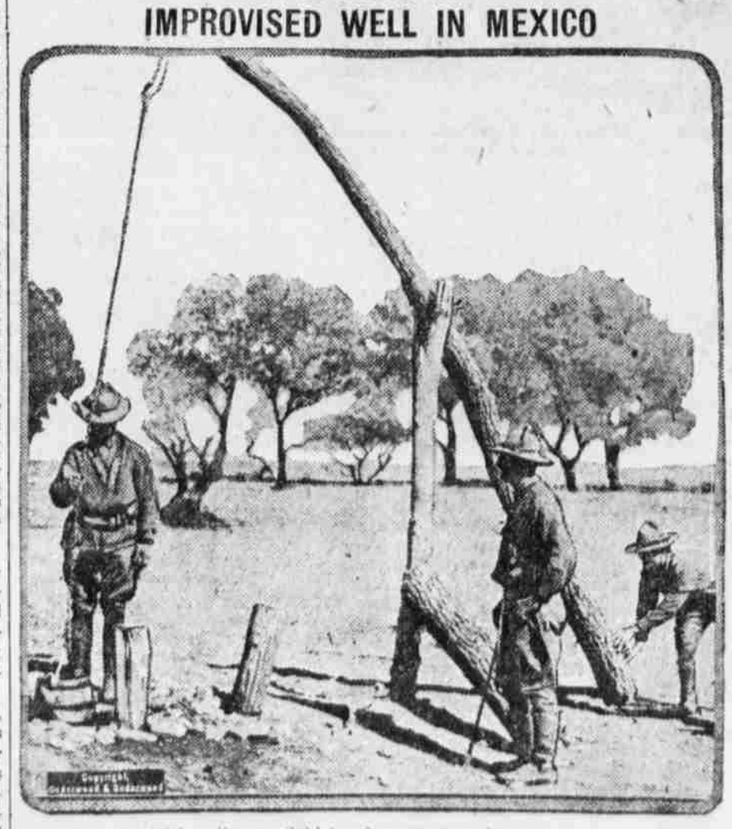
Power May Return.

In the less severe cases of infantile paralysis only a group of muscles undergo complete paralysis and atrophy, and there is always hope of some return of power in a paralyzed limb. Associated with the withered condition of the limb due to the muscular atrophy is an enfeebled circulation, rendering the limb cold, blue and livid; the nutrition of the bones and other parts is involved, so that a limb paralyzed in early infancy does not grow and is shorter than its fellow.

In Scandinavian countries the disease is prevalent and sometimes assumes an epidemic form, whereby one is led to believe that it is due to an infective organism.

Beginning in 1907, or thereabout, a pandemic of the disease arose. The United States, Austria, Germany, and latterly France have certainly had epidemic outbreaks. It is considered a matter of significance that the original foci of the epidemic disease in the United States, occurring in the summer nine years ago, were among the Atlantic seaboard states, and that the two centers of population most seriously affected were Greater New York and Boston. The particular point of importance in this respect arises from the fact that those two centers of population receive first and in a most concentrated way the immigrant populations from northern and eastern Europe.

IMPROVISED WELL IN MEXICO



An improvised well near field headquarters at the American base camp in Mexico. The United States soldier is versatile. He can get himself out of almost any predicament with only the natural resources of the country at his command. The water secured from the wells is of better quality than that found in the waterholes and rivers.

THINKS INDIANS REAL FLAG CONTENDERS

There is at least one manager in the American league who doesn't believe the Cleveland Indians are going to "blow" and he is "Bill" Donovan. The Indians have impressed the Yankee leader as being one of the strongest clubs that ever represented that city and Donovan says it is the most dangerous team in the league.

When it comes to batting in runs the other members of the Indians must "kow-tow" to the hard-hitting right fielder, Elmer Robert Smith-Roth or Robert Elmer Roth-Smith, whichever way you prefer, the combination right gardener having driven in 42 runs for the Indians this season, which is only one-third gone at this writing. The Smith half of the firm has sent 20 runs across, while the Roth half has accounted for 28.

"Chic" Gandil, however, is the individual leader, having driven in 36 runs. "Tris" Speaker, though, is giving him a merry battle, having chased 31 of his team mates across the rubber. "This," however, is batting some 100 points better than "Chic." After passing by the right field firm, we find "Jack" Graney has driven in 24 men, an unusually large number for a lead-off man, who is forced to follow weak batters. In fact, all the Indians are hitting and this combined with the splendid pitching they have had to date has kept them well on top.

BASEBALL STORIES

Outfielder "Greasy" Neale is playing sensationally for Cincinnati.

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The Red Sox don't miss Speaker any more than an auto would miss a spark plug.

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Ping Bodie, with an average of .365, is leading the Pacific Coast league batters in hitting.

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Chicago newspapers have learned that Tinker would like to get Johnny Evers from the Braves.

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McGraw has decided to make a pitcher out of George Kelly, the Giants' extra first baseman and outfielder.

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Speaking of encouragement, there is the headline: "Brooklyn Rooters Wondering Whether Team Will Crack."

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Gilhooley of the New Yorks, is beginning to hit as he did in the International league. He is a capital lead-off man.

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According to importers, ivory is growing scarce, but you'd never believe it after attending a few baseball games.

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Brick Owens is doing sterling work as umpire in the American league. One thing about Brick—he's on the square.

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They are saying that Danny Shay, who once played short for the Cardinals, is liable to get let out as manager of Kansas City.

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Pitcher Bill Harrington, formerly a big card in the New England league, has joined Lynn, that club satisfying the Denver claim to him.

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The Boston Braves have another outfielder. He is Fred Bailey. Mike Kahoe dug him up for Stallings out of Washington and Lee university.

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Manager McCredie of Portland, Ore., makes his players walk to all parks at which they play ball. This is a means of keeping the men in condition.

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An umpire in Little Rock has been sentenced to two years in prison for bootlegging. Which same oughta get more than a passing guffaw out of Johnny Evers.

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And speaking of whiskers, there was a time in the early days of baseball when big leaguers performed on the diamond adorned with facial fringe and got away with it.

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Al Demaree has only won seven out of eight games from the Giants since McGraw gave him the gate. This merely proves that pitchers cast upon the water return in the form of torpedoes.

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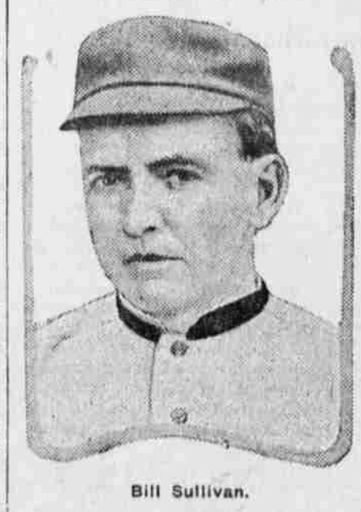
Oscar Horstman has taken the place of "Speed" Martin as the pitching youngster of the Pacific Coast circuit. Horstman is the kind of a twirler that lives on hard work and gets better with each performance.

PATIENCE OF BILL SULLIVAN

Incident Illustrating Determination and Tenaciousness of Veteran Tiger Coach.

A little story is told of the patience and determination of Billy Sullivan, the veteran catcher and Tigers' coach.

The Tigers were in San Antonio, Tex., this spring for a couple of exhibition games. The morning of the first day Sullivan started to clean an old pipe. He shoved a match in the stem, and the wood was caught in the curve of the amber, where it stuck. Sullivan worked on the pipe all morning. He used half a dozen strips of wire in a vain attempt to force the match on through. He failed, however, and was still working on it when the call came to go to the park. Sullivan put the pipe away. That night he worked again, and the next morning he was out in front of the hotel—still working on the pipe. Along about noon he started to grin, and persons interested knew the end was near. A few minutes later the broken match was driven out and Sullivan, taking the stem between his teeth, blew long and vigorously.



Bill Sullivan.

"That must be a valuable pipe," remarked a bystander.

"Nope; it cost 50 cents," replied Sullivan.

"Why didn't you go and buy another? It wasn't worth while to work that long on a 50-cent pipe."

"Maybe not, but I'm not going to let any 50-cent pipe get me down. I started to get that out of the stem and I intended getting it out if it took me a week or a month."

The incident illustrates the patience, the determination and tenaciousness of the man.

Fohl Signs Two Pitchers.

Lee Fohl has added two more pitchers to his staff in Dana Filligim, the star hurler of the South Atlantic league, and John Ferguson, said to be the best in the Ohio State league. Fohl certainly will need more pitchers if he intends to keep his team up at the top of the list.

Tamsett Returns to Game.

Jimmy Tamsett, who announced some time ago that he had retired from baseball, has consented to play some semiprofesshional games in Schenectady.

ALTROCK IS A FAVORITE

Charles Comiskey, owner of the Chicago White Sox, has a high regard for Altrock. "He's always a favorite here," remarked Commy. "He did some great work for us. I remember that post-season tie we had with the Cubs many years ago—the one which was never settled.

"The West siders thought we were through as regards pitchers for the fourteenth game. I went down to the bench and asked Roy Patterson how he felt. Before Roy could answer, Nick chimed in and asked if he couldn't work.

"I took him up on his proposition and let him go in. On the first ball pitched Jimmy Slagle cracked a terrific single to center. Then Altrock wound up and threw the ball over to first, catching Slagle asleep by several feet.

"'It's all off,' I said to myself, as I stood behind the screen under the stand. 'We'll win now.' And we did win. Yes, I've always liked Altrock and am glad whenever he comes to town."

HOLD REINS SEVERAL YEARS

McGraw and Mack Have Piloted Respective Teams Longer Than Any Other Leaders.

During the last ten years in baseball every team in the National and American leagues, with the exception of the Philadelphia Athletics and the New York Giants, have had two or

John McGraw.

more managers. Ten years ago John McGraw was managing the Giants and Connie Mack was leading the Athletics. These two men are still piloting those teams and bid fair to do so for many years to come.

McGraw started his career with the Giants in 1909. Under him the New Yorkers won the National league pennants in 1904 and 1905, and the world's title in 1905. They lost the National league championship in 1908 because of Merkle's famous "boner" and finished third in 1909. In 1910 the Giants finished second, and were first in 1911, 1912 and 1913. The Giants lost the world's series with the Athletics in 1911, and in 1913 were again beaten by the Athletics for the big honors. In 1914 the Giants were nosed out in the pennant fight by the Braves, after the latter had made a whirlwind finish. In 1915, for the first time in McGraw's management, they finished in the cellar.

Connie Mack.

Connie Mack organized the Athletics in 1901. They won the American league championship in 1902, 1905, 1910, 1911, 1913 and 1914. They also captured the world's title in 1910 from the Cubs, and from the Giants in 1911 and 1913. Last year they finished last, for the first time in their career.

Another Pitcher Flaherty.

There's another pitcher Flaherty in the American league. He is a youngster from Dean academy taken on by Hugh Jennings. His first name is Edward. The newcomer, by the way, is a nephew of Pat.