polychromatic cell as seen in the fixed preparation, and are due to the same causes.

3. Owing to the greater delicacy of the vital staining method, the reticulated forms will always be found in considerably greater percentages than stippled or polychromatophilic cells.

4. All these phenomena are evidences of cell regeneration and are indications of the activity of the blood-forming organs.

5. Reticulated forms occur in normal blood in slightly less than 1%; in certain pathological conditions they may be present up to 22% (J. B. H.) or even up to 65% (Chauffard and Feissinger).

6. A study of the reticulated forms in pathological conditions of the blood, especially in secondary anemias, is of value in diagnosis, prognosis and treatment.

I wish to express my indebtedness to Dr. F. C. Shattuck for the privilege of examining the blood of patients in his wards, on which this study is based. To other members of the staff who have allowed me to examine their patients, I am similarly indebted. Likewise I wish to thank Dr. James H. Wright, director of the Pathological Laboratory, who first suggested the investigation to me, and who has given me constant advice and many valuable suggestions. For the accompanying microphotographs I am indebted to Mr. L. S. Brown.

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THE POST-MORTEM DIAGNOSIS, PREVALENCE AND PREVENTION OF RABIES.*

BY LANGDON FROTHINGHAM, M.D.V., BOSTON.

RABIES is one of those diseases which destroys life without causing any gross anatomical pathological lesions which can be considered pathognomonic. There is but one condition in the dog which must be looked upon with much suspicion, and that is the presence of divers foreign bodies in the stomach; but this occurs in only a small percentage of cases, and, even when found, is not

sufficient evidence to warrant a final expression of opinion. An autopsy, therefore, can only be of limited assistance to us in the diagnosis of rabies, and one must seek other more accurate methods.

POST-MORTEM DIAGNOSIS.

The oldest and, until recently, the only accurate method has been the inoculation of animals, and this must still be frequently employed. The animals used for this purpose are rabbits or guinea pigs. The material to be inoculated consists of an emulsion or suspension made by grinding portions of the brain or spinal cord in sterile water, bouillon or glycerine. A few drops of this fluid are injected under the dura or directly into the brain. It is astonishing how much can be introduced in this manner without the animals showing the slightest inconvenience; having recovered from the ether, they continue eating as before, and remain well; only when such material contains the virus of rabies do they show the characteristic symptoms of this disease. Such symptoms may be evident as early as the seventh day but rarely; usually not until between the sixteenth and thirtieth day, and occasionally not for three months or even longer. This is a long time to be kept in suspense if one has been bitten by a supposed rabid dog, and for many years more rapid and equally accurate means of diagnosis have been sought.

In 1903, an Italian observer named Negri discovered certain inclusions in the nerve cells of the brain and cord of animals and people who had died of rabies; he considered these protozoa and the cause of this disease. These inclusions are now known as Negri bodies, and, although they may not be the specific cause of rabies, and their exact nature is not yet established, their presence is certainly diagnostic of the disease; as diagnostic for rabies as the tubercle bacillus is for tuberculosis, and with the same exceptions. For example, one may not be able to demonstrate tubercle bacilli microscopically in a given tubercular material, but, if some of this material is inoculated into a susceptible animal, it becomes tuberculous. Similarly with rabies, one may not be able to demonstrate Negri bodies with the microscope in all cases, but inoculations prove positive. After many experiments by numerous investigators it is now considered quite unnecessary to inoculate animals for diagnostic purposes if these bodies have been discovered.

Negri bodies occur with the greatest frequency and in the greatest abundance in the Ammon's horn (hippocampus major), next in the cerebellum. We, therefore, seek for them in these regions first. There are numerous methods by which they may be clearly brought out. The section method, the only one at first known, consumes much time and necessitates much labor, although the peculiar arrangement of the cells of the Ammon's horn and the distribution of the bodies in these cells lessens the labor of the microscopic examination and the time expended therein. I have, therefore, found my impression prepara-

* Read at the annual meeting of The Massachusetts Medical Society, June 16, 1909.

tions¹ of the Ammon's horn, and also of the cerebellum, of the greatest assistance, inasmuch as they are excellent substitutes for sections, especially those made from the hippocampus, in which maximum accuracy is combined with minimum expenditure of time and labor. [Demonstration by lantern slides of sections, impression preparations and Negri bodies.]

There is still another means of diagnosis, and one which often proves of great value when Negri bodies cannot be found or inoculations cannot be made, for it not infrequently happens that a dog's brain has been completely blown away by shooting with a shotgun at close range, or that a brain is so decomposed that it cannot be used either for microscopic examination or inoculation.

In such instances we may examine the nerve ganglia with profit. Any ganglion will suffice, such as the posterior root, plexiform or Gasserian. The lesions here found are usually very marked and characteristic. They consist of a multiplication of cells within the capsule of the ganglion cell, the ganglion cell itself becoming gradually destroyed and its place being finally occupied by the invading cells, thus forming a focus suggestive of a tubercle. Such lesions may be very extensive, involving most of the ganglion, or only a few ganglion cells may be attacked in this, the typical form. Another, the atypical form, consists of a more or less general infiltration of cells without such characteristic grouping, though usually, and especially when the lesions are extensive, the two forms exist together. Such lesions are not pathognomonic of rabies, for they rarely occur in other disorders, but from the study of more than seven hundred Gasserian ganglia from animals — mostly dogs — I find the percentage of error is very small, and I feel that one is justified in making a diagnosis by this means when others fail. [Lantern slides illustrating the lesions.]

To sum up, then, I adhere to the following rules in examining every case which is sent to me for diagnosis:

1. Seek for Negri bodies in impression preparations of Ammon's horn, cerebellum and cortex.

¹ Frothingham, Langdon: The Rapid Diagnosis of Rabies. Jour. Med. Research, 1906. Zur Schnellen Darstellung der Negrischen Körperchen. Zeitschr. für Tiermedizin, 1907. Impression Preparations and the Van Gieson Stain for Negri Bodies. Am. Jour. Pub. Hyg., 1908.

If not found, sections are later studied as a control, and, I may add here, always with the same results as the impressions.

If bodies are found, no further study is necessary.

2. If bodies are not found, the Gasserian ganglia are examined for lesions, and, when possible, animals are inoculated, whether the ganglia are positive or not.

Thus you can see that a diagnosis is made only after careful study fully in accord with modern scientific methods; there is no jumping at conclusions.

PREVALENCE.

We now come to the prevalence of rabies. In Massachusetts, vital statistics in animals were not kept until recently, but we know that there must have been an outbreak of rabies between the years 1876 and 1882, for during that period 44 people died of this disease. Again between 1888 and 1894 there was another outbreak, for during this period 45 Massachusetts people died of rabies.

In 1895, vital statistics regarding rabies began to be recorded, and the following tables, made up or copied directly from the reports of the Cattle Commission (now called Cattle Bureau), and from my own records, show with the usual degree of accuracy the amount of rabies we have had in Massachusetts for the past dozen years. The figures do not exaggerate matters, for undoubtedly numerous cases of rabies, as well as many suspected cases, were never reported. Some of the tables are reproduced from the reports in order to give you some idea of this branch of the Cattle Bureau's work, and that you may note numerous interesting details regarding this disease, such as its distribution throughout the state, kind and number of animals affected and quarantined, period of incubation after inoculation, etc.

RABIES IN MASSACHUSETTS.

1895.

DOGS REPORTED TO CATTLE COMMISSION.

Date.	Town.	No. of Cases.
Oct. 15,	Newton	1
Nov. 23,		1 (Inoculations + Dr. Ernst.)
Dec. 20,	Millbury	1
" 30,	Watertown	1 (Ran from Revere.)

1896.

INOCULATION FOR RABIES.

Description of Rabid Animals.	Town.	Rabbits Inoculated.	Rabies, First Symptom.	Days Elapsed.
C. C. 432, Newfoundland dog, (a)	Waltham	Jan. 6	Jan. 20	14
455, poodle	Revere	" 21	Feb. 4	15
489, setter	Hardwick	Feb. 21	March 11	19
494, black and tan	Chelsea	" 29	" 15	15
	Haverhill	March 1	" 15	14
503, collie	Lowell	" 14	June 11	89
509, spaniel	Salem	" 18	April 2	15
" "	Boston	April 1	July 1	91
532, dog	Cambridge	May 16	June 26	41
— horse	Haverhill	April 14	" 19	63
545, dog	Lynnfield	June 12	July 7	25
565, cat	Cambridge	July 23	Aug. 1	7
611, whippet	South Hadley	Nov. 9	Nov. 23	14
631, mongrel	" "	" 27		
632, pug	Haverhill	Dec. 3		
— dog	Boston	" 18		

You will note in this table that, as usual, most of the cases of rabies occur in the dog, and that they are not more frequent in the warm months than in the cold; in fact, less so in this instance. Note also the extraordinary difference in the period of incubation after subdural inoculation, varying from seven to ninety-one days. From a dog bite the period is sometimes as long as five to eight months in the bitten animal, and exceptionally fifteen to twenty months. Instances of two-year periods have been reported, but may be open to criticism.

The inoculations recorded in the preceding table were mostly made by Dr. W. F. Whitney, who kindly permitted me to assist him from time to time.

The table opposite shows the number of cases reported during the year, either rabid or suspected of being so.

In this and the following laboratory reports the number of cases marked "doubtful" means that at the time the report was made the laboratory work was still uncompleted, or there was no proof that the case was or was not one of

rabies; either the brain was so decomposed that it could not be used to obtain further evidence, or inoculated animals were still under observation.

1897.

Month.	City or Town.	Animal.	Number of Cases.
January	Boston	Dog	3
"	Holyoke	"	2
"	Waltham	"	2
February	Holyoke	"	3
March	"	"	1
May	Lynn	"	1
July	Boston	"	2
"	Lynn	"	1
August	Holyoke	"	1
"	South Hadley	Cow	2
September	"	"	5
November	Sudbury	Dog	1
"	Melrose	"	1
"	South Hadley	Cow	1
December	Wakefield	Dog	1
Total number of cases reported			27

LABORATORY REPORT (Frothingham).

Positive, 8. Negative, 3. Doubtful, 1.

1898.

Month.	Town.	Species of Animal.	Result of Rabbit Test.	Remarks.
Jan.	Braintree	Dog	Positive (Dr. Frothingham)	
"	Lynn	"	" " "	Bit a man, a boy and five dogs.
"	"	"	" " "	Bit a man who went to Pasteur Institute, and a mare, that died of rabies. Four dogs were quarantined by local inspector for ninety days, but none of them have ever developed rabies, and may not have been bitten.
"	Salem	"	Positive (at Pasteur Institute, New York)	Shot as supposed case of rabies.
"	Swampscott	"	No test made	
"	Melrose	"	Positive (Dr. Frothingham)	Killed as supposed case of rabies.
"	Lynn	"	No test made	Bitten by a dog as given above.
"	Salem	Mare	Positive (Dr. Frothingham)	Reported to have bitten owner and several dogs.
Feb.	Lynn	Dog	" " "	Killed by order of Board of Health.
"	Salem	"	No test made	Head when it arrived too decomposed to use.
"	Danvers	"	" " "	Killed as rabid by dog officer.
"	Lynn	"	" " "	Killed as rabid by dog officer.
March	Swampscott	"	Positive (Dr. Frothingham)	Came from Ocean Street, Lynn. One dog bitten by him shot; eleven other dogs nearby quarantined ninety days, then released.
"	Lynn	"	No test made	Killed as rabid by dog officer.
"	"	"	Positive (Dr. Frothingham)	
"	"	"	" " "	Killed as supposed rabies by dog officer.
April	Watertown	"	Negative (Dr. Frothingham)	Killed by policeman after biting a child.
"	Haverhill	"	Positive " "	Killed by member of Board of Health.
June	Lynn	"	Negative " "	Came from Swampscott. Reported to have bitten several people and dogs. Two dogs quarantined for ninety days were released, having shown no symptoms of rabies.
July	"	"	Positive (Dr. W. F. Whitney, for Newton Board of Health)	Killed by member of Board of Health.
Sept.	"	"	Positive (Dr. Frothingham)	Quarantined by inspector as tuberculous; probably chronic bronchitis.
"	"	"	Negative " "	Was not a case of rabies, but viciousness. Killed by consent of owner.
"	Boston	"	" " "	Killed as case of rabies by inspector of animals.
"	Newton	"	" " "	Reported as rabid. Bit three people and several dogs. Twelve dogs in the neighborhood were quarantined, two have since been killed by their owners to avoid danger, and two have died of rabies. Eight are still in quarantine.
Oct.	"	"	Positive (Dr. W. F. Whitney, for Newton Board of Health)	Bitten by dog, as reported above.
"	"	"	Positive (Dr. Frothingham)	Bitten by dog as reported above.
"	Lynn	"	Negative " "	Bit several people and dogs. Three dogs are still in quarantine as a matter of precaution.
"	Quincy	Cat	Positive " "	Bit two or three persons.
"	Boston	Dog	" " "	
"	"	Brown rat	Negative " "	Bit a woman.
"	Dracut	Dog	Positive " "	Bit a man; injury slight.
Nov.	Lowell	"	" " "	
Dec.	Doston	"	" " "	Reported as case of rabies by inspector of animals.

1899. LABORATORY REPORT (Frothingham).

Date.	Town.	Animal.	Result of Inoculation.
Jan. 16	Ipswich	Cow	Positive
" 16	Melrose	Cat	0
Feb. 7	Swampscott	Dog	0
March 22	Ipswich	"	0
" 24	"	"	Positive
June 1	Lynn	"	0
Nov. 14	Swampscott	"	0
" 28	Salem	"	0

1900.

Date.	Town.	Animal.	Result of Inoculation.
Jan. 8.	Newton	Dog	0
Dec. 12	Watertown	"	Positive
" 12	"	"	"
" 12	"	"	"

You will note that a rabid dog, unaccounted for, probably passed through Ipswich, perhaps during the latter part of 1898, and bit this cow and dog.

During the year 1899 one person from Massachusetts took the Pasteur preventive treatment.

1901. LABORATORY REPORT (Frothingham).

Date.	Town.	Animal.	Result of Inoculation.
Jan. 7	Waltham	Dog	Positive
" 22	"	"	"
Feb. 5	Chelsea	"	0
March 29	?	"	0
July 18	Waltham	"	0
Oct. 12	Malden	"	Positive
Nov. 18	West Dennis	"	0

In addition to these, 15 cases were investigated by the Cattle Commission, 8 of which were undoubtedly rabid.

1902.

Date.	Town.	Animal.	Result of Inoculation.
Jan. 22	Cambridge	Dog	0
" 22	Lowell	"	Positive
June 3	Watertown	"	0
Aug. 6	Lynn	"	0
" 22	Newton	"	0
Dec. 19	Pittsfield	"	Positive

1903.

Date.	Town.	Animal.	Result of Inoculation.
March 14	?	Dog	0
May 6	Ware	"	0
" 21	Cambridge	"	0
June 24	Westboro	Horse	Positive
Sept. 30	Stoughton	Dog	0
" —	Boston	"	Positive (Dr. Burr)

1904.

Date.	Town.	Animal.	Result of Inoculation.
July 18	Lowell	Dog	0
Nov. 11	Somerville	"	Positive
Dec. 20	Milton	"	"

During the year 1901, one Massachusetts person took the Pasteur treatment, and likewise one in 1902 and one in 1903.

The year 1904 marks the beginning of the present outbreak of rabies, with the two cases as shown in the above table. You can, therefore, see that Massachusetts has not been free from this disease for a great many years, although the number has not often been alarming. It must also be remembered that during all these years precautions have been taken to prevent the dis-

ease from spreading, such as local muzzling and quarantining, and destruction of dogs known to have been bitten by rabid ones.

1905.

The Cattle Bureau investigated nearly 300 cases of rabies, of which 100 were undoubtedly rabid.

LABORATORY REPORT (Frothingham).

Positive, 39. Negative, 13. Doubtful, 2.

During the year 12 persons took the Pasteur preventive treatment and 2 died of rabies resulting from dog bites. Two suspicious dogs were reported in the city of Boston, but examination at the laboratory of the Board of Health showed they were not rabid.

RABIES IN MASSACHUSETTS, EXCLUSIVE OF BOSTON.

1906.

	Dogs.	Cattle.	Horses.	Goats.	Pigs.	Cats.
Killed or died with rabies,	293	38	5			
Killed by owners or died in quarantine, not rabid, but exposed,	256					2
Reported as rabid, but found free from the disease,	62					
Released from quarantine,	380	15	4	2		
Animals died, still undecided,			1		1	
Still in quarantine Dec. 1,	98	4	1			1
Totals,	1,089	57	11	2	3	1
Grand total,			1,163.			

LABORATORY REPORT (Frothingham).

Positive, 139. Negative, 35. Doubtful, 13.

BOSTON BOARD OF HEALTH. (LABORATORY REPORT.)

Positive, 36. Negative, 11.

During the year 1906, 8 Massachusetts people died of rabies, and 133 took the preventive treatment. During this year cases in animals were reported from nearly every county in the state. By a legislative act the city of Boston has for some years been permitted to investigate cases of rabies occurring within its limits, and such cases need not be reported to the Cattle Bureau except by courtesy, and are not included in the above or subsequent tables from the Cattle Bureau reports.

1907.

	Dogs.	Cattle.	Horses.	Pigs.	Cats.	Persons.
Killed or died with rabies,	662	21	6	4	4	3
Killed by owners or died in quarantine, not rabid, but exposed,	522	2		10	11	
Reported as rabid, but found free from disease,	46	5			5	
Released from quarantine,	458	6	5	2	3	
Animals still in quarantine,	209	1	2		1	
Totals,	1,897	35	13	16	24	3
Grand total,			1,988.			

In addition to the above, the veterinarian of the Boston Board of Health reported 79 cases of rabies in dogs and 2 in cattle that are not included in the table, making a total of 741 dogs and 23 cattle to have had rabies during the year.

LABORATORY REPORT (Frothingham).

Positive, 203. Negative, 60. Doubtful, 15.

BOSTON BOARD OF HEALTH. (LABORATORY REPORT.)

Positive, 41. Negative, 13.

In the year 1907, 3 Massachusetts people died of rabies and 165 took the preventive treatment.

You observe by the table that few of the animals reported as rabid were sent to the laboratory for confirmation of the diagnosis. In many cases it was quite unnecessary to do so, as the clinical symptoms with the history of a bite by a rabid or stray dog was sufficient evidence. It is, therefore, a commendable custom to send for a laboratory diagnosis only such animals as have bitten other animals or people, those appearing in an uninfected district and such others as it seems for the best interests of the community to have examined.

1908.

	Dogs.	Horses.	Cattle.	Swine.	Cats.	Goats.
Killed or died with rabies,	454	5	32	14	1	1
Killed or died in quarantine, not rabid, but exposed,	412		8	87	10	1
Reported as rabid, but found free from disease,	27		4		2	
Released from quarantine,	402	4	3	1	2	
Animals still in quarantine,	82		4	1	5	
	1,377	9	51	103	20	2
Grand total,	1,562.					

In addition to these animals, there have been at least 6 cases of rabies in human beings, 3 in Boston and the others in Newton, Southbridge and Bernardston. Five of these people had no idea that the dog which infected them had rabies and consequently received no special treatment. The sixth had ample warning, began the Pasteur treatment, then changed to Christian Science.

The veterinarian of the Boston Board of Health reports 50 cases of rabies in dogs in that city during the year.

1908.

LABORATORY REPORT (Frothingham).

Positive, 120. Negative, 45. Doubtful, 6.

BOSTON BOARD OF HEALTH. (LABORATORY REPORT.)

Positive, 26. Negative, 25. Doubtful, 2.

In 1908 probably more than 8 Massachusetts people died of rabies (complete reports not available when this was written) and 139 took the preventive treatment.

The unusually large number of pigs in the above table is accounted for by the fact that a rabid

dog got into a herd of about 100 swine and bit several of them, how many was not known. Some time afterwards a few of these pigs became rabid and died or were killed, and as every now and then one would "go mad" and bite others, it was decided that the only sane method of handling the situation was to kill the whole herd.

The year 1909 has thus far shown a decided and very gratifying decrease in the number of rabid animals, although several people have died of rabies at the Boston City Hospital.

You are now familiar with the conditions as they are and have been in Massachusetts, and it is interesting to note in passing that few states in the union are not experiencing similar troubles to a greater or less degree, and this brings us naturally to the subject of prevention.

PREVENTION.

It is often impossible, or a very difficult matter, to cure an infectious disease; on the other hand, it is often a very simple matter to prevent it.

There is no known cure for rabies after symptoms have appeared; on the other hand, there is no infectious disease which is so absolutely simple to prevent (and yet so difficult owing to misdirected sympathy of the so-called humane).

Consider for a moment the chief source of infection! It is the bite of a rabid dog, who in certain conditions will run for twenty to eighty miles biting nearly every animal and person it meets. For practical purposes we can exclude all other possible sources of infection. It is perfectly safe to say that, if there were no dogs, there would be no rabies, at least in countries where the wolf does not have to be taken into consideration. Therefore, if you wish to prevent rabies, all you have to do is to prevent your dogs from biting, and the only way to prevent a dog from biting is to make him wear a muzzle.

The popular sentiment against the use of a proper, well-fitting, comfortable muzzle, which permits the dog perfect freedom to pant and lap water, and yet prevents him from biting, is the more extraordinary since it is very apt to come from a class of humane people sometimes called "dog-lovers";² people, often of intelligence, who have visited foreign countries where dogs are always muzzled when on the streets, and yet they never observed any more "suffering" or "annoyance" than among the horses in harness. Moreover, if these people really had the prevention of suffering at heart, they could read the history of rabies and find that wherever muzzling is properly enforced, the rabies is reduced to a minimum, and when the muzzles are removed too soon the maximum gradually returns.

Let me give you one instance of what proper muzzling will do, of course combined with proper enforcement of licensing laws and the destruction of all unlicensed and unmuzzled dogs.

This scheme is so readily grasped that explanation seems unnecessary. The number of cases of rabies here given refer *only to the dog*. Other

²I do not refer to that other large class who at bottom simply find the muzzle too much trouble to themselves and consequently flock to the "dog-lovers" banner.

animals are excluded, and I have only added the number of deaths in man to show how they rise and fall with the number in the dog. Remember that many English people annually took the preventive treatment; for example, 147 in the year 1892. These are the only figures that I have, but, if so many took the treatment that year when so few dogs were reported, it is fair to assume that the number increased when more dogs were affected.

Note that in 1892 there were but 38 rabid dogs in England. At this time the authorities listened to a petition of "dog lovers" and removed the "cruel muzzle," with the result that during the next five years 1,602 dogs, to say nothing of many other animals, and 51 people died of the most agonizing disease known to the medical world. In spite of this fearful lesson, the humanitarians (?) came again in 1899 with another petition signed by 50,000 of them asking once more to be relieved of the annoyance of the muzzle. Fearing a repetition of the above calamity, the authorities wisely remained obdurate, with the result that in 1903 no case of rabies occurred in England, and there has been none since. The sudden rise to 13 cases in 1902 is very instructive. These cases occurred in a wild, hilly district of Wales, where both people and dogs were difficult to control, but by rigid enforcement of the laws the trouble was stamped out.

The muzzles have been removed from the dogs in England, but will be resumed with the appearance of the first case of rabies. Moreover, there is a strict quarantine of six months imposed upon any dog brought into the country.

Many people argue that the matter was comparatively simple in England, but similar results cannot be accomplished in Massachusetts, as it is not a "little island." This is true to a certain extent only. If all Massachusetts dogs were muzzled and a rabid dog should come over the boundary from a neighboring state and bite a number of our dogs, a certain percentage of these dogs would certainly develop rabies if not destroyed, but our dogs being all muzzled, the disease would spread no further; in other words, it would be kept down to the minimum.

Even local muzzling may be of great value if properly enforced. For example, not long ago a rabid dog attacked a number of school children and bit several of them severely, necessitating their taking the Pasteur treatment. This dog ran from a neighboring town where a muzzling order existed at that time, and, had he been properly muzzled or immediately shot for not being so, this calamity could not have occurred. Many similar instances might be given.

Even inadequate muzzling sometimes does much good, for it may succeed in preventing an individual dog now and then from spreading this truly terrible disease.

The question of prevention rests very largely with you, gentlemen, for the advice of no large body of intelligent men is more eagerly sought and heeded than that of the physician, and indifference to any matter pertaining to preventive medicine is not a part of your training.

SOME OBSERVATIONS ON HUMAN RABIES.*

BY C. F. WITHINGTON, M.D., BOSTON.

FOR many hundred years so much of superstition and fable has attached itself to the subject of rabies that it is not surprising that the public mind is in a state of confusion and unreasonable variations between extreme terror and incredulity. The portion of the community which is specially interested in the protection of animals, and some of whom apparently hold animal life of more value than human life, have expressed and promulgated doubts and denials as to the existence of the disease. More strangely, this same skepticism has in a few instances been shared by medical men.

The strongest expression of disbelief in rabies in recent years was that given by Dr. Charles W. Dulles, of Philadelphia, before the Pennsylvania Medical Society, in 1884, and his denial of the existence of rabies was also shared in a discussion at about that time by at least one speaker, Dr. Mills. It will be noted that at that time and for a long time afterwards no distinctive pathogenic alterations in the nervous system of persons dying from rabies had been demonstrated. Dr. Dulles, in his paper, referred to cases of *hydrophobia* in the strict etymological sense of the word, that is to say, fear of (drinking) water, which, in his mind, was the diagnostic point of rabies, as occurring in many conditions, as, for example, angina of the fauces and other disorders of the alimentary canal, spasm of the glottis and other diseases of the respiratory passages, bronchitis, acute rheumatism, etc., but special stress was laid by him upon certain nervous diseases, one or the other of which he believed to be the actual cause of what had been diagnosed as hydrophobia, namely, meningitis, cerebral tumors, acute mania with delirium, especially mania *a potu*, tetanus, epilepsy in its rarer maniacal forms, and, above all, hysteria.

The finding of the so-called Negri bodies, which are universally present in cases of true rabies, should set at rest forever the question of there being such a specific disease. While it is exceedingly rare, the universally fatal course of it after it has once developed, and the horror of its symptoms, make it important for us to recognize it as an actuality. Certain prevalent errors are responsible for some of the confusion as to rabies.

1. That killing a dog does any good to a patient whom he has bitten, Dr. Hart, of the United States Department of Agriculture, in a report of last year, showed that the saliva of a dog might become virulent as long as and no longer than six to eight days before the animal developed symptoms. Hence, if a suspected animal remain healthy for ten days after biting, there can be no danger to the bitten, even if the dog later does become rabid, while the consolation to be derived from the continuance of health in the dog is of the greatest value in relieving morbid apprehensions in the person who has been bitten.

2. That rabid dogs show fear of water. This appears to be never the case, although in a ma-

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