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WHAT IS THE CLINICAL AND EPIDEMIOLOGICAL SIGNIFICANCE OF RARE BACILLI IN SPUTUM[1]

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When is so-called "converted sputum" converted? Our answer to this question is that converted sputum is not so completely and permanently converted as we have been thinking.

A review of the sputum examinations of hundreds of patients, undergoing treatment in the Pottenger Sanatorium and Clinic, and the follow-up examinations of a number of these for a period of years following discharge, indicates that completely and permanently negative sputum is rarely attained in those who have suffered from destructive and especially wide-spread pulmonary tuberculosis, even though they are clinically well and able to do their usual work. We have examined this question by submitting specimens of sputum from each patient in the Sanatorium to examination at regular intervals of from four to six weeks while under treatment, and from many patients at longer intervals after discharge—in some cases for nearly fifteen years.

TECHNIQUE

The technique for microscopical demonstration, using the dilution-flotation picric-acid method, and the technique for guinea pig inoculation have been previously discussed by one of us (1, 2, 3, 4, 5).

That this report may be properly understood it is necessary to state that these examinations were made according to carefully devised rules for collecting, preparing and examining specimens. No so-called samples and few direct smears were used in this report, nor has the Ziehl-Neelsen method of preparation of specimen been used except for comparison. The following rules have been followed:

(*1*) A sterilized bottle is provided and the patient is required to save everything expectorated, no matter where he thinks it comes from. The patient is not trusted to separate lung from throat sputum.

(*2*) Three-day specimens are routinely required and, if the first one is negative, four or five additional specimens are collected.

(*3*) The sputum is examined by the dilution-flotation picric-acid method and, when guinea pig inoculation is used, two-thirds of the homogenized specimen or its concentrate is injected. Inocula prepared for guinea pigs are subjected to two hours' contact at 37°C. with 0.5 per cent sodium hydrate. This is one-sixth to one-eighth the strength usually employed. The stronger solutions injure some strains of bacilli so that a negative result is obtained.

In the past few years both stained specimen and guinea pig must be negative before the patient is declared as even temporarily free from bacilli.

(*4*) Specimens are searched for a minimum of ten minutes (a total of about 200 microscopical fields) before they are declared negative.

[1] From The Pottenger Sanatorium and Clinic, Monrovia, California.

THE IMPORTANCE OF TECHNIQUE FROM A CLINICAL STANDPOINT

In order to understand the meaning of rare bacilli as described in our studies it is necessary to know the sensitivity of our technique. Corper estimated that in order to demonstrate bacilli by the usual Ziehl-Neelsen method there must be about 100,000 organisms present per cubic centimeter of substance to be examined. This has been confirmed by one of us (1). The dilution-flotation picric-acid method which we employ, when supported by accurate methods of collecting and preparing the specimen and a search of at least 200 microscopical fields (ten minutes' search) before declaring the specimen negative, shows an average superiority of about eighty-fold. Bacilli may be found when as few as 1,250 are present per cubic centimeter in heavy purulent sputum, and about 200 per cubic centimeter in thin watery material. We have used this method for twenty-six years, adding slight improvements with increased experience.

It does not seem to be sufficiently realized how inadequate and unsatisfactory the usual technique for examining sputum is; nor are the many factors which add to its inaccuracy appreciated. All methods used—whether they be those of staining, culture or guinea pig inoculation—have many inaccuracies connected with them. For example, guinea pigs have different degrees of susceptibility; and there are many things that interfere with the viability of the bacillus, such as the use of chemicals to destroy contaminating microörganisms. The medium used in cultures also is not the perfect ideal to secure growth. Then, too, different strains show variability in viability and tuberculogenic power.

Acceptance of the usual smear by the Ziehl-Neelsen method as sufficient for determining the presence or absence of tubercle bacilli in a given specimen is a cause of much inaccuracy both in diagnosis and estimating the results of treatment; for this may show grossly positive sputum as negative. When the Ziehl-Neelsen method of preparing specimens was first suggested it was such an advancement in diagnosis that it was immediately accepted and has continued to be used in the majority of laboratories regardless of the more accurate methods which have since been devised. Its comparative simplicity causes it still to be employed regardless of its inefficiency. It is only recently that clinicians and laboratory men have been impressed with the fact that a better method must be employed.

In our experience many patients are positive who have been pronounced bacillus-negative by good laboratories immediately before entering the sanatorium and only a small percentage of patients who have had positive sputum will stand the severe tests of having all sputum raised over a period of fifteen or thirty days examined without some bacilli being found. When the stage of rare bacilli, according to our technique, has been attained the numbers are small—often not more than one bacillus in 200 fields, sometimes even in 400 fields, but sufficient to show that the patient is not actually bacillus-free.

Just as this material was ready for publication a paper by Ordway, Medlar and Sasano (6) of the Metropolitan Life Insurance Company Sanatorium, Mount McGregor, New York, came to our notice. By using a sensitive technique their findings in patients while in the sanatorium are similar to our own. The statistics of our patients while in the sanatorium will be published in greater detail later. Since our experience goes back more than twenty years and includes not only patients while in the institution but others after returning to normal life, we are able to show that patients not only show a condition alternating between

rare bacilli and negative sputum while under treatment but that this same condition persists over succeeding years.

The following clinical histories and long-time record of sputum examinations of patients illustrate this fact.

CASE REPORTS

No. 10052, R. M.: Female, aged nineteen years. Entered Pottenger Sanatorium December 16, 1928. Observed fourteen and one-half years. Her mother suffered from advanced tuberculosis when patient was born. The patient was under my observation since birth. In October, 1928 she had an acute onset; temperature 102°F., accompanied by cough and sputum. Examination revealed infiltration above third rib with cavity, one inch in diameter, on the level of the first interspace in the right lung. Patient was treated in the sanatorium with the usual regimen plus tuberculin from December 16, 1928 to April 24, 1930. Since discharge from the sanatorium patient has lived a shielded, hygienic life but has been quite active, particularly in recent years. The first time bacilli were present in sufficient numbers to be found by the ordinary method of examination since leaving the sanatorium was on December 1, 1942, when one bacillus was found in every two fields. No reason for this was apparent in her clinical history, physical or X-ray examination. On April 8, 1943 the sputum had returned to the rare bacillus stage. This case well illustrates, on December 4, 1942, what we believe takes place regularly in tuberculous patients after they have become clinically well.

Sputum Record (No. 10052)

DATE	SPECIMEN	AMOUNT	BACILLI FOUND	DATE	SPECIMEN	AMOUNT	BACILLI FOUND
	days	*cc.*			*days*	*cc.*	
1928 Dec. 17	1	15	35 per field	1932 July 13	1	10	Neg. in 20 min.
1929 Jan. 29	1	25	40 per field	14	1	11	1 in 20 min.
Mar. 11	1	15	15 in 10 min.	15	1	10	Neg. in 20 min.
Apr. 24	1	30	4 in 10 min.	16	1	17	1 in 20 min.
June 5	1	20	1 in 10 min.	17	1	10	Neg. in 20 min.
July 15	1	15	2 in 10 min.	18	1	9	1 in 20 min.
Aug. 28	1	15	3 in 10 min.	19	1	10	Neg. in 20 min.
Oct. 9	3	15	3 in 10 min.	20	1	11	Neg. in 20 min.
Nov. 22	1	11	1 in 10 min.	21	1	9	Neg. in 20 min.
1930 Jan. 1	1	15	1 in 10 min.	22	1	10	Neg. in 20 min.
Feb. 9	3	65	Neg. in 15 min.	23	1	10	16 in 5 min.
Mar. 24	3	45	1 in 10 min.	24	1	10	4 in 10 min.
Oct. 13	3	35	Neg. in 10 min.	25	1	13	2 in 10 min.
19	3	35	Neg. in 10 min.	26	1	10	13 in 10 min.
Nov. 9	3	35	Neg. in 10 min.	27	1	8	Neg. in 20 min.
16	3	30	Neg. in 10 min.	28	1	11	Neg. in 20 min.
1931 Jan. 2	3	30	6 in 10 min.	29	1	11	Neg. in 20 min.
22	3	45	Neg. in 10 min.	Aug. 15	1	10	Neg. in 15 min.
July 19	3	30	Neg. in 15 min.	Sept. 26	2	10	Neg. in 10 min.
1932 Jan. 18	1	25	4 in 15 min.	Nov. 7	2	11	Neg. in 20 min.
Mar. 3	1	20	18 in 5 min.	1934 Jan. 6	2	15	Neg. in 10 min.
Apr. 14	3	45	1 in 10 min.	Mar. 27	1	8	Neg. in 10 min.
May 26	3	40	Neg. in 15 min.	Sept. 4	2	8	Neg. in 10 min.
July 6	1	10	Neg. in 10 min.	1936 Apr. 23	3	20	Neg. in 10 min.
9	1	9	Neg. in 20 min.	1938 Feb. 14	1	30	2 in 10 min.
10	1	12	Neg. in 20 min.	1939 June 21	2	20	7 in 5 min.
11	1	10	Neg. in 20 min.	Oct. 1	1	12	7 in 5 min.
12	1	11	Neg. in 20 min.	1942 Dec. 4	3	20	1 in 2 fields
				1943 Apr. 8	3	22	36 in 10 min.

No. 10698, C. W. B.: Male, aged thirty-five years. He was first examined January 21, 1929 and observed for fourteen years. He has extensive proliferative tuberculosis through left lung; mild in upper left. He was never a patient in the Pottenger Sanatorium, except for phrenic operation. He had been treated since August, 1926 at Tucson, Arizona. He was examined by us repeatedly from 1929 to 1943. In January, 1935 sputum showed several bacilli per field which continued until February, 1937. On account of this we advised a phrenic crush which was done October 22, 1936. Since then he has not had sufficient numbers of bacilli to be found on ordinary examination. During periods of increased bacilli patients are apt to have an endogenous reinfection. The chances of such occurring are especially great in case the patient is living under bad conditions and doing strenuous work, but not so great where the patient lives a hygienic life, as this patient did.

Sputum Record (No. 10698)

DATE	SPECIMEN	AMOUNT	BACILLI FOUND	DATE	SPECIMEN	AMOUNT	BACILLI FOUND
	days	*cc.*			*days*	*cc.*	
1929 Jan. 29	½	0.5	3 per field	1938 Mar. 25	1	6	Neg. in 10 min.
Nov. 3	1	2	6 in 10 min.	May 26	3	8	Neg. in 10 min.
1930 May 23	2	3	Neg. in 10 min.	July 27	2	2	4 in 5 min.
1933 Jan. 6	2	3	1 per field	Dec. 11	2	5	Neg. in 10 min.
1934 Mar. 3	3	3	11 in 5 min.	1939 Mar. 31	2	5	1 in 10 min.
June 2	2	3	23 in 5 min.	May 24	1	8	1 in 3 fields
Oct. 31	1	0.5	18 in 5 min.	Sept. 25	2	6	8 in 5 min.
1935 Jan. 22	2	2	1 in 5 fields	1940 Mar. 20	2	5	4 in 10 min.
Oct. 19	2	3	1 in 2 fields	1941 May 19	1	5	2 in 10 min.
1936 Mar. 18	1	0.7	7 per field	July 13	2	7	Neg. in 10 min.
Aug. 14	2	1.5	1 in 2 fields	Nov. 18	1	4	1 in 10 min.
Oct. 11	2	1	1 per field	1942 July 14	2	7	Neg. in 10 min.
1937 Feb. 26	1	1.5	14 in 5 min.	Nov. 10	2	7	3 in 10 min.
May 19	2	1	7 in 5 min.	1943 Mar. 6	2	7	4 in 10 min.
Aug. 19	2	1.5	10 in 5 min.				

No. 10257, H. S.: Male, aged twenty-four years. He was first examined September 14, 1931 and observed for eleven and one-half years. Patient had extensive bilateral tuberculosis of the fibrocaseous type with small areas of necrosis which finally healed with extensive calcification. The left lung was involved throughout, the right lung in the upper half. An ambulatory patient treated in clinic with open air, rest, general hygienic measures and tuberculin at different periods from April, 1933 to June, 1935. Since that time he finished his college course and has been teaching steadily until the present time. After one year of markedly positive sputum, bacilli became rare and absent and remained so except on September 20, 1936 when, without any known reason, his sputum showed one bacillus per field. Since then his sputum has continued to show rare bacilli and negative. During the past eight years he has been in excellent condition and has had no inconvenience. He carries on his work and lives a normal life.

Sputum Record (No. 10257)

DATE	SPECIMEN	AMOUNT	BACILLI FOUND	DATE	SPECIMEN	AMOUNT	BACILLI FOUND
	days	*cc.*			*days*	*cc.*	
1932 Jan. 29	2	3	10 per field	1934 Sept. 22	3	5	1 in 10 min.
May 27	1	10	2 per field	Nov. 13	3	13	1 in 10 min.
Aug. 25	3	15	30 per field	Dec. 19	2	7	2 in 10 min.
Dec. 7	3	8	12 in 10 min.	1935 Jan. 31	3	10	5 in 10 min.
1933 Apr. 1	3	5	2 in 10 min.	Mar. 18	3	12	2 in 10 min.
June 22	3	3	3 in 10 min.	May 27	3	30	Neg. in 10 min.
Sept. 18	3	3	Neg. in 15 min.	July 15	3	12	1 in 15 min.
Oct. 26	1	7	6 in 5 min.	Sept. 20	1	7	1 per field
Nov. 22	3	3	Neg. in 10 min.	Dec. 24	1	5	Neg. in 10 min.
1934 Jan. 4	3	6	Neg. in 10 min.	1937 June 7	2	12	21 in 5 min.
Mar. 16	3	5	Neg. in 10 min.	1939 Apr. 7	1	12	7 in 5 min.
June 30	3	6	2 in 10 min.				
Aug. 10	3	5	8 in 10 min.				

No. 10243, M. C.: Female, aged nineteen years. She entered Pottenger Sanatorium March 25, 1932 and was observed for eleven years. She took ill in 1929 with severe cold and cough which persisted. She rested about four months, after which she was up and down, part of the time in school. Cough continued. She had marked infiltration throughout entire right lung, largely proliferative with small cavities opposite second and fourth interspaces. She was in sanatorium eighteen months and was treated by usual physiologic methods and tuberculin. After leaving the sanatorium she finished her college course and has been living practically a normal life since. This patient has been studied more intently than any other that we have followed. From March 7, 1940 to June 24, 1942 her sputum was negative on every examination except the specimen of June 24, 1942. This is interesting because it occurred in the last of five consecutive three-day tests.

Sputum Record (No. 10243)

DATE	SPECIMEN	AMOUNT	BACILLI FOUND	DATE	SPECIMEN	AMOUNT	BACILLI FOUND
	days	*cc.*			*days*	*cc.*	
1932 Mar. 19	2	7	15 per field	1937 May 3	3	0.5	Neg. in 10 min.*
27	1	5	105 per field	6	3	1	Neg. in 10 min.*
May 10	3	4	15 per field	Nov. 25	3	0.7	Neg. in 10 min.†
June 19	3	1	90 in 10 min.	Dec. 6	6	1	Neg. in 10 min.†
Aug. 2	3	1.5	25 per field	12	3	0.3	Neg. in 10 min.†
Sept. 13	3	2	50 in 10 min.	14	3	0.3	Neg. in 10 min.†
Oct. 28	3	2	5 per field	1938 Apr. 6	9	0.5	1 per field†
Dec. 5	3	2.5	50 per field	11	6	0.5	Neg. in 10 min.
1933 Jan. 17	3	3	15 per field	Sept. 30	9	2	Neg. in 10 min.
Feb. 26	3	3	45 per field	Nov. 30	3	1	Neg. in 10 min.
Apr. 13	3	6	75 per field	Dec. 5	3	0.8	Neg. in 10 min.
May 25	3	7	20 in 10 min.	1939 Jan. 11	3	1.5	Neg. in 10 min.
July 4	3	10	16 in 10 min.	20	1	0.5	Neg. in 10 min.
Aug. 14	3	3	1 in 2 fields	June 23	3	0.5	Neg. in 10 min.
Nov. 17	3	2	7 in 10 min.	29	1	0.5	1 in 10 min.
1934 Feb. 20	3	0.5	2 per field	30	3	0.5	Neg. in 10 min.
May 10	3	3	Neg. in 10 min.	Oct. 17	3	0.6	Neg. in 10 min.
Aug. 24	3	1	Neg. in 10 min.	20	3	1	Neg. in 10 min.
Dec. 7	3	4	3 in 10 min.	26	3	2	1 in 10 min.
1935 Jan. 21	1	3	32 in 10 min.	28	3	1.5	Neg. in 10 min.
May 13	3	0.3	Neg. in 10 min.	Nov. 3	3	1.1	3 in 10 min.†
June 3	3	1.5	34 in 10 min.	1940 Feb. 27	3	6.8	90 in 10 min.
14	3	0.75	Neg. in 20 min.	Mar. 1	3	2	1 in 2 fields
21	3	0.05	Neg. in 20 min.	5	3	0.8	6 in 10 min.
26	3	1	Neg. in 10 min.	7	3	1.3	Neg. in 10 min.
July 5	3	0.5	Neg. in 20 min.	10	3	1.3	Neg. in 10 min.
Sept. 9	3	1.5	Neg. in 10 min.	Aug. 6	3	1.2	Neg. in 10 min.
Nov. 18	3	1	Neg. in 10 min.	9	3	1.3	Neg. in 10 min.
29	3	8	Neg. in 10 min.	12	3	0.4	Neg. in 10 min.
Dec. 3	3	1.5	Neg. in 10 min.*	15	3	0.6	Neg. in 10 min.
6	3	0.5	Neg. in 10 min.	18	3	0.2	Neg. in 10 min.
1936 May 13	3	0.2	Neg. in 10 min.	Apr. 3	6	1.2	Neg. in 10 min.*
15	3	1	Neg. in 10 min.	9	6	2.7	Neg. in 10 min.*
19	3	0.1	Neg. in 10 min.	12	3	1.8	Neg. in 10 min.*
Dec. 25	3	0.1	1 in 20 min.	1942 June 12	3	1.1	Neg. in 10 min.
1937 Jan. 4	3	1	Neg. in 10 min.	15	3	0.3	Neg. in 10 min.
Apr. 20	3	1	Neg. in 10 min.	18	3	1.4	Neg. in 10 min.
23	3	0.5	Neg. in 20 min.*	21	3	1.8	Neg. in 10 min.
26	3	0.1	Neg. in 10 min.*	24	3	0.3	1 in 10 min.
29	3	0.2	Neg. in 10 min.*				

* Guinea pig negative.

† Guinea pig positive.

No. 10338, E. S. D.: Female, aged twenty-two years. Entered the Pottenger Sanatorium June 5, 1933 and left September 24, 1933. She was observed ten years. Patient had been below par for two years. She had frequent colds which persisted, and gradually increasing malaise. In January, 1933 she began to cough and raised one ounce of sputum per day. Six months prior thereto she had acute pleurisy which was not considered serious. All symptoms were exaggerated following appendectomy in 1933. Sputum, examined June 1 for the first time, was found positive for tubercle bacilli. Examination June 5, 1933 showed extensive tuberculous infiltration through the upper lobe of right lung, much of which was of a soft exudative nature. In the second interspace was a cavity one inch in diameter. There was a slight involvement at the left apex. Patient was given the usual sanatorium treatment, plus tuberculin, with a rapid decline in numbers of bacilli. She refused both pneumothorax and phrenic. She was obliged to leave the sanatorium and continue rest treatment at home. One year later she still had one bacillus per field, after which the bacilli became rare and then the sputum negative. In 1936 bacilli again returned in fairly large numbers. On July 27, 1936 a temporary phrenic was done which did not close the cavity. The latter part of 1936 and through 1937 her sputum again showed numerous bacilli per field. In April, 1940 she reëntered the sanatorium. Pneumothorax was instituted April 17, 1940, which proved unsuccessful in closing the cavity. This was continued but a short time and the lung was allowed to expand, and in so doing closed the cavity. Her sputum entirely disappeared and she has had no sputum since June 23, 1940. This patient was not considered clinically well during 1935 and 1936, although her sputum was negative most of the time.

Sputum Record (No. 10338)

DATE	SPECIMEN	AMOUNT	BACILLI FOUND	DATE	SPECIMEN	AMOUNT	BACILLI FOUND
	days	*cc.*			*days*	*cc.*	
1933 June 6	1	8	30 per field	1936 Apr. 13	3	5	4 in 10 min.
July 21	3	1	3 per field	June 14	3	2	Neg. in 10 min.
Aug. 29	1	5	4 per field	Aug. 30	3	2	Neg. in 10 min.
1934 Mar. 20	2	5	1 per field	Nov. 26	1	1	10 per field
June 20	2	5	1 per field	1937 Feb. 23	3	3	1 in 2 fields
1935 Apr. 12	3	6	5 in 3 min.	July 9	2	6	15 per field
June 7	3	6	Neg. in 10 min.	Sept. 26	3	1	Neg. in 10 min.
Aug. 1	1	1	Neg. in 10 min.	1940 Apr. 14	1	2.5	30 per field
Sept. 18	3	5	Neg. in 10 min.	May 26	1	2	14 in 5 min.
Nov. 6	3	7	Neg. in 10 min.	June 23	1	0.5	10 per field
1936 Jan. 1	3	6	Neg. in 15 min.	Patient has had no sputum since.			
Feb. 16	3	3	3 in 5 min.				

No. 10416, M. K.: Female, aged twenty-eight years. Entered Pottenger Sanatorium March 24, 1934 and was observed nine years. Patient had an extensive bilateral tuberculosis, largely proliferative in character, with very little ulceration and small amount of sputum. She left the sanatorium July 9, 1934, after which she was examined at frequent intervals. On February 26, 1936 a small cavity was developing in the upper left lung. On May 18, 1937 there was increased activity. On October 20, 1937 the cavity was definitely excavated. She married in the spring of 1937, and was quite active, doing considerable walking and many little chores about the house. She was examined January 6, 1938 when she complained of having a cold accompanied by a sore throat and increased cough. It will be noted that at this time her sputum showed an increase in bacilli. She made a trip back to New Jersey, continued feeling tired and had increased cough and expectoration. She returned from her trip with her tuberculosis markedly reactivated and entered the sanatorium September 7, 1938, at which time her sputum showed 30 bacilli per field. The cavity in the upper portion of the left lung was far more distinct than it had been previously. On October 18, 1938 a left phrenicectomy was done. The cavity decreased in size and there was some clearing in the areas. On February 3, 1939 pneumoperitoneum was started. Patient left the sanatorium March 28, 1940, and the pneumoperitoneum was continued until March 13, 1941. It will be noted that her sputum became negative after the pneumoperitoneum and has remained so. This patient developed a complicating tuberculosis of the kidney which so far is mild and has produced no inconvenience. Bacilli were first found in the urine in November, 1939, and have continued to be present in small numbers. She was delivered of a baby by Caesarean section on January 9, 1943, and she continues in excellent condition. It will be noted that the increase in bacilli to 30 bacilli per field which attended the reactivation of her disease which began in January, 1938, dropped back to rare bacilli very quickly, but returned in one year, after which she again went into the negative and rare-bacilli stage and has remained so until now. The disease seems to be well healed. This case illustrated the danger of reactivation and endogenous reinfection which is always present until the lesion is healed.

Sputum Record (No. 10416)

DATE	SPECIMEN	AMOUNT	BACILLI FOUND	DATE	SPECIMEN	AMOUNT	BACILLI FOUND
	days	*cc.*			*days*	*cc.*	
1934 Mar. 26	1½	2.5	1 per field	1939 Sept. 19	3	7	Neg. in 10 min.
May 9	2	6	1 in 10 min.	Nov. 3	3	8	Neg. in 10 min.
June 13	2	10	Neg. in 10 min.	28	3	4.4	Neg. in 10 min.†
Oct. 12	1	10	11 in 5 min.	Dec. 1	3	6.8	Neg. in 10 min.
1935 Jan. 12	2	2.5	2 in 10 min.	4	3	5.3	Neg. in 10 min.†
June 20	2	7	Neg. in 10 min.	7	3	2	Neg. in 10 min.
1936 Oct. 11	3	2	Neg. in 10 min.	10	3	4.0	Neg. in 10 min.†
1937 Jan. 29	2	3	5 in 5 min.	13	3	5.1	Neg. in 10 min.
May 2	3	5	8 in 5 min.	1940 Jan. 23	3	2.4	Neg. in 10 min.
1938 Jan. 11	2	7	1 in 3 fields	Mar. 5	3	2	1 in 10 min.†
Sept. 10	3	15	30 per field	Nov. 18	3	1.6	9 in 5 min.
Oct. 16	3	5	20 in 5 min.	1941 Mar. 13	3	3.2	Neg. in 10 min.
Dec. 1	3	7	17 in 10 min.	July 24	3	1.6	Neg. in 10 min.
1939 Jan. 8	3	5	50 per field	Oct. 1	3	6	Neg. in 10 min.
Feb. 24	3	3	2 in 10 min.	1942 Jan. 19	3	3	Neg. in 10 min.
Apr. 2	3	2	Neg. in 10 min.	June 12	3	1.2	Neg. in 10 min.
May 16	3	3	Neg. in 10 min.	Sept. 14	5	5	Neg. in 10 min.
June 25	3	4	Neg. in 10 min.	20	5	5	Neg. in 10 min.*
				27	5	3.6	Neg. in 10 min.*
				Dec. 12	3	5	Neg. in 10 min.
				1943 Mar. 1	3	5	Neg. in 10 min.

* Guinea pig negative.
† Guinea pig positive.

No. 10538, P. H.: Male, aged fifty-seven. Entered Pottenger Sanatorium July 24, 1935 and was observed eight years. He had a moderate tuberculous infiltration to the second rib in both lungs, proliferative in type. Behind the first rib in the left lung was a small cavity. Patient also had bronchiectasis which was moderately severe. He gave a history of having first spat blood in 1908. He had always been subject to colds with bronchitis and considerable wheezing, but worked steadily until June 1, 1935, when positive sputum was found. On entering the sanatorium he had 65 cc. of sputum in one day with one bacillus in every two fields. On being put to bed with the usual sanatorium regimen, plus tuberculin, the sputum became negative and bacilli were not found again until May, 1936. From that time until this, he has been examined at infrequent intervals and his sputum has varied between rare bacilli and negative, but no reactivation of the disease has ever taken place, although it will be noted that on November 4, 1941 his sputum showed 20 bacilli per field. This was following an acute bronchitis.

Sputum Record (No. 10538)

DATE	SPECIMEN	AMOUNT	BACILLI FOUND	DATE	SPECIMEN	AMOUNT	BACILLI FOUND
	days	*cc.*			*days*	*cc.*	
1935 July 29	1	65	1 in 2 fields	1936 Sept. 15	1	30	Neg. in 10 min.
Sept. 5	1	30	Neg. in 10 min.	Oct. 29	1	30	Neg. in 10 min.
Oct. 13	2	70	Neg. in 10 min.	Dec. 7	1	35	Neg. in 10 min.
Nov. 28	2	65	Neg. in 10 min.	1937 Jan. 19	1	80	Neg. in 10 min.
1936 Jan. 8	2	60	Neg. in 10 min.	Mar. 1	2	75	Neg. in 10 min.
Feb. 17	2	50	Neg. in 10 min.	June 22	2	75	1 in 10 min.
Apr. 1	2	55	Neg. in 10 min.	Nov. 26	2	110	13 in 10 min.
May 12	2	60	Neg. in 10 min.	Dec. 28	3	140	Neg. in 10 min.
21	3	60	Neg. in 10 min.	1938 Mar. 16	1	50	1 in 10 min.
24	3	65	Neg. in 10 min.*	Sept. 7	2	95	5 in 10 min.
27	3	100	1 in 20 min.†	1939 Oct. 11	2	75	Neg. in 10 min.
30	3	95	3 in 60 min.†	1940 Aug. 7	1	55	4 in 10 min.
June 2	3	100	Neg. in 10 min.*	1941 Nov. 4	½	35	20 per field
17	3	130	Neg. in 10 min.	1943 Feb. 10	½	40	Neg. in 10 min.
25	1	4	Neg. in 10 min.				
Aug. 4	1	40	Neg. in 10 min.				

* Guinea pig negative.
† Guinea pig positive.

No. 10707, R. L. P.: Male, aged thirty years. He was observed seven years. He entered Pottenger Sanatorium November 19, 1936, suffering from tuberculous infiltration in the upper lobe of the right lung. This was a recent invasion engrafted on an old proliferative lesion. There was also some fibrous infiltration in the lower lobe of the right lung. Extending out in the left lung from the hilum was a mild infiltration. Patient remained in the sanatorium eleven months. This patient never showed many bacilli. The diagnosis could not have been made by an ordinary smear; but the fact of rare bacilli and negative sputum did not indicate that the patient was healed. During the time of treatment the infiltration in the lung absorbed, leaving the lung area almost entirely clear. This patient was studied intently.

Sputum Record (No. 10707)

DATE	SPECIMEN	AMOUNT	BACILLI FOUND	DATE	SPECIMEN	AMOUNT	BACILLI FOUND
	days	*cc.*			*days*	*cc.*	
1936 Nov. 22	3	17	2 in 10 min.	1937 May 28	1	11	Neg. in 10 min.
26	3	20	1 in 10 min.	29	1	13	Neg. in 10 min.
29	3	15	Neg. in 10 min.	30	1	13	Neg. in 10 min.
Dec. 2	3	20	Neg. in 10 min.	June 1	1	15	Neg. in 10 min.
5	3	20	Neg. in 10 min.	2	1	15	Neg. in 10 min.*
14	3	10	Neg. in 10 min.†	3	1	9	Neg. in 10 min.*
18	2	20	Neg. in 20 min.	4	1	13	Neg. in 10 min.*
20	2	10	Neg. in 10 min.	5	1	12	Neg. in 10 min.*
22	2	10	1 in 10 min.	6	1	14	Neg. in 10 min.*
24	2	12	Neg. in 10 min.	7	1	10	Neg. in 10 min.*
26	2	10	Neg. in 10 min.	8	1	10	Neg. in 10 min.†
1937 Feb. 9	3	25	1 in 10 min.	17	3	25	Neg. in 10 min.
Mar. 23	3	18	Neg. in 10 min.	July 28	3	20	Neg. in 10 min.
May 6	3	35	Neg. in 10 min.	Sept. 6	3	20	Neg. in 10 min.
22	1	14	Neg. in 10 min.*	1938 Sept. 12	2	10	Neg. in 10 min.
23	1	11	Neg. in 10 min.*	Dec. 9	1	7	Neg. in 10 min.
24	1	13	Neg. in 10 min.*	1940 May 2	2	6.6	Neg. in 10 min.
25	1	20	Neg. in 10 min.*	Sept. 9	2	6	Neg. in 10 min.
26	1	13	Neg. in 10 min.†	1941 Oct. 25	3	12	Neg. in 10 min.
27	1	11	Neg. in 10 min.†	1942 Sept. 29	2	7	Neg. in 10 min.

* Guinea pig negative.
† Guinea pig positive.

No. 10739, W. A.: Male, aged twenty-four years. He was observed six years. He entered Pottenger Sanatorium March 2, 1937. Early tuberculosis was discovered in 1928. He was permitted to continue going to school but taking extra rest outside of school hours. In 1930 cough returned for several months. In 1932 he started work. He had some pleurisy. In 1933 X-ray film was taken and a cavity was found in right lung. Patient was treated at home. In March 1937 activity was found in both lungs with a cavity one inch in diameter opposite the second rib on the left side for which he entered Pottenger Sanatorium. He was put on the usual regimen with bath privileges only, and treated with shotbag over left apex and tuberculin. It will be noted that his bacilli decreased rapidly from 75 per field to rare and continued until October 9, 1938, when 3 bacilli per field were found. There was no evidence of any increased activity shown by clinical symptoms or found on physical or X-ray examination. His sputum again returned to rare bacilli and has continued alternating between rare bacilli and negative until the present time. When the patient left the sanatorium May 20, 1940 he was sitting up eleven hours a day and walking four miles with ease. He immediately started work two hours a day, gradually increasing this and in a short time was doing a full day's work with ease.

Sputum Record (No. 10739)

DATE	SPECIMEN	AMOUNT	BACILLI FOUND	DATE	SPECIMEN	AMOUNT	BACILLI FOUND
	days	*cc.*			*days*	*cc.*	
1937 Mar. 5	2½	35	75 per field	1939 Dec. 7	3	40	1 in 3 fields
Apr. 11	1	30	2 in 10 min.	1940 Jan. 16	3	40	1 in 10 min.†
May 27	3	55	7 in 10 min.	Feb. 29	3	50	5 in 5 min.
July 5	3	30	Neg. in 10 min.	Apr. 9	3	45	Neg. in 10 min.
Aug. 19	3	25	Neg. in 10 min.	July 2	3	25	Neg. in 10 min.
Sept. 27	3	40	3 in 5 min.	Sept. 4	3	45	Neg. in 10 min.
Nov. 8	3	20	3 in 10 min.	Oct. 15	3	20	Neg. in 10 min.
Dec. 19	3	20	Neg. in 10 min.	Dec. 3	3	35	Neg. in 10 min.
1938 Jan. 30	3	15	Neg. in 10 min.	1941 Jan. 26	3	35	5 in 10 min.
Mar. 19	3	15	3 in 20 min.	Apr. 22	3	30	3 in 15 min.
22	3	12	Neg. in 10 min.*	June 2	3	50	1 in 10 min.
25	3	15	Neg. in 10 min.‖	Aug. 30	3	35	Neg. in 10 min.
28	3	18	5 in 5 min.†	Nov. 28	3	12	Neg. in 10 min.
Apr. 24	3	20	9 in 10 min.	1942 Feb. 24	3	10	Neg. in 10 min.
June 5	3	10	3 in 10 min.	June 6	3	15	Neg. in 10 min.
July 17	3	15	14 in 3 min.	Oct. 1	3	10	Neg. in 10 min.
Aug. 28	3	45	Neg. in 10 min.	1943 Feb. 25	3	8	Neg. in 10 min.
Oct. 9	3	50	3 per field	May 24	3	8	1 in 10 min.
Nov. 22	3	35	5 in 5 min.				
1939 Jan. 6	3	10	21 in 5 min.				
Feb. 14	3	25	1 in 10 min.				
May 9	3	20	Neg. in 10 min.				
June 18	3	20	1 in 10 min.				
Aug. 4	3	40	5 in 5 min.				
Sept. 12	3	25	7 in 5 min.				
Oct. 25	3	30	Neg. in 10 min.				

* Guinea pig negative.

† Guinea pig positive.

‖ 3 bacilli were found in 60 min. search.

No. 10737, S. B.: Female, aged twenty-eight years. She entered Pottenger Sanatorium February 25, 1937 and was observed six years. Physical examination showed tuberculous infiltration in the upper lobe of the right lung, mostly of an exudative type. A three-quarter-inch cavity was present opposite the first rib. Patient remained in the sanatorium eight months. This patient made a satisfactory recovery in a minimum of time. She was treated by rest in bed, shotbag over right lung, with the usual hygienic measures plus tuberculin. She left the sanatorium in eight months and continued following advice on the outside, returning for frequent examinations. She was delivered of a baby December 13, 1941. This case illustrates that it may be possible to become continuously bacillus-free, for we have found no bacilli now for six years.

Sputum Record (No. 10737)

DATE	SPECIMEN	AMOUNT	BACILLI FOUND	DATE	SPECIMEN	AMOUNT	BACILLI FOUND
	days	*cc.*			*days*	*cc.*	
1937 Feb. 28	3	10	15 per field	1937 Dec. 29	3	4	Neg. in 10 min.
May 20	3	10	1 in 3 fields	1938 Apr. 15	3	5	Neg. in 10 min.
June 27	3	20	10 per field				
Aug. 12	3	10	6 in 10 min.	At this time her sputum disappeared and she			
Sept. 20	3	8	Neg. in 10 min.	was not able to supply us with a sample			
				until March 11, 1942, when she had 8 cc. in			
				three days, which was negative.			

No. 10802, W. B.: Male, aged seventeen years. He entered Pottenger Sanatorium September 21, and was observed six years. He gave a history of having symptoms resembling a cold in March, 1937, with pains in chest, cough and expectoration. Diagnosis of bronchitis was made. In July, 1937, the diagnosis of tuberculosis was made. On entering the sanatorium physical examination showed marked involvement from apex to third rib in both lungs. In the right first interspace was a cavity one inch in diameter, and in the second interspace another cavity slightly smaller. Patient was suffering from acute exudative tuberculosis. He was put to bed with shotbag over the right apex and allowed bathroom privileges only. He was given the usual sanatorium treatment and tuberculin. The sputum of this patient rapidly became negative. He was obliged to leave the sanatorium at the end of nine months. When he was up three hours and walking 3000 feet a day, he continued his program at home returning for examination and guidance at intervals of six or eight weeks. This case illustrates the rapidity with which acute cavities will heal under physiological methods alone. His sputum was quickly changed to negative.

Sputum Record (No. 10802)

DATE	SPECIMEN	AMOUNT	BACILLI FOUND	DATE	SPECIMEN	AMOUNT	BACILLI FOUND
	days	*cc.*			*days*	*cc.*	
1937 Sept. 24	3	18	75 per field	1937 July 7	3	4	Neg. in 10 min.*
Oct. 31	1	10	15 in 10 min.	10	3	3	Neg. in 10 min.*
Dec. 14	1	10	6 in 5 min.	14	3	5	Neg. in 10 min.*
1938 Jan. 23	2	20	2 per field	17	3	3	Neg. in 10 min.
Mar. 4	3	15	Neg. in 10 min.	Sept. 12	2	5	Neg. in 10 min.
Apr. 18	3	15	Neg. in 10 min.	Oct. 10	3	5	Neg. in 10 min.
May 30	3	10	Neg. in 10 min.	1939 Jan. 17	3	3	Neg. in 10 min.
June 2	3	8	Neg. in 10 min.	May 26	3	4	Neg. in 10 min.
5	3	5	Neg. in 10 min.	Oct. 9	3	4	Neg. in 10 min.
8	3	3	Neg. in 10 min.	1940 Sept. 6	3	3.6	9 in 5 min.
11	3	4	Neg. in 10 min.	1941 May 1	3	5	Neg. in 10 min.
14	3	5	Neg. in 10 min.	1942 Apr. 21	4	3.6	3 in 5 min.
17	3	5	Neg. in 10 min.				
July 3	3	4	Neg. in 10 min.*				

* Guinea pig negative.

DISCUSSION

In our experience in the acute predominantly exudative type of tuberculosis with soft-walled cavities and tissues which will readily compensate, as illustrated by cases Nos. 10737 and 10802, the stage of rare bacilli is usually quickly reached, often in a few weeks after the patient is put on treatment. This stage is usually attained whether we depend upon physiological measures alone or add some form of compression; although it may be attained a little sooner if a suitable collapse is obtained by pneumothorax. On the other hand, in the fibrocaseous types of the disease, large numbers of bacilli are often discharged from cavity walls for long periods of time. This is illustrated by case No. 10253, in whose sputum numerous bacilli persisted for a year. If the disease is otherwise healing in a satisfactory manner, this is of little significance when the patient is isolated and properly controlled in a sanatorium, but of greater importance if living in the home with other people. In case No. 10707, bacilli would never have been found by the Ziehl-Neelsen method.

Seven of the patients herein reported were treated in the institution during the active course of their disease and until discharged as clinically healed. Two were treated for only a short time in the institution; one was an in-patient only a few days for a phrenic operation, and one was treated as an out-patient in the clinic.

Since the sputum examinations reported in this paper show that patients are bacillus-carriers long after they are clinically well and able to assume their places in society as producers, certain practical questions arise: When can we disregard the presence of rare bacilli from the standpoint of safety to the patient and safety to those who associate with him? When can a patient be safely discharged as clinically well?

Our experience should be of value in answering these queries. So far not a single individual—adult or child—who has intimately associated with these patients has broken down with active tuberculosis, yet we cannot say with definiteness that no one has been infected; but if infection has occurred, the lesion has been of nonprogressive type. The apparent safety depends upon the fact that so few bacilli are discharged, and the care exercised by the patient who is warned always to destroy every particle of sputum.

There is probably greater danger to the patient, himself, in the rare bacillus stage than to those who associate with him. While only a few bacilli are discharged there may be many in the tissues and, after infection has taken place, the opportunity for endogenous spread is always present should conditions which disturb the architecture of the tubercles arise. However, our experience has been most fortunate. In the past twenty years we have had a minimum of patients who have had recurrences of clinical tuberculosis after being discharged as clinically well in spite of the presence of rare bacilli.

Every now and then irritating forces of various kinds may act upon quiescent foci which are apparently producing no damaging effect upon the patient and cause the discharge of bacilli in numbers larger than usual. This may be produced by any force which causes marked stimulation, such as an acute respiratory infection, meteorological changes and many subtle forces which are not so

evident. The fact that as soon as the acuteness of the episode is over the lesion usually assumes its former state of stability probably indicates that the organisms were discharged from a surface which, while open to the air passages, previously had not been giving off bacilli into the bronchial lumen, or had been discharging them in small numbers.

We are not inclined to look upon these occurrences as serious if they are of a temporary nature and the patient is properly directed at the time. Very different, however, is the case when an active lesion is still present, or when the increase in bacilli persists, or especially if the patient does not give proper heed to the occurrence. So far none of the patients in this group whom we had discharged as clinically well has had to be subjected to further treatment because of an increased number of bacilli temporarily appearing in the sputum. However, the 3 patients who had not been brought to a state of clinical healing all had recurrences of activity (cases Nos. 10338, 10416, and 10698).

Patients are often a great danger to themselves after the period of negative sputum has been attained because of being too willing to accept the fact of two or three negative reports as meaning that the lesion is healed and feeling that they are then able to guide themselves.

The danger of unhealed lesions is illustrated by cases Nos. 10338 and 10416, both of whom developed quite active disease after they had shown rare bacilli on repeated examinations. In case No. 10338 the sputum would have been negative by the Ziehl-Neelsen method at all times between and including April 12, 1935 and August 30, 1936, and in case No. 10416 from May 9, 1934 to May 2, 1937; yet neither of these patients were healed. These cases illustrate what so often follows insufficient treatment.

Our experience shows that the classification of healing must not depend upon a few negative examinations of sputum. The patient must from every angle give indications of a healed lesion. Contrast these 2 cases with cases Nos. 10052, 10243 and 10739, which had alternating negative and rare bacilli but who were not discharged until they were clinically arrested as determined by all available evidence. Their after-course has been satisfactory.

These exacting, long time studies throw light on some of the most serious problems presented in the diagnosis and treatment of tuberculosis. While we do not expect every laboratory to adopt such a technique and repeat such studies, yet we hope that the information which we have gained is of sufficient importance to cause at least a few enthusiasts to repeat them. In several instances, specimens were subjected to long periods of search—twenty minutes, forty minutes, an hour. It was the purpose to find out how nearly and how often patients become entirely bacillus-free. The fact that guinea pig inoculation was used in many instances adds additional accuracy to the report.

Obviously negative sputum is a term which differs widely in its meaning according to the conditions of examination. Since we rarely secure a continuously permanently negative sputum in chronic destructive lesions we do not use the absence of bacilli as a basis for discharging patients. We discharge them when rare bacilli are still found if we think they are clinically well and have reached

a stage of physical strength equivalent to that which will be necessary for carrying on their usual work. We try not to discharge any patient so long as there is doubt in our minds as to his condition and we feel fairly confident that he may secure a healing. We want to feel that he will remain well; otherwise treatment has failed.

As a test of strength we assume that a patient who is able continuously to walk from two to five miles with ease day after day (but still resting ten or twelve hours in bed) is physically fit. We have many conscientious patients doing eight hours' work and still resting ten hours in bed each day. While we would like to have all patients free from bacilli before discharge, we do not expect them to be so.

Many patients showing rare bacilli are able to begin doing two or three hours' work a day, which may be increased gradually until they do full eight hours. The partial guarantee of their safety in beginning work is the fact that they have stood up under this trial program of exercise and remained well while doing so. They are physically rehabilitated when their active treatment is finished.

Our patients are apprized of the fact that the numbers of bacilli discharged may increase with acute respiratory diseases, and they are told that it is necessary for them always to destroy every bit of sputum raised at such times and, furthermore, give themselves special care. It is surprising how relatively few acute respiratory infections patients have when they are isolated and follow hygienic rules, such as are enforced in the sanatorium, and how much milder attacks are after discharge, provided they continue to follow the same rules.

Our experience differs from that reported by Whitney and Dempsey (7) in which they state: "Patients with positive sputum at time of discharge have relatively little chance of survival; only one out of four thus handicapped was living at end of five years, whereas among those with no sputum or with negative sputum on discharge two out of three survived the five-year period." This undoubtedly means "positive" with one of the less sensitive methods. Many of our patients show rare bacilli in their sputum at the time of discharge from the sanatorium. Regardless of this fact, however, they are able to carry on their life's work and rarely show relapse.

This difference may be explained partly by the fact that, using a more sensitive method of examining sputum, our patients are probably farther advanced in healing when discharged, and partly by the higher economic status of our patients, for many of the sanatoria mentioned in this report are public institutions.

It will be remembered that the death rate from tuberculosis of the lower economic group is much greater than in the independent economic groups. The more unfavorable the environment in which patients must live and the lower the nutritive value of their food, the more necessary it is to prolong their treatment and then shield them afterwards; also the more necessary it is to rehabilitate them before leaving the shelter of the institution. Instead, this group is usually discharged earlier than those of a better social and economic status and are returned to their homes without having been rehabilitated and are then given a

minimum of after-care. Two of the greatest faults in our present method of treating tuberculosis is that we are trying to cure tuberculosis faster than healing can take place, and are failing to provide patients with conditions which will enable them to continue healing after they have been returned to their homes. The result of this practice is too often a reactivation after discharge.

The histories of our cases show that negative sputum even by this exacting technique does not indicate that the patient is healed and ready for discharge. They also show that we must in other respects change our ideas of the meaning of rare bacilli in relation to tuberculosis. On the other hand, every patient who has an infection of the lung with rare bacilli in his sputum is not necessarily suffering from active disease, nor is he necessarily a menace to those who live with him. The presence of rare bacilli by this exacting technique shows that tuberculosis is or has been present in a clinical form without determining the state of activity at the time. In this it is not unlike the tuberculin test which indicates infection only.

Our findings throw the diagnosis of active tuberculosis back upon the clinician and require that he depend upon his clinical sense for his opinion. It is only after the careful analysis of all data that we can determine the condition of the patient. The X-ray examination does not give a complete answer to activity or arrestment; the tuberculin test does not give us definite information; nor does the presence of rare bacilli, when a sensitive technique is employed, differentiate between clinically active and inactive disease. So this bit of increased information regarding rare bacilli, like the X-ray film and the tuberculin test, may for the time being throw more uncertainty into an already confused field. It emphasizes that diagnosis must depend upon a well cultivated clinical sense.

When the meaning of rare bacilli is fully understood it should add to the intelligent approach to the solution of the ever more difficult problems which surround tuberculosis in its waning period. (*1*) It teaches the necessity for the adoption of a more sensitive technique for examining sputum and the acquiring of a well trained clinical sense by which the status of the patient may be estimated. (*2*) It especially teaches the necessity of adequate treatment in order to overcome the tendency to relapse. (*3*) When we have accomplished the best that we can accomplish, a few bacilli may still persist in the sputum, but the small numbers present are probably of little significance from the community standpoint. Such patients may expel less than one thousand bacilli in twenty-four hours, and those only occasionally. It would be extremely rare for those bacilli to be brought into sufficiently close contact with associates to cause infection.

SUMMARY

1. Tuberculous patients who have been studied over periods of time varying from six to fourteen and a half years are cited to show that rare bacilli may persist in the sputum over long periods of time.

2. Our experience indicates that, if the patient is clinically well, there is little

danger from rare bacilli found by very sensitive methods, either to himself or to those with whom he associates.

3. Sometimes larger numbers of bacilli will be temporarily discharged by one who has been clinically well and carrying on his regular work without hindrance, the patient returning at once to the rare or negative stage, without reactivation of his disease taking place.

4. The persistence of bacilli occurs whether the patient has been treated by physiological methods alone or by collapse procedures. In our experience no method will regularly produce a continuously negative sputum.

5. The presence of rare bacilli in sputum does not necessarily mean that the patient is suffering from clinically active tuberculosis. On the other hand, it shows that active tuberculosis has been present. This finding may be consistent with good health and full working capacity.

6. Patients with rare bacilli are probably of greater danger to themselves than to those with whom they associate, because bacilli are present in the tissues and may produce endogenous spread in case the proper stimulus is present. As regards the danger to others the number of bacilli expectorated is so small—in many of our cases not being more than a few hundred on some days and negative on many others—that, unless conditions are especially propitious for infection, a sufficient number of bacilli to cause implantation would probably not gain entrance to the tissues of those with whom the patient associates. The danger, however, would probably be greater to children than to adults, and to the less resistant than to the stronger.

7. In its bearing upon the problem of clinical tuberculosis, the presence of rare bacilli in the sputum, as determined by exacting techniques, is in much the same category in its relationship to diagnosis and cure as the tuberculin test. Of itself it only gives evidence of limited value. The true estimate of the case must depend upon highly trained clinical judgment.

SUMARIO

1. Cítanse tuberculosos estudiados por períodos de tiempo que variaron de seis a catorce años y medio para demostrar que puede persistir alguno que otro bacilo en el esputo durante períodos prolongados.

2. La experiencia del A. indica que si el enfermo está clínicamente bien encierran poco peligro los raros bacilos descubiertos con técnicas muy delicadas, ya para aquel mismo o para sus allegados.

3. A veces puede expulsar temporalmente grandes cantidades de bacilos un individuo que ha estado clínicamente bien y ejecuta sin dificultad sus tareas regulares, volviendo el sujeto en el acto al período de negatividad o de rareza de bacilos sin que se reactive la dolencia.

4. La persistencia de los bacilos tiene lugar, ya haya sido tratado el enfermo exclusivamente con técnicas fisiológicas, o con procedimientos de colapso, sin que ningún método produzca con regularidad un esputo constantemente negativo.

5. La presencia de raros bacilos en el esputo no denota forzosamente que el individuo padezca de tuberculosis clínicamente activa, pero sí denota que ha

existido tuberculosis activa, lo cual puede ser compatible con un estado de buena salud y plena capacidad para el trabajo.

6. Los enfermos con raros bacilos son probablemente más peligrosos para sí propios que para sus convivientes, pues los bacilos presentes en los tejidos pueden provocar propagación endógena, de existir un estímulo adecuado. En cuanto al peligro para los demás es tan pequeño el número de bacilos expectorados —en muchos de los casos del A. no pasaban de algunos centenares en algunos días, y en otros muchos días no había ninguno—que a menos que las condiciones se presten por demás para la infección, probablemente no penetrará en los tejidos de aquéllos con quienes se asocia el enfermo un número suficiente de bacilos para lograr implante. Sin embargo, el peligro sería probablemente mayor para los niños que para los adultos, y mayor para los menos resistentes que para los fuertes.

7. En lo que toca al problema de la tuberculosis clínica, la presencia de escasos bacilos descubiertos en el esputo con una técnica minuciosa, se encuentra en su relación con el diagnóstico y curación más o menos en la misma categoría que la reacción a la tuberculina, pues por sí misma sólo aporta datos de valor limitado. La verdadera justipreciación del caso tiene que fundarse en el criterio clínico avezado.

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