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*DURING THE RECENT EPIDEMIC
OF INFLUENZA.*

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GEORGE B. SHATTUCK, M. D.,

VISITING PHYSICIAN TO THE BOSTON CITY HOSPITAL.

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PNEUMONIA IN BOSTON DURING THE RECENT EPIDEMIC OF INFLUENZA.¹

BY GEORGE B. SHATTUCK, M.D.,
Visiting Physician, Boston City Hospital.

DURING the progress of the epidemic of influenza, with which, I think, we must acknowledge we have been visited this winter, I was impressed with the evident increase in the number of cases of pneumonia entering the City Hospital in my own service and in those of my colleagues, and also with the large number of deaths, especially among old people, as appearing in the daily papers and in the reports of the City Board of Health. Moreover, not a few of the pneumonias, as observed at the City Hospital, exhibited peculiarities or irregularities; they were less frank than usual in their development and in their resolution.

As I had about this time fallen a victim to your President's energy, and promised to occupy part of one of his evenings, it occurred to me I would look up these general points in a general way and give you the results, which might at least derive some interest and possibly some value from a comparison with those of a very recent previous epidemic of influenza, and those of an intervening non-epidemic year, sandwiched between the two.

But upon re-reading the contributions to the exposition of the relations between pneumonia and influenza and the mortality-rate and influenza, I found them more elaborate than I had remembered them to be. I thought, however, it was desirable that any new statements in regard to the past two years should be

¹ Read at the meeting of the Boston Society for Medical Improvement.



put in a form comparable with those previously furnished with regard to the previous epidemic. Hence, instead of letting you off with a few simple, and perhaps vague statements, I come before you with some tables, a form of setting forth facts which it has been my duty as an editor to discourage in others. The immediate cause of this unfortunate result is the zeal of your President, as before said; the remote cause is the zeal of my predecessors.

The Clinical Section of the Suffolk District Medical Society held a meeting January 15, 1890, for the discussion of influenza then epidemic in Boston, a discussion which was opened by Dr. F. C. Shattuck and closed by Dr. A. L. Mason;² at this meeting the relation of pneumonia to influenza was incidentally considered. The New York Academy of Medicine devoted its meeting April 7, 1890, to the discussion of the relation of pneumonia simply to influenza. Dr. E. G. Janeway occupied himself with New York, but his paper was not published; Dr. Wm. Pepper gave the results for Philadelphia;³ and Dr. F. C. Shattuck those for Boston.⁴

As our subject was not only the same but dealt with the same locality, it seemed better to follow the general plan of dealing with it adopted by my brother two years ago, and see how far the results would lead to similar conclusions reached by him then or formulated by Dr. Pepper from his figures and observations obtained in Philadelphia. Accordingly where there were tables — and I regret both for your sake and my own that there were so many — I have tabulated the same details for 1890–91, 1891–92, thus giving a comparison of eight years instead of six, and of two epidemic

² Boston Medical and Surgical Journal, vol. cxxii, No. 7, 1890.

³ Remarks on the Frequency and Character of the Pneumonias of 1890; Medical News, vol. lvii, p. 1, 1890.

⁴ The Relation of Pneumonia to Influenza in Boston: New York Medical Journal, vol. li, p. 650, 1890.

periods instead of one, For, whether or not there was a recurrence of influenza as an epidemic at any earlier period of the year 1891 than December, I think we may accept the months of December, 1890, and January, 1891, as practically free from it. I have tabulated the records of the Boston City and of the Massachusetts General Hospitals, from December 10, 1890, to February 1, 1891, and from December 10, 1891, to February 1, 1892, as a continuation of similar statistics for previous years. As arbitrary dates have to be adopted to represent the epidemic limits, these are, perhaps, as good as any others. It may be that some observers would fix an earlier or a later date for the beginning or the decline of this or of the previous epidemic, but for purposes of comparison, especially in regard to diseases of the respiratory organs, it is, of course, essential to take as nearly as possible the same season of each year.

TABLE I.

Deaths from Pneumonia reported at the Boston City Hall for the Months of December and January, 1884-85 to 1891-92, inclusive.

Months.	1884-85	1885-86	1886-87	1887-88	1888-89	1889-90	1890-91	1891-92
Decemb'r	141	74	113	95	68	105	100	223
January,	103	83	91	183	92	332	139	240
Total,	244	157	204	278	160	437	239	463

Table I shows that the number of deaths returned in Boston as due to pneumonia, December and January, 1891-92, was greatly increased over the previous six non-influenza years; that this increase was about as great for December as for January; that the number of deaths for the two months exceeded that of 1889-90, by 26, though the distribution was different,

there being 118 more deaths in December, 1891, and 92 less deaths in January, 1892.

TABLE II.

Cases of Pneumonia admitted to the Boston City and Massachusetts General Hospitals from December 10th to February 1st, for the Years 1884-85 to 1891-92.

	1884-85	1885-86	1886-87	1887-88	1888-89	1889-90	1890-91	1891-92
Total,	33	26	80	68	40	127	48	101
Deaths,	14	4	12	26	13	38	13	39
Mortality	42+	15+	40%	39%	32½%	30%	27%	38%

Table II shows, from the hospital returns, that the mortality, as well as the number of cases, was largely increased, the per cent. being $5\frac{1}{2}\%$ above the average of the previous six non-influenza years, whereas it was $2\frac{1}{2}\%$ below the average of those years for the same period 1889-90. It is a curious coincidence that twenty-six fewer cases of pneumonia entered the hospitals, and twenty-six more deaths were reported at City Hall.

Table III shows by weeks that the increase in deaths from pneumonia began earlier and was more rapid this winter than last winter or the winter of the previous epidemic, and the same is true of bronchitis comparing this winter with last. The week ending January 2d, was the week of greatest mortality from pneumonia this winter, whereas last winter and the winter before it was a week later. The maximum mortality from bronchitis occurred the same week this winter as last winter, and the number of deaths was, curiously, the same; it was a week later than that for pneumonia. If the early increase in deaths from pneumonia was dependent upon epidemic

influenza the epidemic this season should have manifested itself earlier than two years ago. Personally I

TABLE III.

Deaths from Pneumonia reported at the Boston Board of Health in December and January, 1889, 1890, 1891 and 1892, by Weeks.

Deaths from Bronchitis December, 1890, 1891, January, 1891, 1892.

Date.	Bronchitis.	Pneumonia.	Date.	Bronchitis.	Pneumonia.	Date.	Bronchitis.	Pneumonia.
1889. Week ending Dec. 7,	..	9	1890. Week ending Dec. 6,	11	11	1891. Week ending Dec. 5,	14	26
“ 14,	..	13	“ 13,	11	26	“ 12,	14	41
“ 21,	..	17	“ 20,	11	22	“ 19,	15	31
“ 28,	..	36	“ 27,	10	24	“ 26,	27	57
1890. Week ending Jan. 4,	..	89	1891. Week ending Jan. 3,	16	27	1892. Week ending Jan. 2,	30	85
“ 11,	..	117	“ 10,	10	38	“ 9,	38	79
“ 18,	..	93	“ 17,	12	31	“ 16,	31	74
“ 25,	..	38	“ 24,	6	25	“ 23,	24	55
			“ 31,	18	29	“ 30,	16	39

TABLE III bis.

Total Tabulated Cases of Pneumonia at the Boston City Hospital and Massachusetts General Hospital.

	City Hospital.	Mass. Hosp.	Total.
Dec. 10, 1890, to Feb. 1, 1891	36	14	50
Deaths	9	4	13
Mortality	25%	28+	26%
Dec. 10, 1891, to Feb. 1, 1892	87	20	107
Deaths	34	6	40
Mortality	39%	30%	37%

should have said it developed, if anything, a little later. The editorial column of the *Boston Medical*

and Surgical Journal, probably upon good authority, under date of December 17, 1891, says: "It seems to be the general impression that epidemic influenza has once more made its appearance in the United States, though as yet it has not assumed a serious aspect. The Boston Board of Health does not officially recognize its presence in this city, but admits the apparent increase of catarrhal troubles and pneumonia during the last month," etc. The views of individual practitioners upon this point would be of value.

Looking from another point of view at the returns to the city authorities of the deaths from pneumonia and bronchitis, I find the following: the average of deaths from pneumonia for the month of December in the five years 1884-88, was 104; in December, 1889, the deaths were 160; in December, 1890, 100; and in December, 1891, 223: the average for the five Januarys, 1885-89, was 118.6; in January, 1890, the number was 353; in January, 1891, it was 139; and in January, 1892, 240.

In the same way for bronchitis, the average of five Decembers was 54.8; the number for December, 1889, was only 43; for December, 1890, 49; and for December, 1891, 90. For the five Januarys the average was 53.2; for January, 1890, the number was 89; for January, 1891, 48; and for January, 1892, 109.

Before tabulating the total cases of pneumonia (meaning thereby croupous pneumonia) entered at the two hospitals between December 10 and February 1, 1890-91, 1891-92, I was curious to see the proportion of cases in each. I got the following result shown in Table III *bis*. which includes both croupous and catarrhal or broncho-pneumonias — the number of the latter being small — ten in all for the two years, at both hospitals.

The great increase in the number of cases, as well

as in the number and percentage of deaths this winter, comes largely, therefore, from the City Hospital; and there also the proportion of males was larger — sixty-five males to thirty-two females, while at the Massachusetts there were twelve males to eight females.

TABLE IV.

Analysis of all Cases of Lobar Pneumonia admitted to the Boston City and Massachusetts General Hospitals, from Dec. 10, 1889, to Feb. 1, 1890, with Reference to the Precedence of Grippe Symptoms, Localization, Complications, and Termination — Lysis or Crisis, or Death.

	Preceded by grippe symptoms	Not preceded by grippe symptoms.	Doubtful.	No history.	Total.
Total, number	55	36	26	10	127
“ per cent.	43	29	20	8	100
Single lobe, number	39	17	14	6	76
“ “ per cent.	71	47	54	60	60
Unilateral, more than { number	6	11	5	4	26
one lobe { per cent.	11	31	19	40	20
Double, number	10	8	7	..	25
“ per cent.	18	22	27	..	20
Complicated, number	13	11	14	5	43
“ per cent.	24	31	53	50	34
Recovery by crisis, number	15	7	3	..	25
“ “ per cent.	44	44	21	..	36
Recovery by lysis, number	19	9	11	5	44
“ “ per cent.	56	56	79	100	64
Death, number	11	14	8	5	38
“ per cent.	20	39	30	50	30

December 10, 1891, to February 1, 1892.

Total, number	28	61	1	11	101
“ per cent.	27	60	1	11	100
Single lobe, number	22	48	1	9	80
“ “ per cent.	80	80	100	80	80
Unilateral, more than { number	2	8	..	1	11
one lobe { per cent.	7	12	..	10	10
Double, number	4	5	..	1	10
“ per cent.	14	8	..	10	10
Complicated, number	6	20	..	6	32
“ per cent.	21	33	..	50	33
Death, number	11	21	1	6	39
“ per cent.	40	34	100	50	38

Table IV gives an analysis of the cases of pneumonia in the two hospitals—the extent of the process, the complications and the mortality—with reference to influenza antecedents as gathered from the records.

I have not attempted to include recoveries by crisis and lysis, partly because the dividing line is very uncertain, and partly because the charts in many cases had not been entered and were not easily accessible. The results of this analysis differ materially in several important particulars—and especially as to the percentage of pneumonias preceded by influenza-symptoms—from those of a similar analysis of hospital cases in the previous epidemic published in Dr. F. C. Shattuck's paper.

The difference is probably due more to a difference of record-keeping or record-interpretation than to so great an actual difference in facts. Of the total pneumonias only 27 per cent. are recorded as preceded by influenza; 60 per cent. were not entered as preceded by such symptoms, and one per cent. doubtful. This compares with 43 per cent. preceded by such symptoms in the previous epidemic, and only 49 per cent. not preceded or doubtful.

The percentage of complications was about the same for the two epidemics, and the only other marked difference appears in the mortality which has already been alluded to.

Table V gives the age and sex of the 101 hospital cases. The percentage of males was rather less than in the previous epidemic, 70+ per cent. compared to 74+ per cent., and of females 30 per cent. compared to 26 per cent. There were no deaths under twenty years of age, and only five cases, all of which were in males. The mortality increased pretty constantly in the next three periods of twenty years.

TABLE V.

Lobar Pneumonia in Boston City Hospital and Massachusetts General Hospital, December 10, 1889, to January 31, 1890.

Age.	Cases.	Male.	Female.	Fatal.
10 and under	2	2	0	0
10 to 20	14	9	5	2 (14% +)
20 to 30	41	28	13	7 (17% +)
30 to 40	31	25	6	10 (32% +)
40 to 50	16	12	4	8 (50% +)
50 to 60	13	9	4	7 (54% -)
60 to 70	1	1	0	1
70 to 80	1	0	1	0
Unknown	8	8	0	3
Total	127	94 (74%)	33 (26%)	38 (30%)

December 10, 1891, to February 1, 1892.

10 and under	1	1	0	0
10 to 20	5	5	0	0
20 to 40	53	36	17	18 (34%)
40 to 60	23	17	6	9 (39% +)
60 +	9	5	4	5 (55% +)
Unknown	9	7	3	7 (80% -)
Total	101	71	30	39 (38% +)

The upper half of this table shows the age and sex of 127 hospital cases. Nearly 75% were males, and the mortality increased with each decade up to the fifth, remaining stationary thence to the seventh.

Table VI analyzes the deaths from pneumonia and broncho-pneumonia, as reported to the city authorities, with reference to age, and compares the deaths in December and January, 1891-92, with the same months in 1889-90, and the average of the previous five years.

There was an increase in deaths over the average deaths in December for every decade except one (10-20) up to 100, this increase culminating in the decade between 80 and 90 with 479 per cent. In December, 1889, there was no increase under twenty or over seventy, at other ages there was a marked increase

over the average, but a less increase for every decade except two, 20-30 and 40-50, than in December, 1891.

TABLE VI.

Fatal Pneumonia and Broncho-pneumonia reported at the Boston City Hall. Comparison between December, 1889, and January, 1890, and the average of the same months during the previous five years, with reference to age.

Age.	Avgc. deaths, Dec., 1884-8.	Deaths, Dec., 1889.	Per ct. of increase.	Avgc. deaths, Jan., 1885-9.	Deaths, Jan., 1890.	Per ct. of increase.
10 and under	36.2	37	..	36	56	55
10 to 20	2.6	3	..	4	14	250
20 to 30	8	26	225	8.8	43	388
30 to 40	10	22	120	17	54	218
40 to 50	11.8	28	137	15.6	57	265
50 to 60	11.4	18	58	11.8	50	324
60 to 70	11.2	15	34	13	38	192
70 to 80	9	8	..	10.2	28	175
80 to 90	3.8	3	..	2.2	13	500

Comparison between December, 1891, and January, 1892.

Age.	Deaths, Dec., 1891.	Per cent. of increase.	Deaths, Jan., 1892.	Per cent. of increase.
10 and under	60	65	44	22
10 to 20	2	..	0	..
20 to 30	13	62½	22	150
30 to 40	23	130	29	71
40 to 50	22	86	32	105
50 to 60	21	84	26	120
60 to 70	32	186	41	215
70 to 80	28	211	31	204
80 to 90	22	479	14	536
90 to 100	1	..	1	..

In January, 1892, there was a large increase over the average for every decade except one, 10-20 — when there were no deaths — culminating in an increase of 536 per cent. in the decade 80-90, which compares with 500 per cent. increase for the same

decade January, 1890; for the earlier decades the increase was smaller for January, 1892, than for January, 1890, but it was larger for the very old, that is the three decades 60-70, 70-80, and 80-90.

TABLE VII.

Fatal Bronchitis reported at the Boston City Hall. Comparison between December, 1889, and January, 1890, and the average of the same months during the five previous years, with reference to age.

Age.	Average deaths, Dec., 1884-8.	Deaths, Dec., 1889.	Average deaths, Jan., 1885-9.	Deaths, Jan., 1890.	Per cent. of increase.
10 and under	37.2	23	36.8	29	...
10 to 20	0.6	1	0.4	3	650
20 to 30 . . . . .	..	..	0.2	2	900
30 to 40	1	3	1.4	3	114
40 to 50	1.4	..	1.4	5	256
50 to 60	4.8	4	2.4	8	233
60 to 70	6	5	3.4	13	282
70 to 80	2.4	4	5	13	160
80 to 90	1.4	3	2.6	13	400

Comparison between December, 1891, and January, 1892.

Age.	Deaths, Dec., 1891.	Per cent. of increase.	Deaths, Jan., 1892.	Per cent. of increase.
10 and under	42	13	0	..
10 to 20	1	83	0	..
20 to 30	2	..	3	1,400
30 to 40	1	0	6	329
40 to 50	6	329	4	186
50 to 60	9	87½	9	275
60 to 70	12	100	13	282
70 to 80	15	525	17	240
80 to 90	3	114	14	438
90 to 100 . . . . .	..	..	1	..

The very small number of deaths from pneumonia and bronchitis between the ages of 10 and 20 years in the city returns for any year is very striking.

The city returns, it may be remarked incidentally,

show five deaths from bronchitis and pneumonia between the ages of ninety and one hundred in December, 1890-91, and January, 1891-92.

Table VII analyses bronchitis reported to the city, as Table VI did pneumonia, with reference to age. Deaths from bronchitis in December under ten years were increased slightly, in January there were none under twenty years; in December and January, 1889, 1890, under ten years they were less than the average, for all the other decades, except one, for both months there was irregular but considerable increase. The numbers, however, in all three years were too small to be of much value.

Having compared my figures for the present epidemic and the one free year with those published in my brother's paper for the previous epidemic and for the five free years, we will see how the conclusions to which my figures lead, compare with those to which his figures lead him.

He says: "Conclusions can be drawn, but they do not seem to me of such a nature as to throw any really new light on influenza pneumonia." With this statement I fear I must agree. The conclusions are as follows:

"(1) Pneumonia was unusually prevalent in Boston during the height of the influenza epidemic, about the middle third of the visitation." My figures indicate that it was unusually prevalent this winter, too, but reached its culmination a week earlier.

"(2) The statistics of the Pacific Mills indicate that less than a half per cent. of those severely attacked by influenza acquired pneumonia.

"(3) Broncho-pneumonia was rare in the hospitals." I find only six cases in both hospitals this winter.

"(4) The pneumonia mortality rate was probably not increased, perhaps diminished, as compared with that of the five previous years." For this epidemic it

was increased eight per cent. over the previous epidemic and five and one-half per cent. as compared with the average of six free years.

“(5) The number of cases of pneumonia not preceded by gripe symptoms was about the same as the number of pneumonias in an average year.” The number was apparently greater than the number in an average year.

“(6) Pneumonia followed gripe in so large a number of cases as to show some sort of connection between the affections.” In a sufficiently large number of cases.

“(7) In sixty per cent. of the cases a single lobe only was involved.” In eighty per cent.

“(8) Two-thirds of the cases terminated by lysis.”

“(9) Pneumonia was three times as frequent in males as in females, and the mortality rate increased with each decade.” Two and one-third times.

“(10) The most striking increase in the urban deaths from pneumonia was, on the whole, between the ages of twenty and sixty and eighty and ninety. The increase under ten was slight.” The increase in the urban deaths from pneumonia was greatest between the ages of sixty and ninety; it was striking, but evenly distributed between twenty and sixty; under twenty it was slight.

“(11) The gross appearances in nine cases examined after death were not specially noteworthy.” Autopsies not considered.

Dr. Pepper's estimate from returns made to him by a large number (272) of practitioners in Philadelphia, of the relative proportion of croupous and catarrhal pneumonias, differs greatly from the results afforded by our hospitals. These returns indicate that the catarrhal were almost twice as frequent as the croupous. He further states that Dr. DaCosta and he saw about an equal number of catarrhal and croupous pneumonias

in consultation. He notes as a peculiarity of the pneumonias during the epidemic season 1889-90 the large preponderance of cases affecting the right lung, which he estimates was affected twice as often as the left. Of 101 hospital cases in Boston from December 10th to February 1st, this winter, the right lung alone was affected in $57\frac{1}{2}\%$, the left alone in $32\frac{1}{2}\%$; but I find that of 44 cases for the same period last winter, when there was no epidemic of influenza, in 53% the right alone was affected, the left alone in 33% . Osler reports that in 100 pneumonia autopsies at the Montreal General Hospital, not made during an influenza epidemic, the right lung was affected in 51% , the left in 32% and both in 17% . Of last winter's hospital cases in Boston 14% were double, and this winter's only 10% .

TABLE VIII.

Amount of Lung involved and region affected.	Dec. 10, 1890, to Feb. 1, 1891.					Dec. 10, 1891, to Feb. 1, 1892.					Total both years.						
	Total Cases.	Per cent.	Apex.	Delirium	Alcoholic Habits.	Mortality.	Total Cases.	Per cent.	Apex.	Delirium.	Alcoholic Habits.	Mortality.	Total Cases.	Apex.	Delirium.	Alcoholic Habits.	Mortality.
Right lung alone . .	23	53	5	8	12	6	58	$57\frac{1}{2}$	16	11	11	23	81	21	19	23	29
Left lung alone . .	15	33	3	4	8	4	33	$32\frac{1}{2}$	2	9	5	10	48	5	13	13	14
Double	6	14	2	5	3	3	10	10	0	4	2	6	16	2	9	5	9
Whole of one lung .	2	..	..	2	2	1	11	11	..	6	2	7	13	..	8	4	8
Apex	10	23	..	6	5	5	18	17	..	5	6	9	28	..	11	11	14
Broncho-pneumonia,	4	..	..	0	1	0	6	..	..	0	0	2	10	..	0	1	2

Dec. 10, 1890, to Feb. 1, 1891, 44 cases. Dec. 10, 1891, to Feb. 1, 1892, 101 cases. Both years, 147 cases, including two of doubtful location.

Though not coming strictly under my subject, curiosity and a desire to make use of my figures led me to look into the question of apex pneumonia.—especially as I have for some time been sceptical of the current statement that it is more apt to be accompanied by delirium. In 18 apex pneumonias (17% of the total) of the influenza period, there were 9 deaths, or 50%; but 6, or 33%, were of markedly alcoholic habits, and only 5, or 28%, exhibited delirium. One case, notwithstanding the apex and the alcohol, was not delirious and got well. One case of double apex died two days after entering the hospital, this is not included. Last winter in 10 apex cases (23% of the total), five died, five had alcoholic habits, and six were delirious; that is, one only was delirious without being alcoholic.

In regard to his returns for the 1889-90 epidemic, Pepper says: "There was also an unusual proportion of cases of apex pneumonia where the entire upper lobe was completely consolidated without implication of any other part. As usual in such cases, there seemed to be a special predominance of cerebral symptoms."

Among the complications were inflammations of the ear of various degrees of severity, erysipelas, rheumatism, tuberculosis, empyema, cardiac lesions and pericarditis, melancholia, acute mania, meningitis, alcoholism, cerebral embolism, erythema, etc.

One young woman entered my service at the City Hospital with undoubted influenza. She developed an erythema of the face, then a pneumonia; she then miscarried at the fifth month; she then developed diphtheria; and she subsequently recovered her health perfectly.

I had intended to say something about the vague symptoms and ill-defined physical signs observed in some cases of so-called pneumonia during the influenza, but I have already taken up too much of your time.

I hope some of you will favor us with your personal

experiences as practitioners; some I know have seen comparatively little pneumonia this winter and others more than usual.

To sum up briefly, I should incline to the opinion that true pneumonia was a sequel rather than a concomitant or complication of influenza. Though I acknowledge that the tables presented do not offer alone sufficient support for this view.

Pepper takes this position in the following words: "The vast majority of pneumonias occurred as a sequel, rather than a complication, and they were clearly traceable to exposure to damp and raw weather while the patient had a relaxed system and while slight pyrexia persisted after the subsidence of the more marked symptoms of his influenza. Experience furnishes many instances of this fact."

Osler, in his "Practice of Medicine," just published, speaks of pneumonia as a *complication*, and the most serious and fatal one of influenza; but at the same time states that there is, as far as his observation goes, nothing special or peculiar in the character of the pneumonia.

Through the courtesy of Drs. Mason and Folsom at the City Hospital and of Drs. F. C. Shattuck and W. W. Gannett at the Massachusetts General Hospital, I have had access to their cases; and I have to thank Dr. A. C. Jelly and my house-officers, Drs. Dudley and Towle and Mr. Edson, for assistance in abstracting the records, and the Boston Board of Health for figures furnished. My use of Dr. F. C. Shattuck's tables speaks for itself. As they were originally published elsewhere, their reproduction here commends itself additionally.

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