had been used for both products. Though egg was not represented in the formula of the imitation cream, it nevertheless often gained access to the cream fortuitously.

(c) If paratyphoid bacilli gained access to the imitation cream, would the cream be thereby rendered infective for man? There is reason to believe that paratyphoid bacilli are able to give rise to disease in man only when ingested in considerable numbers. It may therefore be assumed that multiplication of the organism must occur in the cream before this becomes infective. Hobbs and Smith (1954) showed that synthetic cream could be divided into two groups—those that supported bacterial growth and those that did not. They further showed, in confirmation of Thomson's (1953) work, that cream belonging to the second group was converted into a rich nutrient medium by contact with flour, cakes, or other source of protein. This is illustrated by Table II, kindly provided by Miss J. Glanville, which shows that *Bact. coli*, though actually dying in imitation cream itself, multiplied abundantly when the cream was kept at room temperature in contact with buns or éclair casings.

The length of time required for sufficient growth of paratyphoid bacilli to occur to render the cakes infective must necessarily depend upon many factors, such as the number of paratyphoid bacilli introduced initially, the number of other organisms present, the nature of the cake or other mixture into which the cream is brought into contact, the degree of heating, if any, that the cake may receive, and the time and temperature of incubation in the shop, on the round, and in the customer's home. In this connexion it is interesting to notice that most of the patients in these two outbreaks had bought their cakes, not directly from the bakery where they were made, but from outlying shops supplied by the bakery or from a roundsman. Under these conditions there was almost certainly a delay in the consumption of the cakes, thus favouring the multiplication of the organism in the cream.

We have assumed here that the cream acted as the direct vehicle of infection. It must be realized, however, that, once contamination is introduced into a bakery, other articles must inevitably become contaminated. Many of these articles will be epidemiologically of no importance, because they will be subjected in baking to a sufficient degree of heat to kill off non-sporing pathogenic organisms such as those of the *Salmonella* group. It is because imitation cream is not subjected to any serious heat treatment after it has been added to articles of confectionery, and because, in conjunction with nutrient materials provided by the cake itself, it provides such an excellent pabulum for bacterial growth, that it must be regarded as of special potential danger.

To protect against outbreaks of this sort known contaminated products must be prevented from gaining access to a bakery. Hobbs and Smith (1954) suggested the use of hydrogen peroxide to prevent the growth of any pathogenic organisms that may gain access to synthetic cream adventitiously.

It need hardly be added that strict control should be kept over the health of employees in bakeries; but the experience of the Public Health Laboratory Service has shown that, though cases and symptomless excreters are not uncommon among bakery employees, they almost invariably give a history of having eaten the contaminated cream buns or cakes. There is growing evidence to support the view that bakery products usually become contaminated not primarily from infected members of the staff but from inanimate articles introduced from outside, of which Chinese processed egg in its various forms is the most common.

Summary

Two outbreaks of paratyphoid fever due to *Salm. paratyphi B* phage type 3a are described.

The vehicle of infection was cakes filled with a proprietary imitation cream used in two bakeries.

The same phage type of paratyphoid bacillus was found in unopened cans of Chinese frozen whole egg used in the bakeries, in some members of the staff, and in the patients.

It is suggested that the imitation cream was contaminated within the bakery by *Salm. paratyphi B* from the frozen whole egg.

The dangers of the use of a contaminated product in a bakery are discussed.

We are grateful to Dr. E. S. Anderson and the staff of the Central Enteric Reference Laboratory and Bureau for phage-typing; to the Dorchester and Brighton Public Health Laboratories for the results of the examinations of specimens from cases and the bakeries; to Miss Muriel E. Smith and the staff of the Food Hygiene Laboratory, Colindale, who examined the egg samples; and to Mr. F. Marsh and his staff for the preparation of large quantities of media. We would especially like to thank Dr. G. H. Pringle, Medical Officer of Health of the Borough of Worthing, and Dr. F. Cockcroft, Medical Officer of Health of Worthing Rural District, and their staffs, for permission to publish this account of their outbreak and for assistance with sampling. We also thank the medical officers of health of several other areas for information about patients in their areas.

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JAMSHEDPUR FEVER*

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Jamshedpur fever is the name given to a peculiar illness which started in the city of that name and affected children and young adults, having the highest mortality among the very young. Later it spread to other cities such as Lucknow, Delhi, Kanpur, Allahabad, Calcutta, and Nagpur. Jamshedpur, unlike some of its neighbours, is a clean and well-planned city with a population of about 251,619 (1951 census); it has a very fine water supply and an excellent sewage system. The standard of health among the population, which consists largely of employees in the iron and steel industry and their families, is good.

The illness was first observed in Jamshedpur on May 14, 1954. A child about 1 year of age suddenly developed respiratory distress with a temperature of 103° F. (39.4° C.). Moist sounds were heard on both sides of the chest, and a provisional diagnosis of bronchopneumonia was made. The child died in two hours. About a fortnight later another child from the same

*Abridged from a paper read at the symposium on "The Mystery Disease in India" held during the All India Annual Conference of Physicians, 1955, at Nagpur.

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house and family became ill with a temperature of 102° F. (38.9° C.). There were no areas of consolidation in the chest, but a few crepitations were heard on auscultation. The child did not appear very ill or toxic. Since the first patient had been treated with tetracycline without success this child was given injections of procaine and crystalline penicillin, 210,000 units of each, the latter to be repeated every three hours. In spite of this the child died within a few hours. The occurrence of two fatal cases of a similar type in the same house within such a short time raised the possibility of an infectious disease, which later seemed to be confirmed when similar cases occurred of children who died a few hours after a sudden rise of temperature.

It was decided that this was a disease hitherto not met with in Jamshedpur. The clinical pattern was the same in all the fatal cases. Cerebral malaria, which is common in Jamshedpur, was ruled out, as malaria parasites were not found on repeated examination in any of the cases. The enteric group of fevers, typhus, brucellosis, and leptospiral infections were all excluded both bacteriologically and serologically. The exclusion of protozoal and bacterial causes pointed to the possibility of a virus infection, probably a virus encephalitis. A team of experts headed by Dr. Telford H. Work, Assistant Director of the Virus Research Centre, Poona, and Dr. T. Ramachandra Rao, medical entomologist, were sent to investigate the outbreak.

Fatal Cases

From May to September, 1954, 35 fatal cases were admitted to the Tata Main Hospital, Jamshedpur. In Fig. 1 the total number of deaths in the hospital and the deaths among children in the years 1952, 1953, and 1954 are compared. The total number of deaths among children during May to September in the years 1953 and 1954 and the fatal cases of Jamshedpur fever are given in Table I.

Thus for the period May to September, 1954, out of a total of 93 deaths among children, 35, or 38%, were due to Jamshedpur fever, the maximum fatality (17 out of 19) occurring in June. Although the number of fatal cases is small when compared with the total number of deaths in the hospital, the fact that it refers to only one disease makes it significant.

TABLE I.—*Total Deaths Among Children Compared with Deaths from Jamshedpur Fever*

	May	June	July	Aug.	Sept.	Total
1953.. ..	12	19	2	21	15	79
1954.. ..	12	19	26	19	17	93
Jamshedpur fever	2	17	8	5	3	35

Age Incidence and Distribution

The ages ranged from 1 to 26 years, although most of the patients were in the younger age groups. The incidence according to age group in the 35 cases was as follows: 1–5 years, 12 (8 males); 6–10 years, 19 (12 males); 11–15 years, 2 (males); over 15 years, 2 (males). Thus it can be seen that most of the fatal cases occurred between the ages of 1 and 10, and that males predominated.

The distribution of the cases is shown on the map of Jamshedpur (Fig. 2), from which it can be seen that they came from all parts of the city.

Clinical Features

The usual history was that the child was well and playing during the day, but that during the night there was a sudden rise of temperature, or an attack of convulsions, or the child muttered deliriously in his sleep. Within two or three hours the temperature reached 104° or 105° F. (40° or 40.6° C.), and in a few cases even 106° F. (41.1° C.). Excessive thirst was common.

When seen, these children were obviously toxic and ill. Some had convulsions, and a few had twitching of muscles and clenching of teeth. Even when patients were conscious on admission, coma or a muttering delirium set in as the temperature rose. The disease ran such a rapid course that many patients died within an hour or two of their admission before any investigation was possible. Patients were flushed and irritable. The skin was dry and hot, and the tongue coated and dry. Neck rigidity was present in a few cases, but was not a constant feature. Pupils were irregular, dilated, and reacted sluggishly to light. Photophobia was not noted. Superficial and deep reflexes, even if brisk at the time of admission, usually could not be elicited as the condition deteriorated. The plantar response was extensor and abdominal reflexes were absent. The pulse rate was slow in relation to the raised temperature. Fundi were congested, with no haemorrhagic areas. In a few cases one or

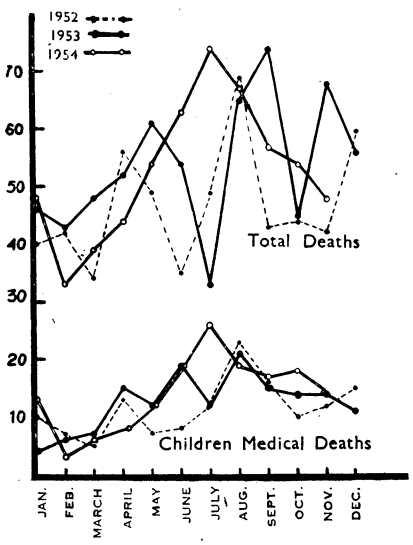

FIG. 1.—Total deaths and deaths among children, 1952–4.

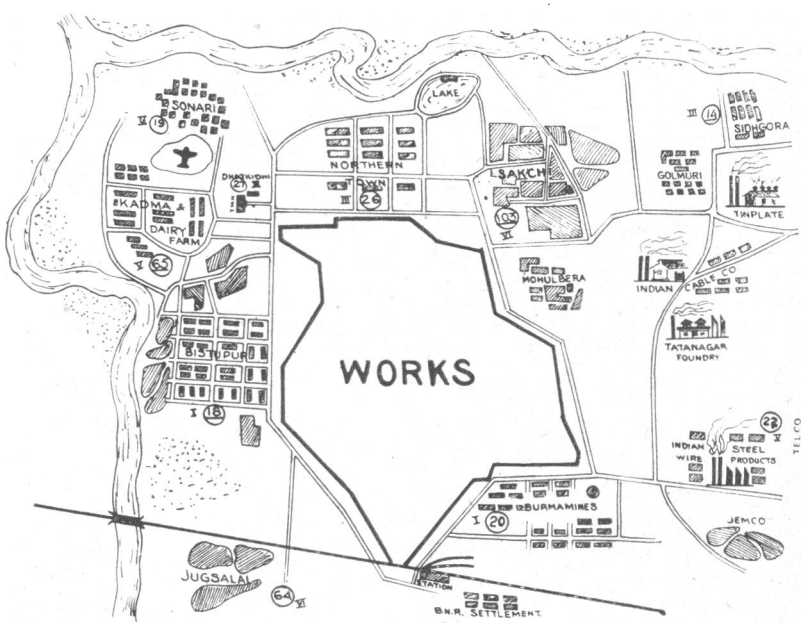

FIG. 2.—Map of Jamshedpur showing distribution of cases (fatalities in roman numerals).

two loose motions were passed after admission. Respiratory, cardiovascular, and other systems were all normal. There was no enlargement of liver or spleen. Towards the end bubbling rales developed on both sides of the chest and became progressively worse. No improvement followed the administration of oxygen, nor did artificial respiration have any effect in prolonging life. All the children died within 24 hours of the onset of the illness.

Laboratory Investigations

As stated earlier, bacteriological and serological tests gave negative results in all cases. Leucocytosis with increase in polymorphs, seen in a few cases, was not a constant feature. Lumbar puncture was performed in 21 of the 35 fatal cases. Results of the cerebrospinal fluid (C.S.F.) examination are given in Table II.

TABLE II.—*Results of C.S.F. Examination* (21 *Cases*)

Amount in mg. per 100 ml.	No. of Cases	Amount in mg. per 100 ml.	No. of Cases
SUGAR			
Below 20	2	51–60	2
21–30	1	61–70	6
31–40	2	71–80	2
41–50	1	81–90	5
PROTEIN			
Below 20	8	41–50	1
21–30	10	Above 100	1
31–40	1		
CHLORIDES			
601–700	7	701–800	14

The globulin fraction was increased only in the case with a protein level above 100 mg. Lymphocytes were present and there was no pleocytosis. Blood sugar was estimated in 13 of the cases. In only three of the nine cases in which blood and C.S.F. sugar was estimated was there a fall in both levels (see Table III).

TABLE III.—*C.S.F. and Blood Sugar Values in* 3 *of* 9 *Cases Examined*

C.S.F. Sugar (mg. per 100 ml.)	Blood Sugar (mg. per 100 ml.)
55·5	20
35·35	40
31·2	44·4

Blood sugar values in the 13 cases are given in Table IV.

TABLE IV.—*Analysis of Blood Sugar Readings* (13 *Cases*)

Amount in mg. per 100 ml.	No. of Cases	Amount in mg. per 100 ml.	No. of Cases
Below 20	3	61–70	–
21–30	—	71–80	1
31–40	1	81–120	3
41–50	1	Above 120	3
51–60	1		

In one case the blood sugar level was 44.4 mg. per 100 ml. at the time of admission, rose to 112 mg. after glucose administration, fell to 18.2 mg. after three hours, and rose again to 61 mg. just before the patient's death. In another case blood sugar was 28.5 mg. and C.S.F. sugar 32.1 mg. per 100 ml., the blood sugar reaching 284.8 mg. per 100 ml. after glucose administration. In this case, diagnosed soon after admission as Jamshedpur fever, blood and C.S.F. sugar estimations were made every four hours; no appreciable fall in blood sugar level was noticed after the glucose administration.

It is apparent that the C.S.F. and blood sugar levels tended to fall in some of the fatal cases. There was no abnormal increase in C.S.F. proteins, however, in any of the cases except one. Intravenous and oral administration of glucose did not affect the prognosis in any way, as all the children so treated died. After glucose had been given the blood sugar level rose and sugar was detected in the urine.

In the three cases in which blood urea and calcium were estimated these were normal. In one case a chest radiograph was normal.

Treatment

Injections of procaine and crystalline penicillin, oxytetracycline, chloramphenicol, chlortetracycline, and tetracycline were tried in different cases, but none of these antibiotics was found to be effective.

Post-mortem Examination

Necropsy was possible in only one case, because of the popular objection to such examinations. Sections of various organs—brain, liver, spleen, kidneys, heart, suprarenals—were collected by Dr. Work. No changes were noticeable in these organs on either macroscopical or microscopical examination. There was no glycogen depletion in the liver. Further investigations on a possible viral aetiology of the disease are being carried out at the Virus Research Centre, Poona.

Non-fatal Cases

Parallel with the increase in the number of fatal cases there was a sudden increase in the number of admissions to the medical wing of the hospital. Fig. 3 shows graphically

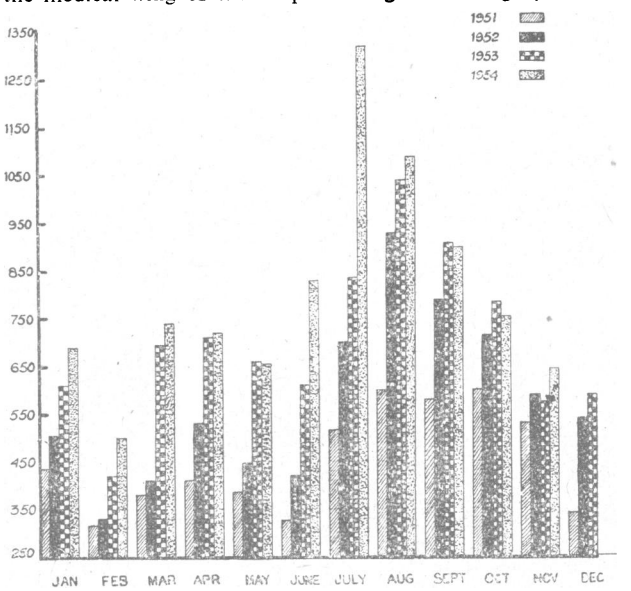

FIG. 3.—Total medical admissions, 1951–4, to show rise in July, 1954, as compared with other years.

the total admissions to the medical wards for the years 1951–4, the rise in July, 1954, being striking. Admissions to the children's medical ward for the years 1953 and 1954 are compared in Fig. 4. The increase in 1954 was due to the admission of a number of cases with a rise of temperature which was sudden in onset, lasted for a day, and then subsided either by crisis or by lysis within 24 to 48 hours. A total of 378 such cases were admitted to one department of the hospital during the period in question. These cases, like the fatal cases, were all bacteriologically and serologically negative. Since the deaths in very young children and these non-fatal cases occurred coincidently it was concluded that both belonged to the same group, the disease being fatal or severe in the very young and mild in the older age group.

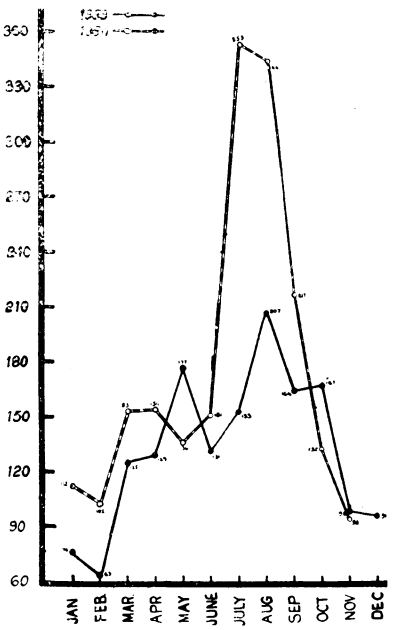

FIG. 4.—Comparison of admissions to children's medical ward in 1953 and 1954.

TABLE V.—*Classification According to Age and to Type of Infection of 378 Non-fatal Cases (Figures in parentheses denote Females)*

Age Group (Years)	May			June			July			August			September			Total		
	Total Admitted	Severe	Mild	Total Admitted	Severe	Mild	Total Admitted	Severe	Mild	Total Admitted	Severe	Mild	Total Admitted	Severe	Mild	Admissions	Severe	Mild
Under 1	0	0	0	6	1	5	14 (8)	3 (2)	11 (6)	14 (5)	0	14 (5)	4 (2)	0	4 (2)	38 (15)	4 (2)	34 (13)
1–10	1 (1)	1 (1)	0	22 (6)	10 (2)	12 (4)	67 (25)	14 (6)	53 (19)	32 (12)	1	21 (12)	5 (3)	0	5 (3)	127 (47)	26 (9)	101 (38)
11–20	2	0	2	27 (9)	4 (2)	23 (7)	29 (9)	1	28 (9)	11 (5)	0	11 (5)	5 (2)	0	5 (2)	74 (25)	5 (2)	69 (23)
21–30	3 (1)	0	3 (1)	30 (6)	0	30 (6)	21 (12)	0	21 (12)	8 (3)	0	8 (3)	1	0	1	73 (22)	0	73 (22)
31–40	5 (2)	0	5 (2)	19 (3)	0	19 (3)	22 (4)	0	22 (4)	8 (3)	0	8 (3)	2	0	2	56 (12)	0	56 (12)
41–50	0	0	0	3 (1)	0	3 (1)	4 (1)	0	4 (1)	0	0	0	0	0	0	7 (2)	0	7 (2)
Over 50	1	0	1	2	0	2	0	0	0	0	0	0	0	0	0	3	0	3
Total	12 (4)	1 (1)	11 (3)	109 (25)	15 (4)	94 (21)	167 (59)	18 (8)	149 (51)	73 (28)	1	72 (28)	17 (7)	0	17 (7)	378 (123)	35 (13)	343 (110)

Clinical Features

The non-fatal cases may be divided into two broad groups—with (1) severe and (2) mild infection. The first group (severe type) was mostly composed of children and young adults. There was a sudden rise of temperature to 103° F. (39.4° C.), with or without rigors, accompanied by severe muscular pain in the limbs and backache, almost dengue-like in nature. Congestion of the eyes and a dry, coated tongue were features. The patient was usually drowsy and apathetic, lying curled on one side and irritable if disturbed. Bradycardia was another feature. Neck rigidity, Kernig's sign, and pupillary changes were present only in the very severe cases. Ankle and knee jerks were brisk and plantar responses extensor. The temperature subsided either suddenly or gradually in the course of two or three days, depending upon the severity of the illness. Respiratory, cardiovascular, and other systems were normal.

Patients in the second group (mild type) had a sudden rise of temperature, with muscular pains. The fever lasted only 24 hours or at most two days, after which recovery set in.

In a few cases in both groups the temperature rose again about three or four days after the onset.

The age distribution and classification according to type of disease in the 378 non-fatal cases are given in Table V.

Incubation Period

The incubation period varied from two to seven days. A child visiting Jamshedpur for the first time developed a fatal illness after a week's stay. Another child contracted the fever two days after arriving in the city. Four days after his arrival from Madras the son of one of us (M. V. C.), aged 4 years, developed a sudden rise of temperature during the night. He complained of excessive thirst, woke up with a start every two or three hours throughout the night feeling frightened and with symptoms of mental irritability. The clinical picture conformed to that in the severe, non-fatal type described, and the patient recovered within 24 hours.

Laboratory Investigations

As already stated, both bacterial and protozoal causes for the infection were excluded. An analysis of the total leucocyte counts is given in Table VI. In a number of cases the urine contained a trace of albumin, probably due to the fever. In some of the cases a few pus cells were also present. On cultural examination urine was sterile and no pathogens were isolated from the faeces.

Blood sugar, blood urea, and serum calcium levels and van den Bergh reaction were all normal. As in the fatal cases, examination of the C.S.F. gave normal results, the protein level remaining constant at about 15 mg. per 100 ml.

TABLE VI.—*Total Leucocyte Counts*

	Leucocyte Count (per c.mm.)				Total Cases
	5,000–10,000	10,001–15,000	15,001–20,000	Above 20,000	
No. of cases ..	229	92	39	18	378

Relapses

After their discharge a number of patients returned to the hospital in a week to ten days with another attack of a similar nature. These cases are analysed in Table VII.

TABLE VII.—*Relapses (Females in Parentheses)*

All Groups (Years)	May	June	July	Aug.	Sept.	Total
Under 1 ..	—	2	—	1	—	3
1–10 ..	—	8 (1)	16 (5)	3 (2)	—	27 (8)
11–20 ..	—	10 (5)	1	4 (1)	—	15 (6)
21–30 ..	—	1	2	—	—	3
31–40 ..	—	3	2	1	—	6
Total ..	—	24 (6)	21 (5)	9 (3)	—	54 (14)

Treatment

In the non-fatal, as in the fatal, cases no antibiotic was effective. Antipyretics together with symptomatic treatment to control the pains in the limbs and headache were given.

Neurological and Mental Manifestations

Only two children developed paresis of an upper motor neurone type, one during the course of the illness and the other while convalescent. The former had paralysis of the arms and legs, and he did not recover the use of his limbs till one month after discharge. The other patient had paralysis of the left arm, which developed four days after the fever had subsided. He started to regain the use of the arm 12 days after the onset of the paresis and is now completely cured. Two patients, a girl aged 8 and a boy aged 5, showed mental changes. Both were normal and healthy before the illness, which was severe. The girl had symptoms of mental instability during a relapse, and the boy showed mental changes when his temperature returned to normal.

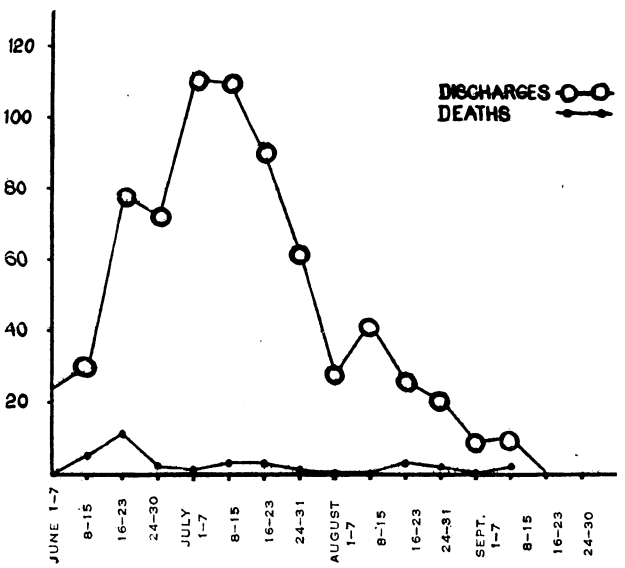

FIG. 5.—Number of cases of Jamshedpur fever discharged each week and number of fatal cases.

Both had completely recovered when discharged ten days later. No reports of the development of paralysis or mental changes in any cases subsequent to discharge from hospital have so far been received.

Relationship Between Fatal and Non-fatal Cases

It was presumed that both the fatal and the non-fatal cases had the same aetiology because they appeared at the same time. Fig. 5 shows the number of cases of Jamshedpur fever discharged each week, and the number of fatal cases. It will be noted that, while the maximum incidence of fatal cases was in June, the number of non-fatal cases increased in July. One of the reasons for this might be the development of a certain degree of immunity.

Increased Incidence of Anterior Poliomyelitis

Anterior poliomyelitis is not common in Jamshedpur, only one acute case being seen in 1953 at this hospital. In 1954, however, the number of cases of poliomyelitis had increased (see Table VIII), and there were two deaths in the hospital. Virus was isolated from one of these fatal cases.

TABLE VIII.—*Cases of Anterior Poliomyelitis Occurring Simultaneously with the Outbreak of Jamshedpur Fever*

	June	July	Aug.	Sept.	Oct.	Nov.	Total
No. of cases ..	0	2	4	2	1	1	10

Except for two cases in children aged 3 and 5 years, all the patients were below 2 years of age.

Any relationship between Jamshedpur fever and anterior poliomyelitis has not been established, and it is presumed that they are not interrelated, the appearance of both diseases about the same time being probably a coincidence.

Epidemiological Aspects

Climatic Factors

Jamshedpur is at an altitude of 550 feet (168 metres) above sea level. The average monthly rainfall, maximum and minimum temperatures, and humidity for the years 1952–4 are given in Table IX.

It can be seen that in 1954 there was a diminished rainfall in Jamshedpur for the months of June, July, and August as compared with the previous two years. Whether this is a likely cause in the spread of this disease is difficult to say.

Locality and Economic Factors

On analysing the cases according to locality it was found that the disease was not confined to one region or to one section of the population. The map of Jamshedpur (Fig. 2) shows the distribution of the fatal and non-fatal cases. Children from both the poor and the better-off classes were affected.

Arthropods

Although the fatal, severe, and mild cases were all treated in the same ward as other children, and although surgical cases were housed in another wing of the same building with a common dining-hall, cross-infection inside the hospital was unlikely. It was only very rarely that more than one case occurred in the same family. Direct spread of the disease was therefore ruled out. In view of this, the possibility of an arthropod vector was considered. Dr. T. Ramachandra Rao, of the Virus Research Centre, Poona, worked along these lines for nearly four months, and his findings are summarized below.

The blood-sucking arthropods found in houses during the daytime were almost entirely mosquitoes (*Anopheles, Aëdes,* and *Culex*) and sandflies (*Phlebotomus papatasii* and *P. minutus*). Houseflies were present in moderate numbers in all the houses. On the assumption that one of these arthropods might be responsible for transmitting the disease it was decided to start anti-arthropod measures. To assess the results of these measures three contiguous areas—Kadma, Sakchi, and Northern Town—approximately 4 miles (6.5 km.) long and 1 mile (1.6 km.) wide were chosen. The number of houses in this area was about 11,515 with a population of 96,559 (1951 census). "Gammexane P 520," a 50% water-wettable powder of benzene hexachloride, was used for spraying the interior of all houses and cattle-sheds in the selected area, 16,473 lb. (7,470 kg.) of gammexane being used. Gammexane was chosen in preference to D.D.T. because of its higher initial toxicity effective over a wider range of arthropods. The spraying extended from July 1 to 30, and served 38.4% of the population.

This resulted in the immediate disappearance of both mosquitoes and sandflies, while their number remained unaffected in the unsprayed sectors. By September–October in the unsprayed sectors the density of mosquitoes had reached 14.9 per man-hour of search, and that of sandflies 7.8; whereas the corresponding figures in the sprayed sectors were 3.4 and less than 0.04. Houseflies also disappeared for a few weeks from the sprayed houses, reappearing in small numbers towards the end of September.

TABLE X.—*Distribution of* 893 *Cases of Jamshedpur Fever*

	Sprayed Sectors	Unsprayed Sectors	Total
Population (1951)	96,559	155,060	251,619
No. of cases:			
Fatal	15	20	35
Severe	32	30	62
Mild	421	375	796
Total ..	468	425	893
Average per 1,000 population ..	4·8	2·7	3·5

A total of 893 cases (including the 35 fatal cases) were analysed by Dr. Rao according to area of origin; his findings are given in Table X.

In Table XI the 893 cases are analysed with reference to their time of admission.

Fig. 6 shows graphically the distribution of severe and fatal cases in the sprayed and unsprayed areas and in the whole town; it also shows the number of cases admitted every four days.

TABLE IX

Month	Temperature (°F.) Maximum			Temperature (°F.) Minimum			Humidity (%)			Rainfall (inches)		
	1952	1953	1954	1952	1953	1954	1952	1953	1954	1952	1953	1954
January ..	88·0	84·0	86·5	46·4	44·0	44·0	69	72	72	Nil	0·12	0·05
February ..	96·8	96·0	95·3	54·2	48·8	54·7	58	65	60	0·30	0·05	0·36
March ..	103·0	107·0	105·0	58·0	64·4	53·7	54	47	39	0·40	—	0·02
April ..	107·8	109·6	111·2	69·8	66·3	68·0	57	38	37	2·90	0·20	0·03
May ..	109·0	114·0	112·0	72·0	73·0	76·1	63	55	54	1·75	1·30	1·03
June ..	112·0	113·6	101·0	73·8	71·8	74·8	70	72	71	9·75	7·50	5·25
July	97·4	94·2	98·0	74·7	74·4	76·0	84	83	79	19·80	16·60	5·00
August ..	93·0	92·7	95·1	78·9	73·7	77·0	82	83	82	9·80	19·80	8·24
September	93·5	93·0	93·6	78·0	74·4	74·2	80	81	82	5·50	7·70	7·26
October ..	93·0	94·0	93·0	72·3	58·3	59·0	72	76	73	2·80	0·20	1·69
November	89·7	86·4	87·0	48·0	53·8	52·6	71	75	68	0·10	3·65	—
December ..	86·0	82·3	—	58·5	53·0	—	76	79	—	—	—	—

TABLE XI.—*Analysis of 893 Cases According to Time of Admission*

	Sprayed Sectors		Unsprayed Sectors		Total	
	No. of Cases	Rate per 1,000 Pop.	No. of Cases	Rate per 1,000 Pop.	No. of Cases	Rate per 1,000 Pop.
May 2–31 (30 days)	21	0·22	26	0·17	47	0·19
June 1–30 (30 days)	137	1·42	116	0·75	253	1·01
July 1–30 („)	205	2·12	192	1·24	397	1·58
July 31–Aug. 29 (30 days) ..	77	0·80	64	0·41	141	0·56
Aug. 30–Sept. 18 (20 days) ..	28	0·29	27	0·18	55	0·22
Total ..	468	4·80	425	2·70	893	3·50
Estimated figures for Sept (30-day period) ..	42	0·43	41	0·27	83	0·33

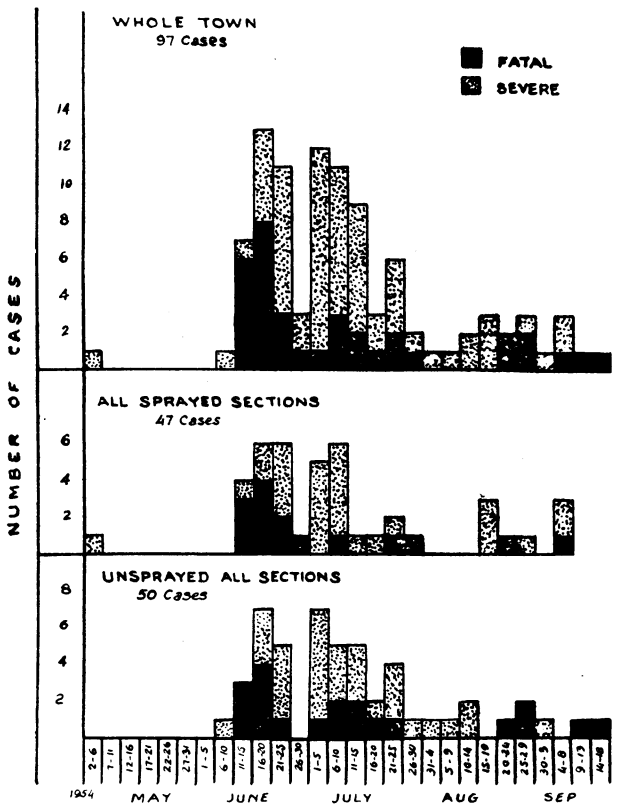

FIG. 6.—Distribution of severe and fatal cases in relation to spraying.

It will be noted that the application of 16,473 lb. (7,470 kg.) of gammexane inside 11,515 houses in a selected area had no effect on the incidence of Jamshedpur fever. The spraying was carried out at the peak of the epidemic, and the decline in incidence was essentially parallel in both the unsprayed and sprayed areas of the city.

Preliminary Result of Serological Study at the Virus Research Centre, Poona

Although the gammexane spraying appeared to demonstrate that the infection was not arthropod-borne, neutralization tests on sera collected both from the acute cases of Jamshedpur fever and from the population at large indicated that there is a high degree of immunity to Type I dengue virus among the residents of Jamshedpur. There was also a substantial incidence of neutralizing antibodies to West Nile virus. The significance of these findings is yet to be determined.

A strain of Group A Coxsackie virus was isolated from the faeces of an 18-months-old child with a diagnosis of Jamshedpur fever. Serum from this patient, in which no antibodies to this virus were found during the acute phase, showed a high antibody content during the convalescent stage. But serological studies with acute and convalescent sera from other cases of Jamshedpur fever and "survey" sera from healthy children of 7–10 years showed a considerable amount of antibody to this strain of Coxsackie virus. These studies suggested that this agent was not responsible for the infection, although an intestinal route of spread is a possibility.

Summary

The 35 fatal cases of an unidentified fever which occurred among children in Jamshedpur, Bihar, during the months of May to September, 1954, have been analysed. The cerebrospinal fluid had a normal protein content in most of the cases. Low C.S.F. sugar and low blood sugar levels were found in a few cases. Treatment with antibiotics had no effect in these cases.

In 378 non-fatal cases admitted to one medical department of a hospital the disease was severe or mild and occurred with or without relapses. Two children developed paresis and two showed mental changes during the illness.

The incidence of anterior poliomyelitis was found to have increased side by side with that of Jamshedpur fever.

The incubation period and epidemiological features are discussed.

Selected areas of the city were sprayed with gammexane to try the effect of anti-arthropod measures on the spread of the disease. This did not affect the incidence, the number of cases in the sprayed and unsprayed areas remaining unchanged.

Serological studies on the possibility that a virus was the aetiological agent are still being carried out at the Virus Research Centre, Poona; a preliminary report of the findings is given.

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Claims that the use of any toothpaste will cure or prevent dental decay are denied by the British Dental Association in a recent statement. The association favours tooth brushing to clean the teeth, but says that cleaning is all that a toothpaste can do. "The British Dental Association," the statement reads, "recognizes that a dentifrice is of considerable value in the cleaning of the teeth and gums, but does not accept as proved on the evidence at present available any claim that a dentifrice can actively prevent dental disease otherwise than by virtue of its function as a cleaning agent."