

## CHAPTER II.

THE GENERAL STATISTICS OF INFLUENZA IN AUSTRALASIA AND  
PARTS OF AFRICA AND ASIA,

BY

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## AUSTRALASIA.

## AUSTRALIA AND TASMANIA.

Two subjects are of outstanding interest in the history of epidemic influenza in Australia; it was the only country which attempted to secure immunity by establishing the principles of maritime and land quarantine in a strict manner, and it was the only country which escaped, for at least some months, the terrifying type of influenza which, from October to November 1918, raged elsewhere almost throughout the world. The immunity, however, did not persist; it lasted until January 1919, but from that month onwards, at different times in different parts of the country, the presence of a virulent form of influenza with pneumonic complications became manifest. The experience of Tasmania was quite similar.

There has been much painstaking inquiry into the various factors which possibly or probably might be responsible for the temporary immunity and for the subsequent epidemic invasion, but no completely satisfactory explanation has yet emerged.

The subject is complicated by the knowledge that there was an unusual prevalence of influenza in various parts of Australia during 1918, before there was any risk of epidemic infection from other countries. The statistics show that the local type of influenza began in July and continued in a quietly progressive form during October, November and December. It is stated, however, "as an established fact" that, whatever influenza incidence obtained during those months, the disease was not to be considered as in any way comparable epidemiologically with the disastrous pandemic form. A chief difference was that although the increased prevalence applied to the statistics of influenza, it did not apply to the statistics of acute bronchitis, broncho-pneumonia, and pneumonia, which were

not widely prevalent as causes of death. The difference is shown in the following statement:—

-----	New S. Wales.	Victoria.	Queensland.	S. Australia.	W. Australia.	Tasmania.
Influenza figures, 1917.	3·0	4·3	3·7	2·5	3·2	1·5
Influenza figures, 1918.	17·5	15·3	19·8	10·2	22·8	19·3
Pneumonia figures, 1917.	60·1	66·1	40·9	46·2	48·4	50·2
Pneumonia figures, 1918.	67·4	70·7	62·9	50·3	48·8	65·3

Evidence of the presence of this local variety of influenza in New South Wales in July 1918 is provided in the following history of the voyage of the transport "Borda," which left Sydney on the 18th July and arrived at Durban on the 19th August:—"During the first few days after embarkation a number of men on board suffered from colds and tonsilitis, the daily sick parades numbering from 4 to 6 per cent of the total number of troops. On the 6th of August, when nine days out from Fremantle, the sick parades became gradually double their size from an outbreak of a form of influenza. The outbreak commenced to abate about the 15th August, but according to official advices received from South Africa two cases of pneumonia and nine of influenza were landed on arrival."

By September 1918 the outbreak of what was regarded as the local type of influenza in Sydney had become very extensive, unofficial estimates stating that 30 per cent of the population of the city and suburbs suffered from the disease. Also at Lithgow (New South Wales) a very virulent form of influenza complicated with pneumonia was prevalent during September; and at Lockhart (in the southern portion of New South Wales) a similar form of a fatal type was prevalent during October. In the hospital at Melbourne in November there were about 30 cases of a form of influenza "sufficiently severe in type to excite comment."

These occurrences were known, but it was held that they represented nothing which could be likened in any way to the extraordinarily severe type of influenza which attacked South Africa and New Zealand.

The application of maritime quarantine from the 17th of October 1918 was an endeavour to prevent the entry of that type of influenza. During the seven months from October 1918 to April 1919 the quarantine service dealt with 149 uninfected vessels and 174 infected vessels, with a total personnel of 81,510 including 1,102 actual patients. In some of the vessels detained in quarantine serious epidemics of the pandemic type of influenza

occurred, but it is definitely stated that no evidence was at any time obtained of an escape of infection by a demonstrable chain from these persons or ships in quarantine to the shore population. For this and other reasons it was concluded that from October to December the measures of maritime quarantine which were taken had the effect of holding at the sea frontiers an intensely virulent and infective form of influenza which during those months was causing disastrous epidemics in New Zealand and South Africa.

In the meantime, however, what was regarded as the ordinary type of influenza continued. It has already been mentioned that in Melbourne during November this type included some cases which were "sufficiently severe as to excite comment."

In the Australia reports at present available, the next reference to the incidence of influenza in Melbourne relates to the 9th January 1919 on which date, it is said, the first cases of the epidemic form of the disease occurred. As regards these cases, however, the official report by Dr. J. H. L. Cumpston, Director of Quarantine, stated that "they excited no comment" and were not known to the State Health Authorities until "some days afterwards, when the occurrence of further cases" attracted attention." It seems probable that for some time it was doubtful whether the cases which occurred early in January in Melbourne were of the type already present in the country or were a -manifestation of the pandemic type. By 20th January, however, it was determined "that there had occurred in Melbourne some 50 to 100 cases of a disease, " which appeared, from the accounts received, to resemble the " severe form of influenza." Immediately following these cases a more or less extensive epidemic developed in Victoria, followed by epidemics in South Australia, New South Wales, Queensland, and Western Australia. The available statistics of deaths from influenza during these epidemics in the different states are as follows :—

*Influenza in Australia.*

*Table showing Number of Deaths from Influenza so far as these are at present available.*

Week ending	Victoria.	New South Wales.	South Australia.	Queensland.	Western Australia.
	Whole State.	Whole State.	Whole State.	Metropolitan Area only.	Whole State.
1919.					
January 3	—	—	—	—	—
" 10	2	—	—	—	—
" 17	3	2	—	—	—
" 24	6	—	—	—	—
" 31	45	—	—	—	—

Week ending	Victoria.	New South Wales.	South Australia.	Queensland.	Western Australia.
	Whole State.	Whole State.	Whole State.	Metropolitan Area only.	Whole State.
1919.	58				
7 February -	122	—	—	—	—
14 " -	164	13	2	—	—
21 " -	115	—	—	3	—
28 " -	88	—	—	1	—
7 March -	69	6	1	—	—
14 " -	59	5	—	1	—
21 " -	33	11	—	1	—
28 " -	36	53	2	—	—
4 April -	61	152	12	—	—
11 " -	122	250	7	—	—
18 " -	187	285	11	—	—
25 " -	227	268	6	—	—
2 May -	265	283	9	1	—
9 " -	235	217	22	6	—
16 " -	177	161	32	20	—
23 " -	107	99	29	38	—
30 " -	87	91	41	68	—
6 June -	107	82	22	68	3
13 " -	89	118	52	29	4
20 " -	75	319	20	No return	7
27 " -	58	634	31	15	11
4 July -	60	677	10	6	4
11 " -	85	612	—	6	2
18 " -	120	540	8	1	13
25 " -	135	343	9	2	5
1 August -	162	231	8	3	30
8 " -	155	117	15	2	26
15 " -	76	120	18	—	41
22 " -	41	56	11	1	36
29 " -	24	47	48	2	34
5 September -	16	52	22	2	25
12 " -	9	25	15	3	28
19 " -	5	20	14	2	15
26 " -	2	20	16	3	21
3 October -	1	23	11	2	14
10 " -	Nil	17	9	3	7
17 " -	"	8	5	1	5
24 " -	"	11	6	Nil	6
31 " -	"	2	5	"	3
7 November -	"	2	4	"	1
14 " -	"	Nil	2	"	Nil
21 " -	"	"	1	"	"
28 " -	"	"	2	"	"
5 December -	"	"	2	"	"
	343	5972	547	292	341

On different dates from the 27th January, New South Wales, Victoria, and other States attempted to limit the spread of this epidemic by measures of land quarantine designed to check public travel as far as was practicable. But people crossed

prohibited borders in large numbers at places where there was no supervision ; other evasions of the restrictions were numerous ; and many additional difficulties were encountered. Ultimately the control of border traffic proved to be impracticable. Moreover, it seemed clear that, as the epidemic became well established in South Australia, New South Wales, and Queensland, at comparatively short intervals after its appearance in Victoria, the land quarantine measures had failed in their primary purpose of protecting the states which imposed the restrictions.

It has already been mentioned that there is as yet no completely satisfactory explanation of the remarkable differences between the recorded experience of epidemic influenza during 1918 and 1919 in Australia and in other countries. In January 1919, when it had been definitely decided that cases of epidemic influenza were present in Melbourne, it was uncertain whether these cases were due to either :—

- (a) the escape of infection from the maritime quarantine defence; or
- (6) the continuity of the epidemic which was prevalent in Australia during the later months of 1918.

It appears that expert local officers who have studied the subject at first hand with great care and attention to detail are not prepared at present to favour one of these epidemiological explanations rather than the other. Dr. J. H. L. Cumpston, Director of Quarantine in the Commonwealth, writing on the 25th August 1919, in connection with the causes of the epidemic invasion, made the following remarks : " Although the utmost " care was taken, by both land and sea quarantine measures to " prevent the introduction of infection into Western Australia, " influenza with pneumonic developments definitely appeared " in early January. Similarly in Tasmania, which is an " isolated island, all shipping was carefully and strictly " quarantined between January and August 1919, but in the " third week of August cases of pneumonia definitely made " their appearance. There are two possible alternatives as " hypothetical explanations—either a disease which was intro- " duced and was prevalent in Australia in August—September " 1918 (corresponding with English May—June outbreak) " remained dormant until it developed an added virulence " under the influence of some unknown factor ; or there is some " phase of this virus which escapes all quarantine measures, " and which must lie dormant for months at a time until some, " as yet unknown, factor stirs it into activity. The quarantine " measures imposed by State Governments were rigidly and " consistently carried out from January to August, but, never- " theless, the epidemics occurred in the different States at the " times indicated. The explanation of this has completely " puzzled me."

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## NEW ZEALAND.

Influenza occurs annually in New Zealand, and in common with the rest of the civilised world, the Dominion suffered very severely from the pandemic of 1918. As in other countries the disease appeared in two distinct waves, the first having its maximum about August or September, the second developing during the first fortnight of November. The mortality in the first wave, although higher than is usual in New Zealand, was not alarming, but the virulence of the second wave was far in excess of anything which had previously been experienced in connection with influenza in the country. The period of greatest intensity of this wave almost coincided in Great Britain and in New Zealand.

Prior to November, 1918, the disease was not notifiable among the civil population, but the statistics from military camps give a fair indication of the incidence throughout the country. The following were the admissions to hospital and the deaths in the larger training camps during 1918.

—	Jan.	Feb.	Mar.	Apr.	May	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Cases -	22	30	16	13	32	16	145	571	1,216	1,126	4,369	15
Deaths	—	—	—	—	—	—	—	2	—	2	280	

From these and other military statistics it was concluded that the primary wave began in July—about two months later than in Great Britain—and reached its crest in September, waning slightly in October. The second wave rose very suddenly during the last few days of October, reached its maximum on the 9th of November and died away by the 18th. In the camps of some native troops, however, the second wave appears to have shown itself somewhat earlier and to have reached its maximum about the end of October.

For the civil population the following deaths, based on the Registrar General's returns, were recorded : —

*Deaths from Influenza among Europeans.*

Jan. 1918.	Feb. 1918.	Mar. 1918.	Apr. 1918.	May 1918.	June 1918.	July 1918.	Aug. 1918.
2	1	1	—	3	5	8	7
Sept. 1918.	Oct. 1918.	Nov. 1918.	Dec. 1918.	Jan. 1919.	Feb. 1919.	Mar. 1919.	Apr. 1919.
11	50	3,294	2,177	86	18	11	4

*Deaths from Respiratory Diseases among Natives (Maories).*

Jan. 1918.	Feb. 1918.	Mar. 1918.	Apr. 1918.	May 1918.	June 1918.	July 1918.	Aug. 1918.	Sept. 1918.	Oct. 1918.	Nov. 1918.	Dec. 1918.
3	3	5	4	7	6	7	8	29	10	200	950

More detailed statistics available from certain areas showed that there was a very steady increase in mortality from the first week of October 1918, that the epidemic death-rate was established in the week ending 4th November, that it rose rapidly during the first three weeks of that month, reaching its peak on the 25th, and that it then declined as rapidly as it had risen.

The following general information is summarised from a special report by Dr. Makgill, District Health Officer, Auckland, and from the report of the "Influenza Epidemic Commission" appointed by the Governor-General of New Zealand on the 28th January 1919.

*Incidence.*—The statistics from camps indicated that between 30 and 40 per cent suffered in the first wave and about 50 per cent in the second wave. About 10 per cent of the cases developed pneumonic complications. It was considered probable that as regards the whole population of the Dominion about 40 per cent were attacked during the second wave.

*Mortality.*—Among Europeans the deaths recorded as being due to influenza in 1918 numbered 5,559 (about 5 per 1,000 of the population), of which all except 38 occurred during the second wave of the epidemic. There was also from July onwards an abnormal increase in the death rate from all catarrhal diseases other than influenza, and this rise was peculiar to 1918, for, although there is usually a seasonal rise, in the winter months, the rate in most years falls as the Spring advances. Among Natives it was estimated that in 1918 between the 1st October and the 31st December, 1,130 deaths. (22.6 per 1,000 of the population) resulted from the disease.

*Case Fatality.*—In the military camps during the second wave about 4.5 per cent of those attacked died, but there are no figures indicating the fatality among the general population.

*Influence of Age, Sex, and Race.*—In New Zealand, as in other countries, the death rates according to age were not a true indication of the case incidence. Of the total deaths about half were among persons between the ages of 25 and 40; but only 24 per cent of the population are in that age-group. In the Featherstone Training Camp an analysis of over 2,000, hospital cases showed that although men of from, 20 to 25 yielded a high proportion of cases, the death-rate among such,

cases was proportionately less than among those aged between 25 and 40. The younger men were perhaps equally susceptible to influenza, but were not equally liable to pneumonic complications, and when such complications developed, they were better able to combat the effects. Thus among the more serious pneumonic cases the fatality among the younger men was 57 per cent., but among the older 72 per cent. The death-rate among males was 6.5 per 1,000 as compared with 3.5 among females, but among children under 15 years of age the proportion of deaths was slightly higher for females than for males, and a similar tendency towards equal figures for both sexes was apparent in the statistics of deaths of persons above 50 years of age.

Native races (Maoris) were more susceptible to attack than Europeans and the disease was more fatal among them.

*Incubation Period.*—The evidence available pointed to an incubation period which was not more than 48 hours and in some cases was less than 36 hours.

*Period of Infectivity.*—It is said that there was evidence that the cases were very infective in their earliest stages—in some instances even before the symptoms were such as to enable a diagnosis to be made. There was some evidence, also, that infectivity ceased within a short period. No case of infection was recorded as having occurred in the temporary convalescent hospitals to which patients were sent as a rule about the seventh or eighth day of their illness.

*Views regarding the Nature and Spread of the Epidemic.*—Owing to unavoidable depletion of staff few bacteriological observations could be made, but such results as were obtained did not differ from those reported in other countries, and, in view of thorough clinical and epidemiological enquiries, it was concluded that the epidemic disease was practically identical in form, incidence, and character, with the pandemic influenza which devastated Europe and America. Detailed enquiry was made into the causes of origin and spread of the virulent form of the epidemic. On the one hand the finding that a recent attack of the type of influenza prevailing during the first wave conferred a certain degree of immunity against the type prevailing in the second wave was held to establish the bacteriological identity of the two outbreaks, and for this and other reasons it appeared as if the various factors concerned were already present in the Dominion during the primary wave, and that the second wave was but the manifestation of a more virulent activity of one or all these factors. On the other hand there were grounds for believing that the second outbreak could be accounted for only by the seaborne introduction from outside the Dominion of some new factors of which a "new infective element" was the most important. The latter was

the view arrived at by the Official Influenza Epidemic Commission, their conclusions on this subject and on the causes of spread being stated (in effect) as follows :—

- (a) The cause of the introduction of the recent epidemic of influenza into New Zealand was the conveyance by sea of the infective element of the "epidemic influenza" lately prevalent in Europe, Great Britain, South Africa and America.
- (6) The extension of the epidemic from its first appearance in Auckland was largely the result of a general disregard of precautionary measures in the initial stages, due to want of knowledge regarding the nature of the disease. The infection was largely spread by the congregation of large crowds of people in the various centres in connection with the Armistice celebrations, race meetings, &c., and the fact that no restriction was placed upon the movements of the people in travelling, even when they had individually been in contact with infected persons.
- (c) The mode of introduction of the epidemic is not capable of absolute demonstration, but the evidence raises a very strong presumption that a substantial factor in the introduction of the epidemic was the arrival in Auckland on the 12th October of the R.M.S. "Niagara" with patients infected with the epidemic disease. The evidence, however, does not exclude the possibility of other sources such as the presence of infection from other vessels arriving at the same time or shortly before the arrival of the "Niagara."

The difficulty of arriving at a final conclusion on the above subject will be apparent from the following paragraph in the special report by Dr. Makgill, District Health Officer, Auckland : "we learn also from the newspaper reports of that period that an epidemic of influenza of virulent type was present in Auckland early in October. Thus, in the *New Zealand Herald* of the 9th and 10th October, special articles appeared describing the epidemic as of widespread proportions, and as being more virulent than previously, and generally emphasizing the serious position of affairs. It is interesting to note that this occurred prior to the arrival of the R.M.S. "Niagara" which is popularly supposed to have brought the new type of infection."

*Measures.*—At the commencement of the epidemic no fewer than 228 doctors were absent from New Zealand on military duty, and of those whose services were available many contracted the disease. In the larger towns this shortage of medical aid was compensated for to some extent by adopting a "block system," under which each doctor had his own special

district, which was not overlapped by any other. In each district a citizens' committee was set up with the duties of providing food and attendance to stricken households, of summoning medical assistance where necessary, and of arranging for the transport of serious cases to hospital. In some districts these committees undertook the equipment and management of temporary hospitals, and for this purpose various bodies, such as the St. John Ambulance Brigade and Association, the Red Cross Society, and the Women's National Reserve, worked in conjunction with them. Schools, halls, and other public buildings were opened as emergency hospitals to accommodate the large number of serious cases for which there was no room in the existing hospital; the milder cases were, as far as possible, nursed in their own homes.

Among the administrative measures adopted by the Public Health Department were the gazettement of influenza as a dangerous infectious disease, the prohibition of "tangis," the prohibition of the sale of alcohol except on a medical prescription, and the enforcement of burial within 48 hours of death. Pamphlets of advice were freely circulated and a trial was made by the Department, as a prophylactic measure, of the inhalation treatment with 2 per cent solutions of zinc sulphate atomised by means of steam under pressure. Chambers for this treatment were established at railway stations, wharves, and in all centres of population. The experience of over two years in the military camps in New Zealand was wholly favourable to the use of weak solutions of zinc sulphate as an inhalation for checking epidemics of measles, cerebro-spinal fever, and diphtheria, but as regards influenza it was said that, on account of the rapidity of invasion, unless the treatment was repeated very frequently and soon after exposure to infection, its value was less. When applied to the general public it was doubtful whether the procedure was useful, and the chambers at the railway stations and wharves were associated with harmful crowding. In regard to the use of masks there was little or no experience in New Zealand, and experience with inoculation was practically confined to troops. Quarantine in connection with shipping was not adopted.

#### FIIJI.

In a report dated the 18th January 1919, the Chief Medical Officer of Fiji states that it is a matter of uncertainty, or even impossibility, to define the manner in which the epidemic of influenza first gained admission to the Colony, especially in view that (1) there was undoubtedly influenza (which in some cases was of a severe type and complicated by pneumonia) in widely separated districts of Fiji for some months before the epidemic; (2) all incoming vessels arrived with clean bills of health until the disease was raging all through the Colony,

In Suva there were some cases of influenza of moderate severity during October, and reports were received of localised outbreaks in Taveuni, Labasa, Navua, and Kadavu, but the main epidemic in Fiji burst out about the middle of November. The earliest fatal cases in Suva occurred on 17th November, and thereafter the reports of burials for influenza fatalities on certain dates were as follows :—

November.							
18	19	20	21	22	25	27	30
2	2	1	1	3	5	9	16

  

December.										
1	2	3	4	6	7	9	12	15	19	20
20	26	27	30	31	25	20	14	6	4	0

It was not found possible to keep records of the number of persons attacked, but the Chief Medical Officer considered that it would not be an exaggerated estimate to say that 85 to 90 per cent of the whole population of Suva and district were affected at some time or another during the course of the epidemic.

The epidemic, once firmly established at Suva, spread with alarming rapidity, both to neighbouring districts and to the districts of Rewa, Ba, Lautoka, Nadi, and Nadrogi, in Viti Levu; also to Levuka in the island of Ovalau, to Labasa and Savu Savu in Vunna Levu, and to the island of Taviuni.

In a despatch, dated the 16th April 1919, the following statistics of mortality based on the final district reports of the epidemic are given:—

	Population on 31st December 1917.	Number of Deaths.	Percentage.
Europeans	4,824	69	1.41
Half-Castes	2,756	76	2.75
Indians	61,153	2,553	4.17
Fijians	91,013	5,154	5.66
Others	4,226	293	6.93
<b>Totals</b>	<b>163,972</b>	<b>8,145</b>	<b>4.96</b>

The decline of the epidemic was said to be rapid from the middle of December. By the 24th of that month all four temporary hospitals which had been established in Suva were

closed, and after the 28 th no more notifications of genuine cases were received.

*Measures.*— Owing to the absence of many officers on War service, to local shipping difficulties, and to the dislocation of the steamship service from Australia and New Zealand, the Colony was ill-prepared to deal with so serious an epidemic.

In November the disease was made notifiable under the Public Health Ordinance of 1911, and circulars were sent to all medical officers, native medical practitioners, and native officials, calling attention to the epidemic, suggesting methods of treatment, advising that food be stored in all villages, and authorising the use of plantation hospitals for the treatment of cases. Temporary hospitals were equipped and maintained in Suva, Levuka, and other centres. Depots were also established from which soup, arrowroot, sago, and other food and medical comforts were distributed to the homes of natives who were too ill to help themselves. In this work the medical officers and other officials in the Colony were assisted by a large number of voluntary workers. A relief party of 4 medical officers, 1 lady doctor, 4 nurses, 3 senior students, and 24 orderlies was sent by the New Zealand Government to assist in dealing with the epidemic, and arrived at Suva on the 17th December. The complete cessation of steamship communication with Sydney prevented the arrival of a relief party which had been asked for from Australia, but the services of two medical officers and some medical orderlies, who were members of the relief party sent by Australia to deal with the epidemic in Samoa, were obtained.

The expenditure incurred in relief measures in connection with the epidemic was estimated to be approximately 10,000l.

#### THE SAMOA ISLANDS.

A Commission appointed by the Governor-General of New Zealand to inquire into the circumstances and causes of the introduction of epidemic influenza into the Islands of Western Samoa reported that in their opinion there was no doubt whatever that epidemic pneumonic influenza was introduced into Western Samoa by the S.S. "Talune" on the 7th November 1918. This ship left Auckland (where influenza was seriously prevalent) on the 30th October, and influenza broke out among the passengers and crew during the voyage to Samoa. Within seven days after her arrival, pneumonic influenza was epidemic in Upolu. It spread with great rapidity throughout this island and later throughout Savaii, the other island of Western Samoa. It was calculated that up to the 31st December 1918, out of a population of 30,738 in Western Samoa, 7,542 persons had died either directly from influenza or in consequence of its prevalence.

The Commission reported that American Samoa (Pago Pago) had entirely escaped the ravages of influenza, and it appears, from their report, that from the 20th November, to avoid the risk of introduction from Apia, the United States Governor at Pago Pago imposed on all ships arriving at this port five days absolute quarantine before discharging or taking on board any mail or cargo.

#### POLYNESIA.

Dr. Cumpston, Director of Quarantine for the Commonwealth of Australia, has drawn attention to the relative incidence of influenza in certain of the Pacific Islands. He notes that the Tonga and Samoan Islands are based upon New Zealand, from which they receive all supplies. Both these groups of islands were very heavily infected and suffered a high mortality.

On the other hand, the Gilbert and Ellice Islands, New Hebrides, Norfolk Island, Solomon Islands, British and German New Guinea and New Caledonia all are based on Australia, with which alone they have communication. This group of islands entirely escaped influenza infection, a result which is ascribed by the French Authorities and by the local British Administration to the strict outward quarantine precautions which were taken by the Australian Quarantine Service in respect of all vessels leaving Australia for these island groups.

#### AFRICA

##### UNION OF SOUTH AFRICA.

On the 3rd of December 1918, the Governor-General of the Union of South Africa appointed a Commission "to enquire into matters concerning the influenza epidemic in the Union." The Commission held sittings at Pretoria, Johannesburg, Durban, Petermaritzburg, East London, Bloemfontein, Kimberley, and Cape Town; they heard in all 192 witnesses and received a number of statements from individuals who did not appear in person.

The following summary is based on the information given in the Commission's Report which was presented to the Governor-General on the 8th February 1919.

*Type of the Disease.*— The Commission distinguish in their report between the disease ordinarily called "Influenza" and the disease called "Epidemic Influenza." In their opinion the latter disease, as it appeared in the Union, was identical with the epidemic disease which in October and November 1918 was prevalent in practically every country of the world.

*Origin and Spread.*— For some months prior to the outbreak of "Epidemic Influenza" in the Union the disease ordinarily described as "Influenza" had been more than usually prevalent in the larger centres of population, and ships had been arriving at Durban and Cape Town with many cases of that illness on board. The cases were in such numbers as to make the Port Health Officers feel that there was a certain abnormality, but they differed in no way from ordinary catarrhal colds which are commonly called influenza, and no special measures seemed to be indicated or were taken. On the other hand, the pandemic disease was prevalent in Europe, Sierra Leone, and other localities which were ports of departure or call of ships arriving in the Union, and although it was impossible to determine the exact manner in which introductions of the epidemic disease from outside operated, and "impossible to fix on any route or vehicle," the Commission, on the evidence adduced before it, were of opinion that infection from the outside was a deciding factor in precipitating the epidemic. The infection may have been introduced by both the western route from Europe and Sierra Leone and the eastern route from countries lying east and north of South Africa.

The earliest outbreak of epidemic influenza in the Union occurred in the vicinity of the Harbour area, Durban, on the 14th September 1918. Thence, it spread to the central Rand area, where numerous cases were observed on or about the 18th September, chiefly among natives working in the mines. Several thousand natives were attacked within a few days, but the mortality among them was comparatively low. On the 23rd September, cases of the epidemic disease appeared at Kimberley, and on the same date the disease was officially reported among the Nigerian troops and in the South African Labour Corps at Cape town. In a short time the disease appeared in several other places and within two or three weeks became pandemic.

*Incidence and Mortality.*—The Commission found it impossible to obtain statistical information which could be relied upon in regard to the attack rate of the disease, but according to the returns and estimates furnished by magistrates and local authorities the total number of cases of pandemic influenza which occurred in the four provinces of the Union between the 1st August and the 30th November 1918 was 2,616,805, of which 454,653 cases were in Europeans. On these figures it would appear that about 32 per cent, of the European inhabitants of the Union and about 46 per cent of the native and other non-European inhabitants were attacked during the four months referred to. The mortality records are said to be more accurate. The total number of deaths reported from the disease between the 1st August and the 30th November was 139,471, of which 11,726 deaths were of Europeans. These figures indicate that about 8 per thousand of the European

inhabitants and about 27 per thousand of the non-European inhabitants died from the disease during the period. In proportion to population the disease caused fewer deaths in Natal than in any of the other provinces, although, according to the information available, the rate of incidence in all provinces was about the same. No satisfactory explanation of this lesser fatality in Natal was apparent.

A tabular statement of the incidence and mortality statistics collected by the Commission is shown on the next page.

*Age and Racial Incidence.*—Persons in the third and fourth decades of life were said to be particularly susceptible to attack and the fatality rate was greater at those age groups. Children and old persons seemed to be partially immune.

The attack rate, the fatality rate, and the death rate in proportion to population, were all greatest among natives and other non-European races ; and Europeans born in the country seemed to be more susceptible than European immigrants.

*Mode of Spread.* — The Commission found no reason to question the view that influenza is spread by contact only; and the general trend of evidence was to the effect that spread was facilitated and accelerated by the railways. The disease had a tendency to run its epidemic course within a period of from three to four weeks.

*Measures.*—On 9th October, the Union Government through their Health Department circularised all Magistrates and Local Authorities urging that everything reasonable should be done to combat the epidemic and stating that the Government would bear half the cost. Generally speaking the measures taken by Local Authorities consisted in providing medical relief, nursing relief, food and other supplies, arrangements for burial of the dead, improvising hospitals and transport of the sick. This work was usually done through voluntarily organised committees headed by the Mayors, Magistrates, or other prominent citizens. As a rule supplies were adequate, but in many cases there was some shortage of petrol and drugs. Certain of the municipalities, notably Bloemfontein, adopted a method of requisitioning essential supplies. Up to the 30th November, 104 medical men, 227 nurses and 163 medical students, hospital orderlies and inoculators, were engaged by the Union Health Department, and placed on duty in various localities.

From about 7th October a polyvalent vaccine prepared at the Government Laboratory, Cape Town, and at the South African Institute for Medical Research, Johannesburg, was available for general use. The opinion was generally held that the vaccine when properly used caused no ill effects. A number of medical men thought that the vaccine " did a certain amount of good," but this opinion was not supported by statistical evidence.

UNION OF SOUTH AFRICA.

STATISTICS OF EPIDEMIC INFLUENZA AND ITS COMPLICATIONS.

Table of Cases and Deaths, 1st August to 30th November 1918.

(Compiled from Returns and Estimates furnished by Magistrates and Local Authorities.)

Provinces.	Population.			Cases.			Incidence Per Cent.			Deaths.			Death Rate Per Cent. of Persons Attacked.			Death Rate per 1,000 of Population.		
	European (1918)*.	Other than European (1911).	Total.	Euro-pean.	Other than European.	Total.	Euro-pean.	Other than Euro-pean.	Total.	Euro-pean.	Other than Euro-pean.	Total.	Euro-pean.	Other than Euro-pean.	Total.	Euro-pean.	Other than Euro-pean.	Total.
Cape -	617,131	1,982,588	2,599,719	192,007	1,009,223	1,201,230	31·11	50·90	46·20	5,855	81,253	87,108	3·04	8·05	7·25	9·48	40·98	33·50
Transvaal	498,413	1,265,650	1,764,063	140,639	491,448	632,087	28·31	38·82	35·83	3,267	25,397	28,664	2·32	5·16	4·53	6·55	20·06	16·24
Orange Free State.	181,613	352,985	534,598	79,532	150,492	230,024	43·79	42·63	43·02	2,242	7,495	9,737	2·81	4·98	4·23	12·34	21·23	18·21
Natal -	120,903	1,095,929	1,216,832	42,475	510,989	553,464	35·13	46·62	45·48	362	13,600	13,962	·85	2·66	2·52	2·99	12·40	11·47
Union -	1,418,060	4,697,152	6,115,212	454,653	2,162,152	2,616,805	32·06	46·03	42·79	11,726	127,745	139,471	2·57	5·90	5·32	8·26	27·19	22·80

Preliminary figures. Final figures 1918 Census not yet available.

On the 14th October epidemic influenza was proclaimed a contagious or infectious disease in terms of the various Acts applicable to the several provinces. This gave to the Local Authorities "power compulsorily to remove to hospital or other " place of isolation cases suffering, or suspected to be suffering, " from the disease, or any person exposed to infection, or to keep " them under observation or surveillance."

On the 30th October and 5th November, Government Notices gave Local Authorities power to close theatres, bioscopes, &c. It was said that this power was used by a number of Local Authorities.

On the 30th November the following instructions were issued to Port Health Officers introducing a modified form of quarantine in respect of the disease.

To The Port Health Officer:  
 Durban, Port St. John's, East  
 London, Knysna, Port Eliza-  
 beth, Mossel Bay, Simonstown,  
 Cape Town and Port Nolloth.

*Epidemic Influenza—Port Health Measures.*

The following measures in respect of epidemic influenza should be taken in the case of vessels arriving at your port:—

(A) *Uninfected Vessels* {i.e., those which the Port Health Officer, after due enquiry, is satisfied have no cases of influenza on board and have been free from Influenza during the current voyage or within the four weeks preceding arrival):—

- (1) Full pratique to be given.
- (2) Master and all on board to be warned of the danger of influenza infection on shore and urged to restrict intercourse between the vessel and the shore as much as possible.
- (3) A supply of influenza vaccine to be furnished to the master or ship's surgeon if desired by them.

(B) *Infected Vessels* (i.e., those having cases of influenza on arrival or having had cases during the current voyage or within the four weeks preceding arrival):—

- (1) " Restricted " pratique to be given and only such intercourse allowed with the shore as may be necessary for off-loading, loading, coaling, &c., the Port Health Officer being authorised to relax or modify the restrictions at his discretion to meet any special circumstance.
- (2) All on board to be medically examined by the Port Health Officer.
- (3) Cases or suspected cases of influenza amongst the crew or in-transit passengers either to be landed for treatment in an isolation hospital on shore or else isolated

on board to the satisfaction of the Port Health Officer.

- (4) Cases or suspected cases of influenza in passengers for the port to be landed and removed with their baggage and personal effects to an isolation hospital.
- (5) Infected cabins or other accommodation, together with their contents which have been exposed to infection, to be fumigated with burning sulphur or formalin, or treated with some other suitable disinfectant.
- (6) Healthy persons to be landed and allowed to proceed to their destination, the local authority at their place of destination being notified on the usual form that they may have been recently exposed to influenza infection.
- (7) A supply of influenza vaccine to be furnished to the master or ship's surgeon if desired by them.

Where cases or suspected cases of influenza are landed for isolation, or where disinfection is carried out, the usual procedure should be followed as regards obtaining guarantees from the master or agent of the vessel for the payment of expenses

The master of every vessel bound for Australia should be informed as to proclaimed first ports of entry (namely, Fremantle, Adelaide, Melbourne, Sydney, and Brisbane) for vessels from South African ports, *vide* my telegram No. 14.485 of 15th October 1918.\*

Where precautions have been taken in respect of any vessel the master should be furnished before sailing with a certificate as to the precautions taken and the reasons therefor for production at his next port of call.

(Sgd.) F. ARNOLD,  
M.O.H. for the Union.

The Commission, while holding the view that maritime quarantine must be resorted to in preventing the entry of certain epidemic diseases into the Union, state that at present it is entirely uncertain whether such quarantine can be justifiably and usefully employed in a disease of the nature of epidemic influenza. The weight of expert evidence before the Commission was so decidedly against the effectiveness of maritime quarantine in a disease of this nature, that, although giving

\* The following is a copy of Telegram No. 14485 above referred to :—  
" Wire name of every vessel leaving your port for Australia since 1st Sep-  
" tember. In conjunction with Customs inform master every vessel leaving  
" for Australia he can only enter Australia at Fremantle, Adelaide, Mel-  
" bourne, Sydney, and Brisbane. Any vessel from South Africa entering  
" any other Australian port, except owing to stress weather or emergency,  
" will be quarantined and ordered to one of the above ports also fined heavy  
" penalty "

full credit to the experience of Australia, the Commission were not prepared to state that the measure should have been enforced in the Union of South Africa, nor were they of opinion that the timely enforcement of maritime quarantine would have prevented an outbreak in the Union.

#### BASUTOLAND.

The mortality from influenza was heavy both among the European and native inhabitants of the territory. The disease was very prevalent during the months of October and November 1918. Births and deaths are not registered in Basutoland; accurate statistics of mortality caused by the outbreak are therefore unobtainable. Information gleaned from the observations of the medical staff, from the district officials, from the native chiefs, and from local statistics supplied by missionaries and traders indicate that the total deaths may be "safely estimated at 15,000," and that probably 75 per cent of the total population were affected.

#### SWAZILAND.

The influenza epidemic of 1918 affected every part of Swaziland, but appears to have been of a less severe type than in most parts of South Africa. Relief measures were appreciated, and the natives submitted freely to inoculation and to the administration of the drugs supplied. The deaths among the native population numbered about 1,250, which is slightly more than 1 per cent, of the total population.

#### BECHUANALAND PROTECTORATE.

Influenza broke out in epidemic form in the Southern Protectorate in October 1918. It spread rapidly, and eventually affected the whole territory except Western Kalahari and the Ngami littoral. The mortality among the native population from influenza and its complications is estimated as having been between 4 and 5 per cent.

#### SOUTHERN RHODESIA.

In a report by the Medical Director, Southern Rhodesia, it is stated that epidemic influenza first gained access to the country along the railway line from the South, the first case in epidemic form occurring among the railway staff at Bulawayo on the 9th October 1918. Within a few days the disease broke out with extraordinary virulence at Que Que Umoma and Salisbury. Spreading up and down the railway lines from those places it rapidly extended until practically every district was more or less affected, "the extent of the infection being

" governed by the density of the population in any particular centre and the mode of communication with other affected places."

*Incidence among Europeans.*—It was found impossible to estimate " anything like accurately " the total number of cases which occurred. The European population was estimated to be 36,953, and among them 352 deaths from epidemic influenza were recorded between October and December 1918. Most of the deaths were in Salisbury and Bulawayo, and about 63 per cent were between the ages of 25 and 45.

*Incidence among Natives.*—Among Natives the disease was most severe in the large towns and on the mines. Native miners suffered more severely than any other class of the population, and labourers on farms and those living in their own Kraals suffered least. Among Natives on the mines the deaths recorded as due to influenza (or pneumonia directly attributable to influenza) totalled 3,006, which is about 97 per thousand of the number employed. The mortality in proportion to the labouring population was highest on mines in the Gwelo, Victoria and Bulawayo districts.

The indigenous native population of the territory is estimated at 770,000 and the number of deaths recorded between October and December was 19,603. From the Kraals, however, no returns of births or deaths are received. It was said that the proportion of deaths among women and children in the native territory was higher than among natives working in towns and on mines, partly, perhaps, because they were more concentrated in the Kraals and refused to scatter and live out in the bush.

*Measures.*—Municipalities and Village Management Boards, being the local authorities under the Public Health Act, were, with the assistance of the Government, the administrative bodies concerned with the disease in the areas under their control. It is said that, without exception, they rose to the occasion and displayed great zeal, energy, and efficiency in coping with the problem. In Bulawayo and Salisbury, where the disease was most widespread, the Mayors and Town Councils formed Committees, called for volunteers, and undertook generally the entire control of the transport and care of the sick, the feeding of the public and the distribution of food stuffs. Schools, churches and places of entertainment were closed throughout the country, emergency hospitals and soup kitchens were established, and arrangements for house to house visitation and home attendance by lay nurses were organised. In native reserves the administration of relief for the sick was in the hands of the Chief Native Commissioner, helped by the police, and by missionaries and other volunteers. Native chiefs were urged to use their influence to prevent people from visiting industrial centres, from coming into

contact with those who were fleeing from infected places and from making inter-Kraal visits. All natives were advised to adopt life in the open air.

Inoculation stations were opened at which district surgeons, veterinary surgeons, dispensers and others who were specially instructed in the technique were in attendance. The vaccine used was a mixed vaccine obtained from the laboratories at the Cape and elsewhere in the Union of South Africa, and altogether about 84,000 doses were issued. It was thought that although inoculation did not arrest the progress of the epidemic, it did much towards reducing the mortality from serious complications.

#### NYASALAND.

The history of the invasion of Nyasaland by influenza as gathered from a despatch by the Acting Governor, dated 27th February 1919, and from a report by the Port Medical Officer dated 14th February 1919 is somewhat as follows :—

Intelligence of the outbreak of influenza in the Union reached Nyasaland at the beginning of September 1918 ; it was then considered to be of a comparatively mild type, but attended with extreme lassitude and prostration and a low mortality.

In October the character of the disease altered; the cases were more severe and the mortality increased, while the disease rapidly spread over the continent.

On the 18th October cases were reported from Salisbury in South Rhodesia, and on the 20th the disease appeared at Beira. The Zambesi at Chindio was reached by 27th October, some cases having been previously discovered in the river boats.

Following the Shire Highland Railway the disease first appeared in Nyasaland at Port Herald on 5th November 1918. Limbe and Blantyre were reached on 9th November and by the 18th Zomba was involved.

Fort Johnston remained unaffected until 3rd December, when cases were reported from this station and also from Mangoche and the Bar.

New Lanjenburg and Kyambila notified the presence of the disease on 5th December and Mwaya on the 6th. " From this " date the disease made its appearance in various parts of " Nyasaland, precise dates and returns, however, being difficult " to obtain."

The whole of Nyasaland was affected by the scourge, which reached its maximum virulence in December, and declined steadily during January 1919. The presence and passage of troops, who suffered severely, undoubtedly helped to spread the

disease. The following statistics are taken from the report, of the Port Medical Officer :—

Europeans.			Indians.			Natives.		
Cases.	Deaths.	Rate.	Cases.	Deaths.	Rate.	Cases.	Deaths.	Rate.
1,418	67	Per cent. 4·7	129	19	Per cent. 14·7	14,327	1,683	Per cent. 11·7

In his covering despatch the Acting Governor says that "extremely drastic precautions were taken from the first to prevent the disease, if possible, from entering the Protectorate. . . ."

It is pointed out also that the statistics above include only patients admitted to various Government hospitals and "are far from being an exhaustive record of the epidemic, since scores of thousands of cases have occurred in outlying native villages. . . ."

It was apparently difficult to do very much for the native population, to whom the disease was a complete novelty, but through the local headman instructions concerning the nature of the disease and the precautions to be taken were promulgated by the British officials throughout the Protectorate.

A good deal of tact seems to have been displayed in reassuring natives who considered the closing of churches and schools to mean that the Government "had permanently forbidden divine worship and education." By many of the less civilised the disease was attributed to witchcraft, and "in the remoter villages there was at first a tendency to resort to the ordeal by poison."

The civil medical staff was aided by the military medical establishment, but, even so, great difficulties were encountered. Two medical officers and a nurse as well as 11 non-commissioned officers of the South African Medical Corps died on duty.

#### UGANDA.

Cases of epidemic influenza at Entebbe were reported during the last week of October 1918, and a few days later at Kampala and Jinja. The epidemic spread throughout the protectorate. At Entebbe the wave reached its height during the third week of November, and then declined rapidly, no fresh cases being reported after the middle of December. Most other stations were free by the end of December.

The statistics available represent only a very small proportion of the sickness which occurred. Up to the end of December the cases treated by Government medical officers at Entebbe, Kampala, Jinja, Nasindi, Masaka, Mbarara, Mbale, Soroti, Butiaba, and Kelle numbered 4,663, and among them 184 deaths occurred. Native inspectors in the Mbale district reported 10,587 cases, with 436 deaths, and the Native chiefs in the Lira district reported that 75 per cent of the population had been attacked, with over 5,000 deaths. Among 104 Europeans attacked no death occurred.

Early in 1919 the Governor of the Protectorate caused inquiries to be made into the number of deaths which had occurred among natives up to the end of February. The returns received showed 15,268 deaths, of which 10,000 were in the Eastern province, 2,036 in the Northern, 960 in the Western, and 2,272 in Buganda.

#### ZANZIBAR.

Influenza was prevalent in Zanzibar from October to December 1918. Cases had already occurred in British East Africa in October, following the arrival in Mombasa of two ships from Bombay, on each of which deaths from influenza had occurred. On 15th November the deaths in Zanzibar numbered 33. All public meetings, processions, and entertainments were prohibited, schools were closed, and church services reduced to a minimum. Energetic relief organisations were soon at work. The total number of deaths in both the islands was 1,446 (population 196,733).

#### SOMALILAND.

In a report dated the 11th January 1919, the Senior Medical Officer, Somaliland Protectorate, expressed the opinion that in all probability the disease was introduced into Berbera (where the earliest cases occurred) by a steamer from Aden. The first few cases in October were among Somalis, and for a few days were not recognised to be influenza. Early in November the disease became epidemic in Berbera, and from there it spread in all directions along the caravan routes and by dhows and other vessels to practically every part of the occupied country. French Somaliland and Abyssinia were also centres from which there was a general spread of the epidemic. By the end of December the epidemic had practically ceased in most parts of the country.

*Incidence and Mortality.*—From the few statistics which it was possible to collect it was estimated that over 50 per cent of the Somali population were attacked, and that of those who suffered 5 per cent died, On the whole it was thought that

the mortality was not so high as in similar epidemics in other parts of the world. Most of the deaths were due to pneumonia, " but a few died from sheer exhaustion and some apparently from fright."

Several Europeans contracted the disease, but there was no death among them.

Among 800 Indian troops in the country about 500 (62 per cent.) were attacked, and there were 53 deaths (10.7 per cent.).

Among 550 Somali troops there were 336 cases with 15 deaths, and among 131 foot and mounted police at Berbera there were 46 cases with 3 deaths.

#### EGYPT.

Influenza as a cause of death does not appear in the annual return of births, deaths, and infectious diseases of the Egyptian Government.

Cases of the disease were notified at Alexandria in May 1918, at Port Said in June, at Cairo in July, and in the province of Dakahlie in August.

The mortality figures for 1918 show that the disease was relatively fatal during the three last months of the year, months of high influenza mortality in neighbouring countries. Thus the number of deaths of "non-notifiable infectious disease" rose from 111 in October to 856 in November, and to 1,568 in December (annual total of 3,049). A similar rise in mortality is seen in connection with pneumonia, October 640, November 1,489, December 1,735 (annual total 6,125). Bronchitis, October 759, November 1,647, December 1,807 (annual total 10,051); and "other diseases of the respiratory system," October 79, November 209, December 169 (annual total 981). From all causes combined the mortality during the last two months of the year amounted to one quarter of the total year's death roll.

#### TUNISIA AND ALGERIA.

As in Egypt two " waves " of influenza swept over Tunisia and Algeria; the first appeared at the end of May and was very mild ; the second, from September to December, caused a large number of deaths.

#### SENEGAL (FRENCH).

As was to be expected, the first mention of influenza in the French Protectorate of Senegal, relates to Dakar. On the 14th September, the British Consul wrote, " Serious epidemic " Spanish influenza appeared Dakar; has been brought by " vessel coming from Sierra Leone. Exact number of cases " not ascertained yet, no deaths reported."

(On the 21st September, H.B.M. Consul at St. Vincent, alludes to this and says, " epidemic influenza is devastating Dakar . . . . ")

Telegraphing again on the 18th, the British Consul at Dakar states that " large numbers of cases of influenza continue to " occur at Dakar, resulting in about 30 deaths per day."

During the period, September 19-29, 1918, there were 221 fatal cases of influenza reported at Dakar, of these 22 occurred among Europeans, 30 among South Americans, 169 among natives. Dakar is the most important sea town in French West Africa, and at this busy port conditions of living approximate more closely to European standards perhaps than in any other sea port in West Africa.

Of late years, it has been a port of call for British passenger ships, and in the excellent harbour, vessels are moored alongside wharves, a rare experience on the West Coast of Africa.

#### CAPE VERDE ISLANDS.

His Britannic Majesty's Consul at St. Vincent in a despatch to the Foreign Office, dated 21st September 1918, reported that epidemic influenza was " devastating Dakar, Sierra Leone, and " the Gambia, and has made its appearance in the harbour of " St. Vincent."

The Brazilian destroyer " Pianby " arrived from Dakar on 11th September with 22 cases on board; the number of cases increased daily until there remained only three officers and five men unaffected. One officer and one man died in hospital ashore, while there was another fatal case aboard. On the 18th of September the British steamer "Matra" arrived from Dakar and the next day the master reported 27 cases (all Lascars). In all 41 patients were removed to the lazaretto.

In a later despatch, dated 28th October 1918, His Britannic Majesty's Consul states that, at the time of writing, the epidemic of influenza had begun to abate in St. Vincent, though the disease had appeared in other islands of the group. According to the latest report then available there were about 9,000 cases with 300 deaths in St. Vincent and among the fatal cases were two British.

When it first appeared the disease seems to have been mild in character, but it spread rapidly, affected all classes, and became more virulent towards the end of October. Labour conditions were very adversely affected.

St. Vincent is a port of call for the Castle liners and other steamers bound for South Africa; there is also a good deal of maritime intercourse with the coast of West Africa.

## GAMBIA.

No accurate information as regards births or deaths for this Protectorate is available. The influenza epidemic was serious ; it commenced in September 1918 and lasted about four weeks, with the result that 6 Europeans and 317 natives died in Bathurst (population 7,700 in 1911). It is estimated that there were 7,800 deaths in the Protectorate from influenza; the population of the Protectorate in 1911 was 138,401.

## SIERRA LEONE.

The first indication of an outbreak of influenza in this Colony was given during the week ending 24th August 1918, when an unusual prevalence of catarrhal conditions of the nose and throat was noted at Freetown. A day or two later two deaths of natives from bronchial pneumonia occurred, and on the 27th August the Serra Leone Coaling Company reported that of a staff of 600 native porters, 500 had failed to put in an appearance. Shortly afterwards labour became almost unobtainable and public offices and work places were practically closed. The week ending 31st August was the most critical period of the epidemic ; the disease was spreading very rapidly, and was marked by dangerous broncho-pneumonic and cardiac complications. Both Europeans and natives were affected, and five of the medical staff were attacked. During the following week the mortality increased considerably ; there were 28 deaths on the 1st; 34 on the 2nd ; 74 on the 6th ; and 72 on the 8th September. Drs. Allan and Young, on whose report these notes are based, state that the course of the epidemic was so rapid that the disease had a firm hold before prophylactic measures could be efficiently applied. During the second week of September the mortality began to decline steadily. So far as could be ascertained the disease accounted for about 1,000 deaths in Freetown alone and deaths were numerous in up-country districts. No reliable data were available for an estimate of the age and sex incidence. The measures of relief undertaken included house to house inspections, the distribution of medicines and food, and the opening of an auxiliary hospital; much assistance was given by voluntary workers

## LIBERIA.

Early in October, 1918 the Government of Liberia circulated among the various West African Colonies copies of a Proclamation in which it was advised that from October 4th no person would be allowed to land at Liberian ports on account of the serious epidemics of influenza raging elsewhere in Africa but which had not, up till then, reached Liberia,

The Republic did not remain free, however, and the disease first appeared as an epidemic, in the interior, in the early part of November, travelling thence to the coast and reaching Monrovia, the capital, about November 15th.

The visitation is said by the Acting Consul-General to have been severe and in Monrovia there were some 50 deaths; the absence of any Organised medical service, however, accounts for the difficulty in obtaining any reliable figures. Travelling facilities also in Liberia are few and far between, and the dwellers on the coast do not in any great numbers venture inland. The fact that the disease was brought to the coast from the Hinterland is interesting in this connection and may also be related to the closing of the Port of Monrovia. The quarantine restrictions were raised as from 2nd January 1919.

#### ASHANTI.

The epidemic first appeared in Coomassie on 23rd September 1918, reached its height in October and declined during the following month. The disease spread from Coomassie to all villages in the vicinity, and also along the Ejura road towards the Northern Territory. In Coomassie the deaths from influenza of 381 natives, 5 Syrians, and 2 Europeans were registered. It is reported that these figures give an inaccurate idea of the mortality caused, as by far the greater proportion of bodies were taken out of the town for burial and so remained unregistered. The approximate number of deaths due to influenza is estimated as:—Central Province, 4,500; Western Province, 1,500; Northern Province, 500; Southern Province, 2,500; total, 9,000.

#### GOLD COAST.

The Influenza figures for 1918 and the two previous years on the Gold Coast are :—

1916.	1917.	1918.
27	280	7,756

As might be expected, the disease first appeared in the littoral towns, and the earliest sign of its appearance seems to have been at Cape Coast, where the mail officer became ill, after boarding the S.S. " Shonga " on 31st August 1918. Cases were then reported from (1) Secondee, 5th September; (2) Saltpond, 21st September; (3) Winnebah, 24th September; Accra, early in September; (4) Axim, 25th September.

From the Coast the disease travelled rapidly along the lines of communication and reached Ashanti late in September. The Hinterland of the Northern territories, to which access is less easy, was invaded last, cases were not being reported until the beginning of October.

In Accra, the capital of the Colony, the Senior Medical Officer reported :—" The pandemic had already assumed considerable proportions among the natives of Accra and Christianburg before it affected any member of the European Community. The first of the white population to suffer were those whose duties brought them into daily and close contact with the natives. The earliest case notified was the " police magistrate, 18th September 1918, then followed in " rapid succession members of various firms, officials "of the " police office, customs and police. On the 30th September, " when the pandemic appeared to be at its height, 17 fresh " cases were reported, and by the end of the month the total " had reached just over 60. From then on, there was a steady " decline until the 10th October when the last case was " recorded."

Amongst 82 Europeans attacked in Accra there were eight deaths.

The Medical Officer of Health for Seecondee, who was able to make a census of a controlled portion of the population in this port, considered that the mortality rate was about 4.55 per cent.; the figures forming the base for the calculation include 2,599 natives employed in various Government Departments together with 80 Europeans.

In the colony, as a whole, the Senior Sanitary Officer thinks that probably 4 per cent of the population died during September and October ; the case mortality was higher both in the coast towns and in the northern territories than in the forest belt of Ashanti.

The pandemic created much consternation among the natives, one of whom wrote :—

" The fell disease on every side  
Stalks forth with tainted breath,  
And pestilence with rapid stride,  
Bestrews the land with death."

The symptoms usually present were : headache, pains in the back and limbs, sore throat and pain in the line of the trachea. There were also infected conjunctivae, slight coughs and a temperature ranging between 100-102. The commonest complication was broncho-pneumonia, but lobar pneumonia and pleurisy with and without effusion were by no means rare. Miscarriage among native women was a common occurrence.

#### NIGERIA.

The epidemic appeared in Nigeria towards the end of September 1918, was very severe in October, and declined abruptly in November. It was imported into Lagos by sea from the Gold Coast and soon spread all over the country. Calabar was the last place to be infected owing to the infrequency of the shipping service; the epidemic was at its height in Calabar when it had all but died out in Lagos.

In the majority of cases, here as elsewhere, respiratory complications were much in evidence ; a gastro-intestinal type of the disease was also noted. All the deaths among Europeans were due to broncho-pneumonia.

From statistics of prisons, police force, West African Frontier Force, and Government employees, a case incidence of 50 per cent with a mortality of 5 per cent. " would probably be a low estimate." It is estimated from the register of deaths that 1.5 per cent of the population of Lagos died of influenza.

Europeans who came under treatment numbered 418 of whom 15 (3.5 per cent) died. There were 5,887 natives treated as in-patients for influenza of whom 11 per cent succumbed.

#### BELGIAN CONGO.

The acting British Consul at Boma, in a despatch to the Foreign Office dated 17th December 1918, wrote :—

" Epidemic of Spanish influenza has broken out at Boma, Matadi, and Kinshasa, and has been spreading to the interior of the Colony, and, (to that) of French Equatorial Africa, both from Boma and Elizabethville. It first appeared at Boma and Matadi about middle of November, and was introduced by passenger steamers from Europe. Up to the middle of December, there have been 119 deaths at Boma, (Europeans, 9; natives, 110). The epidemic seems abating."

Among the precautions taken it is mentioned that five days quarantine was imposed on each steamer, after the last case on board had been cured. No one was allowed to travel by steamer or train without a medical certificate, and quinine as a prophylactic was advised.

There seems to have been a dearth of medical men in the Colony during the time the epidemic was in progress.

#### ST. HELENA.

St. Helena is one of the few places that appears to have escaped any serious epidemic of influenza in 1918. In that year the total civilian death rate for the island was only 9.85 per thousand, the lowest rate reported since 1909.

#### MAURITIUS.

Mauritius, also, appears to have escaped the almost universal epidemic of 1918. The death rate for the island in that year was only 1.1 per thousand above the mean rate of the previous quinquennium. The bronchitis and pneumonia deaths formed 5.8 and 5.6 per cent of the total mortality, as compared with

5.0 and 5.8 during the previous five years. But the island did not long enjoy immunity. During May and June 1919, a very severe epidemic was experienced. The epidemic curve reached its height at the end of May and was at a high level throughout June. Thereafter a rapid decline in incidence was experienced, but deaths from influenza and chest complaints were in marked excess of the normal until the end of October when normal rates of mortality once more obtained.

The following table sets forth the number of deaths that were ascribed to influenza (including deaths from bronchitis, pneumonia and broncho-pneumonia) between May and October in half-monthly periods :—

1919.				1919.					
May	1-15	-	-	259	Aug	1-15	-	-	146
"	16-31	-	-	5,108	"	16-31	-	-	130
June	1-15	-	-	4,299	Sept.	1-15	-	-	124
"	16-30	-	-	1,154	"	16-30	-	-	148
July	1-15	-	-	299	Oct.	1-15	-	-	126
"	16-31	-	-	195	"	16-31	-	-	97
									(practically normal rate).

#### ASIA.

##### CYPRUS.

Towards the end of 1918 Cyprus suffered from an epidemic of influenza. Accurate statistics are not obtainable, but it is known that several thousand cases of influenza were treated in hospitals and dispensaries, and, as no other outbreak of serious infectious disease was noted during 1918 it appears safe to assume that influenza was chiefly instrumental in the increase of the death rate from 18.8 per thousand in 1917 to 26.1 per thousand in 1918. The estimated population of the island was 306,997.

##### PERSIA.

The following notes are extracted from a report by Dr. A. R. Neligan, Physician to His Majesty's Legation, Tehran.

When influenza appeared in Persia during 1918 it found the population already much weakened by two previous epidemics of typhus and relapsing fever which ravaged the country in the winter of 1917-1918 and the spring of 1918 respectively. Moreover, the years 1916 and 1917 had been unusually dry, so that crops failed and there was a food shortage.

The epidemic is said to have invaded Persia at several points.

*North from Russia via— •*

- (1) Askhabad, whence it gained Meshed (August 3) and from there spread west along the Tehran road and south to Birjand (August 4) and Seislan (September 2), and possibly Yezd (October 3).
- (2) Enzeli (August 4) from Baku.
- (3) Tabriz (September 2) from the Caucasus *via* the Julfa Railway from Tiflis.

*South from India via—*

- (1) Bunder Abbas (October 1).
- (2) Bushire (September 4), thence to Shiraz (October 3) and Kerman (November 2).
- (3) Mohammerah (October 1) *vi* Basra. Thence to Ahwaz, Shuster, and Dizful.

*West from Mesopotamia*.—Two " waves " appeared in Mesopotamia : one began in June and lasted till August; the second in September and lasted till November. The primary wave followed the Baghdad-Kermanshah road along which there is heavy motor traffic into the interior. Kermanshah was affected in August and was followed successively by Hamadan, Kazvin, and Tehran. The disease travelled more quickly along motor routes than along caravan ways. From Tehran the disease travelled down the great South road reaching Isfahan in the centre of Persia in the third week of October and probably going on to Yezd.

*Mortality*.—There are no exact figures regarding the population of Persia so that incidence and mortality statistics cannot be quoted. It was found, however, that the mortality was much higher among country people than among urban dwellers; it was very heavy among malarious subjects; it was relatively much less among Europeans than among Persians and was particularly heavy among Indians.

*Incubation Period*.—Generally 24 to 48 hours. " In one case at Kerman it was definitely established at six hours."

*Symptoms*.—Similar to those observed elsewhere. At Kerman, however, most of the cases presented curious oral symptoms, consisting of " a tongue coated with a thick brown fur showing " cleaner edges and tip. The soft palate was invariably covered " with a bluish white mycelial growth which might be thick or " thin."

At Bushire several varieties of skin eruptions were noticed.

*Complications*. — Thoracic complications — broncho-pneumonia, lobar pneumonia and empyema—were the most common and the most frequent cause of death. Many cases of pulmonary tuberculosis, which is a common disease in Persia, rapidly went from bad to worse after influenza.

Intestinal complications, especially enteritis with blood and mucus in their stools, were very common.

*Treatment.*—At Kerman a vaccine was prepared and was said to have done good in four out of the five cases in which it was used—otherwise salicylates and aspirin were most extensively used.

*Notes concerning the Epidemic at various Places in Persia.*

*Kermanshah* (40,000).—Practically the whole native population attacked; mortality in towns, 1 per cent.; in country districts up to 20 per cent.

*Ramadan* (30,000). — Disease widespread, causing some 1,000 deaths. In one series the case mortality was 10 per cent., all due to broncho-pneumonia. Nasal douching with eusol much lauded in this district.

*Kazvin* (20,000). — Epidemic began on 16th September among troops that had come from Hamadan. Purpura and jaundice were observed in this case and epistaxis was common.

*Tehran* (250,000).—Epidemic broke out on or about 22nd September 1918 with extreme suddenness.

There was a high west wind at the time and this was thought to be the carrying agent so that the affliction was called "the disease of the wind." Disease was probably introduced by travellers from Kazvin, though the generalisation of the epidemic in the city took place within a day or two of this high wind; native doctors, too, noted that all who were out of doors during the boisterous weather invariably fell ill.

The death-rate among the poor was very high and a nominal estimate of the total mortality for three months is 2,000. Fresh air appeared to have no effect as a preventive, and out of 80 British motor transport men who had been living in the open practically all succumbed to the infection. The country people were particularly hard hit again.

*Ifahan* (80,000). —The disease here was not of a severe type. Deaths about 300.

*Meshed-i-Sar.*—This port and the Province of Mazanderan in general appear to have been invaded by way of the interior and not from Russia.

The epidemic was very widespread, and the old and young suffered severely.

At Meshed-i-Sar a case mortality of 10 per cent was reported.

*Enzeli* (10,000).—Infection brought from Baku at end of August. Type mild; mortality about 2 per cent. Armenian refugees from Russia suffered severely.

*Meshed* (100,000).—Approximate number of cases was 70,000, of deaths 3,500. Case mortality in city, 5 per cent., in villages, 7 per cent. Outbreak coincided with violent gale of wind. The whole province of Khorassan was attacked, and from Meshed the disease travelled South to Seistan.

*Tabriz* (200,000).—Mild type of disease affecting half the population ; the whole province of Azerbaijan was affected.

*Seistan*.—There were three distinct epidemics :—

- (1) Infection from Meshed by way of Birjund (12,000 cases, with 100 deaths) to Nasratabad—the capital—(7,000 cases and 120 deaths). Whole province affected.
- (2) Local outbreak at Kwast, probably introduced from India. In 139 cases among troops there were 40 deaths, all due to pneumonia.
- (3) *Dehaneh Baghi*.—Severe local epidemic in January 1919. Infection probably brought by nomads from the Sarhad.

*Bushire* (30,000).—Disease introduced by ship from India. Type severe; 15,000 cases, with some 1,500 deaths. " From " this port the infection spread to Skiraz (150 miles away), " without losing any of its severity on the way, to cause, in the " Province of Fars, the most severe outbreak suffered by any " Persian Province. On its way up country it passed through " Kazerun, from which town also comes the story of a preliminary " gale, with hail."

The inhabitants took flight, and it is said that the local doctors treated their patients with prescriptions handed through barely opened doors.

*Shiraz* (50,000).—" The disease was of a very severe type. There were at a low estimate 2,000 deaths. The whole province was almost suddenly disorganised and a heavy sick rate among medical personnel, transport workers and telegraph and postal official added to the difficulties of rendering aid where it was wanted. The death rate in a Persian force was 10 per cent., in an Indian force also 10 per cent. A post of Indian and Persian troops of 416 men lost 31 per cent of its strength. Another post lost 72 per cent of its Indian garrison ; these men had suffered most severely from malaria.

The disease spread to the whole province and was particularly severe round Shiraz. Young adults suffered most, and men more than women. An outdoor life did not prevent people contracting the disease, but cases treated in tents or the open air did best. The disease worked through a town, village or lines in 24-28 hours.

*Kerman* (40,000).—Here the epidemic was also severe and came from Shoraz *via* Saidabad. There were 4,000 deaths : the

case mortality in the town being 10 per cent. (7 per cent hospital cases) and 30 per cent to 40 per cent in villages.

*Yazd* (4,000).—Disease probably introduced from Isfahan. There were 250 deaths ; in some villages 25 per cent of the population were reported to have died.

*Mohammerah*.—Infection from India *via* Basra. Outbreak severe ; 6,000 cases, with about 250 deaths.

*Ahwaz, Dizful and Shuster*.—No severe epidemic. Two separate outbreaks: one in August among civilians and the other in November (severe) among a British force at Ahwaz.

*Bunder Abbas*.—Disease introduced by ship from India. Type mild : but disease lasted three months.

#### AFGHANISTAN.

Information regarding influenza in Afghanistan is necessarily incomplete, but two facts of interest stand out prominently. First, Afghanistan suffered from a widespread epidemic comparable in severity to that which afflicted northern India; second, the epidemic in Afghanistan synchronised with the outbreak in northern India, the two reaching their height almost simultaneously.

No information is forthcoming regarding the source from which Afghanistan became infected.

The disease was first noted in Kabul in the first half of October and during the ensuing fortnight a large proportion of the population fell ill. A rough estimate puts the proportion affected at upwards of 80 per cent. At first the disease does not appear to have been attended by a high case mortality rate, but in the third week of October the mortality in Kabul began to increase in an alarming manner, between 60 and 80 deaths occurring daily in and around the town. During the last 10 days of October the mortality in the city alone is estimated to have been 100 a day, and the vast majority of people attacked are said to have succumbed. All the distressing features of the outbreak that were observed in India appear also to have been experienced in and around Kabul. The epidemic continued unabated till the close of the first week of November ; thereafter a more or less rapid decline was experienced. The large proportion of the population attacked would appear to have determined the short duration of the epidemic, as was the case in the severely affected tracts of India. The mortality in and around Kabul attributable to influenza during the four weeks ending November 8, 1918, is roughly estimated at 10,000.

Though no definite information is forthcoming, reports state that the disease was widely prevalent throughout the whole of Afghanistan.

## INDIA.

Reports received indicate that no part of the world suffered as severely as did India during the latter half of 1918. A preliminary report by the Sanitary Commissioner with the Government of India estimated that up to the end of November 1918 no fewer than five million deaths were attributable to the influenza pandemic in British India alone (population, 238,000,000). In the native states influenza deaths certainly exceeded one million in the same period. A later report states that between 1st June and 31st December 1918, the total mortality in British India exceeded the quinquennial mean mortality for the same period by approximately seven millions. The great majority of this excess mortality occurred in the last four months of the year. There was no abnormal prevalence of other communicable disease, so it is justifiable to accept this figure as a rough approximation of the influenza death roll. In view of the conditions pertaining in India, anything other than approximations of this nature is impossible to obtain.

The presence of an epidemic disease of an unusual type was first noted in Bombay City in June 1918. Towards the end of that month the widespread prevalence of a mild influenza-like disease occasioned a shortage of labour in the offices, mills, banks, &c, of that city. Sporadic cases of a similar nature were observed in Calcutta in the middle of June, and in Karachi and Madras towards the end of the month.

The mild nature and the low case mortality rate of the early cases made it impossible to fix a date for the commencement of the epidemic in India and extremely difficult to determine its source of origin. There is evidence of a debatable kind that influenza was present in the Thana district of the Bombay Presidency in the early spring months of 1918. Some of the earliest cases recognised in Bombay occurred in a transport that arrived at the end of May; these cases only occurred after the vessel had entered dock, and it is by no means certain that infection was not acquired in Bombay city. There had been no untoward sickness on board this vessel during her voyage to Bombay.

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During July and August influenza became widespread throughout India; everywhere it was of a mild form and did not produce any appreciable increase in the mortality rates. In the middle of September, however, the mortality in Bombay city began to rise in an alarming manner, and increased day by day till the 6th October, on which day 768 deaths were recorded. This second virulent epidemic (which very few parts of the country escaped entirely) occurred somewhat later in other parts of India. The total mortality in India in the month of October is without parallel in the history of disease.

Below is given a table from the preliminary report of the Sanitary Commissioner with the Government of India which, though incomplete, indicates the varying severity of the disease during the four or five months prior to 30th November 1918 in the different administrations of British India arranged in order of severity.

It is noteworthy that the first seven provinces on the list are situated in the western or central parts of India in comparison with which the eastern provinces suffered but little. Considerations of climate or mode of living appear insufficient to explain the very unequal incidence of influenza mortality, though, generally speaking, the sea coast areas suffered less than inland districts. The incidence of the disease on the inland areas of Bengal, Bihar, and Burma, however, compared favourably with that of the littoral.

In the first epidemic wave, June-August, the mortality was greater in towns than in rural areas ; in the second virulent epidemic, September-December, the mortality rates in rural areas far exceeded that of the towns. How far the lower urban mortality can be ascribed to relatively efficient health organization, and medical and other assistance, is difficult to say : it is possible that these were factors of no small importance.

Provinces.	Population Census 1911.	Estimated Total Deaths from Influenza up to 30th November 1918.	Proportion of Deaths from Influenza per 1,000 Inhabitants.
Ajmer-Mewara - - -	501,395	33,407	66·6
Central Provinces and Berar -	13,916,308	790,820	56·8
Delhi - - - - -	416,656	23,175	55·6
Bombay - - - - -	19,587,383	900,000	45·9
Punjab - - - - -	19,337,146	816,317	42·2
North West Frontier Provinces	2,041,077	82,000	40·0
United Provinces - - - -	46,820,506	1,072,671	22·9
Coorg - - - - -	174,976	3,382	19·0
Madras - - - - -	40,005,735	509,667	12·7
Assam - - - - -	6,051,507	69,113	11·4
Bihar and Orissa - - - -	34,489,846	359,482	10·3
Burmah - - - - -	9,855,853	60,000	6·0
Bengal - - - - -	45,329,247	213,098	4·7
Total for British India -	238,527,635	4,933,132	20·7

The second wave of influenza had not exhausted itself by the end of 1918, and there is evidence that in certain parts of the country the disease persisted throughout 1919. In Rangoon, Calcutta, and Bombay, deaths diagnosed as influenza were registered in each week of the year, and there was definite evidence of two distinct waves of enhanced virulence. Neither, however, was so widespread or of such an explosive character

as was the second wave of 1918. In Rangoon, the first wave began in the first week of February and reached its maximum in the third week. The prevalence declined gradually, the whole period covered by the wave being 16 weeks. The second wave began at the end of May or early in June, and caused its maximum mortality during the week ending 12th July. This wave lasted 14 to 16 weeks. In Bombay the first wave reached its height between the middle and end of May, but in the second wave, which commenced in the middle of July, the mortality fluctuated from week to week without showing a definite peak. In Madras, the second epidemic was widespread. In Calcutta there was a slight wave between the 20th March and 12th April, and a second wave commenced about the middle of July. Other parts of India suffered in like manner, but in comparison with the incidence in 1918, the outbreaks for the most part were relatively mild, and showed less tendency to widespread dissemination of infection.

*Measures.*—The epidemic of 1918 struck India at a time when she was least prepared to cope with a calamity of such magnitude. War demands had depleted the personnel, and many of the staff available were incapacitated by the disease. The effects of the almost total failure of the monsoon practically throughout the country were still more serious.

In all the larger towns where severe epidemics occurred numerous additional dispensaries were opened and numerous agencies were employed for the free distribution of drugs and milk; in certain towns municipal grain shops were opened which supplied grain below the market rate. But in remote villages it was almost impossible to do anything appreciable to alleviate suffering. In certain provinces travelling dispensaries did a large amount of useful work, and in most provinces the whole of the vaccination staff were engaged in measures of relief. Circulars and pamphlets were widely distributed and endeavours were made by all administrations to instruct the people as to measures of prevention and measures to be adopted when attacked.

*Immunity and use of Vaccine.*—In a report on the prevalence of the disease during 1919 it was stated that no figures were available to show how far an attack in 1918 had protected individuals from infection in 1919, but that, speaking generally, the areas which suffered most severely in 1918 escaped lightly. Early in the second virulent wave of 1918 the preparation of a vaccine was begun locally and it was largely used. During 1919 four laboratories were engaged in the manufacture of a mixed vaccine, about 1 1/2 million cubic centimetres of which were issued. In addition large quantities were received from England for use by military units. It was said that individual medical officers spoke highly of the results, but that no statistical evidence of the preventive value of the vaccine was available.

## STRAITS SETTLEMENTS.

No detailed reports are yet to hand regarding the incidence of influenza in the Straits Settlements in 1918, though the disease was apparently widespread. Of the 36,294 deaths from all causes reported during the year only 3,500 were ascribed to influenza. The estimated population of the colony was 809,869.

In November and December the disease was present in Christmas Island.

In Labuan influenza was largely responsible for the production of a higher death rate than any reported since 1911.

## THE PHILIPPINE ISLANDS.

During the spring and summer of 1918 influenza was widespread in these islands, but caused very few deaths; during the autumn the pandemic fatal type of the disease became very severe, especially between the middle of October and the end of November, and is said to have caused 85,000 deaths.

## CHINA.

On 27th July 1918 it was reported that about half the population of the city of Chungking, in the province of Sze-chuen, were affected with epidemic influenza, and, although no statistical reports are available, there is reason to believe that from that month onwards the disease was widespread and severe. In September it was prevalent at Hankow, and in October Canton, Chefoo, Hankow, Hong Kong, Changsha (province of Hu-nen), and Shanghai were among localities from which reports were received that the disease was widespread among natives and the foreign population. Towards the close of the year many villages suffered a very high mortality from pulmonary complications of the disease.

In Hong Kong the deaths from influenza reported during 1918 were 405, and from pneumonia 2,251, as compared respectively with *nil* and 1,532 in 1917.

In Weihaiwei influenza was epidemic during October and November 1918 throughout the territory. Registration of deaths is not compulsory, and a large proportion of deaths go unrecorded; 900 deaths are, however, reported as having been caused by the epidemic (population 147,177).

## JAPAN.

Between 1st October 1918 and 30th April 1919, 250,333 fatal cases of influenza were reported in Japan.

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