

A paper on the sanitary state of Bombay : read before the Public medicine section of the British Medical Association, at Leeds, on the 30th July, 1869.

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HEWLETT, T. G.

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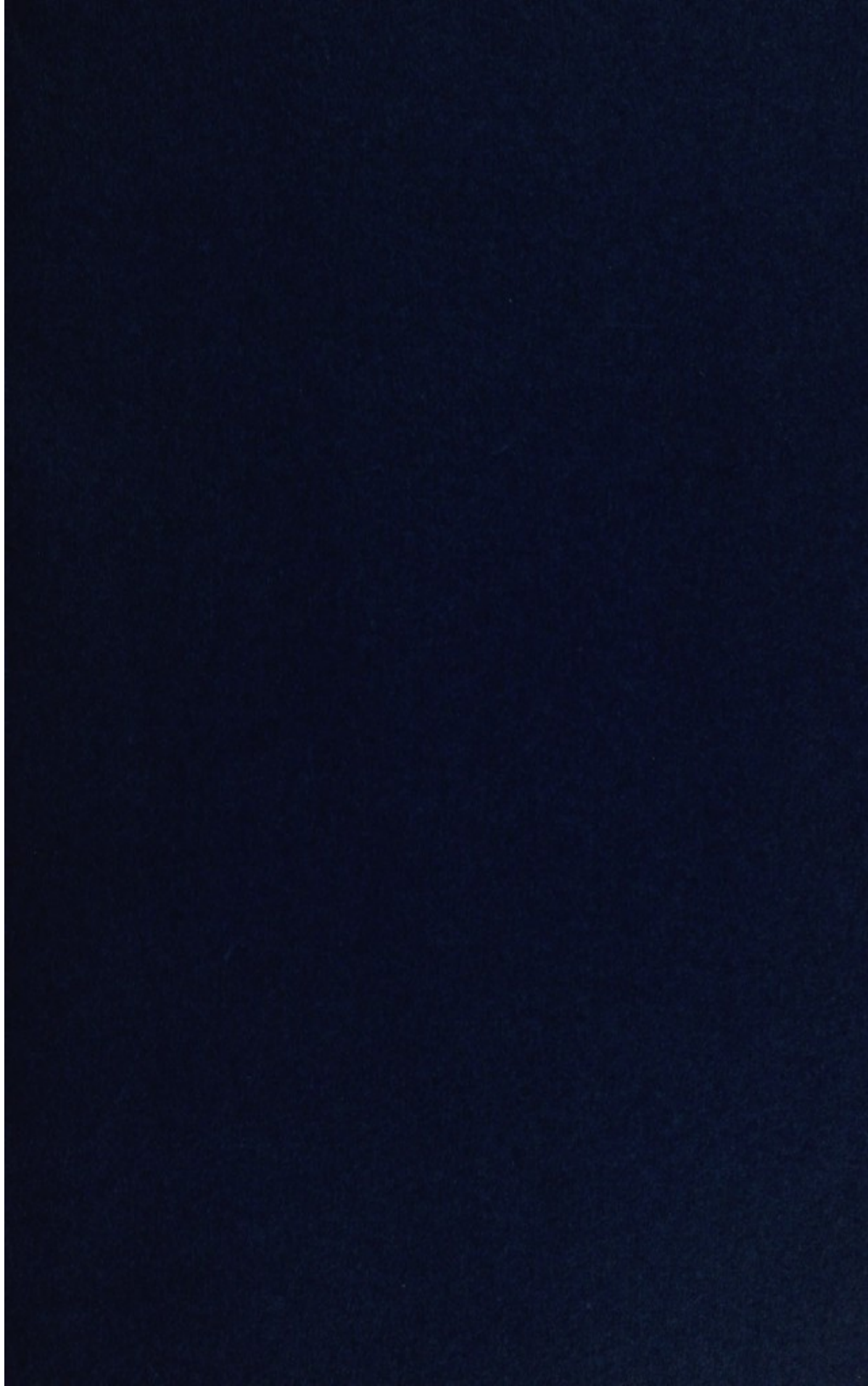
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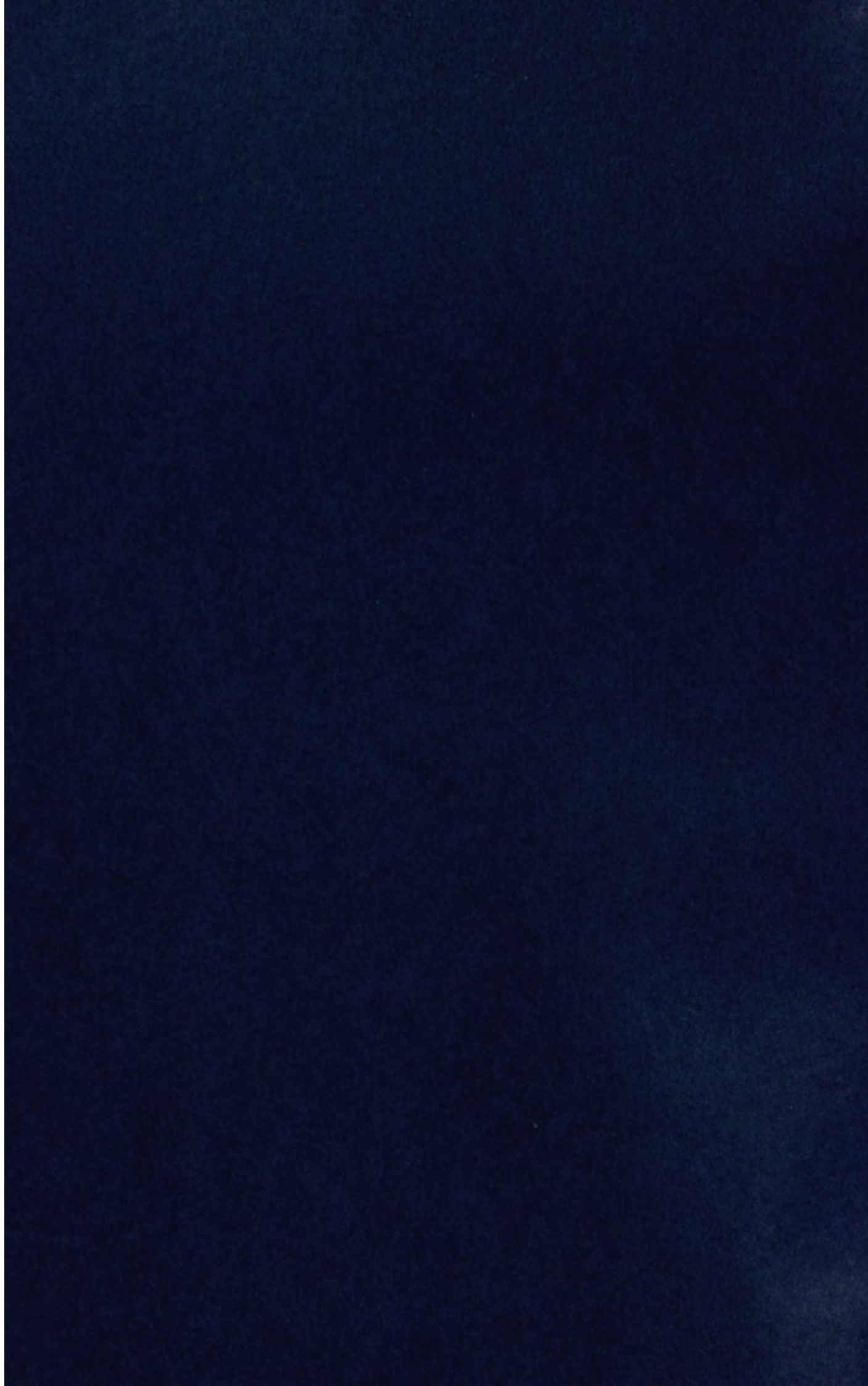
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A PAPER ON THE SANITARY STATE
OF BOMBAY, READ BEFORE THE PUBLIC
MEDICINE SECTION OF THE BRITISH
MEDICAL ASSOCIATION, AT LEEDS, ON THE
30TH JULY, 1869.



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MR. PRESIDENT AND GENTLEMEN,

In offering for the consideration of the Association the following remarks on the Sanitary state of Bombay, perhaps it would be well briefly to review its physical conditions, and the facts which have led to the present improvement in the Municipal Administration of that City.

Bombay is an Island on the western coast of India ; situated in about 19 degrees of latitude, while the longitude at its southern end is reckoned at 4h. 51m. 12sec. ; it is 11 miles long, and of an average breadth of $2\frac{1}{2}$ miles, and its surface is computed to contain 18.62 square miles.

Its Geological features may be briefly described as presenting ridges of basaltic rock, on both its eastern and western sides ; both these ridges are scarped towards the east, and slope downward towards the west. They enclose a central depression, consisting of calcarious sand and alluvial deposit. This low-lying land in the centre of the Island is locally known as the Flats, and is mostly below high water mark. On the north, the land shelves away towards the creek of the sea which flows between the Island and the main land.

The rocky barrier on the western side is not continuous throughout its whole length ; there exists a wide space known as the Great Breach, and another still further to the north at Worlee, through which, as also on the whole of the northern side, the sea at each high tide flowed over the central depression.

About the middle of the 18th century an embankment was thrown across the Great Breach by Governor Hornby, and subsequently the influx of the tide was prevented by similar embankments, both at Worlee and at the northern end, extending from Mahim to Sion.

At the end of the last century Bombay was connected with the main land at the north-east by a causeway, known as Governor Duncan's Vallade, and since 1852 by the embankment of the Great Indian Peninsular Railway, while on the north-west Lady Jamsetjee Jeejeebhoy built another causeway, and the Bombay, Baroda, and Central India Railway passes by a bridge thrown across the creek.

The effect of these means of communication with the main land has been that the course of the tidal waters running from the open sea on the west to the harbour on the east has been entirely obstructed, and the channel is gradually filling up by a deposit of mud.

On the south-western aspect there is a wide bay, known as Back Bay, the shore of which is covered by a broad cocoa-nut plantation, whilst on the eastern side there is the noble harbour which varies from 5 to 7 miles across.

The eastern foreshore is rocky, and was until the last few years covered with offensive mud.

The annual rainfall averages about 79 inches. The prevailing wind is from the westward, or from the sea; on an average such wind blows for 19 hours during each day from this health-giving quarter.

Originally, the Town of Bombay, when in 1664 it was handed over to the British Crown, was principally confined to the Fort which was shortly afterwards encircled by ramparts, and is situated on the eastern foreshore facing the harbour. Fortunately Military precaution demanded an uninterrupted space of about 800 yards wide round the Fort, and this open space is now known as the Esplanade, and forms the park of the City.

As the English rule became more consolidated, the Native Town extended itself outside the protection of the Fort, but in building it no care was taken to lay down broad roads, to provide open spaces for ventilation, or

to regulate the width of streets, or height of houses, and it was allowed to grow by piecemeal, and as it extended there was not the slightest attempt made to secure for it any system of drainage whatever, beyond cutting a few open channels to allow the waste and surface water to escape by finding its way into a natural water-course, which ran across the Island from south to north-west.

In process of time the intolerable nuisance caused by this open cesspool led to its being paved and arched over in its passage through the Native Town, when on reaching the suburbs it continued its foul course along the Flats, poisoning the air to leeward of it until it discharged itself on the western shore, originally at Worlee but afterwards at Lovegrove—a point much nearer the Native Town.

The necessity for Sanitary reform in the Town and Island of Bombay has engaged the attention of Medical men and others from the earliest times of its occupancy by English residents. Dr. Fryer, who visited Bombay in 1672 has left an account of its extreme unhealthiness, and he, after mentioning the irruption of the sea into the centre of the Island, says,—as quoted by Dr. Leith, “that he imputes the insalubrity of the climate to the situation, which causes an infecundity in the earth and a putridness in the air, whence follows—Fluxes, Dropsy, Scurvy, Barbiers, malignant and putrid Fevers, which are endemial diseases.” The Revd. Mr. Ovington, writing 17 years later mentions, “that the common fatality had created a proverb among the English in Bombay, that ‘two mussouns are the age of a man.’ ”

I have no information as to what the Municipal organization was in the early part of this century, but there was when I first went to India, a Board of Conservancy, which was followed by a Commission consisting of 3 members, to whom the whole executive and administrative functions of the City were entrusted; there was also a Bench of Justices appointed by Govern-

ment, who had the power of representing to Government the necessity for action, but who had not, as far as I am aware, any real power in either instituting or ordering reform.

The establishment in 1845 of the Grant Medical College afforded the native youth of the City an opportunity of becoming acquainted with the important influence that Hygiene bears to disease, and doubtless has conduced most efficiently to awakening in the native mind an appreciation of these subjects bearing on the question which have been so earnestly brought before them by such eminent men as Drs. Leith, Morehead, Peet, Giraud, Coles, Haines, and others.

The commencement in 1848 of a regular Mortuary Registration by Surgeon, now Dept. Inspector-General Leith, late Sanitary Commissioner, was the first attempt to lay a foundation for sure Sanitary Legislation, but the value of this registration was considerably diminished as in spite of Dr. Leith's frequent and earnest representations, no trustworthy census of the Population was permitted by Government to be made until 1864. Another great drawback to the value of these returns was,—indeed is,—that the registration of the *causes* of deaths is most unsatisfactory, as the terms of the Law under which it is taken do not enforce a skilled enquiry; and although there is no great fear perhaps, that any very serious errors could occur in returning deaths from Cholera, Small-pox, or Measles, yet undoubtedly, as Dr. Leith frequently pointed out, deaths are returned under the head of Fever, which was probably only the most marked symptom of a distinct type of the disease which proved fatal. It is believed however, that every death was registered, so that it was possible to trace the increase or diminution of disease from year to year.

In the 17 years, ending January 31st, 1865, 264,448 persons had been registered as having died in Bombay, of these 37,817 were slain by Cholera, 13,371

by Small-pox, 4,056 by Measles, making an aggregate of 55,244 persons, or 20.88 per cent of the whole number who had lost their lives from preventable disease. If to them we add the 116,366 deaths registered under the head of Fever, most of which was probably due to unsanitary influence, we find that 171,610 persons (making 64.89 per cent of the whole number of deaths,) or upwards of 10,000 victims annually were unnecessarily sacrificed.

In 1863, in consequence of the influence the Civil War in America had in developing the trade of Western India, and especially from the very marked increase of Commercial activity in Bombay itself, a large influx of labourers poured into the City. It was evident the town itself had not expanded in proportion to the numbers who daily came down from up country, in the hopes of speedily making a fortune. Great overcrowding, and a very large increase in the number of deaths from Cholera and all causes was the natural consequence.

The Governor of Bombay, Sir Bartle Frere, ever alive to the importance of measures that tended to the promotion of the welfare of all classes over whom he presided, had from the time he became Governor evinced the most earnest interest in Sanitary reform. By his direction the removal of the ramparts, shutting off the pure westerly breeze from the narrow tortuous lanes of the Fort, had been effected. Broad roads had been made and a comprehensive drainage scheme had been sent to the Home Authorities for sanction, whilst the reclamation of the foul foreshores on the eastern and south-western sides of the Island had received his favourable consideration, and in his endeavours to induce the Bench of Justices to pay greater attention to Sanitary reform, and in order to put before it the true facts of the state of the City, he entrusted to Dr. Leith the duty of writing a report on the existing Sanitary condition of the Island.

This report, dated the 29th February, 1864, was of the most startling kind, showing in Dr. Leith's own forcible language, the imperfect measures taken to

cleanse the town, the abominable state of the surface drainage, the absence of any other system, the prevalence everywhere of foul matter festering in the immediate vicinity of human habitations, the disgraceful condition of the existing public Latrines, and the necessity for the erection of numerous fresh ones, the presence of unwholesome trades in the very centres of the most densely populated parts of the Town, and in short as Dr. Leith says,—“Of the many evils that the inspection of Bombay has disclosed, that which is most prominent, and at the same time most open to immediate remedy, is its *Filthiness*.”

Immediately following this report Dr. Leith published his census returns, which had been taken under the following circumstances :—“On ” as Dr. Leith says, “Sir Bartle Frere’s entering the Government of Bombay, His Excellency caused a census Act to be brought before the Local Legislative Council. This Act, rendering it obligatory on householders to give correctly the required information, was approved and sanctioned by the Government of India. The educated part of the community warmly supported this measure. * * * * Mr. Dosabhoy Framjee Kusara circulated at his own expense 2,000 copies of a pamphlet, in which he explained the object and uses of a census. * * * * On the eve of the intended distribution of the schedules, a communication was received to the purport that the Act had been disallowed by H. M’s. Government in England. The Governor of Bombay having met with cordial support from the Native community, and having every assurance that the leading and educated part of them was very desirous to have a census taken, the work was allowed to proceed without the sanction of penalties.”

It was accordingly taken on the 2nd February, 1864, and the *Total Population* on shore and in harbour amounted to 816,562, of whom 530,450 were males, and 286,112 were females, these formed 101,890 families, and lived in 25,664 houses.

It was found that in the Native Town the overcrowding was excessive. Its area is calculated at about 606.60 acres, and as 449,891 inhabitants resided in it, each person had only an average surface area of $6\frac{1}{2}$ square yards. In one part of it there were 75,402 persons residing on 408,100 square yards, which would only give 5.4 square yards to each individual.

The European population chiefly reside on the western ridges known as Malabar Hill, Breach Candy, where there was an average of 262.7 square yards to each person.

With the information contained in these two reports before him, Sir Bartle Frere determined on introducing an advanced piece of legislation, and the consequence was that the Municipal Act of 1865 was passed and came into operation on the 1st July, 1865.

By its provision the three Municipal Commissioners were abolished, and there was appointed one Municipal Commissioner in whom is vested the entire executive power and responsibility; and with him were associated, a Controller of Municipal Accounts, an Executive Engineer, and a Consulting Officer of Health.

His Excellency the Governor selected Mr. Arthur Crawford of the Bombay Civil Service, to be Municipal Commissioner,—a gentleman well known for his comprehensive ability, his untiring zeal and energy, and his great administrative capacity,—and I was appointed Consulting Officer of Health.

Mr. Crawford set to work with characteristic vigour; he found the scavengering of this vast City, supposed to be performed by a contractor; he found filthy Markets, filthier Slaughter-houses, filthy Cow-houses, filthy and insufficient Latrines, a ridiculously small staff of men who were the sole removers of Night-soil, so that in fact and in truth the very air reeked of filth as you passed through the Native parts of the Town.

I have not time to speak of the deficiencies or chaos Mr. Crawford found in other departments, so I will confine myself to the one over which I have the honour to preside, viz. :—The Public Health Department, which came into existence on the 1st November, 1865; Mr. Crawford having by that time abolished the contractor.

Mr. Crawford at once divided the City into 11 Wards, and gave to each a distinct Establishment of carts, bullocks, coolies, etc. At the head of each Ward Establishment, is a European Inspector, who is solely responsible for everything in his Ward.

Each Ward is divided into Sections, each Section into Sub-sections, and carts, coolies, etc. are told off to each Sub-section, so that I can fix responsibility or neglect on individuals, and punish the responsible party.

Five hundred dust-boxes have been erected throughout the Town for the convenience of house-owners depositing their house-sweepings, and also to ensure rapidity of removal by carts, and 1800 labourers are daily employed as scavengers. Filth thus being attacked in all quarters, it became at once imperatively necessary to organise a means of not only collecting it, but of dispatching it out of the City.

The “Sweeping Siding” we found in existence was situated at the end of the busiest commercial road in the Town. It was in the form of a Cul de Sac, and only 8 wagons could be filled at one time. The street through which the carts had to pass to the Siding was all day long blocked by our sweeping carts, to the great detriment of trade. Mr. Crawford immediately on the confines of the Town erected a Sweeping Siding, 400 feet long, approached by a road 30 feet broad, under which 22 wagons could stand; the carts come in at one end, discharge, and go out at the other side. The old Siding is still kept for the reception of the garbage collected in the neighbouring Wards. The garbage consists, not only of the surface sweepings, but also of the filth taken from the existing

drains. These are for the most part merely brick channels, cemented on the inside, which run down the centre of the street, and with which the house drains communicate. They vary from 1 to 3 feet wide, with a depth of from 1 to 5 feet. They are generally covered with unhewn blocks of stone, over which the road metal is laid, and they have so little gradient that the filth which enters into them is deposited at the bottom, and gases given off find their way into the street or houses, by the drains or rain-water pipes. It is calculated that these drains are in the aggregate 25 miles in length, and I have found it necessary from their faulty construction, to open up the streets, and cleanse them very frequently.

In 1866, 55 miles of drains were thus opened and cleaned,

„ 1867, 102	„	„	„	„	„
„ 1868, 110	„	„	„	„	„

The wagons when filled are taken by an engine to Coorla, a distance of about 11 miles from the City, and their contents deposited on what was a salt swamp.

In 1864, all the garbage collected was deposited in the low-lying parts of the Town.

In 1865, 45,288 Tons were sent out of the City,

„ 1866, 103,098	„	„	„	„
„ 1867, 111,789	„	„	„	„
„ 1868, 111,876	„	„	„	„

At present the Bench of Justices has not sanctioned any sum for the utilization of these magnificent manure heaps, which by the action of the monsoon are converted into the very richest mould, but I have no doubt that such a course will be adopted, and these mounds will, as we advise, be spread over the surface of the ground, when they will be fit to be made into the Market Gardens of Bombay, and yield a supply of vegetables and green forage sufficient for the requirements of the City, and thus return a handsome revenue to the Municipality.

The next question was—How to improve the collection of Night-soil?

You must remember we have no Water-closets at present in the Native Town, but attached to each house there is a Privy; it consists generally of a slab of lime-washed brick, having a central

hole. The Ablution water, (for Natives use only water after defæcation,) the fæces, and the urine fall into a cow-dunged bamboo basket,—the urine and water run through the basket to a paved channel, and find their way into the existing drains; the solid matter is retained, and this is removed by the Halalcore, whose presence however would defile the inside of a House or Privy, and who therefore approaches the Privy by what is termed the Sweeper's Passage; so that between 2 rows of houses standing back to back, there runs along the back of the Privies a passage, through which the sweeper advances and empties into a large basket he carries with him, the contents of each basket in succession; the Halalcore carries his basket when full to a depôt, or walled enclosure, where Night-soil carts stand, and after emptying the contents of his basket into them, returns to his work.

In 1865 the Halalcores in the Native Town did not exceed 450 men; the head men in the caste had a vested interest in the cleansing of certain streets, and left this privilege to their heirs as real property. Mr. Crawford determined to break this monopoly down, and by degrees has collected men from all parts of India, so that we now average about 1,200 in number.

When we took charge there were but 44 Night-soil carts filled nightly, now there are 136, many of them iron ones, each iron one containing double the quantity of the old wooden ones.

During 1867, there were 36,325 Tons of Night-soil thus collected,
 „ 1868, „ 48,904 „ „ „

The carts are driven during the night to Tanks where they are emptied, and the stuff is allowed to run away, I regret to say, to waste, into the sea at half-ebb tide. I hope as time develops our knowledge, to be permitted (as I have long advocated) to utilize this magnificent manure for the fertilization of our exhausted soil.

When we commenced work, there were only 6 Public Latrines in the Island,—one of these was so disgraceful, that we at once pulled it down,—there are now 14 erected in different parts of the City, but this number is not nearly sufficient, we want at least 30 to prevent waste places, and even the streets being defiled. The Urinals have been increased from 11 to 80.

The next question was the erection of proper Slaughter-houses, those existing being as bad as they possibly could be. The Beef one being in the centre of a very densely populated quarter of the Town; and the Mutton one being simply a shed built over the foreshore, close to the Town, where all the blood and offal added to the putridness of the fætid mud.

A place on the mainland, 10 miles from the City, on a line of Railway was chosen, and on it there have been erected Slaughter-houses, second to none, I confidently believe, in the world. They are very large, covered with an iron roof, and are well ventilated. They are placed on a slope, which, with a plentiful supply of water, enables them to be kept thoroughly clean and perfectly free from smell. Attached to them are large yards and iron sheds, and an arrival platform for animals reaching the ground by rail.

All animals are minutely examined before admittance into the Slaughter-house yard. The carcasses are also inspected after skinning; and if either beast or carcass is diseased it is at once destroyed.

The meat is brought into the City during the night by train. You may imagine our difficulties, when I tell you we were gravely assured that the buffers of the van containing the mutton, must not even touch the buffers of the van containing the beef, or that the Hindoo community would refuse to buy the mutton. We obviated this difficulty by putting the butchers' carriage between the two sets of vans; and the train once made up is never altered. On arrival the beef and mutton are carried away by different routes, and a screen is put up here as at Bandora, to prevent them seeing each other, so to speak.

The Markets were of the same description as the Slaughter-houses; and Mr. Crawford's name will be always associated with the magnificent Markets he has erected.

At the "Arthur Crawford's" Markets, as the Bench has decided they are to be called, the area under cover will be, to quote from Mr. Crawford's report—56,600 square feet all open, with double iron roof of 50 feet span, supported on iron columns—height to the wall plates 30 feet,—Height to ridge of roof $51\frac{1}{2}$ feet.

The Markets cannot be under *one* roof from the religious prejudices of the Natives, but they are in close contiguity. They consist of—1st, A Grain, Spice, Fruit, and Vegetable Market; 2nd, A Beef; 3rd, A Mutton; in these will be 688 stalls.

In another part of the Town, 2 iron-roofed buildings have been erected. The Fish and Mutton Market is 160 by 60 feet, containing 80 stalls, and 125 Fish-sellers' seats; The Vegetable Market, 140 by 120 feet, containing 384 stalls; and in the Fort when I left another handsome Market was in course of erection, which was designed to contain 100 stalls.

All the offensive trades were carried on in the centre of the Town. The disgusting odor of the tan pits with the accompanying

swarms of flies feasting on the half-putrid skins, must have been the occasion of disease. The tanners have been removed to the outskirts of the City, 5 miles away from the Native Town: the Indigo dyers, the Catgut makers, Fat boilers, Sulphur refiners, and Salt-fish stores, have also been removed and placed in safe localities.

Dr. Leith's report shewed the unwholesome and dangerous condition of the various burial grounds throughout the Island. The over-crowding was pointed out by him to be excessive; and their condition had been the subject of comment for many years. They were principally situated on the elevated shore of Back Bay, among the cocoa-nut plantation I have before alluded to; and it was one of the subjects of Mr. Crawford's earliest solicitude, to close the existing ones, and form other cemeteries for each caste, at a distance from the inhabited portions of the Town.

As you are aware we have a population composed of many different creeds who dispose of their dead in various ways. The Hindoos burn their dead: Burial obtains among the Christian and Mussulman communities: whilst the Parsees expose their dead on the Towers of Silence, where they are eaten by vultures. The Christian and Mussulman communities are divided into castes, who must each have separate cemeteries.

There are 28 Christian burial grounds; 3 Jewish; 32 Mussulman; 5 low-caste Hindoo; giving a total of 68 burial grounds: and there are 23 burning Ghâts; and 6 Towers of Silence. The Protestant section of the Christians has had a secluded valley about 5 miles from the Town given to it: while the European and Native Roman Catholic cemetery has been chosen still further from the Town.

At present we have not been able to close any of the Mussulman burial places or burning Ghâts of the Hindoos; and the Towers of Silence still occupy the most elevated part of Malabar Hill, where the vultures are to be seen sitting like evil ghouls on the walls, watching for their expected feast.

In 1859, Bombay which had been before entirely dependent on the surface wells and storage tanks for its water supply, had a great blessing conferred on it, by having drinking water of a very good character brought into it from Vehar Lake.

This Lake was formed by blocking up a valley situated among the Hills in Salsette on the mainland. It is about 7 miles distant from the north end of the Island; and the water is conveyed by a 32-inch iron main to the Native Town. Unfortunately after the vast expense had been incurred for creating a source of pure water supply, and bringing it in that condition into

the town, the Authorities deaf to reason have done all in their power to make this water a means of disseminating—not health, but disease; for they distributed this first necessity of life by means of open shallow wells, which, as Dr. Leith truly says “are objectionable from allowing the water to be dirtied by dust and accidental causes, and by the vessels and ropes with which the water is drawn; and the newer kind of dipping well is likewise objectionable, as in the place of the rope, the dirty hand is plunged into the water alongside the vessel to be filled.” The Natives at first regarded this water with suspicion; but its good is becoming to be more and more appreciated, as we find that from the 208 connections there were in 1860, there were in 1867,—7526.

The Vehar Lake is not equal to the present demand, only yielding about 13 gallons per head of population,—an amount which would be manifestly insufficient if we are ever to have a drainage or water-closet system. I am glad to say that the present Government has taken the subject up, and a Commission whose report is not yet out, has been sitting to discuss both these important subjects.

I must now speak of the working of the Municipal Act as regards the compulsory execution of Sanitary operations in houses.

This Act like all other Sanitary Acts, it appears to me, though drawn up with the best intentions, yet fails in a *practical* point of view, because it was not drawn up by the men to whom the duty of working it would be entrusted.

When therefore we came to put its provisions into force, it was found that to a great degree the wording of the Act was either so vague that Magistrates would not convict offenders, or that only a course, sounding well in the reading, but impossible in practice, was open to the Municipal Commissioners.

I will refer to this point again after glancing at some of the actual work done.

The chief cases in which notices for the Public Health Department are issued, and are as under:—

- To remove huts or fill up and drain ground.
- Level metal or pave private streets.
- Cleanse houses or land.
- Limewash houses.
- Construct covered drains.
- Construct, alter, or repair privies or urinals.
- Fill up, cleanse tanks, marshy land, etc.
- Register dangerous or offensive trades.

A direct summons is issued on application to the Magistrate for such offences as :—

- Depositing rubbish in street or drains.
- Allowing offensive matter to flow in street.
- Keeping offensive matter on premises for more than 24 hours.
- Obstructing public street, side drains, etc.
- Keeping horned cattle, etc., so as to be a nuisance.

The combined notices and summonses amounted

In 1866	to	4975.
„ 1867	„	3984.
„ 1868	„	4107.

But take for example 1867 :—Out of the total 3984, 2708 were notices for various Sanitary works to be done, and of these only 1439 were complied with ; of the remainder 319 were disposed of by summons ; but in 950 cases I could take no further action. And why ? Because the sections of the Act under which these notices were necessarily served only authorize the Municipal Commissioner in the event of non-compliance, to perform the work himself, and to recover the expenses of such work before a Court of Petty Sessions. The Municipal Commissioner could not do the work himself, because he had no funds at his command to pay a Contractor for doing such work.

Would it not be far simpler and easier in all similar cases, to give the local Authority a power to summon before a Magistrate any person who neglected to perform the work laid down in the notice ; and if the local Authority made out his case for the necessity of such work, that the Magistrate should be obliged to inflict a *daily* penalty until such work was COMPLETED. We have one such clause in the Bombay Act, and, as Dr. Lumsdaine, who has most ably and devotedly acted in my absence, most truly says—“This section is our Sheet Anchor, for it is one where non-compliance is followed by summons, carrying with it fine and *daily penalty*, until such time as remedial measures are taken. How different this from the next section and many others. In these a notice may be unnoticed, but there can be no summons. True, the Commissioner “may cause” required work to be done, and the expenses “shall be recoverable ;” but as this would entail an army of workmen and unlimited cash balances, it is no great standby. He *cannot* afford the advance, and the owner or occupier *will* not do it, so of course there is a dead lock.”

I now come to the registration of Births and Deaths, which naturally falls to my province. We attempted to ameliorate the state of things we found, by appointing 15 Medical Registrars

to as many Districts ; but the wording of the Act was so vague, that we found it impossible legally to compel parents or guardians to register the Births of children ; so that at present this part of my work is a perfect farce.

In 1866 only 5904 Births were registered.

"	1867	"	5115	"	"
"	1868	"	4086	"	"

Our Death registration is, as I have before stated, unsatisfactory from imperfection in the return of the true cause of Deaths ; and although the Medical Registrars have done good service in recording them more accurately, yet I cannot hope for much improvement until the wording of the Act is much more explicit.

I append a Table, shewing the deaths from Zymotic disease, and other causes since 1864 ; wherein it will be seen that whereas—

In 1864, the rate was	30.62	per 1,000, or 1 Death to every	32	persons living,
and in 1865,	"	35.04	"	"
In 1866, it fell to	20.66	"	48	"
" 1867,	"	18.95	"	"
" 1868,	"	19.20	"	"

The death rate rose in 1868, partly from Cholera being brought into the City from up country.

I quote from Dr. Lumsdaine,—“ During 1867 there was not much Cholera, 111 persons died from it, and in November it had disappeared. In 1868 there were 227 deaths, and of these 207 occurred in the last quarter, 43 in October, 63 in November, and 101 in December.” These figures are different from the former visitations of Cholera, which in 1864 carried off its 4,847 victims, and in 1865 slew 2,883 persons ; but still they teach us that a lesson has yet to be learnt by the Government, viz. :—that to keep the most populous City of India free from Cholera, and the highway to Europe open to mails, passengers, and merchandise, the only true course is to commence and carry on a vigorous raid upon filth in its own home,—the Native Towns and Villages throughout the length and breadth of India ; and secondly, to prevent passengers ill with Cholera travelling by rail down to Bombay. I believe the Municipal Authorities in Bombay will be always able to stamp out any Cholera that may burst out among ourselves, but we are powerless to prevent its importation into us, and must be so until the reasonable measures we ask for are granted by the Government.

Since I left India in July last, an Act, similar to the Contagious Disease Act in this country, has been passed by the

Government, and will shortly be put in force. It is very much needed, as Syphilis of the most virulent type prevails largely among the lower classes in Bombay.

Such, Gentlemen, is a rapid sketch of some of the more important reforms we have been able to introduce into Bombay ; all the good that has been effected in the moral improvement of the Natives, and the annual saving of many thousand lives, may, humanly speaking, be primarily ascribed to the foresight, and enlarged views of Sir Bartle Frere, who has thus given an opportunity to the world to see how powerful for good a wise ruler may be, and to what degree one single action of his may influence the well-being of his race ; and secondly, the success of this undertaking is owing to the energy, devotedness, and tact of Mr. Crawford, and to the wisdom of the Bench of Justices, who have supplied the Funds necessary for carrying out so large a work ; but though much *has* been done, we have still a great deal more to do before this vast Indian City can be placed on a proper Sanitary footing.

Our present water-supply must be increased, a drainage system must be provided, the ventilation of our Native Town must be improved, and House-owners must be compelled to make a better provision for the Sanitary necessities of their Tenants.

At present we have only had time to remove the accumulations of past neglect, and now our energies must be devoted to greater cleanliness of *surface* ; for in carrying out this work, I have day by day had impressed upon me the imperative necessity for keeping the *surface* clean, and the drains free from deposit.

Instant, vigilant, and continued must be our action for the cleansing of Bombay, the second largest City in H. M's. Dominions, is a matter, not only of Local, but of Imperial importance.

If you can bring the weight of your influence to bear on the Rulers of India, with the view of still further improving the Sanitary condition of the millions over whom they preside, you will have the satisfaction of knowing that happiness will be increased and human life prolonged.

T. G. HEWLETT,

Surgeon Bombay Army,

Health Officer & Coroner City of Bombay.

Table of Deaths from Zymotic Disease and all causes in Bombay during the Years---

	1864.						1865.						1866.						1867.						1868.					
	Cholera.	Small-pox.	Measles.	Fever.	All other causes except Zymotic.	Total exclusive of Still-born.	Cholera.	Small-pox.	Measles.	Fever.	All other causes except Zymotic.	Total exclusive of Still-born.	Cholera.	Small-pox.	Measles.	Fever.	All other causes except Zymotic.	Total exclusive of Still-born.	Cholera.	Small-pox.	Measles.	Fever.	All other causes except Zymotic.	Total exclusive of Still-born.	Cholera.	Small-pox.	Measles.	Fever.	All other causes except Zymotic.	Total exclusive of Still-born.
JANUARY	622	65	5	1140	514	2346	363	36	16	1582	540	2537	13	35	49	1058	353	1508	11	14	3	503	944	1475	1	42	2	584	799	1428
FEBRUARY ...	401	158	22	899	514	1993	540	59	25	1861	505	2990	15	98	89	984	360	1546	21	66	1	534	736	1358	0	95	12	481	639	1227
MARCH	302	367	31	1022	510	2232	520	136	54	2410	500	3620	12	257	141	1114	358	1882	12	247	3	470	745	1477	0	166	11	482	643	1302
APRIL	680	438	27	1140	526	2811	352	173	74	2588	541	3728	16	271	117	1088	398	1887	26	212	3	548	685	1474	3	218	17	396	698	1332
MAY	837	302	13	1204	476	2832	627	68	83	2462	561	3801	21	209	52	1035	418	1735	5	190	4	602	647	1484	3	225	26	455	743	1452
JUNE	395	185	15	1034	459	2088	206	33	40	1381	476	2136	15	112	20	761	389	1297	9	151	3	470	632	1265	2	191	16	414	722	1345
JULY	371	85	4	930	464	1854	116	10	28	1235	709	2098	27	54	6	562	538	1187	5	81	2	396	685	1169	4	76	14	434	909	1437
AUGUST	351	43	2	1050	505	1951	62	9	12	1154	561	1798	43	23	4	574	556	1200	5	40	1	318	830	1104	6	36	7	355	767	1171
SEPTEMBER...	232	20	1	990	455	1698	30	7	8	1137	524	1706	63	9	1	544	467	1084	7	16	1	374	702	1100	1	20	14	407	726	1168
OCTOBER.....	88	10	3	1002	399	1502	32	5	7	1009	426	1479	49	2	1	617	417	1086	6	10	0	428	670	1114	43	8	11	524	642	1228
NOVEMBER ...	137	13	1	1015	421	1587	22	9	10	943	371	1355	31	1	1	697	418	1148	4	11	2	467	698	1182	63	19	15	482	667	1246
DECEMBER ...	431	21	8	1168	493	2121	13	22	12	977	359	1383	27	8	1	843	426	1305	0	17	1	564	662	1244	101	27	22	467	749	1366
YEAR	4847	1707	132	12593	5736	25015	2883	567	369	18739	6073	28631	332	1079	482	9877	5098	16865	111	1055	24	5674	8636	15536	227	1123	167	5481	8704	15702

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the 1990s, the number of people in the world who are under 15 years of age has increased by 1.2 billion (United Nations 1999). The number of people aged 65 and over has increased by 1.1 billion in the same period. The number of people aged 15–64 years has increased by 1.5 billion. The number of people aged 15–64 years has increased by 1.5 billion in the same period.

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