PUBLIC HEALTH ACT.
(11 & 12 Vict. Cap. 63.)

REPORT
TO THE
GENERAL BOARD OF HEALTH
ON A
PRELIMINARY INQUIRY
INTO THE SEWERAGE, DRAINAGE, AND SUPPLY OF WATER, AND THE SANITARY CONDITION OF THE INHABITANTS,
OF THE PARISH OF
REDRUTH,
IN THE COUNTY OF CORNWALL.

BY THOMAS WEBSTER RAMMELL, ESQ.,
SUPERINTENDING INSPECTOR.

LONDON:
PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY,
FOR HER MAJESTY'S STATIONERY OFFICE.
1853.
NOTIFICATION.

The General Board of Health hereby give notice, in terms of section 9th of the Public Health Act, that on or before the 10th day of March next, being a period of not less than one month from the date of the publication and deposit hereof, written statements may be forwarded to the Board with respect to any matter contained in or omitted from the accompanying Report on a preliminary Inquiry into the Sewerage, Drainage, and Supply of Water, and the Sanitary Condition of the Inhabitants of the Parish of Redruth, in the County of Cornwall; or with respect to any amendment to be proposed therein.

By order of the Board,

C. Macaulay, Secretary.

Whitehall, 27th January 1853.
## CONTENTS

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPENING PROCEEDINGS</td>
<td>3</td>
</tr>
<tr>
<td>GENERAL DESCRIPTION</td>
<td>6</td>
</tr>
<tr>
<td>HOUSES, POPULATION, RATEING</td>
<td>7</td>
</tr>
<tr>
<td>Table of Houses and Population 1831-41-51</td>
<td>9</td>
</tr>
<tr>
<td>STATISTICS OF LIFE</td>
<td>10</td>
</tr>
<tr>
<td>Return of Births and Deaths 1845-51</td>
<td>11</td>
</tr>
<tr>
<td>GOVERNMENT—Parish and Turnpike Roads—Lighting</td>
<td>10</td>
</tr>
<tr>
<td>WATER SUPPLY—Precarious and insufficient</td>
<td>12</td>
</tr>
<tr>
<td>Wells affected by mining operations</td>
<td>12</td>
</tr>
<tr>
<td>Water procured from adits, which sometimes fail</td>
<td>13</td>
</tr>
<tr>
<td>Inconvenience resulting</td>
<td>14</td>
</tr>
<tr>
<td>Quality of mine streams</td>
<td>15</td>
</tr>
<tr>
<td>Suggestions for improved supply</td>
<td>16</td>
</tr>
<tr>
<td>Difficulties in the way</td>
<td>17</td>
</tr>
<tr>
<td>Analysis of samples for hardness</td>
<td>18</td>
</tr>
<tr>
<td>DRAINAGE—A great deficiency of</td>
<td>23</td>
</tr>
<tr>
<td>Nuisances consequent thereon</td>
<td>19</td>
</tr>
<tr>
<td>Want of Privy Accommodation</td>
<td>18</td>
</tr>
<tr>
<td>SANITARY CONDITION—Fevers prevalent</td>
<td>23</td>
</tr>
<tr>
<td>Diseases peculiar to Miners</td>
<td>20</td>
</tr>
<tr>
<td>BURIAL GROUNDS</td>
<td>35</td>
</tr>
<tr>
<td>SUMMARY OF CONCLUSIONS</td>
<td>37</td>
</tr>
<tr>
<td>RECOMMENDATIONS</td>
<td>38</td>
</tr>
</tbody>
</table>

[76]
PUBLIC HEALTH ACT (11 & 12 Vict. c. 63.)

Report to the General Board of Health on a Preliminary Inquiry into the Sewerage, Drainage, and Supply of Water, and the Sanitary Condition of the Inhabitants of the Parish of Redruth, in the County of Cornwall.

By Thomas Webster Rammell, Esq., Superintending Inspector.

4, Trafalgar Square, London, August 3, 1852.

MY LORDS AND GENTLEMEN,

A PETITION, signed by more than one tenth of the rated inhabitants of the Parish of Redruth, having been presented to your Honourable Board, praying for a Preliminary Inquiry into the sanitary condition of that Parish, with a view to the application of the Public Health Act, I received your instructions to make such inquiry, in accordance with the provisions of the Act, and with respect to the following matters, viz:—

The sewerage, drainage, and supply of water;
The state of the burial-grounds;
The number and sanitary condition of the inhabitants;
The Local Acts of Parliament (if any) in force within the town, for paving, lighting, cleansing, watching, regulating, supplying with water, or improving the same, or having relation to the purposes of the Public Health Act, 1848;
The natural drainage areas;
The existing municipal, parochial, or other local boundaries, and the boundaries which may be most advantageously adopted for the purposes of the Public Health Act, 1848;
And as to other matters with respect to which your Honourable Board was desirous of being informed.

In pursuance of these instructions, I caused the proper notice to be issued of my intention to enter upon such
inquiry at the Vestry Room, at Redruth, on the 24th of March 1852, when I should be prepared to hear all persons desirous of being heard before me upon the various subjects embraced in it.

On proceeding at the appointed hour to the place of meeting I found assembled many of the principal ratepayers of the place. Amongst those who attended this or subsequent meetings, were the Rev. J. W. Hawkesly, the rector; J. P. Magor, Esq., and S. Davey, Esq., justices of the peace; R. Tweedy, Esq., banker; Mr. A. Jenkins, land agent; Mr. S. W. Jenkin, civil engineer; Mr. W. Sincock, captain and mine agent; Mr. John Hockin, engineer; Mr. R. Blee, chemist and druggist; Mr. J. Hicks, parish surveyor of roads; Mr. James Johns, registrar of deaths, &c. for the district; Messrs. Lanyon, Arnall, Cocking, Rowe, &c.

Having read aloud the petition, and proved the due publication and affixing of the notices, I briefly stated to the meeting the course I intended to pursue in conducting the investigation, and also explained some of the provisions of the Act. I then commenced hearing witnesses, and continued to do so on the two following days, when the inquiry was finally closed. In the after part of each day I made a tour of inspection through the town and surrounding districts, and personally investigated the condition of the localities chiefly brought under notice at the meeting. In these examinations I was accompanied by several of the gentlemen who were present at the meeting.

I have now the honour to submit the following Report of the information thus obtained.

GENERAL DESCRIPTION.—Redruth is an extensive parish and market town in the mining district of Cornwall, distant 262 miles from London.

The parish includes, besides the town properly so called, the ecclesiastical district of Treleigh, and the hamlet of Plain-an-Gwarry. The rural district is scattered with dwellings in various parts.

The town is situated partly in a valley, and partly on the somewhat steep hills forming the sides thereof. The substratum of the town varies, that of the valley consists chiefly of the washings from the neighbouring hills. To the north it is chiefly killas or shale, to the south killas and some greenstone; but both to the north and south at some distance, say three quarters of a mile, there are granite hills. The whole district is intersected with porphyry veins.

This district and tin; the hands. The direct across the va
The large adapted for of them are lives. The resulting fro: are built by
The parish besides, seven near the we

Houses, population at 1851, were a

Rating, &c of rates an

Mr. Cocking,

AMOUNT OF
This district is rich in mineral products, including copper and tin; the working of which employs a large number of hands.

The direction of the metallic lodes is from east to west across the valley; which itself runs north and south. The larger number of the houses are of the description adapted for the occupation of the working classes. Most of them are built upon leasehold tenure, generally for three lives. The owners are mostly people of small capital, resulting from the accumulation of savings. Many of them are built by the miners themselves.

The parish is in the Redruth Union, which comprises besides, seven other parishes. The Union House is situated near the western end of the town, but in the adjoining parish of Illogan.

HOUSES, POPULATION, &c.—The number of houses, and population at the several decennial periods, 1831, 1841, and 1851, were according to the following table:

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount of Rates</th>
<th>Amount expended in Out-door Relief, including Maintenance of Lunatics in Asylum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1847</td>
<td>£2,301</td>
<td>£1,003 8 3</td>
</tr>
<tr>
<td>1848</td>
<td>£3,303</td>
<td>995 16 0</td>
</tr>
<tr>
<td>1849</td>
<td>£2,698</td>
<td>782 6 1</td>
</tr>
<tr>
<td>1850</td>
<td>£1,796</td>
<td>765 10 6</td>
</tr>
<tr>
<td>1851</td>
<td>£1,810</td>
<td>604 16 5</td>
</tr>
<tr>
<td>Total</td>
<td>£11,908</td>
<td></td>
</tr>
</tbody>
</table>

2,382l average.
<table>
<thead>
<tr>
<th>Year</th>
<th>Highway Rate</th>
<th>Church Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1847</td>
<td>£375</td>
<td>£40 2</td>
</tr>
<tr>
<td>1848</td>
<td>£594</td>
<td>£53 12</td>
</tr>
<tr>
<td>1849</td>
<td>£446</td>
<td>£114 0</td>
</tr>
<tr>
<td>1850</td>
<td>£505</td>
<td>£58 13</td>
</tr>
<tr>
<td>1851</td>
<td>£394</td>
<td>£65 0</td>
</tr>
</tbody>
</table>

The proportion of land compared to house property is about three eighths.
Return of the Number of Houses and Population at the several Decennial Periods, 1831, 1841, and 1851, in the Parish of Redruth.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Town</td>
<td>1,142</td>
<td>1,059</td>
<td>95</td>
<td>4</td>
<td>2,867</td>
<td>3,120</td>
<td>5,987</td>
<td></td>
</tr>
<tr>
<td>Ecclesiastical dist. of Trelleigh</td>
<td>250</td>
<td>246</td>
<td>13</td>
<td>2</td>
<td>616</td>
<td>694</td>
<td>1,310</td>
<td></td>
</tr>
<tr>
<td>Hamlet of Plain-an-Gwarry</td>
<td>234</td>
<td>198</td>
<td>2</td>
<td>—</td>
<td>564</td>
<td>595</td>
<td>1,159</td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>426</td>
<td>362</td>
<td>13</td>
<td>2</td>
<td>1,017</td>
<td>1,088</td>
<td>2,115</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2,052</td>
<td>1,865</td>
<td>63</td>
<td>8</td>
<td>5,064</td>
<td>5,507</td>
<td>10,571</td>
<td></td>
</tr>
<tr>
<td>Increase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>745</td>
<td>518</td>
<td>1,263</td>
<td>538</td>
</tr>
</tbody>
</table>
Statistics of Life.—Government.

Rental and Rateable Value.—The gross estimated rental of the parish is £24,560.
The gross rateable value is £16,110.
The mines pay no poor's rates at all, although they throw a general burden upon the parish for the support of their poor.

Statistics of Life.—The table on the following page is a Return of the births and deaths in the parish of Redruth, during the seven years, 1845–51, distinguishing the deaths under 5, 10, and 20 years of age, and those from various epidemic and contagious diseases.

Assuming 10,000 to have been the mean number of the population for the period in question, this would exhibit an annual average mortality at the rate of 19.5 in 1,000.

It will be observed that the number of deaths of infants under 5 years of age is enormous, being within a fraction of 43 per cent. of the whole number of deaths.
The lives sacrificed to epidemic and contagious diseases also make a fearful array. In the year 1849, the deaths from these causes were 108, being more than 1 in every 100 of the population; and in the following year was 77, being 1 in every 130 of the population. The average of deaths from these causes is 40 per annum, being 1 in every 250 of the population.

(Further details upon this subject will be found under the head of Sanitary Condition.)

Government.—There is no Local Act for the regulation of the affairs of the parish.

Parish and Turnpike Roads.—Mr. Hicks is the surveyor of highways, at a salary of £45 per annum. He has been in that office for twelve years. He states,—

"There are 25 miles of parish road. We usually spend annually in repairs from £200 to £300, which will be provided for by a 4d. rate. Besides the repairs we have been in the habit of spending about £100, or from that to £150, in improvements. The total cost of the highways, including repairs, management, and improvements, will be about £450. a year, equivalent to a 7d. rate.

"We make use of porphyry and horn-blende as materials, which are found very excellent for the purpose.

"The length of turnpike road within the parish is about 2½ to 3 miles. It is under two Trusts, the Redruth and Hayle, and the Truro and Redruth Consolidated. The Truro and Redruth Trust extends a short way into the town, but the main street is not turnpike road."

Lighting.—There is no provision for public lighting. There are a few lamps in some of the streets, which are all private, or paid for by subscription.
RETURN of Births and Deaths in the Parish of Redruth during the Seven Years 1845-51.

<table>
<thead>
<tr>
<th>Years</th>
<th>Total Births</th>
<th>Under 5 years</th>
<th>Above 5 years and under 10 years</th>
<th>Above 10 years and under 20 years</th>
<th>Total Deaths</th>
<th>Deaths from contagious diseases, comprising typhus and scarlet fever, hooping cough and dysentery</th>
<th>Deaths from epidemic diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1845</td>
<td>369</td>
<td>88</td>
<td>9</td>
<td>6</td>
<td>78</td>
<td>176</td>
<td>28</td>
</tr>
<tr>
<td>1846</td>
<td>356</td>
<td>62</td>
<td>3</td>
<td>14</td>
<td>77</td>
<td>156</td>
<td>9</td>
</tr>
<tr>
<td>1847</td>
<td>321</td>
<td>60</td>
<td>4</td>
<td>10</td>
<td>94</td>
<td>164</td>
<td>9</td>
</tr>
<tr>
<td>1848</td>
<td>279</td>
<td>56</td>
<td>3</td>
<td>8</td>
<td>91</td>
<td>159</td>
<td>17</td>
</tr>
<tr>
<td>1849</td>
<td>309</td>
<td>116</td>
<td>18</td>
<td>16</td>
<td>110</td>
<td>260</td>
<td>25</td>
</tr>
<tr>
<td>1850</td>
<td>375</td>
<td>112</td>
<td>23</td>
<td>11</td>
<td>83</td>
<td>229</td>
<td>44</td>
</tr>
<tr>
<td>1851</td>
<td>403</td>
<td>93</td>
<td>9</td>
<td>13</td>
<td>102</td>
<td>217</td>
<td>22</td>
</tr>
<tr>
<td>Totals</td>
<td>2,412</td>
<td>582</td>
<td>65</td>
<td>78</td>
<td>635</td>
<td>1,361</td>
<td>126</td>
</tr>
<tr>
<td>Yearly Average</td>
<td>-</td>
<td>87.15</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>194.5</td>
<td>-</td>
</tr>
</tbody>
</table>

Table of Births and Deaths, 1845-51.
WATER SUPPLY.—Perhaps the most serious evil of which the inhabitants of Redruth have to complain, is their deficient and precarious supply of water, and the labour and inconvenience which attend its collection and conveyance for domestic use.

Some of the houses in the lower part of the town have wells, with pumps attached; perhaps 30 or 40 are so provided. These wells vary in depth, but 30 feet may be taken as their average. This supply is not uninterrupted. Owing to the porous character of the substratum, aided by the mining operations carried on underneath, which produce the effect of subsoil drainage, the greater number of the wells are dry, or nearly so, in the summer months. The cost of sinking these wells is about 5l. taking the average.

In the nature of public supply, it may be truly said, there is no provision, natural or artificial, if we except what is called a "public well," in the Foundry Road, which is supposed to serve partially for the wants of about a fifth of the town. This well, it is said, is never quite dry, but in the autumn its supply is a limited one.

The rest of the inhabitants obtain the water they use from common sources, which may be described, for the most part, as abandoned mine springs in the neighbourhood of the town. Of these there are four, respectively known as Drump Adit, Penandra Adit, Wheal Silver Adit, and Wheal Sparnon Adit, being all in the suburbs of the town. But here also the flow is precarious, and sometimes fails, when the inhabitants are compelled to go to more distant points of the surrounding country in search of this necessary element.

Such is a general view of the case, further particulars of which will be found detailed in the subjoined passages from the evidence.

Mr. William Sincock, captain and mine agent, who has resided in the town many years, gives the following valuable information upon the subject. In reference to the wells, he says,—

"The valley as far as from here to the sea is composed of the washings of the surface of the neighbouring hills. The detritus varies in depth from 3 to 7 or 8 feet; it may vary in width from 100 yards to half a mile. Under the detritus we find clay-slate. Granite is not found except at considerable depth. The clay-slate is compact.

"The source of water at the Foundry, which is made use of by the public, is not a "well," as it is usually called, but it may be described as the natural drainage from a breadth of country lying above, and which becomes very scanty in the dry season. The supply is inadequate, even in the winter. In the dry season it would hardly effect of rain.

"The per through the of them are
the supply quality. I
western end
ground."

With res to the east
of the town
been abando
resumed at
"In dry
limited, and
supply, has
jeopardized
opinion, me
being obstro

With a
adits have
ished with
have to fet
considerab
of the tow
quarter of a
last witnes
upon the p

"In sum
the country
of the paris
of water is t
fetched from
four gallons
their own ti
times by po

"When
much waitin
have, at tim
places; and
and longer,
middle of th
breakfast.
waiting, bu
served.'

"The fet
I have kno
Adits.—Deficiency of Supply.

would hardly fill a half-inch pipe. The source generally feels the
effect of rains.

"The private wells, I take it, are sunk for the most part
through the superficial bed I spoke of, into the clay-slate; and some
of them are in veins of green stone and porphyry. These retain
the supply longest, and the water they furnish is of the best
quality. The wells are mostly in the lower part, and at the
western end of the town. I do not know of one on the high
ground."

With respect to the "adits," this witness states,—

"The high ground is generally covered with adits. I speak
of the eastern side more particularly. These adits have been
driven for mining purposes, and some of them which have
been abandoned constitute the principal sources of supply for the
town. I should add, that the working of these adits may be
resumed at any time, and thus the supply be cut off entirely.

"In dry seasons the flow of water from all the adits is very
limited, and one of them, the Drump, which usually affords the best
supply, has never been quite dry. This source, however, is now
jeopardized by a new mine just begun within it, and which, in my
opinion, must interrupt the flow of water, and ultimately deprive
us of its supply. There is a danger, too, of the other sources
being obstructed."

With a view to economize the water in dry seasons, the
adits have shoots fixed at the ends of them, which are fur-
nished with cocks. Those who make use of these sources
have to fetch the water in cans or pails, and have to go a
considerable distance for the purpose; some from the centre
of the town to the top of the hill, a distance of about a
quarter of a mile, and upon a steep ascent all the way... The
last witness describes some of the inconveniences attendant
upon the present state of things:

"In summer, when the adits fail, people get their supplies from
the country. They send generally to Vogel, at the extremity
of the parish. The source there is also an adit, but the flow
of water is more constant. I have never known this dry. Water
fetched from this source is usually sold at the rate of a penny for
four gallons; but most people who have horses and carts fetch
their own supply. A great deal of water is given away at these
times by persons having wells which do not happen to be dry.

"When the adits in the town are beginning to fail there is
much waiting at them for water. People take their turns. I
have, at times, seen as many as 20 or 30 cans and pitchers at these
places; and I have known people wait as long as three or four hours,
and longer, for their turn. I have known people get up in
the middle of the night to make sure of a pitcher of water for their
breakfast. There are frequent quarrels amongst the parties
waiting, but in general there is a rule of 'first come, first
served.'

"The fetching of water at these times is a very serious matter.
I have known extra servants being kept for the purpose. I have
Waiting at the Adits for Water.

...done so myself. The supply then levies a very serious tax upon the town. It follows, as a matter of course, that women with growing families are obliged to leave them to fetch the necessary supplies of water, entailing great inconvenience and loss of time, besides risk of accidents to the younger children in their absence."

Mr. Robert Blee gives further illustration on the same subject. He says,—

"Many women of industrious habits, during the autumn months, take knitting with them to the shoots, to employ themselves whilst waiting for their turn. My servant has been out of my house for three or four hours at a time, when sent for water. She has had to wait up for hours after the usual time of going to bed, and to rise hours before the usual time of getting up, simply to fetch water.

"I have certainly seen 30 or 40 people waiting for water at a time, but many go and take their pitchers, leave them, and come again for water when it reaches their turn. The evil is increased by some taking barrels for water, which take a long time filling. In such cases, the owner of the barrel takes pitcher and pitcher alternately with the rest, until his barrel is filled."

But the waste of time is not the only evil attendant upon the present state of things:—

"The conversation carried on at the spouts," says the last witness, "is of a character very much to be deprecated. It must necessarily be so, when large numbers of men and women, as well as children of both sexes, are congregated together, in a condition of idleness."

Upon another important point this witness states,—

"In the event of fire, we should be utterly destitute of any adequate supply of water for its extinction. I have known of but one fire, which occurred a long time ago. I am almost inclined to think that the knowledge of the scarcity of water makes people more careful against fire than they might otherwise be."

The natural streams in the neighborhood of the mines are liable to be interfered with by them in two ways: first, by draining away the water; and secondly, by polluting it. The lower part of nearly all the streams at Redruth is polluted by the mines, both copper and tin; and Mr. Sincock thinks that "the mine water is quite unfit for use for any domestic purpose."

On the other hand, Mr. Blee is of opinion, that these impurities may, to some extent, be removed by filtration, so as to render it fit for culinary purposes; and he mentions the fact that the Union House is actually supplied with mine water, after undergoing this process.

"As an instance," he adds, "I may mention that our Union Workhouse is supplied from a mine stream, the water of which is purified by filtration. The water is delivered from the mine in a very impure state, but is perfectly safe for use, after having passed through the filter."

The chief ill which is at present affecting Board of Trade workmen is that of any impurity about the water which is supplied to them."

Whatever subject by the Board of Trade the subject of water is considered, it is of the utmost importance that the supply be of the purest water, and that no impurities be allowed in it.

Mr. Blee states that he has seen all the water at the spouts, and has heard of the great discrepancy between the supply at these spouts and the quality of water supplied at other places.

There are springs at Redruth, which have been used for many years, but it is now used only for the purpose of lighting the town. The water is delivered from the mine in a transparent condition, and the Board of Trade have been so careful as to see that the water is not polluted by the mines. The filter at the Union House is actually supplied with mine water, after undergoing this process.

"As an instance," he adds, "I may mention that our Union Workhouse is supplied from a mine stream, the water of which is purified by filtration. The water is delivered from the mine in a very impure state, but is perfectly safe for use, after having passed through the filter."

The chief ill which is at present affecting Board of Trade workmen is that of any impurity about the water which is supplied to them."

Whatever subject by the Board of Trade the subject of water is considered, it is of the utmost importance that the supply be of the purest water, and that no impurities be allowed in it.

Mr. Blee states that he has seen all the water at the spouts, and has heard of the great discrepancy between the supply at these spouts and the quality of water supplied at other places.

There are springs at Redruth, which have been used for many years, but it is now used only for the purpose of lighting the town. The water is delivered from the mine in a transparent condition, and the Board of Trade have been so careful as to see that the water is not polluted by the mines. The filter at the Union House is actually supplied with mine water, after undergoing this process.

"As an instance," he adds, "I may mention that our Union Workhouse is supplied from a mine stream, the water of which is purified by filtration. The water is delivered from the mine in a very impure state, but is perfectly safe for use, after having passed through the filter."

The chief ill which is at present affecting Board of Trade workmen is that of any impurity about the water which is supplied to them."

Whatever subject by the Board of Trade the subject of water is considered, it is of the utmost importance that the supply be of the purest water, and that no impurities be allowed in it.
Quality of the Mine Streams.

very impure state indeed; it appears as a foul muddy stream. The filter employed is composed of layers of gravel and sand. The chief impurity in the water is an insoluble oxide of iron, which is mostly deposited in the settling reservoir. The water after having been passed through the filter is perfectly clear and transparent. I have tested the filtered water by direction of the Board of Guardians, and was unable to detect the presence of any impurity whatever. I have never heard any complaints about the water, when the filter has been in a proper state. I have heard the water complained of on one occasion, but the ground of complaint was clearly traced to the imperfect condition of the filter.

Whatever skill and care may be bestowed upon this subject by the Board of Guardians, I cannot avoid submitting that there must be some hazard in subjecting the inmates of the Workhouse to the results of a process, which, it is admitted, is not always successfully carried out. Mr. Blee stated, that "this was the only instance he knew of where the mine water had been prepared for domestic use," and I think it would be desirable that some other mode should be adopted for supplying water to that establishment. The character of the water in question which is now used in the Workhouse, may be judged of from the fact that the stream from whence it is drawn is one passing through Wheal Bassett, which is both a tin and copper mine, and where it is used for the purpose of dressing and preparing both copper and tin ores for the market.

Mr. Sincock, after admitting the highly unsatisfactory footing upon which the water supply of the town at present rests, and the extreme desirableness of procuring an adequate supply from fresh sources, makes the following observations upon the natural sources at present within reach of the town:

"I do not think that any sufficient or permanent general service of water could be obtained from the substratum of the town. The mines are carried deeper than even the lowest parts of the town, as much, I should say, as 50 fathoms. I do not mean that the levels are as yet extended under the town to this depth, but this may be done. Any well, therefore, sunk to supply the town would be liable to be interfered with by these mines.

"There are very few natural streams of water in this district of the country. I know of none in the immediate neighbourhood sufficient to supply the town with water, nor anything like it. I speak of the immediate vicinity of the town, within a mile of it. There are springs within three miles which are large and permanent, being out of the immediate neighbourhood of the mines. Amongst these I may mention a stream at Carvennell, and another at Gryllis."
Water.—Suggestions for improved Supply.

Mr. S. Jenkins, C.E., stated,—

"I have turned my attention to the best means of improving the water supply of this district. I am of opinion that no source within, or very close to, the town can be depended upon for a permanent supply; all these sources being liable to be cut off by mining operations.

"I think there are some sources on the south and south-west sides of the town which are less likely to be affected by these operations, and which might be made to serve for the supply of the town. The principal ones are—

1. the Seleggin stream, about a mile from the town.
2. the Gryllis stream, about 3 miles distant.
3. the Troon stream, about 4½ miles off.

"These streams are certainly now used for mining purposes, but I think it probable that the landowners would be willing to allow of their diversion for the use of the town upon moderate compensation."

Mr. Jenkins, at the time of giving his evidence, had not made any gaugings of the sources in question, but stated that, from observations and inquiries he had made he was disposed to think they would be sufficient for the wants of the place in the driest seasons. He considers that three storage reservoirs would be required, for the construction of which the ground happens to be favourable; the Seleggin stream, at the point where the water could be taken up, being 115 feet above the highest part of the town. The other streams are still higher, but Mr. Jenkins had not actually levelled them.

The streams in question all lie to the southward of, and between, Redruth and Camborne, and Mr. Jenkins said he thought that one system of storage works might be made to supply both towns. He had, however, made no estimate of the cost of the works.

He added,—

"In case these sources could not be made available, and it became necessary to have recourse to gathering grounds for a supply, the district called Carn Marth, lying to the south-east of the town, I think, offers the greatest facilities for the purpose."

In this view of the case, however, Mr. Jenkins merely threw out a suggestion, not being prepared with any plans or estimates of details.

Mr. Blee was of opinion, that it would be possible to procure a sufficient supply for the town by means of wells of sufficient depth sunk in the lower part of it; and he instanced the case of a well 24 feet deep, not far from the place where the inquiry was held, which, he said, produced an unfauling supply of water, and from which, during the summer months, premises, were it.

Mr. Blee said,—

"I think Capt. with regard to the the town, I am consideration."

In regard to said,—

"Although I thi at the Workhouse, to such a mode of similar sources wi operations, be found now, though never mands upon it."

Mr. Blee's plan to facilitate the this, however, and sary to prohibiting that neighbourhood blished, and due he stated that "it supply cut off by. That such is the it presents the gre settlement of the c wealth of the d the labourers emp. I am aware, any p to prohibit or restr the public interest as water; are at st much difficulty in mine proprietors w Upon this point,

"I think the buy obtaining a supply of E ven though the pre this view, they cou mining property here
Difficulties in the Way.

summer months, many persons besides the occupants of the premises, were in the habit of obtaining their supplies.

Mr. Blee said,—

"I think Captain Sineock was under some misapprehension with regard to the supply from the wells in the southern part of the town. I consider that this means of supply deserves full consideration."

In regard to the supply from the adits, this witness said,—

"Although I think the mine waters might be purified by filtration so as to be fit for use generally, as is the case with that used at the Workhouse, I do not think it would be necessary to resort to such a mode of supply; for I think the Drump Adit and other similar sources will, if we are protected from further mining operations, be found sufficient to afford an ample supply. It is now, though never quite dry, utterly inadequate to meet the demands upon it."

Mr. Blee's plan would be to extend the Drump Adit, and to facilitate the access to other adits. In order to effect this, however, and protect the supply, "it would be necessary to prohibit the continuance of mining operations in that neighbourhood." In the case of wells, also, if established, and dug ever so deep in the lower part of the town, he stated that "they would always be liable to have their supply cut off by the extension of mining operations."

That such is the case there appears to be no doubt, and it presents the greatest difficulty in the way of an economical settlement of the question. The mines are the sources of the wealth of the district, both as regards the proprietors and the labourers employed; and there exists no power, nor, as I am aware, any precedent by which power could be asserted to prohibit or restrain this branch of industry, even when the public interests, in regard to so necessary a commodity as water, are at stake. Moreover there would appear to be much difficulty in coming to any arrangement with the mine proprietors which would be binding upon their heirs.

Upon this point, Mr. A. Jenkins said,—

"I think the buying up of mining property for the purpose of obtaining a supply of water for the town is utterly impracticable. Even though the present proprietors might be disposed to favour this view, they could not possibly bind their successors. The mining property here is nearly all entailed."
Water Analysis.—The following are the degrees of hardness of six samples of water from Redruth, tested by Dr. Lyon Playfair:—

<table>
<thead>
<tr>
<th>No.</th>
<th>Description.</th>
<th>Degree of Hardness</th>
<th>Observations.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Redruth water, Gyllys Stream</td>
<td>1·2</td>
<td>Slightly tinged; some-what opalescent, but inodorous.</td>
</tr>
<tr>
<td>2</td>
<td>Redruth water, Seleggin Stream</td>
<td>2·3</td>
<td>This sample was slightly tinged, but was clear and inodorous.</td>
</tr>
<tr>
<td>3</td>
<td>Redruth water from Stream</td>
<td>2·4</td>
<td>Clear, colourless, and inodorous.</td>
</tr>
<tr>
<td>4</td>
<td>Redruth water, Dopp's Well</td>
<td>3·6</td>
<td>Clear, colourless, and inodorous.</td>
</tr>
<tr>
<td>5</td>
<td>Redruth water, Sparrow Adit</td>
<td>4·1</td>
<td>Clear, colourless, and inodorous.</td>
</tr>
<tr>
<td>6</td>
<td>Redruth water, Penandrea Adit</td>
<td>5·1</td>
<td>Clear, colourless, and inodorous.</td>
</tr>
</tbody>
</table>

Drainage.—The condition of this place in regard to drainage is nearly upon as bad a footing as in regard to water. Upon abstract sanitary considerations, perhaps, the case, in this particular, might be pronounced more grievous than in that of water; although the immediate personal inconvenience, as involving labour and expense, does not bring the fact so prominently and continually to the knowledge of those concerned.

Properly speaking, it can hardly be said that there is any provision for public drainage in the parish. What drains there are are thus described in the evidence of Mr. Hicks, the Surveyor of Highways:—

"In the Fore-street about one third is drained, by means of a rubble drain carried underneath the road; the inclination being steep, the filth is carried off by it pretty well. It receives as well the surface water of the streets and the drainage of the houses. By drainage I mean, for the most part, simply the slopes. There are three or four water-closets also, which drain into it. The above drain is on the western side of the Town Brook. As regards the eastern side there is no drainage whatever.

"There are, besides, drains in Back-lane, Foundry-row, and Cross-street, all communicating with the brook. There may be about half-a-dozen water-closets draining into these drains—not more. These sewers, like the one in Fore-street, receive the house slopes and surface waters. If any filth accumulates in them in dry weather it is carried off by the next flood of water, the inclination being good."
Deficient Drainage. Nuisances. Consequence. 19

With regard to the extent of these drains the witness says,—

"I should say that these sewers would serve for about one sixth, or one seventh, of the whole town. The remaining parts are entirely without drains."

As a general rule, therefore, there is no drainage from the houses, and the expedients to which the inhabitants have to resort for the disposal of their refuse, both slops and privy soil, lead to the most disgusting and unwholesome nuisances. The usual practice appears to be to select some convenient spot, either within the curtilage of the premises, or on the highway before the door, as the depository of these matters. The slops stagnate in a hole either before the door, or in the yard; but the privy soil, being held of value, is collected, in heaps, for use upon the owner's garden, or where he has none, for sale to others. It was stated by one witness that so habituated were the inhabitants to this traffic, that a very prevalent ground of opposition to projects for house drainage, was that it would deprive the occupiers of their privy soil.

The complicated nuisances resulting from the present state of things are described by several witnesses, whose testimony I found to be not at all exaggerated when I personally inspected the various parts of the town. The roads before the houses are generally strewn with offensive refuse, animal or vegetable, the surface rotting in consequence. In the small gardens or yards behind most of the cottages, I found here a pool of stagnant filth, there a heap of dung, mixed up with decayed vegetables, night soil, &c. The effluvium in all such cases was painfully offensive.

Mr. Hicks says,—

"It is customary for the inhabitants, throughout by far the larger part of the town, to dispose of their slops when they are near the highway by throwing them on or by the side of the road; in other cases by throwing them into a hollow or pit in their garden or yard, when it is either taken up by the earth, or passes off to lower ground in the neighbourhood, which is very often upon other premises. There are frequent quarrels and disturbances in consequence of this.

"With regard to the night-soil of the lower class of houses, there is not much distinction made between it and the slops, as regards the mode of getting rid of it. A good deal of that also is occasionally thrown upon the public streets."

The powers of the Nuisances Removal Act have been had recourse to occasionally, but with but little or no effect. The witness states,—

"As Inspector of Nuisances I have frequently to interfere, but find the powers of the Act to be of little use, as a nuisance may be..."
removed to-day and renewed to-morrow. There has certainly been some improvement since that Act came into operation, but as a means of maintaining cleanliness its powers are utterly inadequate.

"There being no public drains near the cottages, it is utterly impossible for the inhabitants to get rid of their filth, consequently accumulations, of the most offensive character, occur on every side, and we have no power effectually to deal in the matter. In one instance, as many as 50 occupiers were summoned before the magistrates, and orders were obtained in every case. The result was a temporary cleanliness; but, in a short time, similar accumulations made their appearance in the same localities."

Want of Privy Accommodation.—The want of privy accommodation, especially amongst the cottagers, may be judged of from the following instances, to which my attention was directed by Mr. Hicks, and which I believe are by no means exceptional.

1. In Buller’s-row (on the property of Mr. John Adams) there are 28 cottages, and one privy belonging to one house only, to which the rest of the inhabitants have no access.

2. In Miner’s-row, there are 16 houses and no privy. It seems there was a privy erected two or three years ago for the use of one of the houses, but it has since become dilapidated, and is now not used.

3. Plain-an-Gwary.—There are here 133 houses, with 11 privies, intended for the use of perhaps one third of the whole. These privies, however, are utterly inoperative, as far as any diminution of the nuisance resulting from the exposure of the soil is concerned. They consist of small rude buildings, placed over a pit, which being open the soil is constantly exposed. In the majority of cases they are without doors, the pit receives as well the solid refuse of the house, and these contents are sold to the farmer when they have accumulated in sufficient quantity.

Mr. Hicks remarked,—

"As a rule, there is no privy and no drain of any kind. There is, in fact, a prejudice against drainage, arising from the desire to accumulate the soil for sale. The farmers are in the habit of giving a shilling for one horse-load of half a ton."

He further stated circumstances incidental to the present state of things, which complete the picture of a wide-spread evil:—

"Where there are no privies, the contents of the earthenware chamber-pot are kept in the house as a substitute, and got rid of at night. The presence of these pots in the small cottages renders the atmosphere very foul."
Sanitary Condition.

"The suburbs of the town are rendered most offensive from the habits of the people. Having no privies to use, they go behind hedges and walls, &c., to obey the calls of nature. There is much indecent exposure in consequence."

Some of the better class of houses have a privy with a covered cesspool, but no drain from the premises. The soil being very porous, the liquid matter soaks freely into it.

Mr. Hicks, in reference to the effect of imperfect drainage in the highways, states:—

"I find much difficulty in maintaining the streets in proper condition, for want of drainage; and also the practice of throwing the filth upon the roads involves considerable expense for its removal. The powers of the Highway Act would meet this evil; but they are not enforced by reason of the practice, from the want of drainage provision, being general throughout the town, and I may say unavoidable.

"The surface of the roads is frequently cut up by floods of water which proper drains would carry off. This, of course, involves expense. As an instance I may state that since the drain in the west end of the town has been laid, the annual cost of repairing this portion of the road has been gradually lessened. I should say, to the extent of 5l. a year for about 300 yards of road. I think 20l. or 30l. a year might be saved in the repair of the town streets by laying down proper drains."

SANITARY CONDITION.—The result of an examination of the natural position and features of the position of this district, would be to lead to the conclusion that it is, or might be, a healthy one. It is open and well ventilated. The atmosphere is a tolerably dry one for this part of the country, though of course more subject to rain-fall than some of the midland counties. This is perhaps to be attributed to the porous nature of the soil, which readily takes up the rain-fall, a tendency which is aided by the mining operations which are carried on beneath. Mr. Blee says, that considering the rain-fall, the "atmosphere is unusually dry for Cornwall."

Added to this, we find a population generally fully employed, and at wages which ought to enable them to procure, in sufficient quantity, the ordinary necessaries and comforts of life. Yet with all these apparent advantages, the district is not a healthy one, exhibiting an excessive number of deaths attributable to a class of diseases, which are clearly ascertained to be, to a great extent, under the control of man by the aid of proper sanitary arrangements; and also a very severe mortality amongst the infant portion of the popu-
Sanitary Condition.—Fever prevalent.

lation,—two infallible tests of an unhealthy condition of soil and atmosphere.

Mr. Blee observed at the commencement of his medical evidence,—"I cannot say there are any diseases peculiar to Redruth ; but when he went into details, in the course of a very lucid and intelligent statement, this observation was found to be explained by the fact, that there exists scarcely a single epidemic or contagious disease, to which, in turn, Redruth is not habitually subject. With regard to the general sanitary condition he stated,—

"I visit extensively in the town and neighbourhood as a medical practitioner. In the latter part of 1849 we had a severe visitation of cholera, and in the course of 1851 a still more fatal visitation of small-pox. The small-pox is now existing amongst us, as well as the usual infantile disorders, such as hooping cough and scarlatina.

"The cholera first showed itself in Upper Back-lane, situated at the east end of the town. The attacks were spread pretty equally all over the town, but perhaps the following places were most severely visited:—Cockings's-court and Adam's-row, Foundry-row, Great-court, Plain-an-Gwary, and some parts of Buller's-row. [The condition of these two last named districts in respect of privy destitution has already been mentioned.]

"To the best of my recollection there were, in all, 36 deaths from cholera. I have no recollection of any marked epidemic disease preceding it. There was much diarrhoea and dysentery existing concurrently with it, and which continued after the cholera had ceased.

"The small-pox which followed the cholera was very fatal, and I should say there were about 50 deaths from it in all. It took the most malignant form, producing blindness, and great debility, in many cases where it was not fatal to life.

"I cannot say that there is generally low fever in this town. There have been a few cases within the last six months, but I know of not one in which it has been fatal.

"In 1833 there was cholera here; I have heard there were 17 deaths from it."

Diseases peculiar to Miners.—Mr. Blee has paid a great deal of attention to the diseases to which miners are peculiarly subject, or more subject than persons employed in other occupations; and amongst these he states that he finds that pulmonary diseases are very general and fatal, and also diseases of the heart. He considers the miners, as a class, short lived; and gave a great deal of evidence in corroboration of this opinion, founded upon tables, the result of his personal researches, and which he embodied in an able paper in the form of a report addressed to the Royal Polytechnic Society in 1833.

A copy, the larger including in the preface:

"By an examination of my inquiries into the nature of the population. My facts are drawn from burial registers; and I hope, sufficient details of the mining districts and urban populations as "In the 1st table males dying at different with respect to the venience of any part of those I have the decennial morta of 1831. To such little importance; some parishes than making it impossible "The decennial of a single year, may greatest where it of deaths, and the compared, the relat with sufficient soc "On this obv... excluded all who parishes to which was probably the cluded in my investig important possible, examine I hope I have left "In Tables III, total numbers bu... the ages under ... Tables V. and... had reached the ... and X. are give districts. "Of the parish the first on the li an almost exclu that there were
Diseases peculiar to Miners.

Society in 1838. Of this paper, Mr. Blee favoured me with a copy, the larger portion of which I take the liberty of including in the present Report.

After some preliminary observations Mr. Blee states,—

"By an examination of the subjoined tables it will be found, that my inquiries have extended to every variety of Cornish population. My facts have, of course, been obtained from the burial registers; and the ten parishes I have selected may afford, I hope, sufficient data for a satisfactory comparison of the longevities of the mining and non-mining districts of the county.

"I am not aware that the tables require any explanation. The order in which I have placed the parishes has reference to the nature of the occupations of the people. The non-mining and mining districts are kept separate, and, in each, the rural and urban populations stand in the same order.

"In the 1st table, I have given the actual decennial number of males dying at different ages; and in the second, the same information with respect to females. I give these tables for the convenience of any persons who may wish to make other calculations than those I have supplied. In these tables will also be found the decennial mortality of the populations, calculated on the census of 1831. To such calculations, however, I must say I attach very little importance; the much more rapid increase of population in some parishes than in others, and the fluctuating numbers of all, making it impossible to arrive at correct conclusions.

"The decennial mortality of a parish calculated on the census of a single year, may, from a rapid increase of population, appear greatest where it has been actually least; but if the total number of deaths, and the ages of the individuals be ascertained and compared, the relative longevity of such a parish may be obtained with sufficient accuracy.

"On this obvious plan I have proceeded, and as I have carefully excluded all who were described in the registers as belonging to parishes to which my inquiries did not extend; and as, where it was probable that the inhabitants of either of the parishes included in my inquiry had been buried in neighbouring parishes, in any important numbers, I have, to make my data as correct as possible, examined the registers of such neighbouring parishes, I hope I have left little room for any fallacious deductions.

"In Tables III. and IV. will be found how many per cent. of the total numbers buried in each parish in ten years, died between the ages under which the per-centages respectively stand; and in Tables V. and VI. the per-centages of the same numbers who had reached the definite ages stated. In Tables VII., VIII., IX., and X., are given the average per-centages of the two entire districts.

"Of the parishes stated in the tables, it will be found that Probus, the first on the list, is first also in the scale of longevity. It has an almost exclusively agricultural population. I could not find that there were any miners residing within its limits, or any other
persons whose engagements imposed long or close confinement. 
The entire parish is in a state of very perfect cultivation. The 
population is located for the most part on elevated sites, and the 
valleys are abundantly watered, and sufficiently drained. 

"The climate of Mabe is cold and inhospitable, and, together with 
the soil, rather unfavourable to agriculture; but the occupations 
of the male part of the inhabitants are, I believe, exclusively 
out of doors, and I am informed that there are no miners among 
them.

"The population of this parish, as of Probus, is exclusively 
rural.

"The two next parishes, Mylor and St. Clements, have both rural 
and urban populations; and to the greater confinement and 
sedentary occupations of large portions of the people, together 
with the effluvia which generally load the atmosphere in towns, 
may, no doubt, be attributed their inferior longevity, as compared 
with the two former parishes.

"Proceeding to the exclusively urban population of St. Mary's, 
Truro, the longevity will be found greater than in St. Clement's; 
and I am disposed to attribute the difference to the superior 
cleanliness, to the more abundant supply of pure water, and 
to the better drainage to be found in St. Mary's, as compared with 
that part of St. Clements to which the town of Truro extends. 
There are, perhaps, very few urban parishes in which the longevity 
would be found so great as in St. Mary's. The mildness of its 
atmosphere, consequent on its protection from cold winds by the 
surrounding hills; the ventilation secured by the breadth of the 
streets, and the streams of clean water which run through them 
all; the rivers which flow past the town, and the rise and fall of 
the tide; together with the praiseworthy attention to cleanliness 
and good drainage before mentioned, have all a tendency to pro­
mote the comfort and health of the people.

"In Penzance we find a still diminishing longevity of males, fewer 
reaching the age of 70 by 7 per cent. than in Truro.

"Falmouth stands the lowest in the scale of the non-mining 
parishes; and this, perhaps, is referable to the extreme scarcity 
of good water; the filthiness of many of the courts and back 
streets, their imperfect drainage, and crowded population. Of 
persons dying in 10 years, fewer men, by more than 10 per cent., 
had reached the average age of man in Falmouth; than had 
attained the same age in St. Mary's.

"Upon a comparison of the per-centages of the different descrip­
tions of population in the non-mining districts, we find, as might 
have been anticipated, that the rural population is the longest 
living; and that a town population, without some superior advan­
tages of situation, or a constant and careful attention to the com­
fort and convenience of the people, is, perhaps, less healthful in 
proportion to its denseness.

"If, with the mortalities of the foregoing parishes, those of the 
three principal mining parishes of the country be now compared, 
we shall obtain, I hope, a sufficiently correct idea of the extent to 
which the occupation of the miner affects his life.
Agricultural and Mining Populations compared.

"Illogan has almost exclusively a rural population, unless the few persons residing in the little villages of Portreath and Pool are to be otherwise classed, which can scarcely be; but if so, they bear no greater (if so great) a proportion to its entire population than the church towns of Probus and Mabe do to theirs. It is, therefore, with these parishes that Illogan should be compared; and as its situation and agricultural capabilities bear the greater resemblance to Mabe, it will be better to confine the comparison to that one. The proportion, then, of persons reaching the age of 80 is as 9 to 2 in favour of Mabe; of persons reaching the age of 70, as 25 to 8; of those reaching the age of 60, 28 to 16; and the age of 50, 37 to 26. The difference gradually diminishing to the age of 30, when the numbers begin to be greatly in favour of Illogan. That it is the occupation of the population to which the comparatively short duration of male life in this parish is attributable, is shown in the numbers who reach the age, before which age they do not begin to work under-ground. There is evidently nothing in the climate unfavourable to the health of children at those ages when they are most susceptible of the influences of climate. Children under 10 years die, in this parish, in fewer comparative numbers than in any other of the 10 parishes (Probus excepted) to which my inquiries have extended.

"The next parish in the diminishing order of longevity is Gwennap. The population of Gwennap is distributed in much the same way as Illogan. The great bulk of it is rural. St. Day is, however, a village of sufficient importance to be taken into the account; and the circumstances exist unfavourable to this parish, particularly, in infantile diseases, I am disposed to refer principally to that circumstance. The differences between this parish and Illogan are small; between Illogan and Redruth, the lowest parish on the list, the disparity is rather greater.

"The proportion of miners to the remainder of the population of Redruth is much less than in the other two mining parishes. It might, therefore, have been expected to contrast more favourably with them. That it does not may be attributed to the almost utter neglect of drainage, to the existence of so many slaughter-houses and other nuisances in the town, and to the scarcity of good water. Had Redruth no mining population, these circumstances would, without doubt, be the occasion of serious differences between it and other towns better provided in these respects. To how great an extent, then, must the miner in this parish be a sufferer from the want of that refreshing and invigorating atmosphere which in Illogan and Gwennap in some measure recruits the energies which his engagements so rapidly exhaust!

"There can be little doubt that the disparity between the mining and other districts of the county, as shown in Tables VII. and IX., is referable entirely to the occupations of the people, and not to the influence of climate. To test the correctness of this opinion, however, I have ascertained the longevities of the female part of the population of several parishes; and I have found the disparity between the female longevity of the two districts considerably less
Diseases peculiar to Miners.

than between the males, as is shown by Tables VIII. and X. There is a disparity even between the females; but no person who has seen the number of girls employed on the mines, at a very critical period of life, in occupations which cannot but be highly injurious—in which, for example, the feet are so much exposed to cold and wet, and who reflects, too, that diseased parents may be expected to propagate diseased children,—will be at a loss to discover other and more probable causes for the difference than any influence of climate. That climate is not the cause, I think, appears on a comparison between the female longevities of Redruth and the other mining parishes. In Redruth there is the impurity of a town atmosphere, from which the other parishes are free; and yet the female longevity is as great in it as in them; and this is undoubtedly to be attributed to the fact, that in Redruth there are much fewer girls who work in the mines, in consequence of the more abundant opportunities for getting employment as domestic servants, shop-girls, and needle-women; the ill effects of the atmosphere in the town not being so great as those of the occupations of the majority of females in the rural mining districts.

"I have now only to add, that greater number of miners die between the ages of 40 and 60 than at any other equal period; while in the non-mining district the greatest number in any 20 years above the age of 60 die between 60 and 80; and I believe I may safely say, that if the old registers had stated the occupations of the persons dying, so that I could have separated the miners from their fellow-parishioners, it would have appeared that, on the average, the occupation of the miner shortens his life by at least 20 years."
### TABLE I.

<table>
<thead>
<tr>
<th>Description of Population</th>
<th>Parish</th>
<th>Male Census, 1831</th>
<th>Total Number of Male Deaths occurring in Ten Years, under Total Male Deaths in 10 Years.</th>
<th>Decennial per cent of Male Deaths.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>10.</td>
<td>20.</td>
</tr>
<tr>
<td>Rural -</td>
<td>Probus</td>
<td>2,280</td>
<td>39</td>
<td>4</td>
</tr>
<tr>
<td>Ditto</td>
<td>Mylor</td>
<td>2,285</td>
<td>255</td>
<td>24</td>
</tr>
<tr>
<td>Rural and urban</td>
<td>St. Mary's, Truro</td>
<td>2,284</td>
<td>262</td>
<td>36</td>
</tr>
<tr>
<td>Ditto ditto</td>
<td>Penzance</td>
<td>2,284</td>
<td>262</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ditto</td>
<td>Falmouth town and parish</td>
<td>2,284</td>
<td>262</td>
<td>36</td>
</tr>
<tr>
<td>Rural -</td>
<td>Illogan</td>
<td>2,280</td>
<td>216</td>
<td>52</td>
</tr>
<tr>
<td>Ditto</td>
<td>Gwennap</td>
<td>2,284</td>
<td>330</td>
<td>65</td>
</tr>
<tr>
<td>Rural and urban</td>
<td>Redruth</td>
<td>3,876</td>
<td>435</td>
<td>44</td>
</tr>
</tbody>
</table>
TABLE II.

<table>
<thead>
<tr>
<th>Description of Population</th>
<th>Parish</th>
<th>Female Censuses, 1831</th>
<th>Total Number of Female Deaths occurring in Ten Years, under</th>
<th>Total Female Deaths in 10 Years</th>
<th>Decennial per cent. of Female Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>Mabe</td>
<td>264</td>
<td>12 4 2 3 3 1 2 5 4 -</td>
<td>35</td>
<td>13.6</td>
</tr>
<tr>
<td>Rural and urban</td>
<td>Mylor</td>
<td>1,331</td>
<td>71 16 16 19 21 13 20 31 20 6</td>
<td>233</td>
<td>15.2</td>
</tr>
<tr>
<td>Urban</td>
<td>St. Mary's, Truro</td>
<td>1,645</td>
<td>112 22 19 18 18 16 37 36 32 4</td>
<td>314</td>
<td>19.0</td>
</tr>
<tr>
<td>Ditto</td>
<td>Penzance</td>
<td>3,720</td>
<td>205 25 45 38 32 42 60 67 54 9</td>
<td>577</td>
<td>15.5</td>
</tr>
<tr>
<td>Rural</td>
<td>Illogan</td>
<td>3,166</td>
<td>188 43 48 32 26 37 34 53 42 8</td>
<td>511</td>
<td>16.7</td>
</tr>
<tr>
<td>Ditto</td>
<td>Gwennap</td>
<td>4,452</td>
<td>290 43 50 32 26 40 47 65 53 6</td>
<td>650</td>
<td>14.6</td>
</tr>
<tr>
<td>Rural and urban</td>
<td>Redruth</td>
<td>4,315</td>
<td>350 36 54 38 35 33 56 84 68 8</td>
<td>777</td>
<td>18.0</td>
</tr>
</tbody>
</table>

TABLE III.

<table>
<thead>
<tr>
<th>Parish</th>
<th>Of the total Number of Males dying in Ten Years, there died per cent. between the Ages of</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In Tables III., IV., VII., and VIII., of the two numbers at the top of each column, the first is inclusive, the second exclusive.
### TABLE IV.

Of the total Number of Females dying in Ten Years, there died per cent., between the Ages of

<table>
<thead>
<tr>
<th>Parish</th>
<th>*-10</th>
<th>10-20</th>
<th>20-30</th>
<th>30-40</th>
<th>40-50</th>
<th>50-60</th>
<th>60-70</th>
<th>70-80</th>
<th>80-100</th>
</tr>
</thead>
<tbody>
<tr>
<td>not mining</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mabe</td>
<td>33'3</td>
<td>11'1</td>
<td>5'5</td>
<td>8'3</td>
<td>8'3</td>
<td>2'7</td>
<td>5'5</td>
<td>13'8</td>
<td>11'1</td>
</tr>
<tr>
<td>Mylor</td>
<td>30'4</td>
<td>6'8</td>
<td>8'8</td>
<td>8'1</td>
<td>9'0</td>
<td>5'5</td>
<td>8'5</td>
<td>13'3</td>
<td>11'1</td>
</tr>
<tr>
<td>St. Mary's</td>
<td>35'5</td>
<td>7'0</td>
<td>6'0</td>
<td>5'7</td>
<td>5'7</td>
<td>5'0</td>
<td>11'7</td>
<td>11'4</td>
<td>11'4</td>
</tr>
<tr>
<td>Penzance</td>
<td>36'6</td>
<td>4'3</td>
<td>7'7</td>
<td>6'5</td>
<td>5'5</td>
<td>7'2</td>
<td>10'3</td>
<td>11'6</td>
<td>10'4</td>
</tr>
<tr>
<td>Illogan</td>
<td>36'7</td>
<td>8'4</td>
<td>9'3</td>
<td>6'2</td>
<td>5'0</td>
<td>7'2</td>
<td>6'6</td>
<td>10'3</td>
<td>9'7</td>
</tr>
<tr>
<td>mining</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gwennap</td>
<td>44'6</td>
<td>6'6</td>
<td>7'7</td>
<td>5'3</td>
<td>4'0</td>
<td>6'1</td>
<td>7'2</td>
<td>10'0</td>
<td>9'8</td>
</tr>
<tr>
<td>Redruth</td>
<td>46'0</td>
<td>4'6</td>
<td>6'9</td>
<td>4'8</td>
<td>4'5</td>
<td>4'8</td>
<td>8'4</td>
<td>10'8</td>
<td>9'7</td>
</tr>
</tbody>
</table>

* See Note, page 29.

### TABLE V.

Per-centauge of Males dying in Ten Years, who had reached the Age of

<table>
<thead>
<tr>
<th>Parish</th>
<th>Agriculture</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10.</td>
</tr>
<tr>
<td>Mabe</td>
<td></td>
</tr>
<tr>
<td>Mylor</td>
<td></td>
</tr>
<tr>
<td>St. Mary's</td>
<td></td>
</tr>
<tr>
<td>Penzance</td>
<td></td>
</tr>
<tr>
<td>Illogan</td>
<td></td>
</tr>
<tr>
<td>Gwennap</td>
<td></td>
</tr>
<tr>
<td>Redruth</td>
<td></td>
</tr>
</tbody>
</table>
TABLE V.

<table>
<thead>
<tr>
<th>Parish</th>
<th>10.</th>
<th>20.</th>
<th>30.</th>
<th>40.</th>
<th>50.</th>
<th>60.</th>
<th>70.</th>
<th>80-100.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not mining</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probus</td>
<td>70.2</td>
<td>67.1</td>
<td>57.2</td>
<td>52.6</td>
<td>45.8</td>
<td>36.6</td>
<td>29.7</td>
<td>11.4</td>
</tr>
<tr>
<td>Mabe</td>
<td>56.2</td>
<td>43.7</td>
<td>40.6</td>
<td>37.5</td>
<td>37.5</td>
<td>28.1</td>
<td>25.0</td>
<td>9.3</td>
</tr>
<tr>
<td>St. Clement's</td>
<td>57.3</td>
<td>52.4</td>
<td>45.4</td>
<td>37.8</td>
<td>32.4</td>
<td>25.9</td>
<td>14.5</td>
<td>8.1</td>
</tr>
<tr>
<td>Mylor</td>
<td>61.6</td>
<td>56.2</td>
<td>49.2</td>
<td>44.7</td>
<td>39.8</td>
<td>33.3</td>
<td>17.4</td>
<td>6.4</td>
</tr>
<tr>
<td>St. Mary's</td>
<td>60.6</td>
<td>55.4</td>
<td>47.7</td>
<td>42.2</td>
<td>37.9</td>
<td>32.7</td>
<td>23.6</td>
<td>7.6</td>
</tr>
<tr>
<td>Penzance</td>
<td>54.2</td>
<td>60.0</td>
<td>44.1</td>
<td>37.5</td>
<td>31.9</td>
<td>24.2</td>
<td>16.4</td>
<td>5.7</td>
</tr>
<tr>
<td>Falmouth town &amp; parish</td>
<td>55.9</td>
<td>51.5</td>
<td>44.3</td>
<td>36.5</td>
<td>27.7</td>
<td>21.3</td>
<td>13.1</td>
<td>4.2</td>
</tr>
<tr>
<td>Mining</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illogan</td>
<td>64.1</td>
<td>55.4</td>
<td>43.0</td>
<td>34.2</td>
<td>26.2</td>
<td>16.6</td>
<td>8.4</td>
<td>2.8</td>
</tr>
<tr>
<td>Gwennap</td>
<td>58.9</td>
<td>50.8</td>
<td>42.5</td>
<td>34.3</td>
<td>24.8</td>
<td>13.6</td>
<td>7.3</td>
<td>2.6</td>
</tr>
<tr>
<td>Redruth</td>
<td>50.8</td>
<td>45.8</td>
<td>40.1</td>
<td>32.9</td>
<td>22.5</td>
<td>15.9</td>
<td>7.1</td>
<td>2.8</td>
</tr>
</tbody>
</table>

* See Note, page 29.
### TABLE VI.

<table>
<thead>
<tr>
<th>Parish</th>
<th>Per cent of Females dying in Ten Years, who had reached the Age of</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80-100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not mining</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mabe</td>
<td></td>
<td>66.6</td>
<td>55.5</td>
<td>50.0</td>
<td>44.6</td>
<td>33.3</td>
<td>30.5</td>
<td>25.0</td>
<td>11.1</td>
</tr>
<tr>
<td>Mylor</td>
<td></td>
<td>69.9</td>
<td>62.6</td>
<td>53.7</td>
<td>47.6</td>
<td>38.6</td>
<td>33.0</td>
<td>24.4</td>
<td>11.1</td>
</tr>
<tr>
<td>St. Mary's</td>
<td></td>
<td>64.3</td>
<td>57.3</td>
<td>51.2</td>
<td>45.5</td>
<td>39.8</td>
<td>31.5</td>
<td>22.9</td>
<td>11.4</td>
</tr>
<tr>
<td>Penzance</td>
<td></td>
<td>64.4</td>
<td>60.1</td>
<td>52.3</td>
<td>45.7</td>
<td>40.2</td>
<td>32.9</td>
<td>22.5</td>
<td>10.4</td>
</tr>
<tr>
<td>Illogan</td>
<td></td>
<td>63.2</td>
<td>54.7</td>
<td>45.2</td>
<td>39.1</td>
<td>34.0</td>
<td>26.8</td>
<td>20.1</td>
<td>9.7</td>
</tr>
<tr>
<td>Mining</td>
<td></td>
<td>55.3</td>
<td>50.3</td>
<td>42.6</td>
<td>36.3</td>
<td>33.2</td>
<td>27.0</td>
<td>19.8</td>
<td>9.8</td>
</tr>
<tr>
<td>Redrath</td>
<td></td>
<td>54.9</td>
<td>60.3</td>
<td>43.3</td>
<td>38.4</td>
<td>33.9</td>
<td>29.0</td>
<td>20.5</td>
<td>9.7</td>
</tr>
</tbody>
</table>

### TABLE VII.

<table>
<thead>
<tr>
<th>District</th>
<th>Gross Male Population</th>
<th>Of the Total Number of Males dying in Ten Years in the Districts included in the foregoing Tables, there died per cent., between the Ages of</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>* - 10</td>
<td>10-20</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table VII.

<table>
<thead>
<tr>
<th>District</th>
<th>Gross Male Population</th>
<th>Of the Total Number of Males dying in Ten Years in the Districts included in the foregoing Tables, there died per cent., between the Ages of</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not mining</td>
<td>10,322</td>
<td>42.4 4.6 6.9 6.6 6.0 7.2 9.0 10.9 6.0</td>
</tr>
<tr>
<td>Mining</td>
<td>10,869</td>
<td>42.8 7.0 8.4 7.9 9.4 10.6 7.0 4.9 2.7</td>
</tr>
</tbody>
</table>

Table VIII.

<table>
<thead>
<tr>
<th>District</th>
<th>Gross Female Population</th>
<th>Of the Total Number of Females dying in Ten Years in the Districts included in Table II, there died per cent., between the Ages of</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not mining</td>
<td>7,160</td>
<td>34.5 5.7 7.0 6.5 6.3 6.1 10.2 12.2 11.1</td>
</tr>
<tr>
<td>Mining</td>
<td>11,033</td>
<td>42.5 6.2 7.8 5.3 4.4 5.9 7.5 10.3 9.7</td>
</tr>
</tbody>
</table>

* See note, page 29.
Mr. Bleesiate: "In this paper, I shall state that the facts warrant the strictest diseases they had a better ground.

I have in respect of the mortality of the proper footing of the miners, Mr. Jam..."

<table>
<thead>
<tr>
<th>District</th>
<th>Of the Total Number of Males dying in Ten Years in the Districts included in Table I, there had per cent. reached the Age of</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10.</td>
</tr>
<tr>
<td>Not mining</td>
<td>57.6</td>
</tr>
<tr>
<td>Mining</td>
<td>57.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>District</th>
<th>Of the Total Number of Females dying in Ten Years, in the Districts included in Table II, there had per cent. reached the Age of</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10.</td>
</tr>
<tr>
<td>Not mining</td>
<td>65.4</td>
</tr>
<tr>
<td>Mining</td>
<td>57.4</td>
</tr>
</tbody>
</table>
Mr. Blee stated in evidence—

"In this paper I have hazarded the opinion that the occupation of the miner shortens his life by 20 years, and I still believe that the facts warrant that conclusion. I also think that in this district the diseases of the miner would not be so rapidly fatal, if they had a better atmosphere to live in when they were above ground. I have no doubt that the very bad condition of Redruth, in respect of drainage and water supply, materially increases the mortality of the place; and if these arrangements were put on a proper footing I should look for a very considerable diminution of deaths at no distant period afterwards."

In corroboration of the great mortality amongst the miners, Mr. James Johns, the District Registrar, stated—

"The last census (1851) shows 530 widows in Redruth out of a population of 10,571, and I have ascertained that by far the larger number of these are the widows of miners who have died at an early age."

**Burial Grounds.**—There are two burial-grounds in the parish; one attached to the Parish Church, the other belonging to the Friends' Meeting House.

1. The parish churchyard is situated at the western extremity of the parish. With the exception of the north-east corner, where the Old Rectory abuts, the ground is quite open on all sides. Including the site of the church, it measures about two acres. It is an old ground, which has been added to at various times; the last addition, about one-eighth of an acre in extent, having been made about ten years ago. The soil consists chiefly of the ordinary killas of the district, a porphyry course running through the new part.

The Rev. Mr. Hawkesley thus describes the condition of the ground,—

"About a quarter of the slip last taken in remains unoccupied. The other part of the ground is very much crowded, and is hardly new used at all, excepting for members of families having vaults in it. For the last ten years not more, on an average, than 20 interments have taken place in this part. The ground is dry and porous, excepting on the north-east side of the church, where I have sometimes seen water standing in a grave. The graves are dug 6 feet deep."

With respect to the extent of burial accommodation afforded, he says,—

"There was much difficulty in finding space for new interments until the last addition was made. I have seen as many as seven coffins exposed in sinking a grave. It has not been proposed to make any further addition of space: and we think that as soon as the new piece is filled up, the old ground will again be usable. Taking into account the accommodation provided by the new..."
Burial Grounds.

piece, and the space and condition of the old, I think there is now ample accommodation for the parish for many years to come, provided the ground is systematically made use of. There is no map of the ground, but a register is kept of the situation of the graves.

"No interments have taken place within the church since I have been rector; nor, I believe, has any such taken place within memory."

The following is a statement of the interments which have taken place in the parish burial-ground of Redruth during the last 20 years:

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Burials</th>
</tr>
</thead>
<tbody>
<tr>
<td>1832</td>
<td>166</td>
</tr>
<tr>
<td>1833</td>
<td>271</td>
</tr>
<tr>
<td>1834</td>
<td>413</td>
</tr>
<tr>
<td>1835</td>
<td>153</td>
</tr>
<tr>
<td>1836</td>
<td>145</td>
</tr>
<tr>
<td>1837</td>
<td>191</td>
</tr>
<tr>
<td>1838</td>
<td>177</td>
</tr>
<tr>
<td>1839</td>
<td>148</td>
</tr>
<tr>
<td>1840</td>
<td>176</td>
</tr>
<tr>
<td>1841</td>
<td>180</td>
</tr>
<tr>
<td>1842</td>
<td>262</td>
</tr>
</tbody>
</table>

Brought forward - 2012

Carried forward 7

Total - 3,743

Average number of Funerals in each year, 187.

2. The Friend's burial-ground is attached to, and surrounds, the meeting-house, which is situated near the western end of the town. It is open on all sides, there being no houses near it.

Including the site of the meeting-house, it measures about a quarter of an acre. This ground has been opened within the last half century, and is about half filled. Mr. Tweedy states, that it is intended to make an addition to it to the extent of another quarter of an acre, on the first desirable opportunity.

The interments which have taken place in this ground, since it was opened, have been as follows:

Burials in Redruth Burial-ground.

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Burials</th>
</tr>
</thead>
<tbody>
<tr>
<td>1829</td>
<td>3</td>
</tr>
<tr>
<td>1830</td>
<td>2</td>
</tr>
<tr>
<td>1831</td>
<td>1</td>
</tr>
<tr>
<td>1832</td>
<td>1</td>
</tr>
</tbody>
</table>

Brought forward - 7

Carried forward 7

Burials in

Year.

1836 - -
1837 - -
1838 - -
1839 - -
1840 - -
1841 - -
1842 - -
1843 - -

Carried forw.
SUMMARY OF CONCLUSIONS.

1. That Redruth is an extensive parish in the mineral districts of Cornwall; the principal village being occupied chiefly by a mining population, the outlying districts being partially rural.

2. That the town or village is situated in a valley which runs from a hilly range southward towards the sea; and that the substratum is principally of a light character, consisting of clay-slate, with veins of porphyry running across it.

3. That the inhabitants are very badly supplied with water, there being no streams of any importance in the immediate neighbourhood; and that in resorting to wells they find the supplies fail, in the summer and autumn especially, by reason of the porous nature of the soil, and the mining operations carried on beneath. That the inconvenience, labour, and expense to which the inhabitants are subject in consequence of seeking for water from land-springs, or deserted adits of mines, in the suburbs of the town, are very great, and are universally complained of, as amounting, in effect, to a grievous tax upon the community.

4. That the town is favourably situated for draining operations, presenting a good fall in all parts; but that as yet little or nothing has been done in the way of drainage work, there being only a few hundred yards of rubble drain...
Summary of Conclusions.—Recommendations.

distributed here and there, and which are estimated to serve (but that very imperfectly) for about one sixth or one seventh of the whole, the rest being utterly destitute of drainage of any kind.

5. That the absence of house drainage, accompanied by a lamentable paucity of privy accommodation even of the rudest kind, drives the inhabitants, particularly those of the poorer class, to expedients of the most offensive kind in the disposal of their house refuse, including excrement. That the common practice is, to throw these matters, liquid and solid, into heaps or holes, either in the back premises or in the street in front of the houses, creating at all times a most offensive and fearful nuisance.

6. That the expense and difficulty of maintaining the roads is aggravated by the above described practices, and that they are generally in an unsatisfactory state in consequence.

7. That there is no public lighting; the few lamps which are found in some of the streets being private or subscription lights.

8. That there is no Local Act for the management of the affairs of the parish, nor any power to remedy the state of things complained of.

9. That the sanitary condition of the village is bad; the mortality amongst infants under 5 years of age, and from contagious and epidemic diseases, being excessive.

10. That the parish churchyard is very old, and is nearly filled with graves, and that increased burial accommodation would be in the course of a short time desirable.

11. That the condition of the parish would be improved, and the comfort and the health of the inhabitants promoted by—

a. An ample supply of pure water.

b. A perfect system of refuse and house drainage.

c. Increased privy accommodation.

d. The abolition of many existing nuisances.

e. The public lighting of the streets.

f. Additional burial accommodation.

I THEREFORE RECOMMEND—

I. That the Public Health Act, 1848, be applied to the parish of Redruth.

II. That the boundary of the parish be that within which the Public Health Act be applied.

III. That the Local Board of Health to be elected under the Act consist of nine persons.
Recommendations.—Conclusion.

IV. That the qualification for members of the Local Board be possession of real or personal estate, or both, to the value of not less than 500l., or rating to the relief of the poor of the parish of Redruth in an annual value of not less than 20l.

I have the honour to be,

My Lords and Gentlemen,
Your very obedient servant,

T. W. Rammell,
Superintending Inspector.

To the General Board of Health,
&c. &c. &c.