

TABLE 4.—AIR ANALYSES.

	Oxygen.	Carbonic Acid.	Ammonia, parts per Mill.		Index No.
			Per cent.	Albuminised.	
9th Aug., 1882, 10.35 a.m.	20.94	0.035	0.046	0.075	25
In Wellington Yard ..	20.91	0.038	0.046	0.070	26
In Wellington Street..	20.86	0.041	0.058	0.081	27
In Back Wellington Street	20.89	0.040	0.063	0.086	28
In Back Milton Street ..	20.91	0.039	0.051	0.073	29
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TABLE 4a.

Observations and Experiments on Temperature of Air and of Stock Manure—

	Temp. of air in shade.	Temp. manure at depth of 12ft.	In stock averages at depth of 7ft. bins.
11th August, 1882, 11.30 a.m.	72° 0 F.	61° 0 F.	63° 0 F.
14th " " 11.10 a.m.	75° 0 F.	61° 0 F.	63° 0 F.

The average temperature manure is 11° F. below that of atmosphere as shown above.

"FELICITY AS A SANITARY RESEARCH."

LECTURE TO THE CONGRESS.

BY BENJAMIN WARD RICHARDSON, M.D., F.R.S.

OUR Congress this year has been ringing peals of congratulations, and the peals are deserved. Sanitary science, in some simple directions, has won triumphs such as have never been won before, and its advocates, once called enthusiasts, dreamers, visionaries, and other poetical names, are now, in respect to enthusiasms, dreams, visions, looked upon as common-place observers. The miracles they declared possible are performed so regularly that wonder and doubt have ceased.

We sanitarians declared that it would be a comparatively easy task to find out the courses and, at least, the proximate causes of the great pestilences, and that, with a fair knowledge on these subjects, combined with a comparative ready assistance by the public, we could control both the courses and the causes. The work has not been done so thoroughly as we could have wished, because the public has not come up, as yet, to our views; but the work is progressing, and sufficient is already done to prove the truth of our position.

We said that the once current rates of mortality were deathly of deathly; that they represented a low civilization; that they might, in these countries, be reduced generally to a mean of fifteen in the thousand per annum, and, in favoured localities, to a lower figure still. We were taunted with the rejoinder, that if such were accomplished men and women would live a hundred and fifty years. We replied, Let them live two hundred years if they like, but let us, any way, reduce the huge mortalities which are considered natural.

The result of our work is that there are towns where the average mortality is actually lower than fifteen in the thousand. Strangely too the popular cry is not now against us as enthusiasts but against towns which do not follow up our enthusiasm. Towns, therefore, in this day, compete with towns for a low

death rate, knowing well that should mortality, from temporary and as yet accidental causes, rise to what was considered the mere natural a quarter of a century ago, they are temporarily ruined if they depend upon outside popular favour for existence.

All this is most satisfactory and would afford a fruitful theme of discourse. But what I want to-night to rivet on the memory is a new thought for new work. I want to put a question or two and endeavour to answer them.

Can we honestly believe that these triumphs of ours, which have so far ended in a certain victory over death, have introduced any fraction of triumph over misery?

Have we by our labours assisted to make men, women, and children happier as well as longer lived?

Have we tried to effect anything in that way, or have we, aiming at nothing more than the promotion of a longer life, left the rest to chance as if it were not our duty to include human Felicity in our design of labour?

Can we effect anything to ensure Felicity as well as length of days? In other words, is Felicity a subject open to sanitary research, and if so, in what directions shall we labour for it?

These questions are momentous, because, if we are aiding in the art of adding to length of life and in developing populations, without giving to an extended and universal life, Felicity, or the enjoyment of that which is given, we may, in the long run, be working evil rather than good for the human race.

A race unhappy lives too long to live.

Surveying the questions I have submitted, I do not think that we have so far done anything to add to human felicity. In the first stages of our labours that, indeed, were impossible. We have had to deal with very unpopular and, some think, unsavoury subjects. We have had to be excessively personal. We have been obliged to tell people to be clean both at home and abroad. We have been forced to be fault-finders all round. We have even had to frighten the masses, and fear is a terrible foe to felicity, both in the house and out of it; and until, one day, I ventured to show, by an allegory, a pleasant side-station on our steep and narrow road, we seemed to conceal the destinies we had in view, or to leave them for anybody to discover—an almost hopeless leaving.

We have not tried, therefore, in any direct manner to teach the way to felicity. We may, like the rest of the world, have spoken of health and happiness. We may have commented on the sound mind in the sound body; but we have not tried to systematize effort towards the attainment of felicity as we have towards the attainment of length of days.

I may make these admissions without the slightest compunc-

tion or regret. If we have done no good in the direction I have referred to we have certainly done no wrong. There has not been sufficient time for a development of Infelicity from extension of life, so we need not ourselves be unhappy.

But now comes the last question.

Can we by any future effort advance human Felicity by a scientific research into the sources of it, and the impediments to it? Can we, scientifically, connect health with happiness? If we cannot we had better never have been born. We are like preachers of mercy who are empty of charity. We are mere sounding brass and tinkling cymbal.

I do not for my part believe that we are in this plight. I hope it is all right that we were born. I believe that we have the moral as well as the physical health in plain subject before us for study, and that we of all men ought to see how to combine the physical with the moral, and to understand the relationships of the one to the other and the interdependence of the one on the other. I trust, therefore, that from this present Glasgow Congress we may take a new departure by inaugurating a new school of sanitary students and scholars, whose interests it shall be to learn the physical and moral art of living well, so that bodily health shall, of a truth, be mental felicity. A dream do I hear it said! If I do, I hesitate not. It was a dream a quarter of a century ago that men could touch death rates and reduce them to order. To-day the dream is a fact.

I see no reason why we should not, by patient research, know all that pertains to our own lower natures at least. I can feel the astronomer overwhelmed with the sublime story that lies before him. I can see the metaphysical philosopher overwhelmed as he questions the illimitable destinies and the sources of illimitable power and will and being. But we sanitarians dealing with secondary phenomena, with phenomena repeating at every moment, with our timepieces selves going through regular courses of eating, drinking, breathing, thinking, working, wearing, sleeping; with mechanism that can be counted, measured, weighed, and calculated on commercial values; we surely have no insurmountable difficulties to get over in determining what are the conditions under which human felicity is possible, and what are the conditions which prevent the accomplishment of felicity. The hardness of the task lies, at the outset, in getting a good view of the actual meaning of Felicity.

Felicity is contrast to misery. To many minds no more. A fancy, an invisible breath of some poet who writes what he has never known, and has never expected to know; or a laugh of some cynic who, tired of life and its vanities, declares that

'All things are alike to all,' and that man, with the beasts, neither goes upwards nor downwards, but dies.

To men who, like myself, are engaged for ten to eleven months each year listening to the sorrows which the sick are forced to tell and the healthy are forced to confirm, it would not be difficult to conclude that there is in the human world no such thing as felicity. There was a noted physician I once knew well, who told me at the close of a career of fifty years of active practice, during which few men had seen more of his fellow men or had observed more keenly, that he never had met a perfectly, or, indeed, a comparatively happy human being. His view was not altogether peculiar. The professors of medicine, generally, are felt by many to be stoically indifferent to sorrow as compared with other persons. They are not so at heart, but, knowing the smallness of human felicity, they are less oppressed than others by the extreme and tenderly acute occurrences of sorrow. They read the Book of Wisdom every day from nature, as the Chaldaic writer of it did, and so, in the everlasting presence of nature, become possessed of a demeanour which seems to separate them from the individual life; and as in that presence felicity is not the feature they are most wont to recognise, they give it wings to fly.

PROOFS OF FELICITY.

By the hard and fast scientific mode of looking at the phenomena of Nature, it might seem, then, at first view, that human felicity had no proofs of existence. There are, fortunately, other evidences which give positive proofs in characters as purely scientific as any in the observation of science. Granting that these are exceptional evidences, they are still in proof.

I notice four of these evidences as all sufficient.

1. In perfect childhood, uncrossed by perverse and chilling influences, and blessed by health, felicity exists, not, perchance, universally, but as a rule. I remember some few pages of my own childhood which were filled with an unbounded felicity—a felicity to be remembered, although it cannot be again realized or explained in relation to the precise causes that led to it. I have questioned others on the same point, and although the response was much more frequently in the negative than I expected to find it, and although the inquiry has often laid bare a recollection of misery rather than of felicity, that could not have been anticipated in childhood, it has yielded, certainly, a majority on the affirmative side. The evidence is sufficient to prove the reality of the phenomenon in at least one stage of life.

2. There are, again, men and women who, by some fortunate heredity of constitution, go through long, trying, and eventful careers with perfection of felicity. Dr. Joseph Priestley was one of these fortunates. "I was born," he says, "of a happy disposition." And so this man, through a life of struggle and tempest such as few men have known, was ever in felicity. In his child life he loses his mother. He leaves his home, and is domiciled with an aunt, whose gloomy tenets would drive some natures to the deepest melancholy. He passes through severe changes of thought on solemnest subjects. He becomes a preacher, but, owing to a defect of speech, cannot display an eloquence he knows is in him, and, tossed from pulpit to pulpit, penniless, is forced to teach that he may live. He becomes half friend, half librarian, of a nobleman, by whom he is petted at first, and then, with the capriciousness of power, is turned off, as a once favoured dog might be, without a word of explanation. He makes one of the grandest discoveries of the century, and lives to see the discovery accredited to another man, to whom he communicated it in the most open manner. Suspected of sympathising with children of liberty he becomes, under the instigation of a rival preacher, the victim of a furious mob which burns his house, and all his precious papers and treasures, wishing him heartily the same fate. Escaping to London he is obliged to hide from enmity, and, cruelest cut of all, is disowned by and cast out of the learned society, whose work he has helped to immortalize. At last, driven in his old age, from his native country he goes, forgiving everyone, to a foreign and distant land to die there in perfect peace.

Such changes as these, such oppressions through every stage of life, would kill a multitude of ordinary men. Yet here was one who went through every phase of suffering with felicity. His friends, one and all, bear witness to this fact from their objective side. He personally testifies to the same, and explains the reason: "I was born of a happy disposition."

We gather from such instances as these, rare it is true, but reliable, that in the range of physical life there is a felicity due to heredity; to some combinations of ancestry, which, being repeated, would lead to the birth of an almost new race amongst which, Priestly's own maxim, "the greatest good for the greatest number," would be the common blessing. For, that which has once been born may be born again, and by birth become universal as a progress. If one man can hold felicity in his hand all his life and under all adversities, why not all men?

3. There is a third proof of felicity which comes within the knowledge of the majority of mankind although it is not

universal, for I have known a few who have afforded no evidence of it. This proof consists of the sensation felt, I repeat, by most persons of a sense of peace, tranquillity, and, in a word, felicity, which, in consequence of its abruptness and the sharp contrast between what has gone before, is a cause of extreme surprise. In such moments the actual cares of the world, cares heavy and sorrowful, sit lightly; the impossible, a short time before, becomes the possible or the easy. Dark forebodings which have pressed, almost to despair, pass away and the future is roseate with prospect.

There are few now present who have not experienced this curious change towards felicity. They may say that it is a fleeting change, and that may be true; but the fact is certain. It is also, immeasurably instructive, for, if felicity can be obtained for one day, for one hour, why not for all days, for all hours.

These flashes of felicity are, I have said, sometimes startling from their abruptness. They are at other times equally startling from their intensity, and from the relief they give to the opposite depression, from which they stand out in contrast.

In speaking of this contrast, and of the advent of felicity after extreme depression, the common terms used to express the conditions are singular. The depression is almost invariably described as a physical weight, and felicity as the removal of a weight, which, like a physical burthen, has oppressed the body, and, in extreme instances, has bent it low. "He is bowed down with sorrow" is an expression as true as it is striking. Bunyan seizes on this physical truth. His pilgrim, while yet wanting felicity, is troubled with a burthen which weighs upon his back night and day, felicity coming when that burthen falls from his shoulders. The illusionist has here defined what he himself had felt, and hence the force of a description which every man and woman who has read Bunyan has, with very few exceptions, recognised. Felicity is lightness from burthen. The common folk call it lightness of spirit, light-heartedness, as being lifted up above the common fate of daily oppression and daily sorrow. The terms define the state.

When felicity is most absent, the sense of depression shows itself in other ways which indicate the physical process, and suggest the ponderable nature of something that tells on the body and on the mind. In worst states of depression the faculty of memory is often overburthened with labour of details, long stored up, which are remembered, re-arranged, and re-conjectured upon with painful and accurate precision. The thoughts undulate, and great waves seem to overwhelm another organisation belonging to the man himself, yet lying afar back and obscured by these rolling tides, dark, dense, material, weighty.

With felicity all these waves of deathly pressure pass away. The memory is charged with no recurring scene of sadness. The calculated difficulties do not appear. The organisation which lies in the shade becomes brilliant, and the future hopeful.

These phenomena constitute both by reality and contrast what may be called the full grown subjective proofs of felicity.

4. Lastly, there are certain objective proofs which lookers on may observe if they will notice others, and which as independent evidences are perhaps the most reliable. A good perception of character and, if I may say, diagnosis, leads the looker on to note and know the symptoms of felicity in others, for the symptoms are clear. In the wake of felicity the pulses are regular, tonic, free. The breathing is natural. The eye is bright and clear. The countenance, even in age, is youthful. The appetites are keen but orderly. The judgment is sound and joyous. The muscular bearing is firm, co-ordinate, steady; there is no indication of carrying a load on the back, nor of oppressive sinking exhaustion.

In the above few passages I have sketched out, as far as I dare in the allotted time, the phenomena of the felicity we are now considering. I have entered into no metaphysical subtleties in definition, but have rested on every-day experience, and having thereby, I think, afforded evidence of the fact of felicity, I pass to the thought how to extend this state—a thought which, according to my view, is eminently sanitary and practical.

PHYSICAL CONDITIONS INFLUENCING FELICITY.

To arrive at the true mode of working for this object we cannot do better than survey, in the first place, the conditions under which the phenomena of felicity, and of its opposite depression, or infelicity, are manifested.

Atmospherical Conditions.

By a sort of general impression the weather is believed to exert a peculiar influence for and against the phenomena of felicity. In this view there is undoubted truth. An *increase of the atmospheric pressure and a decrease* is each a cause of felicity. In ascending from valleys to moderate heights there is, up to a certain distance, a distinct effect of the kind. So definite is this action that I know of one person who, under some conditions, feels life is a load too hard to bear, but who, in a dry, bright, mountain region to which resort is often had, throws off the despair altogether, and lives

a new life. In the nicely-adjusted balance of atmospheric pressure against animal circulation of blood, the circulation is relieved by a moderate removal of pressure. But if such removal be too great, if the organs of the body become congested from the removal, as they may be, the spell is broken.

The brightness of mind induced by removal of pressure and freer circulation is, however, bound by other conditions. Dryness must accompany lightness of air to produce the state favourable to felicity.

There may, again, be conditions in which a slight excess of pressure may be conducive to felicity. In regions where the land is low, compared with the sea level, a slight atmospheric pressure may be advantageous. The air is usually drier under pressure, the wind bracing, and the vital organs charged with blood, conditions essentially favourable in low lying districts to the communities that occupy them.

There are *electrical conditions* of the atmosphere during which felicity contrasts strongly and strangely with the depression incident to other conditions. My friend Mr. Hingeston, of Brighton, has very beautifully connected these varying states of atmosphere, from electrical influences, and these varying states of mind with cloudland. He reads in the clouds the outward and visible signs of the mental state. The large white-headed cumuli that collect in clear bright days are rotary storms of hail, rain, or thunder, gyrating from left to right. Several of these gyrating storms keep marching onwards in alternate spaces, marshalled in vast circular array, and rolling round a circumference of bright translucent calm.

On the approach of one of these masses of vapour the mercury of the barometer first falls, and then rises with great rapidity.

The accompanying and residual state of the atmosphere is congenial to health. Now the debilitated experience, favourable reaction, and the mind is serene and happy. The air in these moments is antagonistic to disease. With the breaking up and dissolving of these large cumuli there is electric action, and most likely explosion, as the vapour is condensed into water.

The entire atmosphere changes; everything is dull and grey; the so-called dyspepsia prevails, the acid indigestion of gouty habits, the scrofulous indolent and pitiable host of "never wells."

Thus, continues my friend, the sensorial effects of the electrical fluid are proof paramount of its pathological, physiological energy, and the various forms assumed by the vapours condensing or dissolving in the air,—clouds—may be considered not only as picturesque beauties in the landscape, but also as criteria for judging of some of the most potent effects resulting from

the operation of an experiment, silently and delicately performed upon the functions and sensations of animated beings.

Cold and Heat each play different parts in production and reduction of felicity. A dry and sharp cold, what is called a bracing cold, exerts a gentle pressure on the surface of the body, which fills the nervous centres with blood, and helps to felicity of mind. A long and piercing easterly chilling cold checks circulation, robs heat, and produces even melancholic sadness. A dry genial warmth acts like a bracing cold; a long warmth with moisture checks the vital action, and produces a degree of depression which may be as intense as that which is induced by prolonged exposure to cold.

The seasons of the year which are attended with least exhaustion of the body are those which favour felicity. When the exhaustion of the winter and depressing spring months has been removed by the warmth of a genial summer and autumn, the time is most favourable for serenity of mind. On the other hand, the exhaustion of winter and spring induces depression and is no doubt the cause of that melancholy which renders the months of April, May, and June the maximum periods of death by suicide.

Purity of the atmosphere is an unquestionable aid to felicity. The comparison of children living under differing circumstances is sufficient proof of this fact. Children in an open well-ventilated schoolroom, how different are they from those who are immured in the close over-packed dens which are mis-called schoolrooms. The felicity of the children of the well-to-do who live out of doors, and of the children of the fields and open streets, compared with the felicity of those of the small trader whose back parlour is living room and playground; the felicity of the man or woman who leads an out-door life, compared with the felicity of those who live in the close office or workroom, how entirely different.

Foods, Drinks, Narcotics.

There are still other agencies which bring or which check human felicity, and which are as purely physical in character as those above recorded.

There are substances which taken into the body produce strange contrasts in respect to felicity and depression. Foods well cooked, foods carefully selected, foods supplied in sufficient quantity to sustain the body equably in all its parts, but so moderately as never to oppress the nervous digestive powers, conduce to felicity in the most telling manner. As a rule all agents which stimulate, that is to say, relax the arterial tension

and so allow the blood a freer course through the organs, promote, for a time, felicity, but in the reaction leave depression. The alkaloid in tea, theine, has this effect. It causes a short and slight felicity. It causes, in a large number of persons, a long and severe and even painful sadness. There are many who never know a day of felicity owing to this one destroying cause. In our poorer districts, amongst the poor women of our industrial populations, our spinning, our stocking weaving women, the misery incident to their lot is often doubled by this one agent.

There is another agent more determinate in its effects and contrasts than tea, and that is wine. I am a total abstainer, but I am, I trust, an honest observer also, and I confirm, from direct observation the old saying, that "wine maketh glad the heart of man." If it did this and no more, I should say let the felicity of wine remain to the world. Wine, like the alkaloid in tea, relaxes, lets loose the channels of the blood; gladdens like the ascent of the mountain side; gladdens like the gentle atmospheric pressure which forces more blood on to the internal parts. But, and here alas! is the rub. Carried a little beyond the right mark, the felicity from wine passes into folly, the folly into feebleness, the feebleness into stupor, and the stupor into a depression the reaction from which is the bitterest, the most persistent.

Tobacco is another substance used to produce abeyance of anxiety. Tobacco is said to soothe irritability without stimulation, but it leaves, in many persons, long depression coupled, generally, with an appetite for a renewed indulgence in it, which becomes intense. The confirmed smoker, who can stand out against indirect effects, whose taste for food and whose digestive endurance are little injured, is kept during the whole time he indulges, in the state of suspension. He does not enjoy felicity, but for the time experiences a relief from infelicity. My own experience, on the whole, is opposed to the indulgence, and I tasted it for a long period of my life, as well as observed the effect of it on others. To the aged it gives, I confess, a negative existence, which when the mind is not filled with choice or refined or cultivated pleasures makes time less wearisome. To the man who engages in work of great excitement and of a mental kind it brings a joyless repose. But, on the whole, it is a bad and sometimes a fatally bad indulgence. I have once known a man die directly from the effects, and how many I have seen injured I cannot say, but a large number. Again I have seen many much depressed by it; so that I dare not put it forward, at its best, as a promoter of felicity. The world, I must conclude, would be happier if tobacco were unknown or unemployed.

The habitual use of opium for the obtainment of felicity is of the same erroneous character. The opium smoker, the opium eater, tell us of certain dreams and phantasies which are, for a moment, felicitous wanderings of the mind. I have visited the opium dens to see the effects, and whatever the dream may be, subjectively, it presents to the observer no sign of felicity. The expression of the opium smoker is one of restless and intense anxiety. He looks like a man in a dream of misery. His eyes are joyless, his features contorted, his skin colourless or dark, his pulse slow and labouring, his breathing hard and heavy; and, when from the half struggling consciousness he wakes to reason, the dream he describes is too confused to be accepted as a dream of felicity. Then he falls into dejection which deepens and deepens until the desire to return to the cause of the dejection is too overpowering to be resisted. To opium eating and to the subcutaneous injection of morphia the same description, with some modifications on which I need not dwell, is perfectly applicable. From the use of such an agent as opium there can be no result of human felicity. There could soon be produced by an extension of the use a madder world than now exists, a more miserable; a happier, never!

And this saying, according to my knowledge, extends to all narcotic substances. There are some, like methylic ether and nitrous oxide gas, which produce for the moment infinitely more refined felicity than those I have specifically named, but in the end the results are the same.

CONSTITUTIONAL INFLUENCES.

I have dwelt thus far on influences of a purely physical kind in their relation to felicity. I have put these influences in contrast as affecting the state of felicity, and I have touched on some agencies which are used to produce a mock felicity. I must move from these to a brief consideration of other influences of a different nature which affect us for or against our happy or felicitous existence.

Temperaments and Heredities.

There are some constitutional differences, determined by temperaments, which are of first importance. Of the four primary temperaments, the sanguine, the nervous, the bilious, the lymphatic, and of their relation to felicity, a volume might be written, and I have collected the facts relating to the temperaments of over a thousand persons, towards such a work. I must not here touch, however, on any detail. I must be content to record, as a general fact, that the sanguine is, altogether, the happier temperament, but not always the most sustained as

such; that the dark or bilious is the least happy in early life, but is often, in later life, more serene; that the nervous is a varying condition full of ups and downs; that the lymphatic is, by a negative effect, the most even; that, amongst the twenty-four combinations of temperaments the sanguine lymphatic is the most felicitous in respect to physical pleasures; and the bilious sanguine and the bilious lymphatic in respect to intellectual; that the nervous sanguine is the most irritable; and the nervous lymphatic the most helpless and miserable.

The moral influences and impressions affecting these natures are, from first to last, potent for good or for evil. In childhood the future history of the felicitous or infelicitous after-life is usually written. A few, born, like Dr. Priestly, of a happy disposition, fight through all adversity, filled with a magic soul of felicity, but they are very few and are commonly, though I dare not, in the face of natural truth, say, always good. They, even in childhood, are not affected as others are. In the schoolroom as in the playground they are comparatively happy.

As a rule, the tendency to felicity or its opposite is planted in childhood. The parent, the schoolmaster, the schoolmistress hold the book not of learning simply but of fate. To the imitative mind of the young, absorbing all that the senses can carry to it and the nervous centres can retain, the character of the presiding mind, ever present with joy or sorrow, justice or injustice, love or hate, cruelty or mercy as its qualities, is the beginning of the end.

Let me, as bearing on these matters of thought, not diverge from, but converge to, our present study, by a reference to the position of felicity as a physiological quality in life.

Of the two living natures with which man is endowed, and which distinguish him from the lower creation,—the pure animal and the pure intellectual natures,—felicity belongs to the animal nature. An intellectuality that would separate man from the animal would leave him beyond either felicity or infelicity.

Felicity, in fact, is not an intellectual quality, it is not centred in the brain. It is not a quality which a man can think himself into, or reason himself into, or directly will himself into. It is like the beating of his heart and the circulation of his blood, a vital process going on independently of his volition. He can by rude process destroy it for himself as he can for others. He can kill it for himself as he can stop the motion of his blood by stabbing himself to the heart, but still the quality is so independent of himself that he is often forced to be in felicity by things and acts and circumstances which his reason scorns. "Why does this fool of a book make me happy," said

a hard and suffering and miserable patient once to me as he pitched his "Pickwick" to the foot of the bed. "Yet it is the only thing that does, while all the time I know that such a set of asses as these Pickwickians could never, possibly, have existed."

By experience of what seems to increase felicity to lighten misery, to make misery, we often confound felicity and sorrow with intellect. This is merely our own external looking upon external manifestations of internal phenomena which we know we cannot influence in the same way as we can teach a lesson or convey a fact, but which we strive to control because we think we must do something, even for the uncontrollable.

Felicity and Infelicity are not intellectual faculties, neither are they passions, neither have they any direct relationship to physical pain. They are distinct from intellect, passion, physical pain. They are the only true emotions. The man who is destitute altogether of felicity is not, of necessity, intellectual, passionate, destitute of passion, or more or less sensitive to pain than anyone else. The most intellectual may be the most miserable; the most silly and inconsequent may be the most blest with felicity. The worst instance of extreme, I may truly say harrowing misery, I ever knew was in one whose clearness and calmness of judgment was a subject of general admiration, but who had never, he told me, known in all his life an hour of felicity. The man most replete with felicity I ever knew was one endowed with no intellectual supremacy at all, and who was all through a long life a veritable child.

The centre of the emotion of felicity is not in the brain. The centre is in the vital nervous system, in the great ganglia of the sympathetic, lying not in the cerebro-spinal cavities, but in the cavities of the body itself, near the stomach and on the heart. We know where the glow which indicates felicity is felt; our poets have ever described it with perfect truthfulness as in the breast. It comes as a fire kindling there: no living being ever felt happy in the head: everybody who has felt felicity has felt it as from within the body. We know, again, where the depression of misery is located; our physicians of all time have defined that, and have named the disease of misery from its local seat. The man who is always miserable is a "hypochondriac;" his affection is seated under the lower ribs. No man ever felt misery in the head. Every man who has felt misery knows that it springs from the body, speaks of it as an exhaustion, a sinking there. He is broken-hearted; he is failing at the centre of life; he is bent down because of the central failure, and his own shoulders, too heavy to be borne, feel as if oppressed by an added weight or burthen, under which he bends as though all the cares of the world were upon him to bear him down.

HABITUAL, SENSATIONAL AND MORAL INFLUENCES.

There are numerous influences which, in an indirect way, tell upon felicity, for it or against it, as distinctly as those grosser agencies of which I spoke in the earlier part of this section of my lecture. To these I would now invite attention.

The influences to which I am about to refer are, in reality, purely physical in their action, although they are commonly known as habitual, sensational, moral, or mental influences.

I notice, in the first place, that felicity is always favoured by sufficiency of *rest and sleep*. Bad sleepers know no felicity; but they who in childhood and old age sleep ten hours, in adolescence nine, and in full age eight hours, out of the twenty-four, and that soundly, are mostly well favoured with felicity. They may be exposed to causes which are opposed to felicity, but even then the causes are feebler in action than they otherwise would be. I put sleep in the first place as an aid to felicity because it comes first. I have no knowledge of any instance in which a person who slept well was altogether devoid of felicity. The beneficent action of sleep is, however, indirect. It is due to the physical and mental strength which it confers on its favoured child.

Strength of body secures felicity. Persons comparatively weak of mind may, with a good physique, be happy; but very few who are weak of body have any long tastes of felicity. We may take it all round that the feeble of all ages are unhappy. It is a matter of common observation that persons who are so unfortunate as to be born deformed of body, though the defect be concealed or hidden, are not blessed with felicity. It need not be the deformity that causes the infelicity, for the deformity may be concealed; the bad health is the rooted cause. Let the defect be from accident happening to a body born of good stamina, and felicity may be the same as in others, despite the acquired defect.

Any sign of inherited weakness is an equal sign of lessened felicity, though it be marked by no physical defect. It has been long observed by physicians that persons who from early life show very large and prominent veins and thereby a languid circulation of the blood are never happy, while those of well-knit body are. The observation is true as steel. We physicians know that a sluggish circulation is incompatible with felicity, and that they who show this indication, by such local diseases as hæmorrhoids for example, are amongst the most depressed of those who consult us. We say of them that they suffer from arrested circulation through the liver, and, doubtless, such arrest is depressing; but the arrest means physical exhaustion,

and physical exhaustion is the root of the evil. When the circulation is sluggish the liver is sluggish, and the brain is sluggish and the nervous centres are depressed. In a sentence, whatever prevents physical exhaustion and sustains physical strength sustains felicity, whatever exhausts sustains infelicity.

When the sun of life is high
All is bright.
When the sun of life is low
All is night.
Thus we laugh and thus we sigh,
Light and shade where'er we go.

Physical work, when it is carried short of exhaustion, keeps up felicity, and sloth destroys it. But the physical work that exhausts kills felicity. The argument extends to *mental work*. Moderate, wholesome, mental work is the best of all aids to felicity next to sleep; it strengthens the mind, it softens grief, it lessens care. Carried to excess it is pernicious and destroys all felicity. Cowper, the poet, was wont to say that no labour is so wearing as composition, and few men possibly felt more unhappiness as the result of mental exhaustion than he. But his was the fate of all who force the brain to daily or nightly repeated weariness.

The influences derivable from sleep and bodily power are purely physical influences, but there are others called *sensational*, which, through the physical power, have a potent effect for or against felicity. The sense of hearing has the most intimate connection with the vital or animal nervous system. The auditory nerve, as Dr. Bucke has shown, possesses many of the characteristics of an organic or sympathetic nerve, and we all know how many external vibrations which reach the ear, affect the digestive system, producing sense of warmth in the body, appetite for food and feeling of felicity; or, on the other hand, setting the teeth on edge, destroying appetite, and giving rise to gloom. Thus things told affect quickly, often permanently, for good or bad. The sense of sight influences also, but less intensely, and after a different manner. Sights gladden or dazzle, or pall, or sicken.

Not to extend an argument, which admits of any extension, the senses as doors and windows through which influences vibrate into the animal organization, can scarcely be touched by external phenomena without conveying some influence that shall make or disturb, or prevent felicity. When they convey beauty in sound or picture: when they convey variety; when they convey cheerfulness of act, and manner, and voice, and feeling; when they convey to the soul the idea or story of generosity, of

courage, of purity of life and character, of prosperity; then they convey felicity, which passing through the brain on its way, finds its seat in the vital centres on and near the heart.

With Felicity as a sanitary research for my theme, I have striven so far to indicate what may be called the physiological bearings of the subject. I have endeavoured to show that felicity is something that is of hereditary quality; that it is something made or not made by external agencies over which we have little control: that it is something made or not made by many agencies, which we have directly under our control.

In these respects felicity stands precisely in the same position as health; in the widest sense it means health, is another word for health. Health is born, and is made and unmade by external agencies which as yet are out of human control. Health is made and unmade by numerous influences which are under human control. Felicity, similarly influenced, depends on the good working of the animal or organic systems of life.

I could enter here into one of the most absorbing questions relating to the connections which exist between the lower and the higher human faculties. I could indicate how the lower and higher nervous centres, charged during life with a subtle ethereal medium, communicate with each other and with the outer universe, and how, by the states of this refined intercommunicating bond or sphere, both health and felicity are moved by external pressures, by external vibrations, by external agents taken into the living organism, by products generated within the organism and diffused through its own atmosphere. But I leave this inviting subject for a more immediately practical application of the few minutes which remain for discourse, viz. :—

PRACTICAL DESIGN FOR FUTURE WORK.

Over those atmospherical causes which have been noticed as influencing felicity, we can exercise as yet no direct action. At the same time, just as we can now divert the lightning from its fatal course, we can indirectly effect good. We can prevent, as far as our teaching is effective, the erection of human habitations in dank and humid places, below the sea level, or in dry and arid spots. We can protest, and if we are clear and reasonable in our demands we can successfully protest, against the construction of new towns on melancholic foundations, and can explain the choicest places for felicitous existence in so far as foundation is concerned.

A Report from such an Institution as ours, or from any learned

sanitarian, on this one subject, addressed to those children of enterprise who are colonizing the worlds that are to come, would affect, if it took root at all, all the generations of the men to come in those new regions, and to a large extent the felicity of the whole future human family. In Africa at this moment the seed of new life that is being sown will, largely, be seed of felicity or seed of sorrow, according to the selection of the sites on which the new and great centres of life are constructed.

Nay, in this direction man himself may divert the operations of nature herself. He may change her surfaces as he cuts down her forests, or plants new forests, or alters the courses of rivers, or makes new courses, or fills up valleys, or lowers or raises mountains, or connects or disconnects oceans. With the mastery of the surface of the planet in his power, man may, in fact, make what regions he pleases for good or for evil.

The Earth is the Freehold of Man.

If the natural air which man makes not and invented not may be to a large extent utilized for felicity, how much more easy is it for him to remove the unnatural which he himself makes, so that instant advantage of what is provided for good may be rendered serviceable?

Here our voices should be heard in a tone not to be mistaken. We shut up our young in closest rooms of close towns; we shut up our men and women by the millions in close shops and factories. Some one million of us in these islands who call ourselves, with ignorant irony, the ruling classes, shut up some twenty-five millions of the people with their wives and children in walled up atmospheres, where atmospheric purity is unknown, where cold and heat oppress, where food is what can be got, where drink is what can supply a false facility for a certain sorrow, where marriages re-establish misery, where good sleep is impossible, where physical strength is so impaired that a perfect body is not to be found, where exhaustion from work is the daily cross, where things and objects of beauty are rare as angels' visits, where in the selfish race to barely live generosity is impossible, where in compressed homes purity of mind is a thing the purest can scarcely maintain, where variety is replaced by the dead monotony of unchanging sounds for the ear to hear and scenes for the eye to see, where fear dominates over courage, where hope has no chance, where prosperity is so little known that the worn-out life has no expectation this side of the grave, and where death is so busy that three die to one of the more favoured communities. We, one million, I repeat, shut up our twenty-five millions under these conditions, and wonder why those millions know nothing of felicity; why

they are pceevish, reckless, melancholy, sometimes drunken, sometimes rebellious and ready to run after any leader who shall promise to lead them into a happier sphere, however little removed from that in which they are. Wonder! the wonder is how human nature can bear such a famine of felicity and live as if it only lived to die.

To give the boon Felicity to these masses, we, not as revolutionaries, but as laborious workers for them and the thing most wanted, have, I trust, come into existence not in vain.

It is better for this work that we should be as we are—men of science rather than men of politics. We are, then, in the first and true place. We are educating politics as well as men by what we teach, an education which, in the present dense state of political darkness, is the noblest work we can possibly execute, until those who rule understand common human nature.

In the direction of education the sanitarian teacher should, I think, begin to study this psychological side of humanity; what human nature can and cannot bear; how much pressure can safely be put on humanity without danger of explosion; how much felicity can be secured by removing that danger.

Beyond the task of inculcating what are the necessities calling for pure atmospheres within and without the body, we can, most appropriately, explain what agents taken into the body are for felicity. We can teach what temperance in all things effects in this direction. We can use our earnest will in declaring for abstinence, where nothing but abstinence is the safe line of conduct. We can denounce every indulgence that undermines and mocks and destroys the blessing. We can insist on cleanliness; cleanliness of body, cleanliness of mind. We can show how flowers and plants grow for health as well as beauty, and why, for both health and beauty they must join the home circle if felicity is to enter it.

These are all sanitary questions, and they all, as one, bear on felicity.

We may educate again in another direction. It has been shown that some exceptional men are born of a happy disposition; and it might have been shown, on the clearest evidence, that multitudes are born of an unhappy, nay, miserable disposition. We could easily by our researches describe what are the lines of heredity for the happy and for the unhappy dispositions. We could, with this discovery in our hand, with certainty of being listened to and attended to, impress on the people the truth that marriages ought neither to be matters of chance nor matters of mere monetary convenience, nor, indeed,

matters of mere insane, so-called, love; but that the marriage tie, extending its influence into the future, and being no bond and seal of diseased heredities, should be the bond and seal of a healthier and happier racial progress in every succeeding generation. Now that our women are, by good fortune as well as good policy, made legally masters of their own property, this sanitary question, involved in marriage, was never so likely to be one of scientific value as it is at this moment, and as it will be in coming days.

We can teach forcibly and faithfully on a different topic regarding which we have a large amount of information collected. We can adopt and urge with all our power our veteran Chadwick's advice to those who are wanting to instruct the young, that it is the perfection of prudence first to live, then to learn. We can insist that, inasmuch as felicity is impossible under mental strain, it is fatal work to press on the young mind the excessive labour which is now in all departments making cram, cram, cram, the footing for knowledge. We can also tell the adult man struggling for the bubble reputation that broken sleep, and disturbed brain, and wearied muscle, and labouring heart, can never exist with felicity: that *sanitas* and *vanitas*, separated by one letter only, are as the poles, apart from each other; and that, *sanitas sanitatis, omnia sanitas* will never be established until, *vanitas vanitatis, omnia vanitas*, is blotted out.

We can instil yet one other lesson, last but not the least, into those foolishlest of the foolish of the world who think that riches and idleness and power are synonymous with felicity. We can tell these that we who have read the human heart, who have learned by closest observation of fact the lives of men, that no success, no wealth, no power, gained by torture of effort for it, ever brings felicity, and that the Horatian verse:—

“He who would hold the golden mean
And live contentedly, between
The poor man and the great,
Ne'er feels the wants that pinch the poor,
Nor plagues that haunt the rich man's door,
Embittering all his state.”

is as true in these days as it was in the days of the philosopher who wrote it.

Felicity as a Sanitary Research.—With all respectful thought I leave it on your memories. You may perchance think of

the idea as an enthusiasm, a vision. Never mind, so long as you think of it. It will grow upon you as a study, and grow from you as a project if it once take root. It will strike you, in time, as the *summum bonum* of sanitary labour; a re-echo of the divine declaration, "On earth peace and goodwill towards men."

The CHAIRMAN: You will agree with me, I think, that I was right when I said that Dr. Richardson would throw light upon many dark corners, and that he would teach us, as he has taught us, many and varied things. We have learned, in the first place, that happiness is very closely allied to the stomach; of that, I think, there is no doubt. In short, I am sometimes in the habit of saying that the circle of life is small, that we live to eat and eat to live. But Dr. Richardson has told us the more important thing that felicity greatly consists in the making of others happy, that the highest and purest and most enduring of all felicity is that in which we promote happiness in others, and that we do this most effectually, most surely, most permanently, by promoting health in their bodies. Certainly health is the great essential to happiness. Where there is health there is commonly happiness, and where there is no health there is no happiness; and as we, especially we of the medical profession, pass along life we often see a person living surrounded with all luxuries—a beautiful house and beautiful surroundings—and not happy, because he is not well. Dr. Richardson has told us that happiness is hereditary. We learn that man is born to *sorrow* as the sparks fly upwards; but I think that statement might be reversed. I believe truly that man is born to *happiness* as the sparks fly upwards and that happiness is the prevailing element of human life. No one can walk through the streets of Glasgow—through the main streets, with men hurrying and bustling about, through the narrow alleys, where little shoeless children are playing about—without feeling that they are for the most part happy, that happiness, after all, is prevailing among them. And I think we are born to happiness from two great qualities in our nature. The first is our remarkable adaptivity. We adapt ourselves to almost any conditions and any circumstances of life. Even the things which seem at first to be most disagreeable and most repugnant to us, we at last take to and enjoy, and cannot think of parting from them. The little dull alley, the little close house, the little dull, miserable room, become the centres and sources of happiness to the individual who has for some time dwelt in them; and, secondly, we are so constituted that the disagreeable and painful events of life leave less abiding impressions than those which are agreeable and joyous; so that the balance derived from memory is, in this respect, in our favour. Thus, I think we may take a broader view of human life than we are in the habit of doing, and that we may look upon our fellow men with the satisfaction of feeling that after all they are happy. Dr. Richardson has rubbed many of us the

wrong way. He has told us of the evils of alcohol, of the evils of tobacco, and of the evils of tea, and he has told us of the evils of love. I am bound to say that I think that without tea, without tobacco, without alcohol, and without love we should have but a dull life of it. I doubt very much, on the whole, if felicity would be greatly increased by the loss of all these, if indeed it would be by the loss of any of them. I wonder whether Dr. Richardson has lived without them all. I suspect that such a jolly-looking man as he, has had a certain share of them all. At any rate we wish him a long life and felicity, and I move a vote of thanks to him for his eloquent and varied and instructive lecture.

The LORD PROVOST: In the Town Council of Glasgow when any motion is made and is not opposed it is held not to require a seconder. I do not think that this motion which the chairman in such eloquent terms has proposed is likely to be opposed. Still as it has been your practice to have the motion seconded, I have the greatest pleasure in doing so. I think we may take some profit from Dr. Richardson's lecture, notwithstanding some inaccuracies which the chairman has discovered. It appeared to me as the doctor proceeded, that the practical issue of the whole might be that this Sanitary Institute might be asked to point to those situations on the earth's surface which we considered most suitable for our future towns to be built on. But it occurs to me that we might with advantage be asked to go a little farther than that, and advise how the towns should be built. I have seen, from this evening's newspapers, that a new doctrine to sanitarians has from this platform been enunciated to-day. We have been told that aggregating our population is not to increase our death-rate. My reading and experience is altogether contrary to that. I have found that in those districts of our great towns where the population was closely packed together, we had invariably a high death-rate. Indeed I cannot conceive that when the breathing space which each man needs, is curtailed by placing half-a-dozen men where only one should be, can be a good thing for any one of the half-dozen. Now we have been told to-day that it is rather an advantage to the community to have four flatted houses instead of one. It has been stated here that it is possible to have upon a square acre of ground upwards of one thousand people living in health. But I very much doubt that. I admit that with your model dwellings in London you may so pack the people, but you must at the same time see that they are a model people you are dealing with, that there is no drunkenness permitted there—nothing to disturb the equanimity of life—that all things are moving in perfect regularity. Under these conditions you may have a good deal of health, even when packed so close as that. But where you have people packed at the rate of one thousand on the acre you must have an enormous surrounding of open space. In none of our Scotch towns have we that open space. We have (I think most unfortunately) got into the system of having our dwellings in flats, and with the greatest bitterness of sorrow I now see the same system springing up in some of your towns in the

south. Depend upon it you are committing an enormous mistake. The cottage system of dwellings that you have hitherto had in England is without doubt the right one, both from a moral and from the physical point of view. We know the evils of the flatted system here, and so I earnestly hope that you in the south may take warning in time before you proceed any further. Well, ladies and gentlemen, I daresay if I had been speaking in our Town Council I would have been called to order as having departed somewhat from the subject. But you will observe that if my suggestion is to be taken of pointing out sites for our future towns, and giving instructions to the building regulations, my remarks are not in that view inappropriate. Coming back now to the object of my rising, I second, most heartily, the vote of thanks to Dr. Richardson, which with so much grace has been moved by our chairman.

Dr. RICHARDSON: I am indebted to you for the kind way in which you have received the resolution proposed by Professor Humphry and seconded by the Lord Provost. I should say with reference to a letter I have received from Mr. Chadwick, who is the great representative of sanitary science in this country, that there is a bit of curious history connected with this lecture. I sent him a proof, and he has sent me a letter, in which he states that with Bentham, who is the author of the word "utilitarianism," he was half a century ago discussing the propriety of that term. Mr. Chadwick suggested "felicitarianism" as a better word than utilitarianism, and so he adds, "You have by a happy thought come again upon the old track. I should like to see that word introduced instead of the other. Bentham seemed inclined at first to change the word; but afterwards went back to 'utilitarianism.' Infelicitarianism is the rule of ignorance, and felicitarianism is the rule of science." I am prepared to stand by what I said. I have no doubt that if drink and tobacco were removed we would be happier. But I conceded much when I said they have their effects—they give temporary felicity. It is only when considering the subject from a broad point of view that we see that for our real felicity we would be better without them. With regard to tobacco, I think my statement is fairly proved, for our young women and children are happier than the men who smoke. With respect to wine, we may all come to the conclusion that the disadvantages and miseries more than counterbalance any of that brief and temporary joy which everybody declares he experiences when he takes wine in moderation. I do not retract what I said with regard to tea. I do not think it is fitted to promote happiness. It makes many miserable. As to love, I only said "insane love." I admired the cleverness with which the learned President left out that word. I think you will see, when you read my lecture, that as leading towards the development of the purest and most perfect love the essay was written. I only protested against the insane love which leads young people to contract foolish marriages. You will all agree that is a kind of love which is better left out of court.

PUBLIC HEALTH A WORKING MAN'S QUESTION.

ADDRESS TO THE WORKING CLASSES.

BY ALFRED CARPENTER, M.D. Lond., C.S.S. Camb.

MY LORD PROVOST, Ladies and Gentlemen, men and women of Glasgow, I must say a word upon that Report* which has been read, if you please. I wish you to understand very specially the position that the judges occupy in connection with this exhibition. Those judges are competent men, men of the highest position in their different professional ranks; they have given their services to the work that they have taken in hand, without fee or reward, and they are only inspired by an honest desire to do their duty. It has been supposed that in exhibitions of the kind which have just been held by the Institute—which have also been held in different parts of the country—the judges, as a matter of course, have given their awards, whether the subjects have been worthy of the medal or the certificate, or not, but I can assure you that so far as this exhibition is concerned, and any other exhibition which has been held by the Sanitary Institute, if there is an award given it is richly and properly deserved.

Having made those observations with regard to the judges, perhaps you will allow me to make a remark or two with regard to myself.

I appear before you as chairman of the Council of the Sanitary Institute. I am not the great Dr. Carpenter who is the philosopher and physiologist, but I am the Dr. Carpenter who is only the family doctor, and who has been a working man all his life, with regard to and in connection with the prevention and the cure of disease. I am the Dr. Carpenter who has been before the electors as a member of a civic council in a certain part of Great Britain, where sanitary science has been specially and practically studied. One of the results of the action of that sanitary authority has been to reduce the death-rate of the district in which I reside from 28 to 17.

* Report of the Judges, see page 394.

Now, you know there are sanitarians and sanitarians. There are a great number of men who have come before the public as sanitary authorities, but let me tell you that sanitary science is one of the most intricate sciences that is possible to follow, because it requires deep study and very great care in coming to conclusions, and still greater care in acting upon those conclusions. If a man follows that science carefully, and with a conscientious desire to do what is right with regard to the people to whom those sanitary laws are to be applied, you may depend upon it that it cannot be done by any royal road. I wish you to understand that point very specially, he can no more at once blossom out into a sanitary authority, than a man acting as a pilot upon one of your steamers can the first time he takes charge of a vessel without previous study of the chart, keep that vessel in safe channel, because he would certainly put her upon the rocks, and cause her to be wrecked.

Now, a statement is frequently made that sanitary science has nothing particularly to do with the working man. I want to show you—and I think, before I have finished, I shall have shown you very conclusively—that it is in a great measure a working man's question; that he has more interest in the health of a given district than any other class of people who live in it. It does affect him excessively. It is a serious question to him whether the health of that district is good or bad. The rich man, the professional man, and the merchant can take their wives and family to the coast or into the country if any epidemic visits the city. At this particular season the Glasgow professional man generally sends away his wife and family to different parts of the country, and the working man is left. The poor man must reside near his work, he must keep to his work or else he will lose it altogether. I draw your attention to what the Lord Provost has explained with regard to professional men and merchants; they can get away from the city and take their wives and families with them, but the working men must remain in it, and, therefore, it is very important for you who are the working men of the city that the health of Glasgow shall be of the very first character, instead, as it has been in the past, namely, that of being one of the most unhealthy cities in the kingdom.

Let me now take you for a moment or two to the era before 1832. You know the cholera was then upon you, and you suffered seriously from it. Still more so in 1848, I recollect that very well, because at that time I was deprived of the advantage of listening to the lectures of my worthy master—Richard Grainger—for he was down in Glasgow, studying the nature of cholera under which you were then labouring. I have the greatest regard for Glasgow, because when Richard

Grainger came back from the city, and brought to our hospital some of the evidences of cholera, and the results of his labours, and showed us as students that we need not be afraid of it, that it was a disease which would not have arisen if the sanitary conditions had been what they ought to be; and he further showed us that it was more preferable to prevent disease than to cure it—that it was far better to prevent the onset of an epidemic than to quell it after it had arisen.

You know that you had the epidemic again in 1854, and the result of that epidemic with other causes was to overcome the incubus of a mistaken economy in your town council, the cry of expense, and to lead to the introduction into Glasgow of your Loch Katrine water, which is now the envy and the desire of other places. Is Glasgow any the worse for the one million pounds that were expended to bring Loch Katrine into your midst? Has it not been a tower of strength to the people of Glasgow? Has it not helped to increase your trade? Has it not helped to increase the prosperity of the place to a much larger extent than is represented by the expenditure which was required to bring the water? may we not look back to some extent, and give some heed to the different kinds of statements which were made by certain parties in Glasgow, when it was proposed to bring that water into your midst? These same parties, or their successors, are now the great opponents of sanitary works of every kind.

While I am upon this question, I want to tell you a little experience of my own, and I want to apply it in another way if you will allow me to be a little personal. In the district in which I reside we had great difficulties with our water supply. We had an intermittent supply, imperfect fittings, and, in short, we had a condition of things which was most unsatisfactory to those who had paid any attention to sanitary subjects. I was chairman of the Water Committee, and I had impressed upon my colleagues in the Council, that whilst our fittings were of the kind that existed, whilst we had the water supply as it was, we were in the greatest danger, we were liable to the incidents of disease of a severe character, and I, for one, was very unwilling to rest under that incubus, I persuaded my committee to agree to recommend certain alterations in the fittings, but at that time it happened that my term of office expired, and I was again before the electors. Well, what happened? The owners of property went amongst the electors in that district and said to them, "Mind, if you vote for Carpenter, and those alterations are carried out which he suggests, we shall be obliged to raise your rents." Now here was a stinging observation, addressed to the working men and the others occupying the small proper-

ties in Croydon, and especially to the tradesmen. They voted against me, and instead of being at the top of the poll, as I generally had been in previous elections, I found myself at the bottom.

Well, I was out of the Council, and my successor in the chairmanship of the Water Committee said, "Now see what a mess we have made in following that fellow's directions. We cannot go on in these lines, the public is against us; we must continue in our old plans." They did go back to the old plans, and the result of continuing them was the continuance of fever and other illness, occasionally to a serious extent. Well, the year did not pass over before the gentleman who had been put into the Council in my place departed this life, and there was a vacancy. I was requested to fill that, but I declined. I said, no; when the electors want me they shall put me on the Council of their own free will again. It happened that at the following election I was returned again upon the Council, and I then endeavoured to get the condition of things altered. That—the condition of the water-supply—was to me a very serious trouble. Well, it required time—it required a great deal more time and expense than would have been the case if they had carried out the resolutions that had already been agreed to. Before it could be done, I had to convince two or three members of the Council that public opinion was not against them, because, while public opinion was not in favour of getting the water-supply into a satisfactory condition, they were not willing to go in the way in which I wanted them for fear of losing their seats. Well, things got worse with regard to the point of health, and eventually I took the liberty of suggesting to the Council, amid a storm of indignant protests, that we were in the midst of an epidemic of fever, and that the character of the fittings connected with the water-supply was at the bottom of it, and I predicted at least a thousand cases. Before very long one thousand cases had occurred in that district. I was accused of being an alarmist, and doing serious injury to the town and to the trade—a vote of censure was moved against me in the Council by the Chairman of the Water Committee—you know how they treat people like me, I need not tell you. Instead of 1,000 cases of fever the number soon run up to 1260 cases, and there were 78 deaths.

It was then that the Council came round to my views and thinking, and altered the character of the water fittings, and did put on that four or five pounds per house of expense that was absolutely necessary, and they had to do it during its continuance, and after the epidemic had subsided, and which, if they had done when I first proposed it, would have been prevented, and very valuable lives would have been saved.

What was the case with regard to that epidemic? It did not affect the poor. It was amongst the rich, the so-called respectable classes that nearly all those cases of fever occurred. When the voting papers went out for the election of members upon the Council, they were returned by those people unsigned. They would not take the trouble to do their duty as citizens, and left me out in the cold. The result was undoubtedly the great increase of that epidemic of typhoid fever to which I have alluded. Well, I have spoken of typhoid fever in connection with water supply, but there are other ways in which the health of the people is affected, and its result is shown in what are called the death-rates of a district. Now, do you know what death-rates mean? It is said that so many persons in every thousand living in the district die in the course of the year. For instance, there are times in which Glasgow has had a death-rate of 36, 35, 33 and 32, these numbers being multiplied by so many as there are thousands, according to the number of the population; happily last year it was only 25 or 26. Well, there are places in Glasgow where, according to the reports of your officials, the mortality has been 50 and 60 per thousand in the course of the year. Do you know what that death-rate means? It does not mean simply that so many people have died: for every one who has died 20 have been laid upon their backs with sickness in the course of the year. For every one who has died in a healthy district—I take my own district—there have been two, on an average, on a bed of sickness every day throughout the whole year. Now, if you will only consider that point you will see that the bearing of the death-rate of a district has immense influence upon the prosperity of working men. If you have a mortality of 36 in the thousand that means 72 persons in that thousand on a bed of sickness every day during the whole year. But if you reduce that death-rate, as you have done in Glasgow, from 36, you will see what an enormous saving there has been to the working men of Glasgow by the introduction of that grand water supply into your midst, and by the various measures that are being carried out by your municipal authorities for the purification of your city. The question of how many deaths have taken place is one thing, but the question of how much sickness, how much suffering, how much infelicity there has been amongst the people, is something very much larger than that which has been proved by the death-rate. Now taking the annual average of seven days' sickness for a working man—and I will tell you how I get my average—it is from a study of the great benefit societies, like the Oddfellows and Foresters—societies which have branches in Glasgow as well as in all other

parts of the kingdom, you will see its bearing upon your welfare and your pocket.

In my own district, from examination of their returns, I find that every member in a benefit society, on the average, suffers seven days' sickness, and draws seven days' sick pay every year. I do not know what the average is in Glasgow, but I combine that seven days' sickness with a death-rate of 16. Now there is a district that I have been inquiring into, containing a certain manufactory which is reported to be of an unhealthy character—where the workmen are thought by outsiders to be following an unhealthy trade. Now that factory has a benefit society of its own. All the members, or, at least, all who like—it is not compulsory—pay into the sick fund, which is managed by themselves, totally independent of the proprietors of the mills. They pay sixpence per week to this sick fund, and at the end of the year they divide amongst themselves what surplus is left. Now, they belong to this sick fund whether they are in other clubs or not, but this has happened with regard to that club, for I have examined the accounts as they have been prepared for their own purposes. They had nothing to do with the object I had in view in making an examination, and therefore they are honest and straightforward accounts of the amount of sickness that those members suffered from. Well, I find that in that club and in that factory, which I am bound to say is managed on strictly sanitary principals, the amount of sick pay that has been paid during the last two and a half years has only been three and a half days per annum per member. Now, just recollect the saving to the working man in the year from not being laid upon his back and drawing sick pay. Instead of seven days sickness, as is the case in all other parts of our district, he has only three and a half days, on the average, for the last two and a half years. Is not that a saving to the working man? Is it not a saving to his wife and family because he has not suffered sickness? I believe, in a corresponding way, his wife and family have been saved in a similar proportion. Yet we are told that the question of public health and the consideration of death-rates has no interest for the working men? I tell you it is the most important question that they can possibly consider. Now, recollect, take the seven days I have mentioned as the average in London, and reduce it to six, or raise it to eight or nine, as probably nearer the case in Glasgow, what is the result? Say there are 50,000 members in the benefit societies in Glasgow and neighbourhood, put this at seven days' sickness and you have 350,000 days' sickness which the members of the societies draw pay for. Make the condition

of the district healthy and you may reduce that by the simple fall of one per 1000 in the death-rate—from 26 to 25 or 24 in the thousand, and you will save to these working men 100,000 days of sick pay, and you will give them the wages they are earning for their work in its place. Is not that a question of the greatest importance to the working men to consider, rather than to consider paltry things that are so frequently put before you, and that this or that expenditure, which is made for the purpose of promoting public health, is adding to the local rates? When a man, therefore, comes before you for the purpose of representing you, and talks to you about the high salaries paid to your sanitary officials, or talks about the great expenditure made in cleansing, and says he is anxious to go into the Council to keep down the rates, and to serve your interests, do not vote for that man; depend upon it, he is not the working man's friend. That is not the man to represent your interest in the Council; the man who does that has his own interest to serve, and not the interests of his fellow-men, and the objection to the officials arises from the latter doing their duty on your behalf, and making a shoe pinch which you do not see.

We heard the other night a great deal from Dr. Richardson about the felicity of sanitation. Now, we know very well that these hundred thousand days of sickness are not days of felicity. Reduce your death-rate by two in the thousand, and see the amount of felicity that you add to your people. Why should the working man from the north of Scotland, where the death-rate is only 17 in the thousand, come into Glasgow where it is 25 or 26, and strike out ten years of his life? Why should he destroy one-third of his family by going to reside in Glasgow, if he remained in the north of Scotland, or in the neighbourhood of London he might keep them with him? Why should a man and his family, going into a certain town where there is only a death-rate of 13 or 15 per thousand, have so many years added to their lives, whilst so many are taken from them if they come to Glasgow? I am not speaking in any kind of condemnation of the Glasgow authorities, because they have done their duty wonderfully in connection with this great city. They have had most superhuman work to perform, and these they have performed remarkably well, inasmuch as they have reduced the death-rate from 35 or 36 to what it is now. Therefore, I say all honour to these men. We want you to give them good God speed upon their journey, and encouragement so that they should not rest contented until they have brought that death-rate down to what it is in London. I think the men of this metropolis of commerce have a desire to beat London. I think, if I am not mistaken, they have not

only the desire, but with your assistance, they have also the power to beat London, because you have advantages which London does not possess. Now, I wish just to refer to some of these causes which are said to increase your mortality. I recollect being here in 1874, and hearing a paper read, I think by Bailie Morrison, in which he stated different causes for the high mortality in Glasgow. It was much higher then than it is now. He said that character and occupation had something to do with mortality. Well, it might have something to do with it under the circumstances which then existed, but it was not necessary. Character and occupation are not reasons at all for a high mortality. Take poverty, for instance. Recall, as I do, the time of the cotton famine. There was no healthier period in the cotton districts than during that time. Why was it that the poverty of the people was accompanied by a far better state of health than when they were in the full flush of work? Why is it that plenty of work, plenty of wages, gives rise to a higher mortality? I am telling you that which is a positive fact. It is a very serious thing to reflect that the more prosperous Glasgow is, *pari passu*, the higher is the mortality amongst you. Character may have something to do with it, but men are not vicious and diseased from choice. They are not accustomed to go wrong simply because they prefer that kind of way. You may depend upon it, it is more frequently than not, that those who go wrong are more to be pitied than blamed. I speak of the poor uneducated portion of the population. They are far more to be pitied than blamed when they do go wrong, because the local conditions very frequently prevent them from going right.

I have been reading the Glasgow papers, and I have heard something of the lawlessness in the Sixth Ward. I suspect that if I were to make some examination of that Ward, I should find out that the lawlessness has something to do with the housing of the people; something to do in the way in which they live; something to do with the manners and customs that arise from the fact, mentioned by the Lord Provost, that a large proportion of these people are living in one room. I have no doubt there is some connection between the lawlessness of a district and overcrowding, just as there is a connection between it and the lawlessness of the people in my own district, and the crimes and disturbances that take place there. I know it from personal experience, from having to sit in judgment upon those who are accustomed to transgress the law in those overcrowded districts. But overcrowding is not a complete reason for a high death-rate, for I know districts in London which are as overcrowded as Bridge Gate, High Street, The

Wynds and The Closes—places where we have more than one thousand persons to the acre, just as you had in some districts which I recollect seeing here in 1874. But happily many of these densely populated and filthy habitations have been cleared away. We have districts in London which are as densely occupied as these were, but with a death-rate of only 14 per thousand. Why is that? I can tell you. It is that nearly the whole of the occupants are total abstainers, and their houses are in a good sanitary condition. Take Shaftesbury Park Estate, named after that noble statesman who has done so much for the people of this land—take that estate which is thickly peopled, there is not a public-house upon it, and the result has been that the health in connection with some other points—I do not impute all to the absence of the public-house—is vastly improved in those dwellings. The same remark is applicable to the dwellings erected by the Peabody Trustees, and the same results have taken place in the dwellings erected by Sir Sydney Waterlow and his friends. There it has been shown that correct principles of sanitation in connection with dwelling houses bring about a wonderful state of public health, notwithstanding the density of population, especially if it be associated with absence of drinking shops. How do I account for the circumstances of your high death-rate. Well, there are two circumstances over which you have no control. One of these, to my mind, is that your houses are built of stone. These stone houses are not pervious to air in the same way as the houses of the jerry builders which we have in London and neighbourhood. Some houses in which our poor live are such that the wind can blow through every brick..

There are many mischievous results, in one sense, from that kind of house, but there is also a great advantage in another, because the air will find its way in and the people cannot keep it out. That is not the case with the houses of Glasgow. They have solid stone walls which no air can penetrate. I am afraid that in many instances they take care to shut up every crack and cranny through which the fresh air can find its way. One result is that the foulest of air is kept in the apartments in which you live. I have a proof of the fact, inasmuch as I read from the evidence of your highly-advanced officials, that the effect of cold air upon the inhabitants of Glasgow is shown in an immediate rise of the death-rate. Why is that? Why should Glasgow have a high death-rate from the influence of cold, whilst other districts around the city, exposed more to the cold, do not suffer in the same way? It is because you keep out the cold air, and the walls will not allow fresh air to come in, and you stop up all the openings through which air might get in.

If you keep your wives and families in these badly ventilated apartments, the result is, that when the cold weather comes on it checks an action established in the body for the purpose of throwing off morbid matter which exists in the constitution, and in the fight life is frequently lost. But there is another circumstance over which you have control, and that is not to shut out fresh air from your buildings. Let there be fresh air; do not be afraid of it, no harm will arise to you. With regard to myself, no matter where I am, I always sleep with my bedroom window a little down. I am not going to recommend that practice to everyone, because there might be circumstances which may make that impolitic; but, as a rule, those who sleep in a pure atmosphere will not be troubled with headaches in the morning, that is, if they have not been in the whisky shops over night. They will enjoy their breakfast without having any nasty taste in their mouths. One of the inducements to enter a whisky shop so early in the morning, and so frequently, in Glasgow, is the foul air in which the people live; if you want to stem the torrent of intemperance you must ventilate your sleeping rooms.

There is one other reason mentioned by Bailie Morrison, viz. the high infant mortality. I find from the evidence that, speaking generally, 13 per cent. of all babies who are born in Glasgow die in the first year of their lives, and that nearly half of all the children who are born do not reach the sixth year of their existence. Now, is not that a sad state of things—that nearly half of all your children are put under the ground before they reach their sixth year? That is not so in the healthy districts of the kingdom. The mortality of a school with which I am connected, and in which there are 900 orphans and others belonging to the parochial authorities of the South of London, is not more than two or three in the thousand. These children have been left orphans or deserted by their parents, and are taken charge of by the parish authorities, and brought up in this school under the simplest arrangements with regard to food and clothing. They have enough and no more, yet, as I have said, the mortality is now two or three in the thousand. Why should 50 per cent. of the children of Glasgow die before their time, whilst not one-twentieth of that number die if the children are taken care of by parish authorities elsewhere? It is because of all those evils of which I have spoken—the foul air to which they are exposed, the bad influences with regard to food to which they are subjected, and, worse than all, the whisky poured down the throats of their fathers and mothers. The money which should go for food to the children is too often consumed by the depraved fathers and mothers in drink for themselves.

There is another reason why you are not quite so well off from one of your great advantages as you might be, namely your pure water. It is not a trouble to the poor man, but I think to the wealthy citizens of Glasgow a serious evil follows from its very purity; because the purer the water, the more absorbent it becomes. If it is exposed in your houses, and allowed to come into contact with the air before it is consumed, it will imbibe foul matters from the atmosphere, and may be dangerous to health. Thus the very purity of the water is a source of danger. I am going to tell you how to get rid of that danger. It is said that Parliament may give a man a vote. Quite true. I have great respect and regard for the voters of Glasgow, because they do honour to my profession by returning to Parliament a member of the medical profession as one of their representatives. I, therefore, believe that there is a great deal of intellect amongst the working men of this city. There is one thing that I would say—that knowledge is power, and undoubtedly it is the right arm of democracy. The knowledge that belongs to democracy is power, and when that power is exercised in the right way, and for righteous purposes, it will make the people far happier, far more powerful and prosperous than any other power they can exert, and the more knowledge they get the more powerful they will become, provided it be not used for evil, but for good, not for the destruction of the country, but for establishing and raising it to a higher level in the scale of nations. Parliament may give a man a vote, but it cannot give him a comfortable home. The comfortable home must be got by your own exertions and by attention to those principles which the Sanitary Institute would teach you, and these things are not to be learned at once; they are only to be learned by steady attention to the rules which are given by those men who have made sanitary science their life-long study. When, therefore, your eminent medical officer gives you instructions with regard to certain conditions to which your houses are exposed, you should give him an attentive ear. I have, in this excellent pamphlet that is before me, "The Decennial Census and Memorandum, and a Report upon the Hospital Accommodation for Infectious Diseases in Glasgow," these instructions. I know that you have in him a giant with regard to sanitary work, and I urge you to follow these instructions. He gives you information that should prevent overcrowding. Mind, overcrowding means also something much more serious. It means diversion of income to whiskey. If I went into these rooms where there is overcrowding, where men are content to live in one room, I should find that many spend a great deal of their wages in drink. They

go to the whiskey shop because they have no comfort at home. I advise you to let the whiskey shop alone. I have been a follower of abstinence for many years, and have, as a medical man, practised in a large district amongst people of all ranks, and I can tell you that whiskey and such drinks may be very excellent medicines, but they are dangerous and poisonous foods. Don't be afraid of investing some of your income in more house accommodation. I will grant it may be possible to live healthy and well in one room under certain circumstances—with abundance of ventilation and great attention to the proper principles that should regulate health. But I cannot conceive it possible in your stone houses, without the ventilation being very excessive, that you can live, sleep, wash—if you do wash there—cook your food, and do all the duties and all the offices that belong to human nature, and at the same time keep healthy. There is another phase in the history of the working classes of Glasgow. It was mentioned by the Lord Provost, namely, the large sum invested by them in the savings bank. Indeed, they have saved on the average per head more in that way than the working classes of any other place in the kingdom. There is certainly no other city or district where more than three millions have been banked by the working classes. But don't let thrift deprive your wife and children of more house accommodation. There is an old saying which is taken from Holy Writ—"There is that which scattereth and yet increaseth; and there is that which withholdeth more than is meet, but it tendeth to poverty." I know of nothing that tends more to poverty than that kind of thrift; for the saving may be carried out at the expense of the life blood of your brothers, and sisters, your wife and children. Purity of air is a factor in promoting health, and in promoting felicity. I will not say you may not have a morbid sort of feeling which you may call felicity, and which that man has who has taken rather more liquor than is good for him. He says, "I am very happy." That may be felicity or not; but generally he does not find it so next morning. I think you had better let that sort of happiness alone.

There is another thing that promotes felicity, namely, good cooking. Depend upon it, good food and bad air cannot go together. If you have good food and bad air you will not have the full advantage of the food you ought to have; indeed, more serious effects will arise from having plenty of food than having less of it, and unless you have proper cooking you cannot have a healthy digestion. Now, here every one of you may assist in promoting the purity of your atmosphere. The 130,000 domestic hearths in Glasgow pour into the atmosphere a large quantity

of smoke which helps to render it impure. If you could look at some of the gas-cooking apparatus in the Burnbank exhibition, and get your landlord to give you one, you would be able to cook cheaper, and help to diminish the impurity of the atmosphere which is doing great injury to the citizens.

I have been privileged to take a run down the Clyde to-day. I was astonished to see the immense volumes of oily smoke that your chimney stacks and your steamers poured out. I hold that your steamboat and factory owners have no more right to pollute the atmosphere which we breathe, than you have to pollute the stream that is running through the estate of one of your riparian landlords near Glasgow. I think that public opinion of Glasgow should insist upon this nuisance being stopped—in demanding this you are doing no injury to the delinquents. I am satisfied that if the steamboat and factory owners were compelled to consume their own smoke, the tons of carbon and oil which they send into the atmosphere every day would amply repay them, and then you would have that pure atmosphere which is so necessary to health and enjoyment. I speak feelingly upon this matter. I live in a district ten miles from London, and whenever the wind comes from the north, there is sent down upon my district a cloud of smoke which people with the least chest complication at once feel. Hence the death-rate rises just as the wind blows from that quarter, and vegetation is also injured. I feel it must be so in Glasgow and neighbourhood, therefore, you, as the electors of the Town Council of Glasgow ought to insist upon your representatives taking this matter in hand, and upon the law being put into force with reference to those matters to which I have alluded.

I might have said something more to you with regard to the death rates. I might have told you that there are places where the death rate used to be high, but where the action of the authorities has brought it down to a very low standard. There is the army, you know. I don't know whether my friend Dr. De Chaumont is present, who has done so much to reduce the death rate of the army, but he will bear me out when I say, that each soldier existing in Her Majesty's army has cost on an average £100 to whip him out of the raw material of the recruit, till he is fit to go into the line as a properly drilled soldier. Years ago, the death rate in the army was very great, and not very long ago the death rate at Gibraltar, for instance, was $21\frac{1}{2}$ in the thousand. Now, by the introduction of sanitary measures under the supervision of the medical officers from Netley, who have been educated by Dr. De Chaumont or his predecessors and his colleagues, the death rate is only $5\frac{1}{2}$. Look at the wonderful saving by this to the country. The death

rate of the London Police is only five in the thousand, and in the army nine per thousand. The death rate in the navy is $6\frac{2}{10}$. Why should the death rate in the navy be less than the army? Because the soldiers are more exposed to the influences of the whisky shops and gin palaces than the sailors are. The difference of mortality between the army and the navy amounts to more than two in the thousand, mainly from the very circumstance that one can get to the gin shop more frequently than the other. There is another circumstance that one ought to mention more in detail, that is the mortality of your children. I find from experience and from the examination of the reports, that some of you are very thrifty and careful with regard to your children. You go so far as to insure their lives, so that if they die, you may have money to bury them. Well, I don't suppose that many are present who have been in the habit of doing this for the sake of the money, because I take it those who have come here to listen to me are anxious to know something about sanitary matters, and have thought a little about them; but it appears to me that those who have insured their babies, have thought more about the certainty of their deaths from the insanitary surroundings than from having any care to try and keep them alive, because I find $22\frac{1}{2}$ per cent. of the children who have died under five years of age are insured. It is an unfortunate phase in human nature that this should be so. I think there should be a great care on the part of the people not to encourage the insurance of children's lives against death, because children ought not to die in the way in which they do, and you would be doing the right thing if you would take more care to prevent them going than to insure their lives and bury them when they do go.

I am afraid you will be tired hearing me talk; but there are two or three other things I would like to mention to you. One is with reference to the advantage of sanitary operations in saving life, and in saving you from the consequences of sickness, because it may encourage you still further in your thrifty habits. I wish to point out that with reference to savings banks, if you can reduce the mortality of your district from 26 in the thousand to, say, 18, you will effect such a saving that, without any kind of arrangement of your own, except putting aside money that has been saved, so that when you reach sixty years of age, you can retire with an annuity for the rest of your life of 10s. per week. That can be effected if you pay into the post office savings bank 7s. per month from the age of twenty-five to sixty. You will see, if you can persuade your authorities here to take such measures as will reduce their death-rate from what it is down to the figure I have mentioned, you may every one of you save

that amount which will secure you 10s. a week for the rest of your lives when you reach the age of sixty years. Now, is not the public health a working man's question? Such being the state of the case, is it not important that you should consider this subject very seriously; and I want you to consider it in this way—something after the light of a little circumstance which happened some years ago to a distinguished individual connected with the Court of this land. He made a remark that the Lord Chamberlain's wand was a simple stick of polished deal which cost one shilling, and he had been examining the accounts of some civic entertainment, and he found that every one of the wands had cost about two guineas. He asked the reason why such a large sum should be paid for a wand in the city, whilst the Lord Chamberlain's at her Majesty's drawing-room only cost one shilling? The answer was this. The Lord Chamberlain gives the dignity to the wand; but the gentlemen who officiated in the city had dignity conferred upon them by the very handsome wand that they had to carry. Gentlemen, when these matters come before you, vote for the men who won't have the dignity of the wand conferred upon them, but who, from their education and knowledge of sanitary work, will give dignity to the wand; who will take the men into their confidence who have shown that they studied the state of public health, and by their knowledge of other matters conferred dignity upon the work. If you do your duty with reference to this great question, and not be led away by clap-trap by men who are so anxious to keep down rates, you will find that you will not be one of those persons spoken of in Holy Writ, who saved when spending would have brought a much greater return to them.

And now I want to say a word or two upon another subject, the one which Dr. Angus Smith dwelt upon yesterday. He told us that the waste of ammonia that was going on in connection with the city of Glasgow amounted to £1,000 per day. £360,000 of wealth is lost every year to the country from the way in which your own noble river is being turned into a common sewer. I am not going to tell you that the common sewer is at this time unwholesome and producing mischief in your midst. I question whether it is so dangerous as some of your closed sewers that are introduced into some parts of the town, and which may be simply sewers of deposit. The immense traffic upon your river, the constant stirring up by the screws and paddles of your steamers, and the rise and fall of the tide, keep up that motion in the river which is so essential to prevent mischief arising in you midst; but if by any chance your steamers were to become motionless, the

trade of your town to be seriously damaged, and the Clyde less stirred up, then a mischief would arise some day, sooner or later, to this city. You can adopt a plan to prevent that mischief—a plan which is wrought successfully in the district to which I belong. There is nothing that the Glasgow men determine upon but they have the energy to carry out. Machinery could accomplish the work, and your sewage could be taken out of the Clyde as easily as you brought in the Loch Katrine waters to the city. The sewage is in its wrong place. If you put it into the cultivation of crops in your own country, you will be doing a very great good, instead of doing, as at present, a very great harm, and depriving your country of the ammonia which the sewage contains.

“There is that scattereth and yet increaseth, and there is he that withholdeth more than is meet, but it tendeth to poverty.” This question is undoubtedly a poor man's question, because if ever it should come that this country should suffer from a short supply of the provisions of life, it is the poor man that will first feel it, and what are you to do? You are throwing into the river £360,000 yearly of ammonia which ought to be somewhere on your land. Now, in my own neighbourhood there is a farm with 600 acres of land which is cultivated by sewage. Before that land was occupied it was worth 25s. per acre—agriculturally, I mean. We have had now to purchase that land at over £300 an acre, which has cost nearly £200,000 to get possession of that land and fit it for our purposes. We have made the owners of that land rich men. Before we took the ground one man was sufficient to cultivate fifty acres of the ground, but at present there is one man for every ten acres, and, therefore, you see the amount of labour that is put into the ground is multiplied to a large extent. We have also added to the rates of the parish in which that farm is situated, because it is rated at the money we have given for it—not at its former agricultural value. We have sent into our own town an enormous quantity of milk and meat produced on that sewage farm; yet the mortality in our town is under 17 per 1,000, and sometimes it is only 15. We have also produced on that farm material sufficient to raise three and a half oxen per acre instead of half an ox that it raised before we had anything to do with this farm. That has been done, not at a large cost to the ratepayers of the district. They have had their sewage utilized, and the health of the district is of the highest possible character, because there is close to it a large population with a mortality of only 14 per thousand. For some years back we have had this great produce of meat for the people, and I contend, that if the whole of the ammonia that is produced by human beings was

properly placed upon the land we should not have that meat famine which is imminent in our land, because we are now obliged to depend upon foreign countries for our meat supply. I take it that this is a very important poor man's question—a question whether the meat supply of your country shall be supplemented by the material we send to waste, or whether we will have it increased by the operation of the local authorities in connection with sewage cleansing. I want you to entertain these two questions—the purification of your atmosphere and the purification of the Clyde. These are two matters that the men of Glasgow should set their minds to. I honour Glasgow extremely for her magnificent water supply and for her well-swept streets, for utilisation in connection with those works which I witnessed the day before yesterday at St. Rollox, for your grand hospital accommodation—I say that the hospital accommodation provided by your authorities is ample, and I strongly urge the working men of Glasgow when they have got infectious diseases to take care to get Dr. Russell's assistance, and not hesitate to have their children, their wives, and themselves conveyed to those infectious hospitals as quickly as possible; because by so doing they will help yourselves materially, and help your neighbours.

I honour Glasgow for the absence of small-pox. I am told that disease is almost unknown amongst you. It is a great credit to the working men of Glasgow that that should be the case, because without their assistance I am quite sure such a result would not follow. I honour Glasgow for another thing. I understand that married women—suckling women—are not seen in your mills and factories. That is not the case in some parts of the United Kingdom. The effect upon these married women and nursing women is great, and it is much credit to you that these women should not be allowed to work in your factories. I also honour Glasgow for one or two other circumstances—minor circumstances—that you don't allow houses to be occupied until they have been pronounced fit for habitation. These are things which lead me to honour Glasgow. Your Town Council is not parsimonious in connection with sanitary work. I take it that the electors of Glasgow are not altogether parsimonious. I trust in the future they will be still more liberal than they have been in the past in connection with these matters. If I shall have the glorious opportunity of again coming amongst you I may hope to tell you that your reduced death-rate has followed from carrying out these works I have mentioned, and that you will then come, with regard to health, to occupy the same position as you do with regard to the commerce of the Empire, viz., the first place.

Let not the great intellect that does exist in the Scotch character in Glasgow be blunted by the fear of expense in connection with these matters, but do be determined that you will have these changes carried out which I have mentioned, at whatever cost. I am certain that the day will come when you will find that the money spent has been returned to you, in the same way as the money has been returned to you, over and over again, which you invested in the Loch Katrine supply.

I thank you most heartily for the kind attention you have given to my observations. I beg just to say, in conclusion, that although I appear here as the Chairman of the Council of the Sanitary Institute, these views are mine alone, and not necessarily the views of the Sanitary Institute itself. On some points there may be individual differences on point of detail, but with regard to the principles upon which those views are founded, I am quite certain that they have the support of the Institute.

REPORT OF THE JUDGES OF THE EXHIBITION, NEWCASTLE-UPON-TYNE, 1882.

SUPPLEMENT.

MEDALS AND CERTIFICATES.

Awarded to Exhibits deferred for further practical trial at the
Exhibition at Newcastle, 1882.

MEDALS.

DOULTON & Co., *London*, for Anti-percussion Ball-valve.
ROBERTS, CHARLES G., *Haslemere*, for Buck's Automatic Rain Water
Separator.
SANITAS COMPANY (LIMITED), *London*, for Sanitas Oil.

CERTIFICATES.

ANTISEPTIC APPARATUS MANUFACTURING COMPANY, *London*, for Red
Cross Antiseptic Fluid.
BRITISH & FOREIGN MINERAL WATERS COMPANY, *Glasgow*, for
Potash, Soda, and Seltzer Waters and Lemonade.
EDMUNDS, J., *London*, for Currie Powders.
IRVINE & Co., *Gateshead*, for Mustard.
KITE, C. & Co., *London*, for Outlet Ventilator.
MIGNEN, P. A., *London*, for Improved Filtre Rapide.