Stevens Hospital, he explained and demonstrated to us his mode of treating open wounds with a solution of chloride of zinc, a plan which afforded so much satisfaction, that it has been universally adopted by my colleagues and myself, and we have thus for over twenty years been carrying out, without any rational foundation in histo-pathology, what I conceive to be the most essential and valuable part of anti-septic surgery, and I do not think our faith in the practice will be shaken by the dictum of even so high an authority as Koch, who asserts that chloride of zinc is inert as a germicide, and much less efficient than corrosive sublimate, iodine, or carbolic acid. It may not be directly poisonous to germs, but I firmly believe, from very extended observations, that it will render a cut surface a barren cultivation field, and I think we may fairly infer that it will produce a similar effect on the wall of an abscess. With this conviction impressed on my mind, it occurred to me that the continuous application of some such agent to the investing membrane, after the matter was discharged, would render it proof against the invasion of infective germs, and thus assist Nature in making a stand against their encroachments. Accordingly I proceeded by the following method:—A long curved trochar and cannula was pushed through the abscess, and made to transfix it some four or five inches; a piece of rubber tubing with a single hole about the centre was drawn through the cannula by a thread connected to the cutting end of the trochar; the aperture in the tubing being lodged midway between the two trochar wounds, the cannula was removed; one end of the tube was attached to the exit conduit of an irrigating can hung well above the patient's bed; the other end discharged into a reservoir at the bedside; by means of a stop-cock the flow of the fluid could be regulated with greatest nicety, so that it could escape drop by drop, and render not only the contained fluid, but the abscess-wall, perfectly aseptic. Again, by compressing the exit portion of the tube between the finger and thumb, you can cause distension of the sac to any degree desirable, and thus produce all the advantages of the distension method proposed by Mr. Callender. And now, as to the fluid which is to be used for irrigating an abscess. In my earlier trials I, of course, employed the fashionable antiseptic, carbolic acid; but my patients, after a few hours, exhibited olive-coloured urine and gastric disturbance, warning me that I could not persist without reducing the strength of the solution to such a degree as to render it inert. Subsequently, I employed a very weak solution of chloride of zinc, 1 pint to 200, with the best possible results. The cavity remained septic; remarkable changes were developed in the wall of the abscess; thin membranous matter was discharged from time to time. After about a week the opening through which the tubes were passed became enlarged so as to be no longer water-tight. This at first caused considerable trouble in keeping the patient dry and comfortable, but more extended experience proved that at this time continuous irrigation is not needed, the cyst-wall having undergone such decided alteration in its structure and condition that occasional syringing is quite sufficient for the perfect healing up of the cavity. Such, Mr. President and gentlemen, is the treatment of chronic abscess by irrigation.

In conclusion, fellow-labourers of the British Medical Association who are engaged in surgical work, we have committed to us a goodly heritage. This Victorian age in which we live has been signalised by some most remarkable advances in all the arts and sciences. Human intellect and inventive faculties, day after day, gain fresh triumphs over matter, but in none have greater strides been made than in the art and practice of surgery, more especially in those lines where it is being extended by a more careful application of anatomy and physiology. It is true that in this country experimental research, which has done so much to relieve human suffering and to save human life, is cribbed, cabined, and confined within the four corners of an Act of Parliament, which is a reproach to the common sense of that august assembly, and an outrage on the character of the members of a profession who, whatever may be their faults and failings, have never been obnoxious to the charge of cruelty or disregard of suffering or pain. The hysterical shrieks of a few women and the puling sentimentality of some weak-minded men have placed and retained in the statute book the Vivisection Act. *Tu quoque* is, I believe, a bad defence, but we see them mount their horses and hunt to death the timid hare or the clever fox. I should be sorry indeed to say a word against field-sports, which have no doubt their own useful purpose; I only ask for consistency, and that scientists in this country should not be placed at so great a disadvantage compared with their Continental brethren.

We must, however, make the best use of the means at our disposal, and carry forward the standard of investigation into new and unexplored fields. One by one the dark caverns of the human body

are being illumined by the light of scientific surgery even the ivory walls which guard and protect the dome of thought are pierced by its rays, and the brain itself mapped out with geographical precision, as in a chart, so that we can by careful reading of symptoms place our finger on the very spot oppressed by injury or disease, and by a bold and decisive operation lay it bare, and remove the cause of its morbid condition or disturbed function. There is ample room and verge enough for work—many untrodden fields of discovery—so that we can make the future of Queen Victoria's reign as glorious in the annals of scientific discovery, as full of help to the sick and wounded sufferer, as has been its past.

ADDRESS IN PUBLIC MEDICINE.

BY

The Rev. SAMUEL HAUGHTON, M.D.,

Senior Fellow, Trinity College, Dublin.

REFLECTIONS ON DEATH-RATE, WITH SPECIAL REFERENCE TO DUBLIN AND ITS SUBURBS.

MR. PRESIDENT, AND MEMBERS OF THE BRITISH MEDICAL ASSOCIATION,—Allow me in the first place, in the name of Trinity College, to offer you, for the second time, a hearty welcome within our walls.

Twenty years ago, in 1867, the British Medical Association met for the first time in Dublin, and the chief event of that meeting was the formation of our Medical Reform Committee, whose labours, after nineteen years of varied fortune, terminated last year in the Medical Acts Amendment Act, 1886, which came into force on June 30th of the present year. Were it not that I served on that Committee for seventeen years, I would praise it for its tenacity and perseverance; but I am here to-day "to bury Cæsar, not to praise him." This much, however, I am bound to say, that whatever success followed our long continued efforts was mainly due to the good temper, tact, and indomitable perseverance of our chairman, Dr. Edward Waters, of Chester.

NATURAL RIGHTS.

The natural rights of every human being born into the world may be shortly summed up as follows, liberty, air, water, food, heat, and light. The most important of these are air, water, and food. Without air, we live three minutes; without water, we live three days; without food, we live three weeks. Instincts, stronger than reason, compel us from our birth to seek these natural rights for ourselves; by force, if necessary; but how slow has been our progress in recognising the equal claims of others to the enjoyment of these natural rights.

For eighteen hundred years, with the notable exception of a handful of intelligent Quakers, the whole Christian world accepted slavery as a divine institution, and even the aged Paul, prisoner of Jesus Christ, awaiting death at the hand of Nero, in sending back a runaway slave to his master is quite unconscious that the slave, whether Christian or heathen, had as much right to his personal freedom as Paul himself, or his master Philemon.

In 1851, the window tax was abolished, after having deprived millions of their fair share of sunlight and air for more than one hundred and fifty years. In principle, this was as monstrous a tax as that levied upon urine by the Roman Emperor, Vespasian.¹

The supply of pure water to the poorer classes was as defective as that of sunlight and air. In 1836, the first year of complete registration, the water supply of London was 36 million gallons daily, much of which was drawn from the tidal portion of the River Thames, more or less imperfectly filtered, but owing to the doubtful purity of the water-supply, many persons preferred for drinking purposes the water derived from surface pumps,² some of which were in the immediate vicinity of churchyards. In 1845, the water-supply of London had increased to 45 million gallons daily; in 1858, it was 75 million

¹ ———— *lucri bonus est odor ex re*

² Quâlibet

² Within a hundred yards of the place where we are now assembled, there is a pump famous for its delicious cool water; about fifteen years ago five cases of enteric fever occurred among our students (one of which proved fatal), all of which were traced to the use of water from this pump. The students who drank beer escaped the fever.

gallons; in 1886, the supply reached 180 million gallons daily,³ half of which is drawn from the Thames, above Teddington Lock; its purity is ascertained by repeated continuous analysis, and although inferior to the water supplied to Glasgow and Dublin, is quite sufficient for all practical purposes.

In the good old times Ireland was not much better off. The City of Waterford depended chiefly for water-supply upon its own surface-wells. One of these, which appears to have been in great demand, was analysed by Sir Charles Cameron, who declares it to have been, without exception, the worst water he had ever met or read of. On closely smelling this water, a faint urinous odour was perceptible, and the amount of ammonia contained in it exceeded the quantity he had found in some specimens of Dublin sewage.

Dr. Tucker, medical officer of health for Sligo, thus describes a cabin occupied by a nobleman's tenant:—"It was about 12 feet wide and 24 long. The domestic circle, happy family, or menagerie, that dwelt therein consisted of a sick man, his wife, four daughters, one son, three cows, one horse, two calves, two pigs, and poultry, all in one common undivided house, no partition; generally the pigs dwelt beneath the beds, the people in them, and the poultry overhead. They can enjoy the prospect of chickens and bacon, which they seldom taste."

DEATH-RATE AND DENSITY OF POPULATION.

The death-rate of a population is the number of deaths for 1,000 living persons of all ages in a year. The density of a population is the number of persons residing in a square mile. It is well known that after the density of population exceeds a certain limit the death-rate begins to increase, so that the density of population must be regarded as one of the causes of death-rate, though only a secondary cause.

The first person who attempted to reduce the relation between density and death-rate to a mathematical form was the late Dr. Farr, who rendered such important services to the science of vital statistics. He selected seven groups of districts of England and Wales arranged according to density of population, and compared their death-rates; from these data he derived the following formula:—

$$m'm = \left(\frac{D'}{D}\right)^{0.11908}$$

where m , m' are the death-rates of any two places, and D , D' the densities of population at the same two places. This is equivalent to assuming that the relation between density and death-rate may be represented by a parabolic curve, of the form

$$y = px^2$$

passing through the origin, Dr. Farr assumed that n and p are constant, and from this assumption derived his formula, which is compared with observation in the following table:—

Dr. Farr's Formula.

	Density.	Death-rate.		Difference.
		Observed.	Calculated.	
1	65,823	38.62	38.74	-0.12
2	12,357	32.49	37.70	-5.21
3	4,499	28.08	28.08	0.00
4	1,718	24.90	25.02	-0.12
5	379	21.88	20.87	+1.01
6	186	19.16	19.16	0.00
7	166	16.75	18.90	-2.15

The column of differences is too large, and gives the large probable error

$$\epsilon = + \text{ or } - 3.11$$

in the death-rates. If we assume that the values of n and p vary at different parts of the parabolic curve, we can readily find formulae for calculation, in which the probable error is reduced to less than one-third of that of Dr. Farr's formula. The values of n which I employ are

$$\begin{aligned} n &= 0.118, \text{ between } 19 \text{ and } 25 \text{ death-rates} \\ n &= 0.135, \text{ " } 25 \text{ and } 32 \text{ " } \\ n &= 0.105, \text{ " } 32 \text{ and } 40 \text{ " } \end{aligned}$$

by using these values, I find

³ During the last fifty years the population of London has increased from 960,000 to nearly 4,000,000. The increase of water-supply has been fivefold, and that of population nearly fourfold.

⁴ This form of parabolic curve represents also in meteorology the relation between radiation and temperature.

Dr. Farr's Formula (Improved).

	Density.	Death-rate.		Difference.
		Observed.	Calculated.	
1	65,823	38.62	37.73	+0.84
2	12,357	32.49	31.75	+0.74
3	4,499	28.08	28.77	-0.69
4	1,718	24.90	24.67	+0.23
5	379	21.88	20.63	+1.25
6	186	19.16	19.00	+0.16
7	166	16.75	17.10	-0.35

The column of differences gives the mean probable error

$$\epsilon = + \text{ or } - 0.97$$

which is less than one-third of the mean error of Dr. Farr's table. I have constructed for the use of persons not familiar with mathematical tables the following table of death-rates calculated from densities, the use of which is obvious:—

Table (Dr. Haughton).

Death-rate.	Density.	Death-rate.	Density.
15	146	28	4,332
16	160	29	5,580
17	165	30	7,140
18	175	31	9,051
19	186	32	13,480
20	287	33	18,059
21	434	34	23,615
22	645	35	31,673
23	939	36	41,371
24	1,347	37	53,605
25	1,904	38	69,293
26	2,527	39	88,648
27	3,324	40	112,990

This table enables us to determine the average death-rate when we know the density of a population, but the actual mortality depends on other causes, which vary from place to place. In order to make full use of it, we must form a standard of perfect health. Dr. Farr selects for this purpose sixty-four localities in England and Wales, where the mortality of the people ranged on an average from 15 to 17 per 1,000, and fluctuated only slightly from year to year.

The inhabitants are 973,070, living on 4,797,315 acres. This gives a density of 3,155 to the square mile. From the preceding table the mortality of the whole population of England and Wales at that density would be 26.21, so that in these healthy districts upwards of 10 lives per 1,000 are yearly saved by the absence of causes which injuriously affect the other parts of the country, and this happy million of country folk have 10,000 fewer funerals to attend each year than any other million in the community.

The inhabitants of this Arcadia follow agricultural pursuits, are scattered thinly over an open country, often on high ground, so that the impurities which they produce are dispersed and diluted in the air and water. They do not breathe each other's breath in theatres and churches. They do not drink water sullied by impurities. They do not drink poison in gin palaces. Their minds are not overwrought by dissipation, passion, or intellectual effort. Yet, methinks, they purchase their low death-rate at a great cost. The value of life does not depend on its mere length; it depends on the number and value of the thoughts of the liver. These good people do not live, they only vegetate; they are in happy ignorance of Greek and Latin, and have never heard of Swift and Pope, of Molière and Voltaire, of Shakespeare or of Newton. They are a dull race, and I should prefer living among a livelier people, where I could live and take my chance of a share in the 10,000 additional funeral feasts and baked meats.

I take London, Edinburgh, and Dublin for my next example, and have the authority of our Registrar, Dr. Grimshaw, for the year 1881—

	Density.	Death-rate.		Difference.
		Observed.	Calculated.	
London.....	88,512	21.20	35.09	-13.89
Edinburgh...	35,072	20.10	35.66	-15.56
Dublin.....	9,152	27.00	31.02	-4.02

The column headed "Death-rate Calculated" is the average death-rate of the whole population, corrected only for density. In all three cities it exceeds the actual death-rate, showing that all the cities have a death-rate less than the average, and the column of differences indicates the total effect of the sanitary causes acting in favour of each city, viz. :—

London...	13.89
Edinburgh...	15.55
Dublin...	4.02

We thus see that the sanitary causes acting in favour of Edinburgh and London are nearly four times as great as those in Dublin. Setting aside the absence of epidemic disease, these causes are—air, water, food, clothing, lodging, and drainage.

With respect to water Dublin is better off than most other towns, but large districts of Dublin are very badly provided with fresh air and good lodging, owing to the continued existence of overcrowded tenement houses; and I can testify myself, from personal observation extending over forty years, that in winter time large numbers of children suffer severely from the want of good food and fuel. With regard to the drainage of Dublin it is admittedly bad.

I have on a former occasion expressed the opinion and given my reasons for it, that Dublin is unfavourably situated, as compared with other towns, with respect to drainage. If this be so, it ought to be a strong incentive to us to combine all our resources and intelligence to devise a scheme of main drainage which would possess all the well-known medical qualities of the perfect cure, by acting *cito, tute, jucunde*, which I translate thus: *Cito*, that is, that the Corporation of Dublin and the various Suburban Township Commissioners should at once terminate their jealousies and disputes, agree upon a plan of main drainage for the city (properly so-called), and provide at once the funds necessary to carry it out. *Tute*, that is, that the scheme of main drainage should be carefully considered and planned beforehand, and criticised by those competent to judge, so that Dublin should secure from her expenditure the greatest possible improvement in the health of her poorer inhabitants. *Jucunde*, that is, that this little millennium should be celebrated at the Mansion House by a dinner, at which the Corporation and Township Commissioners should sit down, and eat and drink together, thus fulfilling to some extent the prophecy of the Hebrew poet:

The Wolf and the Lamb shall feed together:

The Lion shall eat straw like the Ox:

A little Child shall lead them.

The density of population and death-rate of Dublin proper and Dublin including townships are:

	Density.	Death-rate (Calculated).
Dublin (proper)	42,368	36.08
Dublin (including Townships).	9,152	31.02

or, in other words, for every 1,000 men, women, and children living in the ill-drained and over-crowded liberties and slums of Dublin, five more must die each year than die among 1,000 of the inhabitants of of Dublin the suburbs.

The townships cannot say that the drainage and health of Dublin proper is no concern of theirs.

I quote for their benefit an authority that they dare not dispute:

Jehovah said to Cain

Where is thy brother, Abel?

And he said, I know not;

Am I my brother's keeper?

Jehovah said, What hast thou done?

The voice of thy brother's blood cries to me from the ground.

This is the old story, and it is as true to-day as it ever was; the saddened lives of the Dublin poor and their early deaths cry silently (*Dum tacet, clamat*) from earth to heaven, and plead their cause before the Heavenly Father against the selfishness of those who have denied them their fair share of the natural rights of man; and at times that silent cry is heard and answered.

I have seen cholera in 1866, and small-pox in 1871, leave their congenial haunts amid the dwellings of the Dublin poor and carry terror and death into the homes of the rich. And at such times the fever hospitals received hundreds instead of tens of pounds, and thousands instead of hundreds—offerings to the Fetish of Pestilence, of as little value as the large sums cast into the Temple Treasury at Jerusalem, because they were wrung from the pockets of the rich by a terror as abject as their former selfishness was mean.

The quarrel between the city and the suburbs reminds us of the line of Horace—

Quicquid delirant reges, plectuntur Achivi
Seditione, dolis, scelere atque libidine et ira
Ilacos intra muros peccatur et extra.

which means that both city and suburbs are in the wrong.

The following table shows the condition of Dublin during the last fifteen years with respect to death-rate.

Death-rate of Dublin.

Period.	City and Suburbs.	City.	Suburbs.	Difference.
1871-75	29.4	31.7	21.6	+10.1
1876-80	31.8	34.1	23.4	+10.7
1882	27.80	30.25	21.81	+8.44
1883	29.10	31.74	22.61	+9.13
1884	27.90	29.66	23.41	+6.25
1885	28.40	30.69	22.66	+8.03
1886	26.90	28.22	23.66	+4.56
Mean of last five years ..	28.02	30.11	22.83	+7.28

The following inferences may be fairly drawn from the foregoing figures: 1. That the death-rate of both city and suburbs is greater than it ought to be. 2. That during the last five years, in which the Corporation of Dublin have spent much money on street sewers, paving of streets, domestic scavenging, and clearing of unhealthy areas, a saving of life amounting to 3 in 1,000 a year, has been effected, and nearly 4,000 lives saved from death during that time. 3. That the death-rate of the township population has remained stationary during the whole fifteen years.

The results of the expenditure on sanitary improvements may appear small, but they are only the beginning of a better state of things, and I have no doubt that the improvement will proceed at an accelerated pace, like a stone rolling down a hill: *vires acquirit eundo*, every thousand pounds spent on sanitary work enables the next thousand pounds to do more work and cause a greater amount of benefit.

The death-rate of Dublin is too high, not merely as compared with English and Scotch towns, but as compared with other Irish towns.

Death-rate of Large Irish Towns from 1871 to 1881.

Dublin	27.60
Belfast	24.10
Cork	23.48
Galway	18.69 ?

The density and death-rate of population of all Ireland are given in the following table:

Period.	Density.	Death-rate.	Period.
1841	249.6	14.8	1831-41
1851	204.8	17.5	1841-51
1861	179.2	13.6	1851-61
1871	166.4	13.8	1861-71
1881	160.0	18.3	1871-81

Notwithstanding the low death-rate, Ireland is not yet Arcadia!

DEATH-RATE AND TEMPERATURE.

One of the causes that most tends to increase the death-rate is the absence of heat; and the following table shows that death-rate is in the inverse ratio of temperature.

Relation of Death-rate to Temperature in Dublin for the Five Years 1882-6.

Month.	Death-rate.	Temperature.	Product.
January	34.43	41.4° F.	1424
February	36.55	43.2 "	1577
March	37.13	43.5 "	1614
April	32.80	48.1 "	1578
May	30.84	52.1 "	1605
June	26.07	57.7 "	1506
July	22.33	60.7 "	1354
August	24.46	59.9 "	1468
September	27.30	56.0 "	1529
October	25.94	50.0 "	1295
November	29.25	44.4 "	1296
December.. .. .	34.19	41.3 "	1412
Mean			1471.5

If m denote the mortality and θ the temperature, the following formula—
 $m \times \theta = 1471.5$
 represents the relation between death-rate and temperature.

If we take from the preceding table the two coldest months in the year (December and January), we find—
 $m \times \theta = 1418.$

I have taken the product of death-rate and temperature for the same two months in London, and find—

1881	...	...	$m \times \theta$
1882	...	...	864.0
1883	...	...	970.5
1883	...	...	869.2

Mean ... 901.2

Hence the relation between death-rate and cold in London in winter months is—
 $m \times \theta = 901$

The following table shows the relation between cold and death-rate during the winter months in Dublin and London.

Death-rates in Dublin and London in December and January.

Temperature.	Dublin.	London.	Difference.
40° F.	35.4	22.6	12.8
39 "	36.4	23.1	13.3
38 "	37.0	23.7	13.3
37 "	38.0	24.4	13.6
36 "	39.0	25.0	14.0
35 "	40.5	25.8	14.7
34 "	41.7	26.5	15.2
33 "	43.0	27.3	15.7
32 "	44.3	28.2	16.1

This table shows that when the thermometer falls from 40° to 32°, the cold increases the death-rate in London by 5.6 per 1,000 and in Dublin by 8.9 per 1,000. What this means no one can tell better than the clergy and physicians, who know the sufferings of the Dublin poor in winter. The real cause of the high death-rate of Dublin is the poverty of a large proportion of its inhabitants, which arises from causes quite beyond the control of the sanitary authorities. How much of this poverty is due to political causes, and how much to the habits of the people themselves, is no business of mine to discuss. It is there, and produces its deadly effects. However, we must not despair, but by repeated efforts on the part of all, do what we can to relieve the sufferings of the poor, and remove their causes. I would ask my Dublin friends always to keep in mind the answer of Simon Peter to the Divine Lord: "Master, we have toiled all the night and taken nothing; nevertheless at Thy word, I will let down the net."

AN ADDRESS

DELIVERED AT THE OPENING OF

THE SECTION OF PHARMACOLOGY AND THERAPEUTICS,

At the Annual Meeting of the British Medical Association held in Dublin, August, 1887.

By WILLIAM WHITLA, M.D.,

Physician to the Belfast Royal Hospital; Consulting Physician to the Ulster Hospital for Women and Children; President of the Section.

PROGRESS OF THERAPEUTICS.

GENTLEMEN,—The idea of devoting a separate Section of the great annual meeting of the British Medical Association to the treatment of the subject of pharmacology and therapeutics originated in connection with the Belfast meeting in 1884, and you will forgive me when I refer to the rather remarkable coincidence that the Council of the Association, without the least knowledge of the fact, appointed as President of the new Section this year the one to whose mind the first suggestion of the new departure occurred.

In inaugurating its fourth session we may congratulate ourselves upon the success which has attended the experiment. Since its birth under the skilful care of Dr. MacLagan, in the cold North, the Section has passed in safety through the critical period of infancy, and having without any mishap survived the first and second dentitions in Cardiff and Brighton, under the fostering care of my illustrious pre-

decessors in office, Professors Fraser and Lauder Brunton, the young giant exhibits himself to-day, let us hope, with every prospect of a long and vigorous existence.

In expressing my appreciation of the honour conferred upon me by the Council of the Association and the members of the Dublin Branch, allow me to say that I feel no stronger proof of the success of the new Section could be afforded than might be found in the reflection that the department is now considered to be so thoroughly established that it may be trusted into my weak hands.

It might be profitable to glance back at the work done at former meetings of our Section, but the short space allotted by the Council to the presidential addresses this year forbids. It appears more desirable to look forwards and see if in any way we can advance the great work of progress which our large Association has been so long and successfully carrying on in the interests of medicine.

As the title of the new Section implies, it was created with the intention of advancing the growth and progress of two distinct sciences. Pharmacology, in the present accepted meaning of the term, deals exclusively with the actions of the various remedial agents in health altogether independent of disease; whilst therapeutics, it is needless to say, embraces the consideration of the practical application of remedies to the treatment of disease. Speaking in a general sense to-day, one might regard the first as a science dealing with the results of experimental researches upon the lower animals, and the second as the science which applies these experimental results to the relief of suffering and disease in man, always, of course, remembering that there was a Therapeutics before the science of Pharmacology was dreamt of. There is perhaps no sadder aspect of scientific medicine in this country than the present position of pharmacology. The restrictions imposed by a short-sighted Legislature, warped and swayed in its judgment by noisy and clamorous agitators, have driven us into the humiliating position of looking to the more favoured investigators in other countries for those solid materials out of which, to a large extent, we must rear a truly scientific treatment of disease.

It is not my intention to dwell upon this sad grievance, but in the brief period at my disposal to look away from it and take a rapid glance at our position from rather an opposite standpoint. It is easy, by dwelling upon the thought of how we are handicapped in experimental researches upon the lower animals, to foster a sullen or slothful inaction, which in time might become a paralysis, and it appears already that signs of such inaction are not wanting. Too much is expected from pharmacology, and many of those who chafe and fret under the difficulties of carrying out investigations of this sort, and who lament the dearth of laboratories and appliances in our great teaching institutions, have got to believe that if only such restrictions and difficulties were removed, and every school had its pharmacological laboratory, the millennium would at once arrive. If we could fancy every obstacle removed, and every conceivable facility given for the prosecution of such research, the practical physician would not find the way to a better treatment of disease made easier for a long time to come. The results of pharmacological labour are often of very little value until elaborated, tested, and purified from their dross at the bed-side by patient and repeated clinical observation. The real work sometimes only begins when the pharmacologist leaves off. It is perhaps as well for the science of medicine that, after all, in the most favourable view of the case, few men can be expected to devote themselves exclusively in this country to the study of the action of remedial agents and substances upon healthy organisms, otherwise the treatment of disease might soon become utter chaos, as years of careful clinical observation and experience are often needed for the laying down of correct rules by the practical physician or therapist before the discovery of the pharmacologist can be of much value. Indeed, at the present moment, though we justly mourn over the paucity of pharmacological material, there is evidence that in many directions it is far in advance of our therapeutics.

Strophanthus, digitalis, caffeine, convallaria, adonis vernalis, scillin, casca or ordeal bark, mistletoe, and many other active vegetable substances have been found to produce certain definite and similar effects upon the healthy heart. What a vast field of clinical experience, and what innumerable observations by hosts of patient observers must be recorded before the physician can expect even to know which of these remedies is the most valuable, and under what conditions certain members of the group are indicated, whilst others are forbidden in the treatment of the diseased organ. This is true of the great bulk of our new drugs. We are only familiar with their most evident and striking actions, and we cannot expect for years to really know all we should about them, till innumerable observations at the bed-side reveal to us their value in the ever-varying conditions of diseased processes. The most sanguine view of our present position,