ably demonstrated recently, and which I trust this lecture will also emphatically reflect.

Let me speak quite plainly. Any large, easily-felt hydronephrosis is the evidence of failure; any large, easily-felt pyonephrosis is the evidence of culpable neglect—both might have been avoided. Both will need mutilation, not surgery, for their cure, and if mutilation then curtailment of strength and life, in the place of that which early conservative surgery has in its power to confer.

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- ¹ Taylor, BRITISH MEDICAL JOURNAL, 1910, vol. i, p. 1108. ² Sir A. Clark, Discussion on Catheter Fever, *Edin. Med. Journ.*, April, 1884. ³ *Trans. Med. Soc.*, 1896, p. 9. ⁴ *Path. Trans.*, vol. xlv, p. 107, 1894.

An Address

ON THE

PREVENTION OF HEART DISEASE.

DELIVERED BEFORE THE ULSTER BRANCH OF THE
BRITISH MEDICAL ASSOCIATION.

BY

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[DR. CALWELL, after thanking the members for electing him, and referring to the necessity of brevity and condensation in their proceedings owing to the very large amount of useful and important scientific work to be gone through, proceeded as follows:]

Many years ago I brought before the Ulster Medical Society a short paper on "Some Possibilities of Preventive Medicine." I was fresh from the study of Koch's work on tuberculosis, and citing what had been done in the past with regard to other diseases, I ventured on the hope that tuberculosis in time would slowly diminish to vanishing point as a national disease. To-day I might point to the tropics as well as to our own country as illustrating further possibilities and larger hopes. At home, amongst the most recent work, respiratory affections are being approached by the clinical bacteriologists, and a scientific knowledge of their cause may reveal the path of prevention or of cure. Cancer is slowly and stubbornly yielding up her secrets; but the darkest blot is undoubtedly the increase of insanity and weakmindedness. Despite the repeated warnings of our alienists, the public pay but little heed, and were it not for the more advanced educationalist the outlook would be indeed black.

In this light, a short investigation into the possibilities of the prevention of heart disease might be both instructive and interesting; and as I shall have to deal with some rather tiresome statistics I shall throw them upon the screen, and both save your patience and more clearly demonstrate the results.

First, we must study the extent of the problem. Out of a total number of 520,456 deaths in 1908 in England and Wales, 49,891, or 9.59 per cent., occurred from heart disease, or a proportion of 1 death in 10.41. In Ireland out of 76,891, 9,020 were due, or a proportion of 1 in 8.8; in Ulster 3,396 out of 28,696, or 1 in 8.4. We see, then, that heart disease is returned to the Registrar-General as a much commoner cause of death in Ireland than in England; that in Ulster it is slightly greater than the average of all Ireland.

TABLE I.—SHOWING NUMBER OF DEATHS DURING 1908 IN
ENGLAND AND WALES.

Causes of Death: England.

	Males.	Females.	Total.
All causes	268,714	251,742	520,456
Heart diseases	23,918	25,973	49,891
Blood vessels	15,114	16,222	31,336
Rheumatic fever... ..	871	934	1,805
Rheumatism of heart ...	156	207	363
Tuberculosis (all forms) ...	34,182	21,898	56,080

TABLE II.—SHOWING NUMBER OF DEATHS DURING 1908
IN IRELAND.

Causes of Death: Ireland.

	Males.	Females.	Total.
All causes	38,219	38,672	76,891
Heart disease	4,401	4,619	9,020
Blood vessels	1,508	1,743	3,246
Rheumatic fever	91	70	161
Rheumatism of heart ...	21	37	58
Tuberculosis (all forms) ...	5,568	5,725	11,293

You see in Table II the number of deaths due to tuberculosis in all its forms, 1 in 9.2 deaths, and have thus a means of realizing the comparative mortality of two of the great causes of death.

Let us next examine the subdivisions given by the Registrar-General under the heading "Heart disease." We can understand the first six headings, but a moment's consideration will show us that the last heading must embrace a large number of undetermined causes; this is due partly to the laxity of present-day registration, and partly to inevitable inability to ascertain the exact cause. It probably embraces apoplexy, aneurysm; perhaps ruptured stomach or intestine; perhaps violence and poisoning. It is a huge collection of causes which it is impossible to analyse. For the present we must simply accept the heading, "Syncope, heart disease," but should keep in mind that in a large proportion the cause of death is probably due to some other affection than heart disease.

TABLE III.

Heart Disease: England and Wales, 1908.

	Males.	Females.	Total.
Valvular	7,611	8,752	16,363
Pericarditis	237	195	432
Hypertrophy	181	85	266
Angina pectoris	617	312	929
Dilatation	1,670	1,685	3,355
Fatty degeneration	1,133	1,417	2,550
Syncope, heart disease (not specified)	12,469	13,527	25,996

TABLE IV.

Heart Disease: Ireland, 1908.

	Males.	Females.	Total.
Valvular	1,083	1,195	2,278
Pericarditis	13	15	28
Hypertrophy	18	4	22
Angina pectoris	59	23	82
Dilatation	126	124	250
Fatty degeneration	161	125	286
Syncope, heart disease (not specified)	2,941	3,133	6,074

Comparing Tables I and III and II and IV, in England and Wales you notice that the proportion of deaths from rheumatic fever and rheumatism of heart to deaths from all forms of heart disease is 1 to 23; in Ireland it is 1 to 41; Ulster is intermediate, 1 to 36. On the other hand, the proportion of valvular disease to syncope in England and Wales is 1 to 1.5; in Ireland it is 1 to 2.6. The Registrar-General in England draws attention to the fact that deaths registered as due to "valvular disease" are slowly rising in England but those due to "syncope" are falling. His interpretation is that diagnosis and registration is becoming more accurate, and so the vague general term is being less used. If this be correct, our diagnostic capabilities in Ireland or our care in registration

is below that of our English brethren. On p. cxvii of the English Report for 1908 we find it stated:

The fact that the mortality from valvular affections and also from angina pectoris, dilatation, and fatty degeneration of the heart is apparently increasing from year to year must be considered in relation to the associated fact that the death-rate from indefinite forms of heart disease is decreasing.

In both England and Wales and in Ireland the deaths from rheumatic fever, acute rheumatism, and rheumatism of the heart vary but little. In England and Wales the crude annual death-rate from this affection per 100,000 persons living—because these three are but different terms for the same disease—from 1902 to 1908 inclusive, ran as follows: 8.4, 7.1, 7.0, 7.2, 7.4, 7.0, 6.1; this is decidedly lower than the decennium from 1891 to 1901; but any consequent fall in the ensuing valvular disease would not show itself for some years. I have to thank the Irish Register Office for the corresponding figures for the same years; they run as follows: 4.9, 4.8, 4.0, 4.5, 4.2, 4.9, 5.0 per 100,000 persons living. This proves that England is more subject to a fatal form of rheumatic fever than Ireland; so that we may claim perhaps that, if our diagnostic powers in heart disease are not so able as those of our English brethren, our skill in treatment of rheumatic fever is greater. However, it is a subject that undoubtedly requires further investigation and consideration, whether there be a fallacy or whether there be a real difference, and if so, what is the cause.

Leaving these heavy statistics, let us examine some local figures. I made a careful search through the cases labelled "Heart disease" in the Royal Victoria Hospital. During the year 1906 there were 95 cases; in 1907, 134 cases; and in 1908, 100 cases, or a total of 329. I divided them into three classes: (1) Those with a definite history of "rheumatism," 138; (2) those denying any history of "rheumatism," 107; and (3) those with an uncertain history, or where the notes were so incomplete as to be valueless for my purpose, 84. Before going further, it would be well to define clearly the meaning in which I use the term "rheumatism." As yet I cannot see that, clinically, we can go more fully or exactly in the case than to form three divisions to which the term "rheumatic" is popularly applied: (1) Acute rheumatism, or rheumatic fever; (2) fibrositis, popularly called muscular rheumatism, but which also embraces sciatica, lumbago, wry-neck, etc.; and (3) osteo-arthritis, or rheumatoid arthritis. In all, I have confined my attention to (1), or rheumatic fever; and where (2) muscular rheumatism, or (3) rheumatoid arthritis were evidently, or even most probably, intended, I have discarded the case. It is more than possible that as our clinical bacteriology advances we may have to modify this classification; but it forms a working clinical hypothesis. Such anomalies as "gonorrhoeal rheumatism" are taken as discarded by the profession.

This leaves us for examination 245 cases with fairly satisfactory notes; and we see that those with a definite rheumatic fever history are 56 per cent. of the total, and those without are 43 per cent.; so that of the 16,363 deaths in 1908 in England and Wales due to valvular disease (endocarditis, not infective), at least some 9,000 were due originally to rheumatic fever. No doubt some of these, if they had not been affected and cut off early from endocarditis and valvular disease due to rheumatic fever, would have become subject to valvular disease and endocarditis from other causes; still it is legitimate to put the statement in round numbers, and say that, instead of the deaths from rheumatic fever being some 2,168 in 1908, 12,000 would be nearer the actual fact. Indeed, as deaths from rheumatic fever seem more frequent in England, we might even increase this estimate. In Ireland the corresponding figures would be that, instead of 219 due to rheumatic fever, 1,500 would be nearer the truth.

If we investigate the age on admission we find that of those with a rheumatic history the maximum was between 20 and 29, and 75 per cent. were between 10 and 39. Of the non-rheumatic history admissions the maximum number lay between 40 and 49, and 60 per cent. were between 30 and 59 years. When we consider that a great number of people have had rheumatic fever in childhood of which they absolutely remember nothing, and so deny having had it, we clearly see that there are two chief divisions which embrace probably 90 per cent. of the whole—namely, endocarditis and valvular disease, due to

previous rheumatic fever occurring earlier in life, and, secondly, those with a degenerative valvular disease occurring twenty to thirty years later. Of this second or degenerative form it is impossible to form accurate or even approximately reliable statistics as to cause. That due to pure old age is seldom admitted to our hospital; alcoholism is admitted in a large proportion of cases; indeed, if we took our notes literally it would be the only one practically present; but excessive physical strain, especially under the influence of mild doses of alcohol, or after its effect, is probably even more common. When combined with syphilis the picture is complete. The discharged soldier with his five years in India, his syphilis, his alcoholic habits, his gallant attempt to undertake the heavy work of a shipwright, his thickened pulse, atheromatous aorta, and failing heart, is a familiar picture; he is a "done man," to use his own expressive phrase, at 45.

Let us now attempt an estimate of the chance either of prevention or of abortion of the various kinds of heart disease; we shall adopt a clinico-bacteriological or pathological basis for our divisions.

1. *The Infective Endocarditis Group, not Rheumatic.*—This is at present a small group, but as our bacteriological knowledge becomes more exact and complete it will grow. Several microbes have been found, and it is more than probable that several vague cases of illness, sometimes ending fatally, occasionally recovering, with an impaired heart, will be found to be due to a microbial infection. But we can simply hope that in future the path of entrance may be discovered, and so the invasion may be stopped, or that a vaccine may cure. The bacteriological examination of 10 c.cm. of blood from a vein is daily yielding fresh knowledge, and occasionally the evidence points to the curative effect of a vaccine prepared from the special strain. The peculiar inroads of the *Bacillus coli* into the urinary system, accompanied by fever, etc., is probably sequent to a general systemic infection, and a full investigation of all analogous attacks will do much to teach us something of infections where the endocardium is attacked. As our surgeons formerly appealed to an early resort to surgical aid in cases of strangulated hernia and perforated gastric ulcer, against the delay which often ended in the patient becoming moribund, so I would strongly now urge an early recourse to the clinical bacteriologist when the vital powers are still capable of reaction.

2. *The Rheumatic Fever Group.*—This is a large—the largest—division. We know much of the natural history of this fever, but it has not enabled us to stop its ravages. The bacteriology is still in dispute, and its study remains barren. Notification of its presence and immediate investigation of the surroundings would help; and some such measure seems necessary, if we are to ascertain its frequency. In a disease that is in itself seldom fatal, but so often leaves fatal effects behind, we want the earliest intimation, not the results of a necropsy, or the ascertainment of the presence of heart disease ten years afterwards. Therefore, although we are on the tip of expectation for some beneficent discovery fresh from the forge of the bacteriological laboratory, we cannot postulate any preventive measure which will either in the near or distant future rid us of this affliction. It was hoped that the salicylate treatment would lessen cardiac complication—no proof of this exists; we simply can neither affirm nor deny that there is a diminution; the evidence to come to a conclusion does not exist. It is common experience to find, however, that a case benefits considerably at first by the salicylate, and then hangs fire, with mild exacerbations even under heavy dosage occurring alternately with periods of improvement. This condition reminds one closely of the recorded effect of the arsenic preparations on the trypanosomes, where the parasite develops an immunity to the remedy. The salicylates seem to lose their power, or the problematical microbe perhaps develops an immunity. Accordingly I would suggest the experiment of large and heavy dosage in the very early days of the disease. Such few cases as I have had any approach of an opportunity to try this method in have answered well, although I can neither claim I have aborted the disease or prevented heart complications; but the cases have not been seen early enough, and the circumstances were not such as to permit of a satisfactory trial. The conclusion, then, as regards

heart disease arising from rheumatic fever to which we are bound to come is not on the same hopeful lines as is tuberculosis. In this latter affection we know the problem, our information is exact, we understand what is to be done, and we can say with confidence that if the nation were to adopt the necessary measures tuberculosis would disappear; but the task is so stupendous that only by slow degrees can any improvement come; a complete radical attempt would induce a revolution. In rheumatic fever our knowledge is inexact, incomplete, perhaps even misleading. The individual may receive the advice to avoid chills, wettings, exposure, overexertion. Such advice to the nation means a higher civilization. Pure clinical study has had its innings. We must await with reverence the work of the laboratory clinician and vivisectionist.

3. The third group I shall mention is a somewhat vague but still a very real one. It includes that form of heart trouble due not infrequently to exertion undertaken while out of training, or immediately after a full meal under the popular idea that it was "working it down"; or while recovering from some of the minor infections, such as influenza, common cold, where the heart muscle was still suffering from the toxin; or in chlorosis, as a chlorotic girl's first day on the links in spring. Sometimes permanent dilatation and incompetency is left, even leading years afterwards to sudden death. In this type we cannot hope for much prevention—so much depends on the intelligence and education of the patients themselves—but its increased recognition, both by the community and by the profession, would undoubtedly lessen its incidence.

4. We now come to the great group of the degenerations. It would be useless to speak separately of angina pectoris, of fatty degeneration, of arterio-sclerosis, of atheroma, of valvular thickenings and degenerations. Our knowledge of the broad natural history of these affections is extensive, but it has not told us yet why better rubber is put in one person's arteries than in another's, and why the webbing of the aortic valves in one person is less easily and less early irritated and degenerated than in another. We can, however, mention some causes that undoubtedly induce early degeneration, and affirm that a legitimate hope exists that these causes are being, and can be still further, lessened.

(1) Alcoholism. Heart trouble arises both from excessive consumption of beer—Munich heart, Tübingen heart, draymen's heart—and also from the toxic effect of the alcohol alone, as in whisky drinkers. Now the nation's bill for alcohol has fallen steadily from £185,927,227 in 1899 to £161,060,482 in 1908. Again, Horsley and Sturge's diagrams of the relative consumption of alcohol and of milk in seven of the large London hospitals point to a very decided diminution in the use of alcohol as a medicament; and lastly, a chart giving the amount of alcohol per 100 patients in the old General Hospital, Belfast, from 1851 to 1858, with the mortality of the medical patients, and the same curves for fifty years later (1901 to 1908), demonstrating a greatly reduced alcoholic bill and a lower mortality.

But it is not so much the question of pure alcoholism as of alcoholism combined with physical strain, such as we see typified in soldier and shipwright. Nothing seems to bring degeneration to heart and blood vessel so early and so hopelessly as excessive physical exertion, while the system is still poisoned with alcohol and the arterioles are still dilated, allowing a runaway heart to expend itself against an unprotected capillary. Hope here lies in a higher civilization and better education, when the citizen will be taught the rules of the game of life. Under this heading we may well include overeating, and the undue nervous strain of the day so fertile in worn-out hearts.

(2) The next cause is syphilis, but its injurious effects are chiefly felt in the vessel, not in the heart. However, such effect as it has we have legitimate hope of lessening—first, by the adoption of preventive measures, such as we see succeed in the navy; secondly, by the power of aborting the disease by Ehrlich's new remedy; and, thirdly, by the slower development of a higher civilization.

Prevention of heart disease thus embraces (1) more accurate registration of deaths, so that the huge group labelled "syncope" may be analysed; (2) the labours of

the clinical bacteriologist to teach us what is rheumatic fever and how we may prevent it; and (3) lastly, a spread of real knowledge and education, so that men may learn not to treat their heart and blood vessels as a careless and reckless schoolboy treats his bicycle, but as a skilled engineer treats a strong yet delicately balanced piece of complicated mechanism that reacts quickly, silently, mysteriously to every touch of the skilled hand.

THE TREATMENT OF RODENT ULCER.

BY

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THE treatment of rodent ulcer has undergone very marked changes in the past decade, and it is probable that comparatively few cases are now treated surgically as compared with even as short a period as ten years ago. As a consequence of the newer physical methods of dealing with this disease, which are much less terrifying to the average lay mind than a surgical operation, the treatment is usually now commenced at an earlier stage, and one seldom sees the ghastly mutilations which were not infrequent when surgery was the only effective means, and when, therefore, patients often preferred to let the disease take its course. This was not surprising, inasmuch as rodent ulcer most commonly appears on prominent parts of the face, where the scarring from operation, which was necessarily widely beyond the limits of obvious disease, caused great and often hideous deformity.

I. TREATMENT BY CARBON DIOXIDE SNOW.

I have had an opportunity of testing the application of carbon dioxide snow, and of ionization, in a series of cases of rodent ulcer, both in hospital and private practice, and am much pleased with the results. With the exception of a short preliminary note on this treatment by freezing of three cases of rodent ulcer by Morton,¹ I have not seen any record of the use of this method for rodent ulcer, and my personal experience, which dates from July 14th, when I treated my first case, recorded below, may be encouraging to others.

Preparation of Carbon Dioxide Snow.

So many methods have been described that I should perhaps apologize for including details of the procedure I adopt. As, however, I have found that medical practitioners still meet with difficulties in its preparation and use, I may be pardoned for making the following preliminary remarks.

Carbon dioxide gas can be obtained readily enough from various manufacturers, its use being widespread for producing soda water. Large or small cylinders can be obtained. To the vent of the cylinder I have had fitted a small brass nozzle, about 2 in. long, which makes an adaptable support for whatever device is used to collect the snow. The quickest, most economical and satisfactory method I have found to be the blotting paper mould introduced by Tousey.² A rather thick blotting paper or filter paper is used; a piece about 6 in. square is taken, and rolled round a thick pencil or rod of the same calibre as the free end of the brass nozzle. One end of the roll of paper so formed is folded so as to produce complete obstruction, and the roll is then bandaged closely over, leaving two free ends of bandage, with which the roll is eventually attached to the neck of the cylinder. The bandaged roll is then slid on to the nozzle and tied tightly over it and round the cylinder; the stopcock is slowly turned on, until the nozzle is quite cold and covered with frost, when, with a few more sharp turns, the gas is released under greater pressure, and the roll can be felt to harden under the finger. The cylinder should always be supported with the neck lower than the base while the snow is being collected. When the desired quantity has been obtained the stopcock is turned off, and the roll, filled with hard snow, is removed and the bandages and blotting paper peeled off, exposing a stick about the size and thickness of the little finger. For many purposes this is sufficiently compressed, but for rodent ulcers, where