

Address.

THE PRESENT STATUS OF THE PRACTICE OF MEDICINE, AND THE URGENT NEED OF MORE STRINGENT APPLICATION OF HYGIENIC AND SANITARY LAWS.¹

BY WILLARD S. EVERETT, M.D., HYDE PARK, MASS.

Mr. President and Fellows of The Massachusetts Medical Society: Such is our theme to-day. But you must not expect to listen to a scientific exposition, or an elucidation of some new or great principle or application of a principle, that is destined to overthrow prevailing customs or change the practices of men. You must not prepare yourselves to find a new or unexplored mine of intellectual wealth revealed. For these acquirements search must be made elsewhere.

But happily an exhibition of great learning is not needed now. The Shattuck lecture, with its marvelous wealth of scientific instruction, and with the exhaustive treatment of the subject, so ably presented by our honored guest; the various dissertations that have been given in the different sections, together with the comments and discussions by which they have been followed, have supplied all the intellectual and scientific aliment that is needed to redeem the exercises of these anniversary days from the charge of being useless or unprofitable, and this one hour may well be devoted to lighter themes.

And so I will invite you to be patient with me while I shall indulge in some of the reflections, and make some of the suggestions, and state some of the conclusions that have been evolved from the experiences and in the course of a practice extending over a period of nigh forty years. And as the events and transactions of those forty years pass in review before us like the shifting scenes of a panoramic landscape, memory will be busy with its visions and thought gravitates easily and naturally into meditative and reminiscent moods. And it is but the natural exercise of the ordinary functions of mental activity that leads to a general survey of the whole broad field that lies before us, and attempts to penetrate, even with our imperfect vision, some of the mysteries that lie beyond.

The changes of those years have been many. The men who were then in active life, and who were then giving character to the medical profession, are gone. But few of those who were in active practice when those forty years began, are with us now. New customs have supplanted the old. New practices have displaced those that prevailed at that time. New measures have been introduced. Former ones have become obsolete, and with the men that sustained them are gone to the shades. Altogether the former things have passed away. Changes are apparent everywhere, and but little remains except the memory, of those fleeting but eventful years. But medical science

has not stood still. Increased facilities for acquiring knowledge, improved instrumental aids, and industry and devotion have produced their results.

In some lines of human endeavor the advancement and the progress of medical science has been magnificent and great. In the department of surgery, and in all that pertains to the surgical art, its achievements and its victories have out-rivaled the dreams of visionaries of a few years ago. To us, from whom the future is hidden, it almost seems as though the limit had about been reached.

It is not easy for one endowed with only common faculties of observation and reason, to imagine in what direction improvement in surgical processes can much farther go. Yet others have thought so before our time. Ambrose Paré thought so once, and informed the world in 1579 that there seemed to be but little left for posterity to accomplish "but a certain small hope to add some things." His words sound to us like boasting. But the man who sent the torturing searing iron, the hot pincers and the blazing pitch to the museums of the antiquaries, to rest there forever as surgical appliances and as curiosities of the days gone by, by substituting for them the simple ligature for the arrest of hemorrhages, may well be pardoned for some self-glorification, for the changes he himself had wrought in surgical processes, though there yet remained such marvels of progression to be revealed in the future, that then were hidden from his dazzled gaze. We wonder, as a clearer perception of his position dawns upon us, if the medical antiquary of three and a half centuries hence, as he delves into the archives of our epoch, will indulge in the smile of complacency or of derision, with which we read his words.

And we wonder also what can happen that shall make the chasm between our own times and the centuries that are coming, as wide as that which separates us from the times of which he wrote. Yet we know not what a day may bring forth. Surprises in surgery are constantly occurring, and it may be confidently predicted that in some way or other a progressive future awaits the art of surgery yet.

In the department of medicine, however, though the changes have been many, if it is true that by their fruits ye shall know them, we cannot feel quite the same assurance that the real advances in dealing with diseases have been correspondingly great. Yet we do not forget the work that medical science has done. We do not forget Jenner, nor Pasteur, nor Koch, nor those who follow in the paths where they have led. We do not forget that great learning, immense wealth and untiring industry are laid upon its altar, and are expended without stint or limit in the study of diseases, and we are not unmindful of the result.

We do not forget the means that have been perfected for our assistance, nor the aids that have been placed in our hands. We do not forget all that we owe to the clinical thermometer,

¹The Annual Discourse delivered before The Massachusetts Medical Society, June 11, 1902.

the use of which had never been suggested fifty, and scarcely forty years ago. We do not forget all that has been learned from urinary analyses, that were rarely thought to be essential then.

We do not forget the hypodermic needle, nor how opportunely or providentially the antitoxins have come to our aid. We do not forget the thyroid extract, by means of which the unsightly and distressing myxedema has been made to yield. We do not forget what the Röntgen rays are doing in making plain what was hitherto invisible, nor that their palliative, if not curative, action upon sarcoma and carcinoma and epithelioma are rapidly passing beyond the experimental stage.

We do not forget the improvement that followed when the indiscriminate use of the lancet yielded its place to milder measures or to gentler stimulation, nor the disgust that was avoided when the nauseating doses of a former period were so largely superseded by the triturate tablet and the sugar or gelatine coated pill.

And we do not forget the wonderful improvement in pharmaceutical preparations, that the progress of the times, as directed by medical science, has demanded, and that these latter days have ushered in; and contrasting them with the vile concoctions that were forced upon the sick and the suffering, in the days when crab's eyes and blind puppies, earthworms and human skulls, had a place in recognized formulæ, in standard pharmacopœias of the period, and a commercial value as staple articles in the catalogue of pharmaceutical supplies, we felicitate ourselves with great joy and gladness, that the lines have fallen to us in more pleasant places, and bless with sincerest gratitude our ancestral lineage that our existence was delayed to these later days.

And finally, we do not forget the great multitude of investigators that have so long been focusing their microscopic lenses upon every form of pathological condition, with the hope and determination of tracing the ultimate causes of every form of disease.

We do not forget that never in the history of medicine or of the world have the searchlights of science been cast more persistently or more determinedly upon these bewildering problems, to work out their solution, than in these later years.

Never have clearer heads or keener intellects or braver hearts grappled with these perplexing difficulties, either to find the way to overcome them or to demonstrate the impracticability of the attempt. Indeed, so far has science already led us, that the personal element in the profession is being largely eliminated from the account, and the oldtime independent thought, self-reliant judgment and prompt, decisive action — not always without their errors, it must be admitted, yet useful in many ways — that belonged to a former generation, are rapidly and it is to be feared altogether, disappearing; and where once the way seemed clear before us, and pathognomonic symptoms clearly and sharply defined; we now hesitate and falter, if we do not positively decline—

even while disease is rushing onward with increasing and dangerous rapidity — to render a diagnosis, until the revelations of the microscope or the bouillon cup have either exploded or sustained the views we have entertained. And we do not question their conclusions. We only learn to distrust our own.

And if there are those among the older practitioners who ask if the best interests of the sick and the dying are always subserved in this way; whether the accuracy of a mathematical demonstration is always secured by methods like these; if there are those who claim that habits of lifelong observation and years of experience at the bedside are entitled to some consideration still; if there are those who believe that the trained perception, the quick ear, the keen eye, the sensitive touch, that years of practice have intensified, if they have not perfected, are entitled to a place for practical purposes in the armamentarium of the physician that neither the exhibitions of the microscope nor the logic of the laboratory can fully supply, and that they will sometimes lead to just conclusions, before either the microscope or the laboratory can so prepare and adjust their specimens as to pronounce definitely upon the result; yet even these are willing to concede, when they do not conceal their misgivings, and while reserving to themselves the privileges of private judgment and independent action, do not hesitate to fall into line in the great procession that marches to the music of progression where the heralds of science blaze the way. And it is well. Heaven grant to these pioneers of science an unobstructed sway! Heaven grant to them abundant success to their labors! Heaven grant that their work may continue to prosper, until they shall find not only the germs of all diseases, but shall also discover the means that shall dislodge them from their place!

All honor to those noble men. All honor to those worthy ones who are denying themselves so many of the things that add to life's enjoyment, that they may devote their best years to this beneficent work. All honor to those who are teaching us the beginnings of disease. Let all encouragement be given them to continue in the paths they are pursuing, till they shall also teach us how to bring their work to a successful end. Let all praise be theirs for results already won. We honor them for their devotion to the work they have undertaken; we respect their conclusions; we follow their directions; we adopt their recommendations; we proclaim their fame while they are living, and rear monuments to commemorate and prolong their memories when they are gathered to their rest.

But the old conviction comes back to us still. If the purpose of study and of treatment is to cure disease, and so to promote the welfare of humanity, then the ultimate purpose of medicine is not yet in sight. When all our investigations are completed, when our studies and researches are done, when the improvements in management and the additions to our resources have either

demonstrated their value or failed in our hands, the grand object of curing disease by medication, so far at least as many diseases are concerned, is not gained.

Tuberculosis remains the same unconquered and unconquerable foe to human life that it has been always. And in cases where improvement has been noted, it has been accomplished less by medication than by hygienic means. Pneumonia swept away 5,282 victims in 1900 in Massachusetts alone. Typhoid fever remains typhoid fever still. And neither improved — or at least varied — methods of treatment, nor cold ablutions, nor chilling immersions, nor Widal tests, nor microscopic views, nor corpuscular computations, have perceptibly changed its character in any essential particulars, from the fatal and fearful affection that baffled the skill of the physician in the days of our predecessors, and that resists with equally stubborn obstinacy the best directed efforts of our own. It regards neither rank nor condition; it abates not one degree of its destructive energy, whether its visitation fall upon the heedless victim of his own carelessness and needless exposure, or on our own cherished and beloved governor, who relinquishes the chair of State and retires from the duties of the gubernatorial office long enough to come in here with us year after year, to honor us with his presence, and to speak to us words of encouragement and praise.

And the humiliating thought that adds the keenest pang to our affliction is that both the sanitarian and the medical profession are committed to the opinion that its place is in the catalogue of preventable disease. There were fifteen diseases whose fatality was greater in Massachusetts, in both 1890 and in 1899. Whether its rank throughout the country in those years was higher we do not know. But in 1896 Dr. Bradford tells us, in the Annual Address² for 1899, that it claimed 75,000 victims in the United States.

We know not and are not now considering "whether disease is a part of the plan of creation," but we know that existence is hedged round with so many unfavorable conditions, that danger surrounds us like an atmosphere from life's beginning to its close. In whatsoever paths our feet are guided, disease is everywhere present with us still.

We do all that medical science in the present state of its development suggests and all that experience teaches, to counteract the ills that beset us, that we are obliged to acknowledge we cannot prevent at present and do not always cure. We build hospitals in every city, and furnish them with every convenience and necessity for the care of the helpless and the sick. We secure to them the best attendance that the medical profession can supply. We build expensive laboratories, and equip them in liberal fashion with every useful appliance, in the hope that every new aspect as it makes its appearance, as well as every structural change, may be noted and assigned to its

² Medical Communication, Massachusetts Medical Society, vol. viii, No. 1, 1899, Annual Address, p. 33.

appropriate place in the etiology of disease. We exhaust our knowledge of the pharmacopeia and the products of the earth, the sea and the atmosphere in devising new antidotes for the relief of whatsoever maladies afflict the children of men. We experiment with every new remedy or combination of remedies that is commended to our attention as possessing special adaptation to special diseases or uses, to the end that we may thoroughly test their virtues, and when they have disappointed us sufficiently we cast them aside. We invoke the aid of all the resources that can be made available or be supplied from any quarter, to counteract the ravages of those living organisms that science tells us are wasting life away. We dismember the body when its life has departed that we may subject its every tissue to a scrutiny that was impossible while its subject was living, to ascertain the ultimate structure as well as function of the minutest filament of muscular fibre or the smallest spicula of bone. Neither nerve tissue nor brain substance escapes us. Nothing is overlooked, and nothing satisfies until we have resolved the whole human structure to Virchow's universal cell, and located all our many troubles in the cellular transformations and atomic changes that have their origin there.

We stifle our feelings of humanity and pity, in the interest of science, and subject the lower orders of creation to direct suffering and agonizing death, and composedly study from their vicarious anguish the pathologic processes that, artificially induced in their less respected bodies, seem to be identical with the cellular changes that take place in the human system in the same disease, and in so doing, hope to learn from their distresses how to relieve our own.

We try to follow in the paths wherein the men of science lead us, though we may not fully comprehend their ways. We study the published reports of their proceedings, with the determination — if not with an entirely successful attempt — to master and appropriate to our own uses the lessons of wisdom that they teach us, and make in some measure their wealth of scientific lore our own.

We apply ourselves with diligence and assiduity to the mastery of the marvelous vocabulary and nomenclature that has been developed in the progress of the science, and tax our mental machinery to its limit, while we wrestle with the intricacies and technicalities of accurate scientific expression, till microbe and leucocyte, bacteria and bacillus, and spherical cell, and cylindrical cell, and spindle cell, and micrococcus, and streptococcus, and staphylococcus, and diplococcus, and spores, and ptomaines, and spirillum, and vibriones, become familiar, if not always distinctly differentiated or perfectly understood, terms.

We divide ourselves into schools and systems and specialties, and argue and dispute with one another in controversial earnestness, even to the verge of desperation and ill temper, in vainly attempting to discover or determine which modes of procedure of all that are presented are best,—

for the patient's well being, if so it may be,— or, failing that, for bringing to our own exchequer the amplest return.

We do all this, and we do much more. We hold ourselves in readiness to respond to every call for medical assistance, however slight the occasion or attended with whatsoever of inconvenience or self-sacrifice it may be.

We sink into the depths of despondency and discouragement when death defeats our best endeavors, and hardly recover from our disappointment to a normal plane of hope and cheerfulness when—as does sometimes happen—we have the satisfaction of believing that we have been instrumental in prolonging a life. We grapple courageously and fearlessly with diseases of every description, however dangerous in their character they may be, as though there were neither contagion nor infection nor personal danger in the world.

We do all these things. We fight to the last to save our patients, but the arch-enemy is mightier than we. Disease and death will not be vanquished. They remain with us still. The fight with them goes on forever. It has been going on through all the centuries. It is going on still. The combat is never ended. The battle is never won. Our efforts to overcome them are thus far largely futile. Our most earnest endeavors to eradicate them are thus far at least partially in vain.

Men die—die in the vigor of useful and prosperous manhood; die when life's responsibilities are greatest; die when ties of affection are strongest; die when life seems most essential to the family and to the world. Youth and beauty are stricken by the fell destroyer, and go down to the silent chamber, ere yet the first taste of life has lost its exhilarating flavor, and fade out of existence ere yet the mildew of time has touched the hem of the garments that adorned their primal bloom. Fathers and mothers stand in hopeless but unavailing sorrow round the couch where the pride of their eyes and the joy of their hearts is breathing out its infantile and agonized existence, and gaze imploringly, beseechingly—and it may be reproachfully—into the face of the physician, whose countenance does not cheer them, whose word can yield them neither hope nor encouragement, and whose impotent hands are powerless to bring them relief. There is no need to overdraw the picture; but it is useless to keep the truth from sight.

Statistics might reinforce these statements, but everyone knows that they are true. Or if there are those who doubt them, let them search the registration reports, and review their own experiences for themselves. We are assured that the death-rate is diminishing, and gladly believe that it is true. But granting all that is claimed for increasing longevity, the rate is yet sufficiently high. The churchyards are constantly receiving their accessions, are multiplying in numbers everywhere, and are extending their areas; and because they are encroaching too largely on valuable territory, as well as becoming in themselves a

menace, the crematory fires are kindled and are blazing with fervent heat.

And this deplorable mortality is not confined to the aged, whom all know must die. Neither can it be attributed to a scarcity of physicians, for there are but eight states in all our broad land where there are 1,000 persons to each physician; and from thence the range is down to one in 420 in California, which seems of all the states in the Union, to be most abundantly supplied. In Massachusetts, in whose welfare we are more particularly interested, the ratio is one to every 539. Throughout the whole country there is, or was, in 1898, one registered physician to every 647 persons. And yet this excessive mortality exists, and it is not an accident of recent times. It is as ancient as the historic page. It was thus in the days of the psalmist. It was thus when the poet paraphrased his words:

"Tis but a few whose days amount
To threescore years and ten."

It was true when these words were written, and it is true now. Disease is lurking everywhere. Life is imperilled at every step. The causes that induce the one and sustain the other seem mingled in unutterable and inextricable confusion, and overwhelm us in doubt and perplexity, from which, while existing conditions continue, we can look forward to no release.

The atmosphere that supports respiration is laden with pathogenic germs. The elements that supply nutrition become the messengers of death. The mother's kiss imparts contagion, and the hand that is grasped in the fervor of friendship finds contamination concealed in its clasp. The balmy Southern breezes that refresh and cool the fevered forehead waft their miasm from the Savannas of the southland, and the rugged northern tempest that imparts its energizing vigor brings its microbe with its chill. It was a microbe that sapped out the lifeblood of the blue-eyed and fair-haired creature who grew up with you in your boyhood, whose hand restrained you in the recklessness of adolescence, when even your mother's wishes were not always obeyed, and guided you into paths that have led to your present high estate, and whose loss left a void in your existence that the world has never filled, when she died; and it was a microbe also that caused the bread she ate to rise.

The same organisms that produce the ferment that keeps the earth in condition suitable for human habitation, are more destructive to those who dwell upon its surface than the rifle or the sword.

The insect world arrays itself with the forces that compass our destruction, and comes swarming round us in its myriad forms, not alone destroying our comfort with its annoying presence, but exposing us to dangers that are too subtle for our unsuspecting senses to recognize, but too powerful also, in their aggregate numbers, to be easily dispelled or controlled. And even the contemptible and villainous little mosquito, seemingly

too insignificant to be worthy of notice, and which we feel it to be beneath the dignity of manhood to recognize, even as an annoyance — if it is the truth that is told about him — has sins and transgressions little less diabolical than murder, laid to his charge. Some one may object to the use of the masculine pronoun here, because they tell us that it is the female, in this instance, that makes the mischief, as it was at creation's birth. But perhaps the generic title may be permitted here as being adapted to our present purpose, while we leave them to arrange the question of individual responsibility between themselves. Yet against the insidious attacks and incursions even of so despicable an enemy, we have neither defense nor protection, save only by calling to our relief, assistance, and even preservation, the whole gigantic machinery of the Standard Oil Trust, which, backed by all the Rockefeller millions, is able to furnish only a partial guarantee of immunity, in the ratio of fifteen square feet to the ounce. In this new David and Goliath contest the advantage is certainly again with the sling. Yet life has greater foes than he; for when the worst has been said against him, it must be admitted that at worst he is an open enemy. Whatever potentialities of mischief may be concealed within his diminutive figure, his attacks are never disguised. We can see him, we can hear him, we can feel his sting; and warned in this manner of his presence, we are given some opportunity to protect ourselves.

But the greatest foes of existence are those that do their work unseen and in silence, and that nothing less powerful than a microscope can render visible to human sight. Yet the devotees of science assure us that in these microscopic organisms are traced the elementary sources of all disease; and they assure us, also, that it is to counteract or prevent their ravages that the best energies of medical science can be most effectually applied.

(To be continued.)

Original Article.

THE IMPORTANCE OF MILK ANALYSIS IN INFANT FEEDING.¹

BY A. H. WENTWORTH, M.D., BOSTON,

Assistant Physician to the Children's Hospital, and to the Infants' Hospital, Boston.

WITHIN the past few years various methods have been devised for the "modification" of cow's milk. The purpose of these "modifications" is to combine cream, milk, milk-sugar and water in such proportions as to produce mixtures containing any desired percentage of fat, milk-sugar and proteid. All of these methods have one thing in common, namely, they assume that

¹ From the Pharmacological Laboratory of the Harvard Medical School, and from the Chemical Laboratory of the Massachusetts General Hospital.

there is a fairly constant percentage of fat in a given number of ounces from the upper portion of a quart of cow's milk after the cream has risen. The following analyses show that this assumption is not true for individual milk, and that the percentage of fat in cow's milk varies very much.

TABLE I.

No.	Upper 8 ounces.				Lower 24 ounces.			
	Fat.	Sugar.	Proteids.	Ash.	Fat.	Sugar	Proteids.	Ash.
1	13.60	4.	4.42	0.472	0.30	4.90	3.42	0.62
2	14.40	3.60	4.73	0.504	0.30	4.90	3.96	0.60
3	9.60	4.35	4.24	0.57	1.40	5.	3.80	0.00
4	15.20	4.40	4.66	0.52	0.70	5.15	4.02	0.13
5	11.	4.	4.62	0.65	0.70	4.90	3.60	0.58
6	14.	4.40	5.24	0.55				
7	8.20							
8	10.							
9	9.20							
10	12.20							
11	8.							
12	10.20							

ANALYSIS No. 1.

Upper 8 ounces.			Lower 24 ounces.		
	Per cent.			Per cent.	
Fat	13.60		Fat	0.30	
Sugar	4.		Sugar	4.90	
Proteids	4.424		Proteids	3.418	
Mineral matter	0.472		Mineral matter	0.62	
Total solids	22.496		Total solids	9.238	
Water	77.504		Water	90.762	
	100.00			100.00	
Actual weight in grams.			Actual weight in grams.		
Milk	5.		Milk	5.	
Total solids	1.1248		Total solids	0.4619	
Mineral matter	0.0236		Mineral matter	0.031	

ANALYSIS No. 2.

Upper 8 ounces.			Lower 24 ounces.		
	Per cent.			Per cent.	
Fat	14.40		Fat	0.30	
Sugar	3.60		Sugar	4.90	
Proteids	4.728		Proteids	3.966	
Mineral matter	0.504		Mineral matter	0.60	
Total solids	23.232		Total solids	9.766	
Water	76.768		Water	90.234	
	100.00			100.00	
Actual weight in grams.			Actual weight in grams.		
Milk	5.		Milk	5.	
Total solids	1.1616		Total solids	0.4883	
Mineral matter	0.0252		Mineral matter	0.03	

Address.

THE PRESENT STATUS OF THE PRACTICE OF MEDICINE, AND THE URGENT NEED OF MORE STRINGENT APPLICATION OF HYGIENIC AND SANITARY LAWS.¹

BY WILLARD S. EVERETT, M.D., HYDE PARK, MASS.

(Concluded from No. 23, p. 683.)

Such, then, appears to be the status of medicine, as these first years of the century begin. We note many improvements, we recognize many and great advances in the administration of medicines, but we cast our gaze outward over a world of sickness and suffering yet. The normal condition of existence should be one of perfect health. The perfect type of life on this earth is a sane mind in a sound body, from the earliest moment of existence, through the intermediate stages of development and maturity, until it shall terminate finally in the processes of natural decay. Yet a condition of perfect health in any large community is nowhere to be found. Some allowance may perhaps be charged to the inherent imperfections of our nature. But if we attempt to account for the universal prevalence of disease upon any such theory, we deceive ourselves.

Do we find encouragement and comfort in comparing our own times with the past? We search through its annals, as guided by the light of history, to find that in the sixteenth century the average duration of human life was from eighteen to twenty years. At the beginning of the nineteenth it had reached to thirty years. And now, as the twentieth century opens, it is said to have been extended beyond forty years. But why tell of that? Why count that as a victory for therapeutics which possibly may have been accomplished in other ways? Are we certain that the administration of medicine has produced the change?

Running parallel with all this increasing longevity, and precisely corresponding with it, both in regard to times and localities, are better modes of living, fewer unseemly and unwholesome practices, wider streets, purer air, and the introduction of sewerage systems and unpolluted water supply—all advances in sanitary and hygienic conditions, with which therapeutic agencies have nothing to do.

And what of the future now? Signs are not wanting that indicate along what lines the advances of the twentieth century shall come. And prevention seems, in the light of history, more promising in its results than attempts at cure. Probably hygienic measures will never supersede the use of the therapeutic remedies in the treatment of disease. But we well may anticipate with satisfaction the approach of that season when they shall be blended together in a closer and more beneficent union than the world has ever yet known.

¹The Annual Discourse delivered before The Massachusetts Medical Society, June 11, 1902.

Preventive medicine is no new thing. Nor is it one whose importance or influence upon the public health need be urged upon a body of physicians for the novelty of the subject or for the originality of the thought. Its importance has long been recognized. Boards of health have been appointed specially to enforce its requirements. Volumes have been written upon public hygiene. Preventive medicine and the discussions that have followed its recommendations have long occupied a prominent position in the medical literature of the times. Discourses have been read to us that have placed the subject before us in a manner as convincing and as truthful as can find expression in language, and in terms that admit of no reply.

Boards of health, both state and local, have urged upon us the need of improvement in sanitary conditions, with force of statement and cogency of reasoning that no argument can refute. Public health associations make sanitary science their chief purpose and study. National conferences of state and provincial boards of health seek to secure co-operation and uniformity of methods of doing their work. The American Medical Association organizes a section to discuss state medicine and public hygiene. The American Climatological Association wrestles with the problems that our ever varying and always trying climate presents. They all tell the same story. They all say, Pure air, pure food, comfortable clothing, freedom from exposure to pathogenic germs.

We have been told also, until the repetition induces a sense of weariness, that wherever putrefactive processes are going on; wherever there are accumulations of that material which we call filth in contradistinction from dirt; wherever stagnant pools or swamps abound; wherever marshes exhale their deleterious vapors; wherever tenements are overcrowded, and wherever lack of proper ventilation exists; wherever food products of every kind are placed upon the markets, and so upon the tables of the hungry, in improper condition; wherever agricultural processes are carried on, specially such as relate to milk production and meat supply, without proper regard to sanitary requirements and purity and cleanliness; wherever the effluvia from sink-drains and house offal mingle with and vitiate the air that is breathed; wherever noxious weeds or plants contaminate the atmosphere with their infectious exhalations; wherever drinking water is polluted from any cause; wherever streams and rivers are made foul by waste from manufactories, or from being used as receptacles of decaying matter of every description, all along their courses; wherever the smoke nuisance envelops us like a cloud; wherever these things exist, we have been told sufficiently often that danger exists also. There the microbe revels; there the bacillus watches for his prey. And there preventive medicine and preventive measures are needed always, to destroy their power of doing harm.

It is true that the work of the medical profession appears in all this. It is true that it is science — medical science — that makes these matters plain. It is true that it was medical science that first discovered the microbe, and it was medical science also that first suggested the measures that should terminate his work. It is true that the guiding hand of medical science has given direction to all these proposed or actual measures of sanitary improvement and reform. It is true that it is because of medical science that the rivers of waters that take their rise among the unpolluted springs and streams of the highlands and the mountains are rushing onward with impetuous speed through their conduits and channels, in haste to allay the thirst of the famishing millions that crowd the cities' contracted areas. It is true that because it is the best method for its disposal that medical science can devise at present, that so much of the waste of the earth that is concomitant with existence is drained through miles of impervious conductors and buried in the sea. It is true that whatever improvement is to be noted in these, and in other particulars, has resulted from medical science and the facts that medical science has made known. It is true that they who have been instrumental in inaugurating all these reformatory enterprises, whose benefits are already so great, as well as in projecting others which it must rest with the future to complete, have been chiefly medical men. It is true that it has been the voice of medical science that has set forth so clearly the dangers that still are threatening, and it is the voice of medical science also that is yet busy in calling for measures of relief. It is true that it has been the trumpet blasts of medical science that have brought these topics to our attention, and have thundered their ominous warnings so often and so loudly in our ears.

But repetition does not stimulate to activity. Argument does not renovate a broken constitution. Discussion does not destroy the industrious germ. And so, in defiance of all that medical science or common knowledge has taught us, these dangers yet remain — a constant menace to life and health. Our rivers are too often streams of pollution; our tenements are overcrowded; our food products are not always above suspicion; our milk supply is not always free from danger; our drinking water is not always pure. And so there is work yet for medical science to accomplish.

The intense activities that have marked the nineteenth century have gone far in many beneficent directions, but they have left to the twentieth an inheritance of labor and of duty that must not be postponed.

Dr. Salmon, veterinary of the Bureau of Animal Industry in the Department of Agriculture at Washington, makes this remark: "Without doubt there should be greater efforts than have yet been put forth in this country to secure a pure and wholesome food supply. Those who are working in this direction need the encouragement

and aid of the general practitioner of medicine, I might say of the whole medical profession. They need even more than this — the experience and knowledge which are gained by the men in the active practice of medicine."

Thus does the representative of our government at Washington recognize the agency and influence of the medical profession in the prosecution of this department of its work, thereby practically making the acknowledgment that the work is not yet thoroughly nor satisfactorily done. And so, because it is not, our strong men perish, and so our children die. When sixteen children in every hundred born in Massachusetts have died before they were one year old, through twenty successive years — twenty-five in every hundred, according to high authority, is the ratio in all large American cities; — when 11,500 of the little ones die in a single year, as happened in Massachusetts, in 1900; when 47,266 persons, or very nearly one in every fifty, of the total population of the State exclusive of those who die by violent death and also those who are reported as dying of old age, die in Massachusetts in a single year, a large percentage of whom die from zymotic or infectious diseases, which should be largely if not wholly preventable, there is certainly something left for medical science and the twentieth century to accomplish which all the centuries that have preceded it have left incomplete. These facts appear in the registration reports for 1900.

And to him whose nature is easily moved to sympathetic sorrow for affliction, they may well be deemed sufficient to bring into activity a train of sentimental reflection that quickens the heart throbs and suffuses the eyes. The suffering and distress of those whose support is thus taken from them, and the moans of the despairing mothers of the eleven and one-half thousand babes that are dying, should burst asunder the clouds of indifference that surround the subject and cause the deaf heavens to hear.

While these unsanitary or unsafe conditions prevail, whose existence is a matter of common observation, which every man of science assures us invite disease; while these fatalities continue, as we must believe largely in consequence of such condition, faithfulness to the obligations of an honorable calling, that is charged with the great responsibility of the preservation of the public health, demands that the medical profession shall devote its energies more systematically and more determinedly to the inauguration of improved systems of sanitation that may result in better things.

And so there has been no reluctance in bringing the subject of preventive medicine before a gathering of physicians, confident in the assurance that it cannot be out of place. The times are propitious and the need is great. It must be the coming topic for discussion and for settlement and for urging upon popular support and favor, as these early years of the century begin. Its benefits are certain; its possibilities are great. Perhaps in this way we may discover the expla-

nation of some of the hidden mysteries of our being that seem incomprehensible now.

Perhaps we may learn why it is that the food that nourishes the body becomes its destroyer, too. Perhaps it will yet tell us why the same region that engenders the chill and the ague becomes a balm to the sensitive lung. The guiding stars of science indicate that the paths of progress lead in this direction, and undoubtedly the most encouraging and satisfactory successes of the period are to come in this way. It may win fame for no one, to be identified with the movement, in favor of sanitary science, but it will furnish an opportunity for doing a world of good. It may be less fascinating than a surgical exploit, but its beneficence may be multiplied hundreds of times. It is a marvelous achievement certainly, when it happens, and should bring renown and honor to the operator, to lift the curtain of darkness that veils the light of reason, and by a bold and hazardous surgical operation to restore a wretched and pitiable idiot to useful and rational life. It is a wonderful thing truly, and is deserving of all admiration, to suture a stab wound in the heart successfully, and so to prolong a life.

But probably these occurrences will not come very frequently into the ordinary life of the physician, and it may be that even Dr. Sternberg of New York, with all his great abilities, who was so successful in the former instance, and Dr. Nietert of the City Hospital at St. Louis, who performed the stab wound operation, may be compelled to rest their claim for exceptional distinction in these classes of cases—and they may well be content to do so—upon their success in a single case.

Opportunities for doing great things do not often happen, and perhaps in the practice of medicine, least frequently of all. But here the little things count. And he who secures to the children of Massachusetts a milk supply that shall yield the required nutrition, and yet be free from pathogenic organisms, will save thousands of lives. He that shall devise some method of harmlessly destroying or removing decomposing material, wherein disease germs originate, will save thousands more. Whoever will find a way to prohibit the pollutions that accumulate upon the earth's surface, and that are now permitted to contaminate the water that is used for domestic purposes, from reaching their present destination, will delay the flight of uncounted numbers to the celestial regions, and will prolong their stay upon the earth. But certain questions arise and need to be answered.

When so many organizations and agencies are working so actively and so harmoniously together, with these objects in view, what reason for dissatisfaction or discontent remains? Just this one: results at present are not commensurate with humanity's needs. When peace and harmony combine so happily to work out the solution of these intricate problems that interest so many, what excuse can be given for fermenting a feeling of uneasiness and unnecessary fear?

Simply this: nigh fifty thousand persons die in Massachusetts every year, at an age when the insurance tables of expectancy would have assigned to them a longer life.

But what more can be done? The one thing that more than anything else is needed is to awaken a public sentiment that, realizing and comprehending the great importance of these measures, will not only justify and encourage an expenditure that shall be adequate to the destruction of conditions that foster the development of diseases, but shall imperatively demand such expenditure and such destruction wherever disease germs are found.

If, then, efforts are properly directed, and if superintended by competent guides and directors, the closing years of the century that is opening should witness results in the department of medicine hitherto unattainable and that shall equal or rival the surgeon's most extravagant claims. If the valleys and waste places are teeming with dangerous bacteria, they must be exalted. If the mosquito is such a dangerous creature, the places of its abiding must be destroyed. The mountains may not be brought low in every instance and the mountain wind may not be tempered by human devices nor adapted to the needs of the tubercular diathesis, but the human subject may be taught, perhaps, to protect himself from its chill. If the appearance of the milker is suspiciously or conspicuously uninviting, he must be made to see the necessity of either changing his occupation or his methods of doing his work.

And so on—and so on! Through every department of human experience there is need for constant supervision, watchfulness and care. If individual interests or rights, even, are invaded and become antagonistic to the public needs, then individual interests and rights must be made subordinate to public necessity, when public safety is the issue that is involved; and, if it be possible that whatever is for the public benefit can be detrimental to the interests of the individuals of which the public is composed, then compensation for the injury that is inflicted must be allowed.

It will be objected—and not without reason—that the expense of such a movement will be enormous, and it is true. But the loss of fifty thousand, or thereabouts, of useful and cherished Massachusetts lives per annum, is a more costly and deplorable sacrifice still. The cost is not an insuperable objection nor obstacle against the expenditure of whatsoever of treasure these improvements and reforms may require. The means can be provided to procure the laborers, and the laborers are ready to do the work, and results will fully justify—even if they do not amply repay—all the expense that need be incurred. And means can be found by which all these things can be done.

Capital can furnish means to do great things. It can tunnel mountains. It can cover a whole land with a network of railroads, even to its most inaccessible regions, and settle its waste places with a busy, thriving and prosperous people that

increases its wealth and its power. It can find means to turn the waters of Niagara into a source of revenue. It can cross mighty rivers with bridges of enormous span. It can find means to flash its signals unheralded through the air. It can secure communication with most distant regions, and astonish them with messages that pass the sunlight, in their journey around the world. It can illumine its mansions with the lightning of heaven and literally hitch it to its car. It can execute and maintain enormous trusts. It can combine steamship lines. It can monopolize traffic and transportation and trade. It can spend uncounted thousands in testing and perfecting a piece of heavy ordnance and it can build forts and arsenals without considering the cost. It can build battleships that are apparently invincible. It can create navies that are at once the wonder and admiration, as well as dread and terror, of the world. It can equip and maintain armies that no power on earth has yet been able to withstand. It can support camps and courts. It can fit out costly expeditions to most distant places, to observe under most favorable conditions the occultation of eclipses or the transit of a star. It can extract luxury, as well as profit, from winter's dreary and desolate fields of ice.

It can find remunerative employment in blasting out huge and shapeless masses from the barren and unimpressible granite quarry, and transforming and fashioning them into forms of surpassing beauty, and adapting them to purposes where ornament blends with permanent use. It can dig treasure from the mines of the earth, and refine it at the smelting furnace and stamp it at the mint, in quantities that are most conveniently handled with a derrick and gathered with a spade. It only fails of its purpose and is beaten and defeated when it attempts to find a northwest passage to reach the northern pole, and to construct a practical, safe and useful flying machine.

And the amount of money that has been lavished on either of these questionable—even if successful—projects would, it is very probable, give us all that we ask or need. And it neither satisfies or pacifies our desires, nor convinces our judgment, to tell us that we transgress the bounds of prudence when we ask it to come to our assistance when so many precious lives are involved. It is idle to tell us that whatsoever of capital is demanded to secure the public health and safety—whether it be much or little—cannot be furnished without either perceptibly impairing its energies or seriously obstructing its designs.

There is no doubt, there can be none, that the ravages of disease will be greatly diminished and the death-rate correspondingly changed when suitable measures shall be adopted for carrying projects like these into execution, and thus affording protection to those who do not or cannot protect themselves. And if, indeed, their excessive cost should seem to justify a doubt of their expediency, yet the times are come upon us when every consideration and dictate of humanity,

of philanthropy, of zeal for the public safety, of interest in the progress of medical science, demand that the experiment shall be no longer delayed.

It is time to end this homily, that seems but just begun. The subject is inexhaustible. But the hand will move upon the dial plate, and you are growing weary, and a more alluring entertainment is awaiting you in the hall below. The great multitude that represents the medical profession in Massachusetts are gathering, eager and impatient, to exchange those kindly greetings and interchanges of recognition that cement more strongly the sympathetic tie that binds them, as they gather round the social board. Our annual festival does not fail. Year by year, as the sun approaches the solstice, we note—if we do not always welcome—its return. It has its delights and its enjoyments, but it has its suggestions too. Year by year we find ourselves moving farther and farther upward toward the head of that great procession that marches, not only into the anniversary dinner, but into "the pale realms of shade" as well, whither so many have preceded us whose forms and features have been familiar to us in years that are gone, when we were marshaled to our places in the rear, and whom we have watched year by year, to see them gradually putting off the robes of stately manhood, to wear the crown that only age could bring them, and then to disappear, that they who joined the society in the decade next in order, might move upward to the places that had belonged to them.

The century is at its beginning. At its close no one of us will remain. But that matters not; the world will move on. Medical science will continue its work for humanity, will make new discoveries, will find new and better ways of controlling diseases, will establish more perfect and effectual methods of arresting and destroying the causes on which they depend. Generations will come and go. The young, hopeful, ardent, eager, aspiring, ambitious graduate in medicine will take his diploma and enter upon his work with high resolve and noble purpose to win distinguished honors and achieve a brilliant success, as his predecessors for generations have hoped to do. The middle-aged practitioner will pursue his daily round of duty with a calmness and serenity of spirit that no adverse circumstance can disturb, that are born of faith in the value and usefulness of his profession and his labors, and with resignation to the many hardships of his lot, that will sustain him and reinforce his courage when the stimulus of ambition and expectancy has been withdrawn. The aged veteran in the service will look backward reflectively over the paths that he has trodden and where his fathers have traveled before him, contrasting the new ways with his own, and then will sleep as they sleep.

But The Massachusetts Medical Society will live on; surviving all changes, keeping fully abreast with all advances, it will live on. Strong in the abiding affection and veneration of its members,

stronger still in the confidence and support of the people, for whose welfare it exists, but strongest of all in the ever increasing and ever expanding range of its benefactions, it will live on, and on; and if it shall be true to its history and equal to the opportunities that await it, it shall rise to higher—and still higher—planes of usefulness and honor, and the voice of millions shall reverberate down the ages in strains of thanksgiving, gratitude and praises for all the blessings it has secured to men.

Original Article.

THE IMPORTANCE OF MILK ANALYSIS IN INFANT FEEDING.¹

BY A. H. WENTWORTH, M.D., BOSTON,
Assistant Physician to the Children's Hospital, and to the Infants' Hospital, Boston.

[Concluded from No. 26, p. 686.]

It is interesting to compare the above results* with analyses which I have made of twenty-six modifications of milk procured from an establishment that devotes especial attention to the preparation of milk for infant feeding. Everything pertaining to the examination of these specimens was done by me and every precaution was taken to avoid any chance of error. Only unopened bottles of milk that had been delivered for the use of patients were analyzed. The contents were thoroughly mixed before examination. The same method was employed in the examination of these milks that has been described in the first part of this article. Two specimens were examined from each sample of milk to avoid any chance of error.

TABLE V.

No.	Date.	Formula ordered.			Formula supplied.		
		Fat.	Sugar.	Proteids.	Fat.	Sugar.	Proteids.
1	Dec. 18, 1901	4.	7.	2.	4.20	7.20	1.80
2	" 19, 1901	3.50	6.50	1.50	2.50	5.50	1.62
3	" 19, 1901	3.	6.	0.75	2.60	4.80	0.86
4	" 20, 1901	4.	7.	2.	3.50	6.50	2.28
5	" 20, 1901	3.50	6.50	0.75	3.20	5.50	1.02
6	" 21, 1901	1.50	5.00	0.80 } 0.85 } whey mixture	1.60	5.35	0.96
7	" 21, 1901	4.	6.	3.	3.60	6.80	3.04
8	" 23, 1901	3.50	6.50	1.50	2.80	3.75	2.16
9	" 24, 1901	3.50	6.50	0.75	3.50	7.25	0.86
10	" 24, 1901	4.	6.	3.	4.20	6.75	3.09
11	" 25, 1901	4.	7.	1.	3.40	7.40	1.03
12	" 26, 1901	3.50	6.50	1.50	3.20	5.90	2.20
13	" 30, 1901	4.	7.	1.	3.40	6.50	1.

¹ From the Pharmacological Laboratory of the Harvard Medical School, and from the Chemical Laboratory of the Massachusetts General Hospital

* See issue of last week.

No.	Date.	Formula ordered.			Formula supplied.		
		Fat.	Sugar.	Proteids.	Fat.	Sugar.	Proteids.
14	Jan. 3, 1902	3.	6.	1.	2.20	6.40	.
15	" 7, 1902	3.	6.	1.	2.60	6.40	0.81
16	" 9, 1902	1.	5.	2.50	1.	4.45	2.71
17	" 15, 1902	3.	6.	1.	2.40	5.90	1.03
18	" 23, 1902	3.	6.	0.80 } 0.85 } whey mixture	2.30	7.55	1.49
19	" 24, 1902	3.	6.	0.80 } 0.85 } whey mixture	2.30	5.75	1.63
20	" 27, 1902	4.	7.	0.80 } 0.85 } whey mixture	3.30	6.55	1.68
21	" 29, 1902	2.	5.	0.80 } 0.85 } whey mixture	1.30	6.25	0.67
22	Feb. 28, 1902	4.	5.50	2.	3.	5.75	2.30
23	Mar. 7, 1902	3.50	6.50	0.75 } 0.80 } whey mixture	2.	7.15	1.81
24	" 15, 1902	4.	7.	1.	3.10	7.	0.95
25	" 18, 1902	4.	7.	1.	3.40	7.10	0.87
26	" 24, 1902	4.	7.	1.50	3.10	6.50	1.19

TABLE V.
ANALYSIS No. 1.

Specimen No. 1.		Specimen No. 2.	
	Per cent.		Per cent.
Fat	4.20	Fat	4.20
Sugar	7.20	Sugar	7.20
Proteids	1.80	Proteids	1.80
Mineral matter	0.30	Mineral matter	0.30
Total solids	13.50	Total solids	13.50
Water	86.50	Water	86.50
	100.00		100.00
Actual weight in grams.		Actual weight in grams.	
Milk	5.	Milk	5.
Total solids	0.675	Total solids	0.675
Mineral matter	0.015	Mineral matter	0.015

ANALYSIS No. 2.

Specimen No. 1.		Specimen No. 2.	
	Per cent.		Per cent.
Fat	2.50	Fat	2.50
Sugar	5.50	Sugar	5.50
Proteids	1.62	Proteids	1.62
Mineral matter	0.22	Mineral matter	0.22
Total solids	9.86	Total solids	9.84
Water	90.14	Water	90.16
	100.00		100.00
Actual weight in grams.		Actual weight in grams.	
Milk	5.	Milk	5.
Total solids	0.493	Total solids	0.492
Mineral matter	0.012	Mineral matter	0.011