

Esmarch, antisepsis and bacillus : the annual address delivered before the Philadelphia Academy of Surgery, January 8, 1883 / by William Hunt.

Contributors

Hunt, William, 1825-1896.
Royal College of Surgeons of England

Publication/Creation

[New York] : [publisher not identified], 1883.

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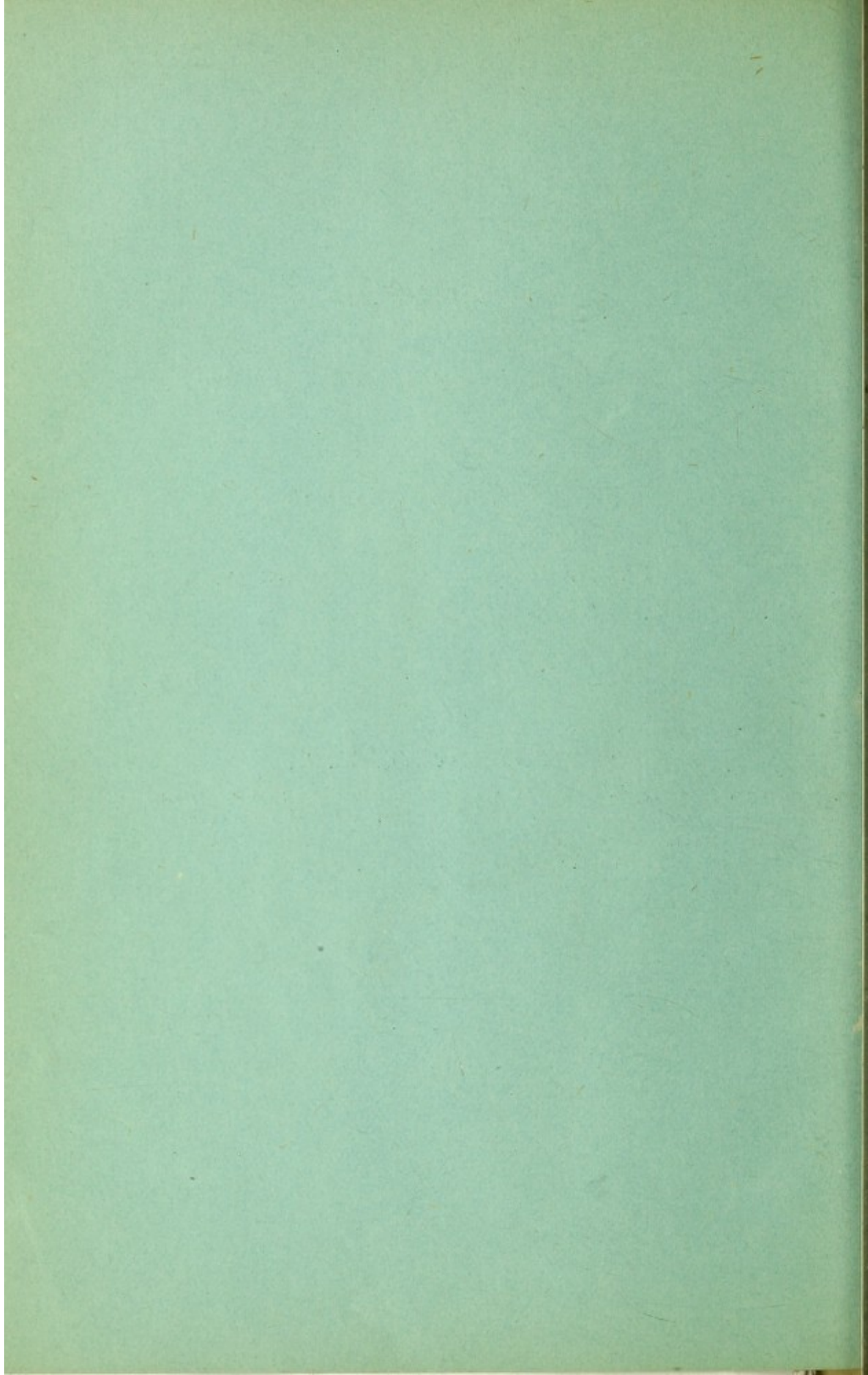
ESMARCH,
ANTISEPSIS AND BACILLUS.

THE ANNUAL ADDRESS
DELIVERED BEFORE THE
PHILADELPHIA ACADEMY OF SURGERY,
January 8, 1883.

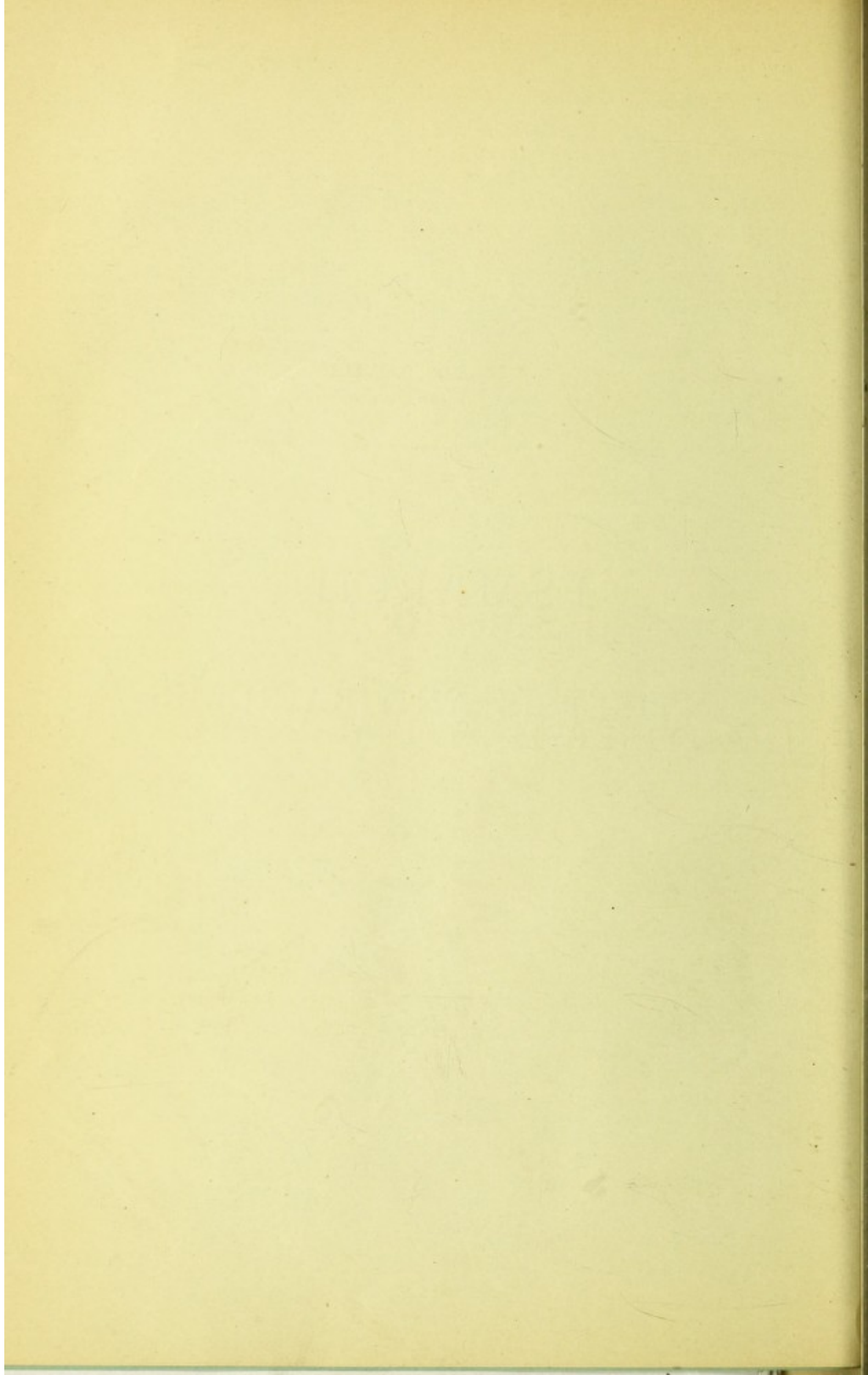
By
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FROM
THE MEDICAL NEWS,
January 27, 1883.



ESMARCH,
ANTISEPSIS AND BACILLUS.



ESMARCH, ANTISEPSIS, AND BACILLUS.¹

BY WILLIAM HUNT, M.D.,
SENIOR SURGEON TO THE PENNSYLVANIA HOSPITAL.

GENTLEMEN: How does the statement, so often made in these times, that everything is practical and demonstrative, and that the days for didactic teaching and oratory are past, agree with the fact that there not merely lingers, but actually exists, an intense desire on the part of most people to hear something said by somebody, it too often seeming to be a matter of indifference whether what is said be good or bad, so that the desire is fulfilled? Does not the reason lie in the fact of the vast superiority of the sense of hearing, over every other sense, as a means of intellectual culture? Science demands demonstration, but demonstration requires explanation; pantomime alone will not do, otherwise the deaf and dumb should be our intellectual superiors. They are, however, shut off in a much greater degree than the blind from that capacity of association with their fellow-men which is so essential to high degrees of mental cultivation. We can demonstrate to deaf mutes, but we cannot do so to the blind. These say "*tell* us all about it;" the others, "let us *see* it." These will ponder with the subjective, and show that, hearing, they have understood, while with the others there is reason to believe the objectivity of objects remains without analysis, and for the most part seeing, they see not. The modern introduction of lip language promises a great compensation to these

¹ The Annual Address, before the Philadelphia Academy of Surgery, delivered at the Hall of the College of Physicians, January 8, 1883.

unfortunate ones. I can see no reason why a deaf mute with a healthy brain, one who simply cannot speak because he has never been able to hear, having learned the language of speech, instead of his own, which is essentially a foreign one of signs, should not become the peer of any of his fellow-men. It may be said that deaf mutes have all the requisites for cultivation in books, after they have learned to read. But reading of a high order, to one who only knows the language of signs, must be a labor indeed, and I should argue without having made practical inquiry that it would be very exceptional, and in most cases an impossibility.

In studying, then, the respective merits of the didactic and the demonstrative, the blind and the deaf give us the most striking contrasts. Great contrasts, also, teachers most sadly know, exist among those who pride themselves on the full possession of all of their senses. Dumb talkers and deaf hearers thrive in such numbers as to almost justify Carlyle's estimate of population being "mostly fools." It may be that a tacit acknowledgment of this by the wise ones of the world is the foundation of the immense advance of demonstrative teaching over the other and older method. The teacher seems to say, if I cannot *talk* a fact into your head, I can at least *show* it to you; and if with ears and eyes both you do not take it in, it is your fault and not mine! Who knows but what these proud demonstrators, who now so largely occupy the field of knowledge, may, when the concealing veil of truth is lifted, have to realize that they have been engaged in a fleeting *show*; while the dialectician, by contemplation led, is enabled to reveal that to which their work is as nothing and vanity.

And now I, who have always been a demonstrator, being forced for the first time, by the appointment of our unrelenting President, into a didactic position, must cast about for a theme with which to occupy the allotted time this evening.

Biography is justly the favored resort on such occasions, for what is more interesting and instructive than the following of the footprints of the great and learned ones of the past? Our two great leaders have already indulged us in this way. John Hunter and his pupils and Baron Larrey have been most vividly pictured to

us. It is most tempting to follow the example, and I might take up Paré, or Cheselden, or Cooper, and discourse on the ligature, or lithotomy, or luxations, until my task was done. I might also go back, almost into the "night of time," and query as to what was then done for human ills, and show that medicine and the knife and fire were then, as they are now, at the command of those who had the skill, or the boldness, or the assumption to use them. But I shall choose none of these subjects, for my discourse will be devoted to a few of the occurrences of the past year, partly hackneyed and partly, I hope, fresh enough to interest you.

On the 2d of February, 1882, the distinguished Prof. Esmarch delivered a lecture at Kiel upon the "Treatment of the Wound of President Garfield." He was so kind as to send me a copy of this lecture. The high standing of the author and the lecture itself were looked upon as matters of such importance that, you will remember, they were made the subjects of a cable telegram to this country, and doubtless also to other places. A short statement of the opinions of Esmarch was given in the telegram. In his lecture the Professor states that he is led to select his subject from having noticed, through many English and American publications, that the widest difference of opinion exists among most distinguished American surgeons, both as to the wound and as to its treatment.

Short comments on five of the critics form the introduction to his paper. These, in the order named, are myself, from whom he opens the discourse with quite a lengthy quotation, from my letter published in *THE MEDICAL NEWS*, for Nov. 1881, which he characterizes as an attack upon antisepsis. Then follow the conclusions of Drs. Wm. A. Hammond, Marion Sims, John Ashhurst, Jr., and John T. Hodgen, taken from the celebrated and widely read article contributed by these four gentlemen to the *North American Review* for December, 1881.

In his concluding paragraph Dr. Hammond says, "it is denied that the wound was necessarily a mortal one," and that "the President did not have all the advantages of treatment which modern surgery is capable of affording." This much of that paragraph Prof. Esmarch quotes, and further on he says, "I must,

upon the whole, adhere to the last proposition of Dr. Hammond, but, indeed, from an entirely contrary standpoint." He then takes the history of the case furnished by Dr. Bliss to the *Medical Record* of the 8th of October, 1881, and from it, and from the report of the autopsy, he seeks to establish his points.

I have never met Prof. Esmarch personally, but he must be a capital example of the effect of climate on character. His work has the snap of a Norseman in it, and is very different from the tedious disquisition of many German writers. He was born at Tönningen, on the North Sea, but most of his life appears to have been spent at Kiel, on the Eastern shore—"by the wild Baltic's strand." In considering his subject, he gives a synopsis of the case from the materials at hand, and with abrupt, short, and sharp, if not always decisive, running comments, in the shape of foot-notes, he makes his thrusts. The reader who is not fond of foot-notes would miss the gist of the matter if he avoided them here. It would be interesting to know how they were managed in the lecture, as this, surely, could not have been delivered as printed; for, if so, much of its spice must have been lost.

The main point of the illustrious critic is, that *true* antiseptic treatment was not practised. The whole story is so familiar to us that I shall confine myself mostly, and therefore often abruptly, to the exact places where these pithy notes occur, and also, adopting the same style, I shall take the liberty of occasionally throwing in a note of my own, designating it with an H. The order will be a translation by me, back into English, of the parts of Esmarch's synopsis of Dr. Bliss's record, which are the especial subjects of his strictures; then Esmarch's notes; then my H's. After the record has been gone through with, only E. and H. will appear.

To begin: "The first physician who saw him (Dr. Townsend) carried his finger immediately into the wound; nevertheless, without finding the ball."

Note, "It is not stated that before this he washed and disinfected his hands."

H.: Railroad stations, as a general thing, do not keep twenty to forty per cent. solutions of carbolic acid on tap.

"The patient complained of a feeling of weight and numbness, later of pins and needles, and pain in the lower extremities."

Note, "Shock of the spinal cord."

"Dr. Bliss immediately examined the wound."

Note, "Nothing is said of antiseptic precautions."

"Then he carried the little finger of his left hand into the wound."

Note, "A dangerous operation without the spray."

"Thereupon he carried in a bent silver probe."

Note, "That it was previously satisfactorily washed and disinfected, is not stated."

H.: Clean hands and clean probes are at least as common in America as in Germany or Denmark. That "something is rotten in the State of Denmark," is a matter of common information.

"As the President was very desirous of being taken to the White House, a *temporary dressing*"—

Note, "What is that?"

H.: Why that is just what it says, a temporary dressing put on to last during transportation.

"In answer to questions, the President stated that the movement of the wagon did not cause any unpleasant feelings."

Note, "From which it is to be concluded that the spinal column was not separated."

H.: His attendants surely knew that much.

"As there was suppression of urine until six o'clock in the evening."

Note, "Urethral spasm."

H.: Better, insufficient or disturbed innervation from admitted spinal shock.

"A catheter was introduced and six ounces of clear, not bloody—"

Note, "Therefore, no injury to the kidneys."

H.: A good point in diagnosis.

"The carbolyzed-cotton dressing had become displaced and must be renewed."

Note, "An *antiseptic* dressing could not have been so easily displaced."

"During the night the outflow of dark blood continued, and made frequent renewals of the dressing necessary."

Note, "The dressing could not have been very thick."

H.: I find nothing about frequent renewals at this time in Dr. Bliss's report, but if they were made, how thick should the dressings have been? It appears to me that the abundant first and wet organic discharges would soon, in the hot weather especially, have become a true outward nest for infecting germs, instead of theoretical ones in the room.

Drs. Agnew and Hamilton arrived July 4th. "The temperature was 37.8° C., pulse 104, respiration 19."

Note, "Therefore the whole condition was very satisfactory. In spite of this a renewed examination was made with probes, flexible bougies, etc., in order to determine the course of the ball."

Note, "What for? According to his report, Dr. Hamilton disclaimed any probing. It is not stated whether the instruments were properly disinfected or whether other antiseptic precautions were observed."

H.: Here is a question of fact, and here is an extract from a letter of Dr. Agnew's, dated December 5, 1882. I wrote to Dr. Agnew on account of remembering what he told me on his return from Washington after his first visit there. He says: "You are right; no examination was made by the consulting surgeons at the time of their visit. They were informed that careful explorations had been made at the time of the shooting by Bliss and by Wales. Bliss admits that he committed an error on this point, writing as he did in New York and without any notes to refer to." Of course, Prof. Esmarch is excusable, as Dr. Bliss's report was his source of information. But one of his severest strictures is thus swept away, and the expectant treatment, as we will find further on, which he so ardently advocates in such cases, and with which I am in full accord, was carried out to the letter.

To proceed: "They were convinced that neither the liver, nor the kidneys, nor the intestine, nor the peritoneal sac were injured, and refrained from any operative interference."

Note, "They might have known this without this examination."

H.: As the examination was not made, they appear to have been a fairly bright set of men, with average reasoning faculties.

"On the 21st of July a pus collection was discovered

in the general integument which passed below the twelfth rib, towards the erector spinæ muscle, and underneath the latissimus dorsi; and the pus, with every change of the dressings, was carefully (Dr. Bliss says gently) pressed out towards the wound of entrance (Schussöffnung)."

Note, "Stromeyer and myself (references given) have most energetically spoken of the dangers of pressing pus out of wounds, especially, or namely, if splinters of bone are within."

H.: A very important thing to protest against, but I will again refer to this further on.

August 6: "A flexible catheter was passed downwards through the wound seven inches, towards the crest of the ilium. This was *now done twice daily* in order to rinse out the pus with an irrigator (hand fountain) filled with a solution of permanganate of potash."

Note, "In any case an obsolete and ineffective disinfection method."

H.: Whether this was done too often or not, those who were in attendance were the best judges of the requirements; also they were at perfect liberty to select their disinfecting fluid, and the permanganate of potash is a good one.

"In conclusion, Dr. Bliss remarks that the most approved antiseptic dressings were used during the entire progress of the case."

Note, "That, certainly, does not amount to much. There is a great difference whether one treats a wound with antiseptic *dressings*, or whether he treats it according to *antiseptic principles*. Against these much that is bad has been manifestly done here."

H.: Here are questions of fact, and the record to appeal to. Each one will have to judge for himself, though I hope not so harshly as the Professor has done, as to whether principles were subordinate to technic in the case.

Here follows a synopsis of the autopsy, illustrated by the familiar drawing of the perforated vertebra and fractured ribs. How any surgeon can look at that drawing and reflect upon the surrounding structures, which, if not directly, were by contiguity involved, and then say, not that it is not *possible* for a man so wounded

to recover, but that he *ought* to recover, through modern methods properly applied, it is hard to conceive.

Then follow the conclusions of the Holstein Professor, thus:

E.: "1. President Garfield did not receive an absolutely deadly wound. The liver was not injured; the peritoneal sac was not injured; there was no peritonitis; altogether there was no important organ injured, *with the exception of the vertebral column!* The injury of the vertebral bodies was not of itself mortal. Healing might have readily occurred if putrefactive ichor (*verjauchung*) had not set in. *In military surgery there are examples enough of recovery from similar injuries.*"

H.: Instead of giving any such examples, here follows a long foot-note about deer shooting, thus:

Note, "Every hunter knows that the stag mostly survives a peculiar shot, the so-called *hohlschuss*. This is a shot by which neither the viscera, nor the great bloodvessels, nor the spinal cord are injured. As the great vessels lie directly below the faces of the vertebral bodies, and the spinal cord directly above them, the ball, in this case, must go directly *through* a vertebral body itself. If the cord is wounded, the stag, on account of the paralysis of his hinder extremities, cannot take to his heels when the hunter comes to give him the final stab.

"If the descending aorta or the inferior vena cava is injured, he does not fall immediately, but very soon after the shot, on account of the great hemorrhage. The '*Hohlschuss*' is considered to be a bad one by the hunters, because by it they do not secure the game. It is also of no great consequence, because no surgeon comes to the rescue with fingers and probes, which carry corrupting causes into the wound."

H.: Allow me to suggest also that neither spray nor antiseptic dressings are at the service of the poor stag. "Pity 'tis, 'tis true." This is a point for the open method. To go on:

"Equally also the game is not killed or secured when it receives a shot that only wounds the spinous processes. In this case the stag falls because the hinder extremities are paralyzed momentarily by spinal shock. When the hunter approaches, however, the stag strug-

gies forwards for some distance like a seal, with his forelimbs, and then suddenly springs up, and on all fours he runs away and is quickly out of sight."

H. : If the deer is so soon out of sight and if also those who have received the Hohlschuss escape, how do you know whether they die or not? Are they not as likely to suffer, and to languish, and to die in their solitudes, with such injuries, as human victims do in the open day? The laborious preparers of anatomical specimens, both human and comparative, so numerous in Germany, should be able to show some specimens illustrating recoveries of the kind the Professor mentions. I believe they would be very rare from the stag.

As to man, the matter has been gone over so thoroughly by most competent authorities that it is unnecessary for me to burden you with the tedium of statistics. Museums have been ransacked and records have been searched. I have done something at it myself, and notwithstanding the Professor's assertion that there are examples enough of recoveries from such wounds as that of the President, I feel no hesitation in here challenging him to produce a single *human specimen* unquestionably proving a recovery from a PERFORATING gunshot wound of the body of a vertebra. This deer note also requires further criticism. A shot is spoken of by which neither the viscera, nor the *great blood-vessels*, nor the spinal cord, are wounded. What does the Professor call the splenic artery two and a half inches from its origin at the cœliac axis, where it was wounded? I call it a great bloodvessel. I have prepared and mounted many a one, and we all know what a striking idea of great vascular supply to the spleen and neighboring parts is given by specimens of it. This artery wound was enough of itself to determine a fatal result.

To go on with the conclusions. E. : "2. The putrefactive ichor (*verjauchung*) cannot be laid to the ball, as it appears to have carried no septic substance into the wound, for it was already encapsuled and the neighboring part of its track was obliterated, that is, healed.

"3d. Therefore the foulness, the putrefying causes of the wound, must *have been brought in from without*,

and for this, different points in the treatment are to be accused!"

H.: Is it logical in the search for the causes of phenomena, to abandon obvious and all-sufficient ones, and to substitute those which are vague, unproved, and theoretical? What a blessing it is to live and learn! In 1868, in the *Pennsylvania Hospital Reports*, in a paper called a "Contribution to the History of Toxæmia," I give an account of how I was poisoned and made seriously sick, from suddenly inhaling the fumes from an outburst of ichor, that gushed forth when I plunged my knife into a huge gluteal abscess. Innocently thinking that inward causes, possibly germs, may have been at the root of the trouble, I say, "we may imagine a micro-photograph taken of the material just as it gushes forth, picturing myriads of spores rising to a certain height and then falling dead like melting snow-flakes. The hapless victim who chances to be in the first part of the stream, catches up the living material, and affords a bed for its nourishment and propagation. Who knows, but what we may some day see such a photograph? Stranger things have happened."

My hopes of ever seeing such a picture have vanished, for I find I was altogether wrong. The spores were going the other way! I am told that, without having taken antiseptic precautions, the moment I made my cut, a myriad host of cocci rushed for the wound, and that some cowardly divisions as they passed me by, sought refuge in my mouth and air-passages, and insidiously poisoned me with their foulness. The invisible contest with the main army must have been fearful and altogether without the ramparts, and without quarter, for the gluteal sortie was successful, as the parts healed kindly and there was no evidence of prisoners. Notwithstanding my enlightenment, I have still a lurking belief that it was what came out of that man, and not what went into, or tried to go into him, that defiled both him and me.

To continue, E.: "The different points in the treatment that are to be complained of are:

"1st. The immediate examination of the wound with button probes and fingers, which were probably not disinfected (without antiseptic precautions).

"2d. The repeated examinations on the third day by several of the surgeons (probably so)."

H.: We have already dealt with this point.

"3d. The entirely insufficient antiseptic treatment of the wound (deficient in the technic of dressing).

"4th. The *squeezing* out of the wound undertaken from the 21st of July on."

H.: Nowhere, my dear Esmarch, in your synopsis of the record, nor in the record itself, does the word *squeeze* occur, but you take the deliberate liberty of substituting, in your summing up, "*Ausquetschen*" (to squeeze), for "*Ausdrücken*" (to press), and Bliss says, *gentle* pressure in one place, and pressure in another. Now, if you knew our beloved Dr. Agnew as we know him, you would know that he would not allow himself to *squeeze* any kind of wound, to work harm; nor would he allow others to do it if he could prevent it. In practice and in precept, he is most earnest against roughness of any sort. Shall I tell you, though, what I know he thinks? He thinks that, for a first-class squeezer, there is nothing equal to an Esmarch bandage, and it is on account of this very squeezing property that I have often heard him utter warning caution as to its use.

E.: "5th. After this the daily probing and syringing out of the wound with unsatisfactory antiseptic fluids (obsolete disinfection methods)."

"6th. The neglect of a radical division into the pus-cavity (8th August)."

H.: From Dr. Bliss's account, it was in my opinion radical enough, and Dr. Agnew writes to me, December 27, 1882, "free incisions had been made, one *five* inches in length, opening up freely the post-peritoneal space of the lumbar region, in order to favor drainage, which was also assisted by means of drainage-tubes." What more the Professor would have I cannot imagine. He appears to find fault here for not doing enough, and later on we will find him blaming the attendants for doing too much.

After noting the metastatic inflammation of the parotid, which he says did not advance to a regular metastatic pyæmia, the Professor goes on to say that "The President did not die of pyæmia, but of a relatively small hemorrhage, after his powers had become

exhausted by septic fever, by decubitus, by bronchial catarrh, and by hypostatic pneumonia. The hemorrhage followed a laceration of the splenic artery, which perhaps may have been caused by the ball, or by a splinter of bone; but probably it gradually formed later, under the influence of the ichorous degeneration acting upon a place contused by the ball, or against which a splinter of bone had been *squeezed* (*gequetschten Stelle*). Before the fatal hemorrhage, probably, a spurious aneurism had formed, which burst under the influence of the ichorous degeneration. If suppuration had not set in, the injury to the artery might not have produced any evil consequences."

H.: Why depreciate the hemorrhage by calling it relatively small? The record states that, besides some bloody fluid, the coagula which were gathered measured nearly a pint. Is it likely that a wound four-tenths of an inch long in so large an artery as the splenic would have healed spontaneously under any circumstances? Who of us here to-night, apparently in full health, would give much for his chance of life if he knew that there was suddenly thrown into his abdomen a pint of blood from an ulcerated splenic artery? Of the two, I would rather take my chance from a perforating gunshot wound of a vertebral body. Either would be enough to kill; our poor President had both conditions to contend with, and yet there are those who say he ought to have got well if he had had a fair chance.

I notice that the Professor does not say the blood was pushed out of the arteries after death by the embalmers' injection. He knows better than that!

To go on, E.: "It appears, therefore, that our colleagues on the other side of the ocean have not regarded our admonition as to the leading principle in the first treatment of gunshot wounds: 'Do no harm!' and the beautiful observations of Pirogoff, Klebs, Reyher, Bergmann, and others, upon the healing of the most serious gunshot injuries without suppuration, have made no impression upon them."

H.: That is fine! All we have to say is, that we have had a *few* gunshot wounds on this side of the water, and that we have made most beautiful observations upon them, and the outcome of those observations is that some get well and some do not.

E.: "The public, indeed, think that the ball is the most dangerous thing, and the soldier is happy when the ball which has been cut out of him is placed in his hand. The surgeon, however, should know that the ball itself in most cases does no harm. The real injury is what it has inflicted in its course, and what is superadded comes mostly from the fingers of the examiner."

H.: This is somewhat strongly put as to the last proposition, or else German fingers must be peculiar. With the other part I, and I think most of us, are in full accord, both as to practice and precept. I have written and taught in almost precisely the same words and to the same effect.

E.: "Practising American physicians seem, under the pressure of public opinion, to have assented to the proposition that much too *little* was done. But, according to my view, they did not do too little, *but much too much!*"

H.: It would be a fair logical sequence that, between these two extremes, just enough was done and no more!

Here is the climax and conclusion of this remarkable address:

E.: "If they had left the search for the ball entirely alone, and immediately after the injury treated it with *true antiseptic dressings*, the President probably might have been now alive, even as our Emperor, of whose numerous shot grains Langenbeck did not cut out a single one."

H.: Now, my dear Esmarch, is not this *ganz durchsichtig*? Is it not most uncommonly diaphanous? For one moment to compare the bird shot peppering of the Emperor with the frightful, deadly wound of the President! Is it your regard for the "divinity" that "doth hedge a king" that makes you do this? As I write, I have before me German newspapers, and an extra of the day, containing full accounts of the attempt on the Emperor and the after-history. On the 2d of June, 1878, towards three o'clock in the afternoon, the Emperor, whilst taking a drive, was wounded by two discharges from a double-barrelled shot-gun, loaded with shot, and fired from the second-story window of house No. 18, Unter den Linden.

Many of the shot were warded off by the Emperor's

helmet, of which he soon afterwards affectionately said, "How often, old helmet, hast thou done this duty for me! and now again thou hast protected my life." Nevertheless, there were wounds in the face and both arms, but none of any gravity whatever. A quarter of an hour after the outrage the Emperor took a cup of strong tea, and at half-past three Count Perponcher appeared upon the landing-place of the palace, and communicated to the assembled officers and cadets the facts that his Majesty had received three wounds from grains of shot—one upon the left temple over the eye, a second upon the cheek, and a third in the hand. He gave also to the feverishly excited masses the comforting assurance that there was no danger to the life of the Emperor.

The royal patient kept his bed for a very short time, and on the 10th of June, 1878, the eighth day after the injury, at 9.30 o'clock in the evening, the following bulletin was issued by his medical attendants, Drs. von Lauer and von Langenbeck and Dr. Wilms:

"His Majesty the Emperor feels himself strengthened by a night's rest, and after the dressing was finished he left his bed for his arm-chair. Most of the wounds are healed. The arm, however, is still swollen, but is not so painful on being moved." The case went on without a drawback to complete recovery.

To compare this case with the President's! Full well you know, Dr. Esmarch, no one better, that if two mortals of the baser sort, wounded respectively as these two great men were, had been brought together into your hospital, that the one, after the requisite examination and dressing, and possibly after a few days' detention, would have been consigned to the care of the merest tyro in the out-ward; while the other would have claimed all of your knowledge and skill as a surgeon, and all of your sympathy as a man; and, although you may have appeared like impassive steel at his bedside, your heart would have bled at his imploring looks for that aid, which you were powerless to give, beyond mere temporary help; and some morning, coming and finding his place empty, you would have thanked God that relief had come for both of you at last.

When I said my discourse would be devoted to a few of the occurrences of the past year, I had no idea that one of them would take up so much of your time. The *great* event of the year, as important, if true, to surgery as to medicine, was the announcement that Koch, in Berlin, had discovered the origin of tubercle to be a bacillus, which he named the bacillus tuberculosis. This event also was heralded by cable and wires the world over. I had intended to give the discovery more than a passing notice, and I might dwell upon the excitement which it caused among all classes, scientific and lay, especially though in Germany.

No one has more graphically pictured the story than Dr. Formad, in his lecture before the County Medical Society, on October 18, 1882. The bacillus was discovered. The emperor saw it and fled. Virchow was driven back. We are told by an imperial order that in military hospitals phthisical patients were isolated. The community was in a ferment. Koch's conclusions are, however, not unchallenged, as the masterly labors of Formad prove.

More interesting and instructive reading than his lecture, I do not know. Formad admits the bacillus, but denies the claim for it as a cause, and right well, by experiment and reason, does he sustain his propositions.

And now there is another antagonist at hand. One whom some of us know well, Dr. H. D. Schmidt, a former close colleague of Dr. Leidy and myself, in this city, but now of New Orleans. When one sees that man, broken in health, lame, and with hands terribly crippled with rheumatism, through exposure in the field (for this was his condition on his last visit here), one is lost in wonder at his enthusiasm, and at the way in which he produces his beautiful work. He writes me, under date of October 20, 1882, in a tone of apology, for not having sent certain preparations for the Mütter Museum: "Just now I am very busy in preparing a paper on the bacillus tuberculosis of Koch, with which I have been occupied the last three months. I have made very extensive microscopic researches on this subject, during which I prepared and examined several hundred sections of tuberculous lung tissue taken from a dozen fresh cases, besides other fresh

sections which I had on hand from my studies of the miliary tubercle during last fall and winter, and *I can say now that Koch's bacillus tuberculosis* appears to be nothing else but a *fat crystal* formed from the fat globules in the degenerating tubercular cells. I have found this pseudo-bacillus even in pathological neoplasms containing fattily degenerated cells. But my paper will tell you all about it." Here, then, is a man who has the temerity to deny the very existence of the bacillus which the emperor saw.

I would suggest whether it can possibly be the same thing that all of these men are looking at? Koch's and Formad's bacilli increase and multiply rapidly under nurture and cultivation. Schmidt's, if they are fat crystals (pseudo-bacilli), cannot surely do this.

And now I hear some specialist say, after the abrupt manner of Esmarch, "So *you* had intended to take up and discuss Koch's bacillus? What do you know about it?" My friend, did I say I *knew* anything about it? What do you *know*? I have a right to an opinion, have I not? I, who long ago put in a most touching appeal for maggots! Having noticed wounds healing kindly under masses of maggots, I reflected, that they were scavengers, eating only dead material, and so converting harming matter into harmless living substance. We have to get rid of them, it is true, because they will *persist* in getting into *wrong* places, and so give an infinite amount of trouble. Now are the plaguing micro-organisms of which we hear so much any more than consumers of dead material, serving (as we find them everywhere), a beneficent end, so long as they do not get into the *wrong* places? Molecular death is going on continuously in all living tissues. In the nice balance of perfect health, the results are removed so completely through the blood and lymph-channels (so beautifully described by Formad), and by other means, that there is no accumulation. When, however, disturbances arise, as inflammations, for example, from any cause, abundant *necrotic* products are the consequence, and these accumulate faster than they can be removed. Then come in the migratory micro-organisms. It is a question of food, and is consonant with what we know of the movements of hosts of higher animals, possibly

also of plants, and sometimes of man himself. As these organisms get into the *wrong* places, they, accumulating with great rapidity, help to choke further and irritate what has already started on an evil course, and so they become secondary and very fruitful causes of disease. We may comprehend, from Formad's views, how scrofulous subjects with narrow lymph-channels, are more readily affected than others. *To my mind there is no positive proof as yet of the organisms being SPECIFIC AND PRIMARY in their operations.* I must say, if they are so, I do not comprehend how any of us are alive.

There is none the less reason to get rid of them, or to keep them out, in disease or injury. The *practice* of antisepticism does not require a theory of a fixed character to make it good, as Esmarch seems to think, nor need it be limited to one method. From the germicide sprays and liquids and the cumbersome details of the dressings of Lister, we may come to the use of simpler methods equally as effective.

It is truly astonishing how the medical, and the German medical mind especially, is impregnated with this subject. It really does seem to be a bacillary craze. I have before me as I write, the November, 1882, number of Volkman's *Klinische Vorträge*, containing an essay by Theodor Kocher, "Upon the Simplest Means of Obtaining the Healing of Wounds by Agglutination Without Drainage-tubes."

This writer discusses in a very thorough manner the various articles used in antiseptis. The merits of carbolic acid, iodoform, salicylic acid, and the chloride of zinc, are reviewed. His own purpose is to advocate the use of the subnitrate of bismuth (wismuth), which he does with great care and detail, and gives experiments and illustrative cases. It is not my intention to consider the matter here, but I hope to give this substance a trial. Kocher says that it is undisputed that a great number of wounds heal by Lister's carbolic antiseptis process, perfected by Volkman, but it is also certain that this often does not happen. "I have seen," he says, "colleagues who tenaciously hold to the spray, with all the attributes of the Lister-Volkman technique, here and there, have the most grave cases of infection, after complicated

operations." Again, and here is a refinement to worry us! "As it is proved that with different forms of inflammation different micro-organisms come into action, that simple septic occurrences upon the wound and suppurations are not to be laid to the *same* cocco-bacteria, so it is to be inferred that by recent wounds and by already existing suppurations, the same anti-septic measures are not to be used."

What are we going to do about it? Different kinds of game, different kinds of ammunition. Buckshot for one, No. 12 for another. Before the surgeon can go to work, he must know the season, and what kind of germs are about, before he can select his germicide. The strict antiseptist is most skilled in strategy. He takes care of his base, and keeps the country behind him open. The theory must stand, and whatever mishap occurs is not due to it, but to incompetent officers, or failure in details.

It is the fashion now for writers and thinkers to express their ideas by epigrammatic generalizations, thus: Formad (agreeing with most recent pathologists)—"No inflammation, no tubercle." Koch—"No bacillus, no tubercle." I shall venture one which is much wider in its application, as it is not confined to tubercle alone, and according to the ideas I have expressed, it will meet the very great majority of cases, NO MICROCROSIS, NO MICROMAGGOTS; *that is, food mostly in the shape of necrotic products, precedes the advent of the micro-organisms, however these may originate, whether animal or vegetable, and in disease these necrotic products first, plus the organisms second, play havoc with their environment.* I know these views will be regarded as obsolete by some, and was disinclined to express them, until I was delighted to find that Formad, and I think also Dr. Joseph Leidy—and if so, I wish no higher authority—essentially hold them. Thus, Formad says, "The presence of bacilli (so far as our present research goes) is *secondary*, and appears to *condition* the complete destruction of the tissue already diseased and infested by them, and this destruction is in direct proportion to the *quantity* of the organisms, which thus regulates the prognosis. The tubercular tissue seems to serve merely as a nidus for the growth of the bacillus."

What do I know about this, indeed? Please remember, friend specialist, I have put away my microscope for the present, and have turned dialectician. I am much further and much deeper than you! You, surface searcher, *go on* with your mucous membrane; I have reached the inner consciousness, and through it, sitting, like old Teufelsdröckh, "alone with the stars," I may yet reveal a bacillus that will make you tremble.

No one can feel more relieved than I am at having passed safely through with the didactic. Now, do not despise me if I turn traitor at once, and return to my old love, the demonstrative. As soon as our President has dismissed us, the west room of the museum downstairs will be thrown open. There, among other objects of interest, you will find vertebra and vertebral bodies, and models illustrating the line of the President's wound; also photographs of it sent to me by Dr. Reyburn immediately after the autopsy. You will see splenic arteries, human and comparative. Judge whether, if wounded, a hemorrhage from one of them would be a trifle. You will also find Esmarch's portrait¹ and an Esmarch bandage—remember that this is a good thing, a very good thing; but how it can squeeze!—try it. I am sorry I have nothing to illustrate the wound of the Emperor. If it were reed-bird season, I could easily have had a boy up from the hospital, but reed-bird season is past.

Scientifically speaking, these objects are coarse compared to what is prepared for you in the east room of the library. There, under powerful microscopes, you will see Koch's bacillus by Formad, Schmidt's pseudo-bacillus, which I understand him to say is identical with Koch's. It does not appear to me to be so, but the special microscopists will have to settle this. You thus find that, even with them, seeing is not always believing, a point in favor of the didactic. The slides of Schmidt only arrived on Saturday evening, and have not been seen here before. You will also see live bacilli and other forms of bacteria. The microscopic exhibition will be almost entirely illustrative of the germs which are now considered to be such fruitful

¹ Ueber Land und Meer, zweiten Heftes, 1883, No. 4.

causes of disease, but which, as you have learned, some of us think are secondary.

Some of you of the laity may smile at scientific enthusiasm when you come to look at these minute rod-like lines, averaging, say the four-thousandth of an inch in length. But when you reflect what importance has been given to them by pathologists, and what influence they have already had, on German social life especially, you will understand the great interest taken in them. Some of the most noble and tender traits of humanity threaten to be undermined. The consumptive who has been heretofore lavishly loved and cared for, and nursed with tears and parted from with anguish, is to be isolated and shunned as a leper, if such doctrines as those of Koch prevail. Is it any wonder that some of us wish to look further before we adopt them?

NOTE.—There is authority enough for one in an address of this kind to allow the fancy some play, instead of keeping strictly down to the dry detail of science. In fact, the imagination in a right direction may be a great aid in developing scientific truth.

Tyndall has fully recognized Lucretius, and Goethe was prouder of his science than his poetry. Dr. J. Gibbons Hunt had under two microscopes at this meeting, what he called the "dance of life," and the "dance of death." Under one glass were swarms of bacteria (bacillus, and other varieties), fairly seething with life. Under the other were inorganic particles, which had been kept sealed up for two years, and yet they were in very active movement. A curious observation made by Dr. Hunt was, that these atoms were getting smaller and smaller as time went on. Whenever I see this life movement, and death in life, I think of the spirit lines in Faust. Goethe threw science and poetry into the same crucible, and subjecting it to the heat of his imagination, he poured out immortal ingots:

In the sea of life, and the storm of deeds
To and fro I rave,
Entwine in commotion
Birth and the grave.
An eternal ocean,
Webbed fabric of change,
Life's glowing range.
So on time's humming loom the warp I receive,
And the living garments of Godhead I weave.

