groin. This channel, now known to be due to the burrowing of pus from the wound, was supposed during life to have been the track of the ball. On an examination of the organs of the chest, evidences of severe bronchitis were found on both sides, with broncho-pneumonia of the lower portions of the right lung, and, though to a much less extent, of the left. The lungs contained no abscesses, and the heart no clots. The liver was enlarged and fatty, but free from abscesses; nor were any found in any other organ except the left kidney, which contained, near its surface, a small abscess about one-third of an inch in diameter. In reviewing the history of the case, in connection with the necropsy, it is quite evident that the different suppurating surfaces, and especially the fractured spongy tissue of the vertebra, furnish a sufficient explanation of the septic condition which existed."—D. W. Bliss, J. K. Barnes, J. J. Woodward, Robert Reyburn, F. H. Hamilton, D. Hayes Agnew, Andrew H. Smith, D. S. Lamb.]

It may be necessary, however, to repeat, inasmuch as contrary statements have been made, that the lungs contained not even the most minute abscess, and that there was no metastatic abscess found in any of the structures examined, except one less than half an inch in diameter near the surface of the left kidney. There were three small serous cysts under the peritoneal covering on the convex edge of the right kidney, each about the size of a vertical section of a large pea. The abscess found between the transverse colon and the liver was evidently not metastatic, but probably was caused by the original injury. There was no cicatrix or wound of the liver, nor anything to indicate that it had suffered injury in the slightest degree.

Since it has been thought by some that it was the duty of the surgeons to have ascertained positively the course and location of the ball, it is proper to consider whether either the one or the other was practicable.

As to determining the course of the ball by a probe, every anatomist will see that it was impossible, if he will consider the very tortuous course which the ball must have taken to reach its final destination; that it passed through the solid structure of the vertebra; and that no metallic instrument sufficiently firm to give indications of the course and direction which it took within the body could ever have reached the ball; nor would any surgeon of experience, familiar with gunshot wounds of the belly, in the absence of any satisfactory or conclusive evidence as to what course the ball had taken, venture to introduce a probe into the abdominal cavity for the purpose of exploring the supposed track; nor, indeed, if he had evidence as to the course and situation of the ball, could he have been justified in such an exploration. No point is better settled in surgery than that interference of this sort in gunshot wounds of the belly is meddlesome, useless, and dangerous; and had it been done, and a fatal peritonitis, in consequence, been set up, the surgeon doing it would have been justly held responsible for the fatal result.

As to the possibility of the extraction of the ball safely, it would have required a large tegumentary and muscular incision as a means of approach to the spinal column; the actual removal of the whole of the twelfth lumbar vertebra in order to furnish a sufficient channel through which the bold surgeon should advance with his instrument for extraction; and, after emerging from the cavity thus made in the spinal column, he would have to penetrate or grope his way cautiously between the ganglionic system of nerves, and arteries, veins, lymphatics, including the thoracic duct, all of which are vital structures, almost inextricably joined to each other on the front and sides of the spinal column, and the lesion of any one of which must have proved inevitably fatal.

Throughout the whole course of the treatment, contrary to what has been publicly said repeatedly, so far as it was possible to apply the system of antiseptic surgery advocated by Mr. Lister to a wound of this character, it was rigorously employed.

I am reminded now to say, in reply to some suggestions made from time to time, that we ought to have made a counter-opening in the lower portion of the long sinus which terminated in the right iliac fossa; that there was no period of time during the progress of the case in which we felt absolutely certain that what we recognised in the fossa as a point of induration was the ball; nor were we entirely certain at any time where the lower end of the sinus was actually situated; nothing but a very flexible instrument could ever be introduced, and, inasmuch as when introduced its presence in the track could not be recognised by the sense of touch, we were left without any means of determining, with a sufficient degree of accuracy to justify an operation, where the lower end of the channel was. Indeed, it is probable that the flexible catheter employed never reached the lower end of the channel, but doubled upon itself near the crest of the ilium. To have cut through, or between, the great mass of muscles in the lower portion of the lumbar region, for the purpose of making a counter-incision into a small

channel, the course of which we did not and could not know, even approximately, would have been, under any circumstances, an unjustifiable procedure—and especially so in the case of the President, whose hold upon life during all this long period seemed to depend upon a thread.

AN ADDRESS ON SPECIALISM IN MEDICINE.

Delivered before the Medical Society of University College, London.

By J. RUSSELL REYNOLDS, M.D., F.R.S.,
Consulting Physician to University College Hospital; etc.

THERE was a time when every man was his own doctor, priest, and lawyer; and, with a due or undue regard to himself and his immediate relatives, may have exercised the functions of those three professions to the entire satisfaction of himself and of those about him. But the age of perfect capacity to do everything has long since passed—if a man would pay due regard to anyone but himself; and yet it is not so very long since that I have seen persons who thought themselves able, not only to do all these things, but to command the Channel Fleet, or correct telephonic apparatus with its last and newest improvements, if such delicate operations were only confided to their charge. But are such persons competent and sane? or are they self-important people, who are ignorant and crazy?

When knowledge was very small, people, and those who thought that they possessed it, were very great; since information has become very great, and the means for acquiring it are also vast, the want of wisdom and the power to use it may make men very small.

Some departure from the primal condition of man soon became necessary; and yet, not many centuries ago, the "wise man", the "seer", the "priest", was the person to whom those about him would go if there were anything wrong in their mind, body, or estate; and it was mainly to the priest that such appeal was made. He was the man who could give help in those rough times; and he often did so well: giving counsel to those suffering with morbid thoughts, and medicines to those with upset bodies, and advice to those who did not know how to arrange about their neighbour's landmark; and also comforting those whose hearts were tried about the meaning of it all, and the ending of it all in some other world than this. He was the only man who knew anything outside his own daily routine of work; and so he was not only the parson or priest, but the doctor and the lawyer.

But what have we now? There are so many professions, and so many subdivisions of the work of each of them, that time would fail me to say anything of any other than our own. The priest, the doctor, and the lawyer, have been distinctly separated in the general nature and character of their several lines of work; and yet often they follow their respective callings hand in hand, and with mutual help. And it is with no disrespect to either profession that I say it is not outside the experience of some that the priest feels the pulse, and occasionally asks questions which he might have left unasked; and sometimes gives drugs, often of harmless "homœopathic" sort; but sometimes does things, and more often says them, which may be mischievous; and that the doctor goes outside his vocation in the matter of prayers and tracts; and that the lawyer does not always see the distinction that the clergyman sees upon ritual or doctrine, or that the physician holds to be of importance in regard to public or domestic health. We know that it is so; but we might do well, perhaps, to regard these acts in the light of spasmodic activity of the organs left in a rudimentary state, in either one or the other, by the processes of differentiation, evolution, and specialism, that have brought us to the positions we now occupy. I draw a sharp and broad line between those three words and their outcome in modern present life. "Differentiation" means "division of labour"; "evolution" means its upward growth in utility to all; and "specialism" means its abuse.

With the expansion of human life, and the increasing complication of its requirements, division of labour becomes a necessity. The "simple cell", with its simple elements, may, as it does in some "low forms of organisation", as we term them, do all that the cell needs to do. But some cells, looking equally simple, have within them powers that necessitate, for their real use, a differentiation of those powers; and so, out of a "primordial cell", with some appropriate materials

and conditions, muscles, nerves, and the like, are grown and rendered useful. And so it is with human life, and all its complex social arrangements. Some of the differentiated elements must do one thing, and some another; and so the "corporate body" (as it is sometimes called) of humanity requires this aid.

It would be simply waste of time if I were to say anything more about the entire necessity for division of labour. It would be waste of words for me to tell you, members of this "Medical Society"—for you must all know it quite well—that you cannot any one of you attain to the proficiency, in all of the several branches of your calling, to which others have attained by special work. You must be content, first of all, to master what is common to all, *i.e.*, the knowledge that will fit you to undertake all the work that will come before you in after-life—the common knowledge of facts, and of principles, without which you can have no good ground from which to start in any "special" work that you may wish to do.

Next let me say a few words about "evolution". Your able Assistant Clinical Professor, Dr. Poore, said, in this theatre, a few days ago, in the admirable and wise address which I had the great pleasure of hearing, many weighty things, well worthy of your consideration, as to the meaning and use of words. Let me urge upon you to realise that which he said, and to see carefully to it that such words as "evolution" and "survival of the fittest" do not, in themselves, convey the whole of biologic or social science. Evolution does not involve in its primary meaning all the disturbing elements that may derange its processes, when these have been brought into it from outside by perverse activities of surrounding forces; nor does the phrase "survival of the fittest" distinctly convey to every mind an answer to the question: "Fittest" for what? When I used these words, a few moments ago, it was my intention to convey to your minds that which, in the progress of time, has to be observed and valued in our profession, *viz.*, the progress from the lower to the higher ranges, from the simple to the complex; and, so far as individual work may make it so, the giving of the results which special labour could, or can, alone obtain, to those whose circumstances were such that they could not obtain this information for themselves. The results of their toil has often been given by these special workers to those who have no time nor opportunity for such direction of their industry; and they are of vast advantage to those who can use them well. By such mutual help all may derive advantage, and medical science may be carried, as it has been, to a higher stage of usefulness than that which it could otherwise have attained. But, by the expression "survival of the fittest", it seems to me sometimes questionable whether or no that expression, unqualified, would express exactly what we mean by "professional progress" in any other sense: than "progress of the individual". The response to the earnest feeling expressed in the words "*Il faut que vivre*" may be perhaps answered now, as it was years ago, by "*Je ne vois pas la nécessité*". In many instances, this division of work and this process of evolution have resolved themselves into "specialism"; and it is to that I wish now to direct your attention. It is, in my view, the wrong side of two right things and processes: the abuse of divided labour, and evolution of knowledge.

At the outset, let me remind you that there are thousands of members of our profession, practising in town and country life, who are absolutely free from the vice of "specialism"; but as absolutely dependent, if they do their work well, on the labours of the "specialists". All honour to them; their life is hard, and in the country beset with difficulties and risk to which the London or town practitioner is not exposed. The one has to undertake anything and everything, at a moment's notice; to treat apoplexy or pneumonia; to set a broken limb; encounter a case of placenta prævia; treat croup and diphtheria, cholera and chicken-pox; and to do this single-handed; and in the vast majority of instances he is equal to the occasion. In all sudden or acute maladies, he must do something before any outside help can come, and he must often do this promptly, and do it well. The other, the practitioner in a town, is equally liable to sudden calls and immediate responsibilities; but within ten minutes he can generally summon to his aid a professional brother to share his responsibility, or advise him from special knowledge, as to what he should do, and so much mitigate his sense of care.

But if the country practitioner be thus well-informed, and able to do his work, and to do it well, let me ask, in what way was he fitted for this work? And to this I answer, without hesitation, to the work of specialists, who have taught him, in the wards of hospitals, and in systematic lectures, and by their writings, what their special work has enabled them to teach, and which they could not by any but the rarest gifts or still rarer accidents have obtained in any other way. Other men have sown, and they have reaped, or entered into their labours.

It is not possible that the courses of instruction that are given in

this college and hospital could have been made of any use to the general practitioner unless the teachers had already been taught by their own "special" devotion, or by that of others, to separate branches of inquiry, so numerous that life is by far too short for any one man, by his own industry, to acquire even a superficial knowledge of them all, or of a hundredth part of them. The results of years of labour are summed up by your teachers, and these fit you to undertake the work of life. These, in physiology, in medicine, and in surgery, are the outcome of special work, digested, sorted, and put forth into shape the most usable for those who have to learn.

But, when I speak of "specialism", the word carries us into a region quite other than that of helpful work—into that of miserable retrogression, instead of "evolution"—into that of the "survival", not of "the fittest", but of the charlatan and the quack. You may not know all or even much of this; and I hope that you never may, because there is a belief in my mind that specialism may die out. I may not live to see it; but you, many of you, will; for, foolish as people are, they are beginning to see through much of it, if not all.

But let me make one word of distinction between specialism and the adoration of great names. For the former, our profession is to blame; for the latter, the public. I have known distinguished surgeons go down into the country to say whether or no a patient with rheumatic fever had endo- or peri-carditis, when neither of them would know which end of the stethoscope to use. I have known physicians treating onychia or stone, and doing minor operations in surgery, for which, as the results proved, they were quite incompetent; but also men in both major branches of the profession who have declined to accept such responsibilities, and who referred the applicants for relief to those who could help them wisely and well. Great names will often override specialism; but, as I have said, this is due to the fault or ignorance of the public, and has its reward.

If you ask me what I mean by specialism, I should say: "It is a morbid condition of the mind—of physician or surgeon, as the case may be—which shows itself in his regarding every patient who comes under his care as a sufferer from the particular disease which he has studied; of seeing the symptoms only from the point of view which he has assumed, and made quite clear—to himself—and of treating it in a manner which no one like himself understands; and of treating it to the utmost degree of attention, frequency, and speciality of treatment that his patient's patience will endure."

It is well to classify "specialities" and their commonly attendant "specialisms", and the classification which is now proposed is in a somewhat "natural order": first of all, the distinction between those who deal with men, women, and children; then, secondly, those who treat either of those groups of patients as sane, or insane; thirdly, those who divide certain parts of the human being upon a somewhat regional, anatomo-physiological basis, and take as their fields for cultivation nervous system, respiratory system, digestive system, and the like; fourthly, those who make particular diseased conditions, such as gout, fever, their line of study; fifthly, those who take special lines of work, such as medico-legal practice, in courts of law.

I. Men, Women, and Children.—To what does specialism often lead? There are many surgeons in large cities who never, except by caprice, accident, mistake, or good nature, find a lady in their consulting-rooms. They have to treat what they find in the so-called "sterner sex", and their practice becomes somewhat closely confined to a particular class of maladies that most frequently arise from irregular modes of life, of which many of them are ashamed. There are those who have chosen this speciality, and done what they have to do, with good to their patients, credit to their profession, and honour to themselves. But this cannot be said of all. Are there not some who prey upon the sense of shame, and extort money for needless operations, and worthless drugs, holding in terror over their victims the knowledge of facts that have been confided to them, and using that knowledge, which is power, to benefit, not their patients, but themselves? Are there not undergraduates and others who dare not "call in the family doctor?" and are there not "potent, grave, and reverend seniors", who are just as anxious as their sons may be that nothing of their malady should be known at home?

The consulting-room—as sacred as the confessional—is degraded to the lowest depths of degradation when it is used, or abused, as the engine of terror and extortion. But yet debts are incurred, and bills are drawn, and Jews are sought for, aye, and Christians too, in order to meet the so-called "obligations" of these sufferers. The surgeon has the power in his hand, and he knows it, and wields it often with a cruelty that no words of mine can utter, or efficiently condemn.

The surgeon who resorts to no such baseness as this might, I think, in another way, be helped if, occasionally, he had some other things to do, and were, every now and then, consulted by some few of what is

called the "softer sex", of pure life, and exalted character; some one of virgin soul, or matron dignity, who might break in upon the routine of daily practice, and teach, by their bearing and their anxiety, a higher lesson than that which is learned mainly in the chatter of the clubs. The surgeon becomes rough and ready, and there are hundreds to speak well of his skill; but often his roughness has risen to such point that men will say, "I cannot again see so-and-so, he is so outrageously rude and overbearing."

We know that there are a very large number of physicians, and a very small number of surgeons, who devote their lives to the treatment of women, and who do their work well; never shunting a duty, never overstating a case, never condescending to anything in their practice that they would object to inspection by the *élite* of their professional brethren. They have studied, have learned, and have taught; and their lives are as valuable as they could wish them to be.

But we know that there are others of whom this cannot be said. Physicians have coined names for trifling maladies—if they have not invented them—and have "set fashions" of disease. They have treated, or maltreated, their patients by endless examinations, speculations, applications, and the like; and this sometimes for months, sometimes for years; and then, when by some so-called accident the patient has been removed from their care, she has become quite well, and then there has been no more need for caustic, speculum, or pessary.

The profession is not altogether to blame for this. Such is the want of education on physiological matters, that women do think and feel a great deal more about any "irregularities" of a certain kind than there is reason for them to think or feel. They attach an amount of importance to dysmenorrhœa entirely out of proportion to that which they render to dyspepsia; and tight lacing and ball-dressing, and all that they involve, are disregarded, so long as these special functions are not disturbed. But when anything goes wrong in such way that the "lunar periods" are put out, then the specialist is consulted; and happy is it for them if the doctor himself do not suffer from specialism. If he do not, he treats the patient as she ought to be treated. If he do, too often he "makes a case" of it; and then follows the whole ritual of what I need not describe.

Some years ago *ulceratio uteri* was the fashion, and applications of various sorts were made two and three times a week in order to cure a malady which some eminent men, in special practice too, said did not exist. Lately I have rarely heard of this complaint; the disease has died a natural death, or has met with a violent end. But now, according to some authorities, there is scarcely any woman living whose uterus is where it ought to be. It is anteфлекed, or retrofleked, or verted this way or that way, so that all kinds of contrivances have to be adjusted or readjusted in order to cure backache, vesical irritation, albuminuria, hysteria, and I know not what besides. Now, when this is all done by some one who knows with what he is dealing, and honestly deals with it, as many do, much good may be accomplished. But when imitators of the good workers take such cases in their hands, nothing but harm can follow. There is meddling and muddling of the most disreputable sort, and the patients after a time grow sick of it and give it all up, and get well; or they go on from bad to worse, and become chronic invalids, and a great trouble to themselves, their relations, and their friends.

There are the consulting-rooms of some doctors that are as they ought to be; there are others soothed by "a dim (can I say?) religious light", into which the patients are ushered, and in the dim silence of which all this kind of "treatment" goes on. And not only so, but in their own homes, patients are sometimes treated by—or shall I say to?—a vaginal injection of warm water, which the physician himself must administer.

This kind of thing is "specialism", and in one of its worst forms. It is the taking advantage of a natural solicitude on the part of women, and of their undue anxiety; and, instead of correcting it by steady purpose and common honesty—is a pandering to the weakness of human nature, petting their patients into a feeble condition of dependence, and rendering them unfit for life, in all its personal and domestic relations.

If some surgeons may be at fault in seeing life only as they read it in the clubs, surely some specialistic physicians are also to blame in looking at life only as they see it through a speculum; and it would be of advantage to them if they could occasionally have men for their patients, and so lose a little of that tendency to soft words and compliments in the use of which they are such conspicuous adepts.

There is not much that need be said about specialism with regard to children. They are virtually unsexed, and so do not fall into the hands of either of the classes of practitioners that I have mentioned. But it is quite possible for the man who deals solely, or even mainly, with children's diseases to take an exaggerated view of their differences from those with which adults may be afflicted, and so construct a patho-

logy and a therapeutics which may be of disadvantage to the profession and of no real use to the child. Specialism can scarcely be said to exist here, unless it be in the physician sometimes taking upon himself the functions of the nurse, and seeing almost all things from a nursery point of view.

2. *Sane and Insane*.—The speciality of the physician who directs his attention mainly, or, it may be, even exclusively, to the charge of the insane, is a most direct advantage to the profession and the public; and this is demonstrated by the fact of its general recognition. This is true, however, only when the physician is at the same time competent to treat the other bodily ailments that may range themselves around the brain-disease with which he has primarily to deal.

The fault of "specialism", however, in this department is, that the so-called "mad-doctor" fails, sometimes, to see anything from a sane point of view. The *mens sana* is a myth to him, and he cannot bring himself to believe in its existence. He may think that it exists in *corpore sano* of his own possession, and in other *corpora* of his friends; but, beyond that narrow range, the sane mind is not to be found in those who are suffering from anything which may perturb the current of their thoughts. He may be right in regarding all people as somewhat mad, but he may be wrong in thinking that all men are so far mad as to require restraint.

There can be no doubt as to the fact that men and women have been, in the past, and sometimes—but much more rarely—in the present, dealt with as insane, when they were simply incompetent, vacillating, eccentric, extravagant, or perverse. But, the mode in which "specialism" becomes mischievous in these physicians is this: that they have but one idea; and that is, that the patient must be secluded, or sent to an asylum to be treated; and the upshot of such advice often is that the patient is not "treated" in any other sense than that he or she is delivered over to the care of attendants, who are not always of the best-informed, the wisest, or the kindest sort.

The physician who is affected with "specialism", in regard to the insane, seems to take his stand upon the threshold of an asylum—half in, half out; and, holding that to be the stand-point for the observation of human life and human history, bases his creed with regard to both of them upon the facts that lie behind him, and does not look, face-forward, into the world beyond.

3. *Regional Physiology*.—There are "specialisms" in regard of nervous system, of lung and heart systems, of digestive systems, and the like; and, with regard to them, I have but this to say, that the faults lie in the incompetency which many who have devoted themselves to one line of study often exhibit in their analysis and diagnosis of cases, into the complicated conditions of which their speciality of study has prevented them from entering.

Thus, I have known learned and distinguished "head-doctors" to speak of grievous palpitation of the heart as a merely nervous phenomenon, when the patient had dilated heart, with obvious valvular disease; of dyspnoea of very trying sort as a "nervous condition", when there were, in addition to dyspnoea, cough, expectoration, and the physical signs of emphysema, chronic bronchitis, dilated bronchi, and enfeebled heart; of short breathing described as "hysterical", when one half of the chest was filled with fluid.

On the other hand, "heart and lung doctors" have failed to trace that anything was the matter, because the stethoscope could tell them nothing, when it was obvious that disease of the spinal marrow in some cases, and disease of the kidneys in others, was the cause of altered breathing.

Again, it has often been my lot to see "digestion-doctors" worrying their patients with blue pill and elaterium, and bringing them to the verge of extinction from not having been able to discern that a diseased heart was the *fons et origo* of their sufferings.

4. *Special Diseases*.—With regard to these, "specialism" is sometimes more interesting and amusing than directly mischievous. There are consumption-doctors, cancer-doctors, gout-doctors, and the like. If the former send their patients to the Riviera, or the uttermost parts of the earth, when it was unnecessary for them to make such pilgrimages, they, at least, have had the benefit of seeing new scenes, and sometimes of acquiring the knowledge of a foreign tongue. If cancer-doctors have given, with grave looks and graver forebodings, a diagnosis and prognosis that may have been most distressing, yet sometimes tears have been turned into joy, when the tumour has disappeared, and the cancer of the liver has turned out to be a gall-stone. If "gout-doctors" have given their patients very wise instruction as to life and diet, they have been often rewarded by the extermination of "the fear of the evil" from which the patient suffered, and have found favour in their sight.

5. *Lines of Practice*.—The one illustration that I will give now is that of the "specialism" which affects many members of our profession

when they are in the frequent habit of giving evidence in courts of law, and I will take for example that which happens in the case of railway accidents. It is pretty well known who, among the physicians and surgeons of the day, will be called upon for the plaintiffs, the injured, and who for the defendants, the company. So familiar in legal circles has this knowledge become that the phrase, "So and so is a very rising witness" has been used, and not unfrequently. What does this mean but that members of our profession, whose only object should be truth and justice, "take sides"? Many years ago much of this came under my notice, and I alluded to it in some lectures which I had the honour to deliver before the College of Physicians; but, for many years I have declined to take any part in such proceedings, owing to the manner in which evidence was given by what I must call "party witnesses".

It seems to me quite unpardonable that six or eight members of our profession should meet together, and go through the farce of a so-called "Consultation" when no one of the physicians or surgeons, on either side, would interchange a single word with those on the other. I have tried to break through this absurdity more than once, and sometimes have succeeded in my attempt. But more frequently I have failed, and have given it up; and this because I have heard said in courts of law such things as were so utterly unscientific, ignorant, or perverse that it was simply impossible to deal with them. One instance will suffice; after rather understating the probable issue of a case of hemiplegia, the result of accident, it was urged, "on the other side", by an eminent surgeon, that the man was shamming, because, forsooth, he did not exhibit ptosis, strabismus, and dilated pupil, and that he had never seen a case of hemiplegia in which those three things did not coexist.

There are some members of our profession who have become specialists in this direction, who seem to think that everything that a man tells them of his subjective symptoms are matters of fact and of great importance; and, on the other hand, there are those who regard every plaintiff as either a knave or a fool, and most probably a combination of the two, but who never believe that any man is injured in a railway accident unless he has broken his neck, or has a compound fracture of his thigh.

It is time that this specialism should come to an end; and we, of our profession, can bring it to an end, if we will but insist upon it that the meetings together of the doctors is a consultation, and not a farce.

There are many other points upon which I should have liked to speak to you, of the specialisms that have so limited an area that it is quite impossible for any man, who is restricted to any one of them, to make an income, unless he does so by inducing his patients to pay him needless visits; such, for example, as to touch his throat with something every day; to turn the screw of his "instrument for the back" two or three times a week; or to do something to the Eustachian tube with equal frequency. But what I have said is enough to guard you, I hope, from falling into these mistakes, these "worse than crimes, these blunders".

In conclusion, let me revert to an illustration used at the outset, with regard to what "differentiation" means—viz., the springing into being of varied structures, with their varied uses, and of their development into the being of a perfect whole—a living thing, with complex powers—all its parts subservient to the ends for which they were intended, and for which they are so ordained as to conduce to the "survival of the fittest"; but let me carry the illustration yet further, and say that all these different members are members one of another, and that when any member suffers all the other members suffer with it; and that when any physician or surgeon does that which is ignoble, he not only does injury to himself, but to the whole of the noble profession to which he belongs.

THE EFFECTS OF OIL OF TANSY.—Dr. G. Jewett, *Boston Medical and Surgical Journal*, reports eight cases of poisoning with this drug. Case 1.—Fifteen drops at 11 A.M., teaspoonful, at 2 P.M.; convulsions, shock, general cyanosis; recovery. Case 2.—Teaspoonful to promote catamenia; convulsions and death in one hour and a half. Case 3.—Unknown quantity to cause abortion; convulsions; death in three hours and a quarter; no abortion. Case 4.—Teaspoonful to cause abortion; coma, recovery; no abortion. Case 5.—Four drachms; spasms and death. Case 6.—To cause abortion; rapid death; no abortion. Case 7.—Decoction of tansy leaves to produce abortion; paralysis; coma; death in twenty-four hours without abortion. Case 8.—Infusion of leaves daily for a week; also for vaginal injection; abortion, metritis, peritonitis; recovery after three months. As druggists are often asked for oil of tansy under various pretences, we believe the above table will be useful in reminding them of the dangers attending the sale of tansy and its preparations.

ON THE OCCURRENCE OF MICRO-ORGANISMS IN FRESH URINE.*

By WILLIAM ROBERTS, M.D., F.R.S.,
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THE fresh and healthy urine is perfectly free from bacteria or other minute organisms. The ordinary types of morbid urine, although they may contain blood, pus, or casts of tubes, are equally free from organisms. But there are conditions in which the urine, at the moment of emission, contains bacteria, that is to say, conditions in which the urine breeds, or becomes contaminated with, bacteria during its sojourn in the urinary passages. It is to these that I propose now to direct your attention. Before doing so, it will facilitate the understanding of my subject if we glance very briefly at the quasi-spontaneous changes which the urine undergoes after emission when it is abandoned to itself.

When a sample of acid healthy urine is set aside in a clean bottle or other glass vessel, it remains for a while apparently unaltered; but after a time it begins to change. In a day or two, it loses its transparency and becomes turbid. If a drop be now examined under the microscope, it is found to swarm with dancing dots and actively moving minute rods; these are bacteria. At first the urine continues acid, but the acidity gradually declines, and in two or three days the urine becomes neutral, or even slightly alkaline. This is the phase of incipient decomposition. Then a further change ensues: the urine becomes strongly alkaline from the production in it of carbonate of ammonia; it exhales an evil ammoniacal smell; the earthy phosphates are precipitated, and the chemical constitution of the secretion is profoundly altered. This is the phase of ammoniacal decomposition. These two phases run into each other without any appreciable break; but it is important to distinguish the one from the other; for, as we shall presently see, they correspond to clinical conditions which are widely different.

The changes just described as incipient and ammoniacal decomposition are entirely due to the ferment-action of bacteria. These organisms, or their germs, gain access to the urine with the dust particles which pervade the air, or with the subtle particles which float in every natural water and cling to all surfaces that have come in contact with water. The leading or principal ferment-change which occurs in decomposing urine is the transformation of urea into carbonate of ammonia.

The most common and numerous of the cases in which micro-organisms are voided with the urine are those in which the urine has become decomposed in this manner in the bladder. But there are other and different cases in which bacterioid organisms come away with the urine, and yet the urine is not in the least degree changed by decomposition. It is, therefore, necessary to divide cases of bacteriuria into a certain number of groups or categories. How many groups of this kind it may eventually be necessary to establish, I cannot say; the subject is as yet new, and the field of inquiry only partially explored. The examples which have fallen under my own observation up to the present time are divisible into four categories, namely:

I.—Bacteria with incipient decomposition of the urine.

II.—Bacteria with ammoniacal decomposition of the urine.

III.—Bacteria without decomposition of the urine.

IV.—Beaded filaments (micrococcus chains) without decomposition of the urine.

Each of these categories demands a separate notice.

I.—*Bacteriuria associated with incipient decomposition of the urine* is not uncommon, especially among women. The urine in these cases is opalescent when voided; it is feebly acid, neutral, or feebly alkaline in reaction. When examined under the microscope, it is found to contain bacteria in active motion. The urine, on standing, does not recover its transparency; on the contrary, the turbidity tends to increase, and it passes quickly on to ammoniacal decomposition. This condition is accompanied with few or no symptoms; there may be a little heat about the genitals or a slight undue frequency of micturition, but for the most part no complaint is made. This condition is not unfrequent in females of weak health suffering from leucorrhœa, and among men who have suffered from stricture and who have frequently used catheters or bougies. It is in itself of no importance, and may persist for years without requiring attention; but it assumes a graver significance if, as

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