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ADDRESSES.

A BRIEF REVIEW OF SOME OF THE RECENT PRACTICAL ADVANCES IN MEDICINE AND THERAPEUTICS.

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The function of the member of this Association who is called upon to deliver the annual address in medicine is not to give in detail the course and results of laborious laboratory investigation nor to weary his hearers with long reports of cases. It is rather his duty to present as far as lies in his power certain broad views of the present status of the non-surgical side of our work as doctors of medicine.

The consideration of one particular field of work is also out of place and I have therefore decided that a brief and necessarily imperfect discussion of the present status of therapeutics and diagnosis would enable me to fulfill, to some extent at least, the duty which has devolved upon me. The department of surgical therapeutics and diagnosis does not fall to my care and will be ably discussed by Dr. Mudd tomorrow.

By therapeutics I do not mean to indicate a subject already well worn, though new, namely, an enumeration of the new remedies which the manufacturing chemists are foisting upon us with an ardor beyond description and with a success, so far as numbers are concerned, which is appalling to many conservative members of our profession. These drugs have their proper place and form only part of the great line of advance which while it is broken now and again by the development of a weak spot is nevertheless moving forward, bringing with it much cause for congratulation and many promises for even more beneficent results in the future. To regard our therapeutics of to-day as improved only because of the invention of such compounds is to ignore the whole cause for encouragement, namely the increasing tendency to place all our remedial measures on a rational basis.

Very closely associated with this improvement in therapeutics is the increased accuracy of diagnosis which modern research has placed in our hands, for the correct diagnosis of a case must always be an important preliminary to proper therapy. Not the least of these diagnostic gains is the ability which we possess to recognize the presence of tuberculosis when the signs of the disease are so indefinite that positive information of the condition of the patient can not be gained. Again in many instances where unusual and aberrant symptoms are present, microscopical examination of the blood may show the

presence of various micro-organisms. Nor should we forget the valuable aid rendered us by the advances in the diagnosis of gastric affections by the use of the stomach tube and the microscopical and chemical examination of the gastric contents, more especially in regard to the absence of hydrochloric acid in cancer and its excess in cases of gastric ulcer. Finally, an important aid to diagnosis in gastric disorders was the introduction of salol by Ewald to determine the motility of the stomach and the question of dilatation or atrophy.

The day is past when there is any excuse for the physician dodging a diagnosis and treating a patient on the indefinite basis of "general principles," and the public have learned that the shotgun prescription of years ago is only a cover for the ignorance of the medical attendant who expects the various drugs to influence an area the diseased state of which he is himself unable to discover.

The prescription of to-day is to be written only after careful examination and study of a case, and its constituents must be directed towards the condition they are to modify. It is necessary therefore that diagnosis should be well enough advanced to enable us to discover the exact stage of a malady and the precise condition of the patient's system in addition to the knowledge that a given disease is in existence in his body.

Fortunately the improvements in diagnosis and treatment have kept pace with one another although other branches of medical science have fallen to the rear. The advances have been rapidly yet gradually accomplished, not by startling leaps but by small and lasting accretions which have formed on the sides of our older views, either modifying their appearance or completely changing their aspect.

These gains have not been heralded to the profession and the world at large as have many of the newer surgical procedures which are often so brilliant at their inception that they dazzle the professional eye to such an extent as to blind it to the subsequent shrinkage which takes place in their practical importance. Sudden rushes are attractive and for this reason even the laity often chide the physician for failing to advance as rapidly as the surgeon. The very character of a surgical operation is destined to attract attention from the more humdrum, but none the less important, medical methods, yet it is the latter which require in many instances a greater amount of attention to the minute points of differential diagnosis. As I have pointed out elsewhere the relation of the knife to a diseased tissue must always be identical, while the relation of a drug to a disease process must constantly vary with the perverted function of the special protoplasm involved. The one carves the wood the other grafts upon its living cells impulses which alter its activity. In the one case the questions of shock and repair are

the points to be considered; in the other, the ever changing vital processes still more varied by perverted function must be balanced and their importance weighed. For these reasons it is impossible for the physician to advance his methods by strides or bounds, and he can only remember the story of the hare and tortoise when accused of being dilatory.

Leaving these general views of the question of medical, in distinction from surgical advancement, let us if possible discover in what directions we have really made distinct advances. There are those who have seen method after method of diagnosis and treatment rise and fall, and who have in consequence become pessimistic as to the value of new ideas, partly perhaps because they have not employed them properly. There are others who are equally optimistic and excessive in the laudation of new or old methods of diagnosis or remedial measures. A careful survey of the field certainly shows that a gain commensurate with the amount of labor expended has been made, and the only loss or standstill that can be found is the tendency of the profession in general to rush after new things to the neglect of the old, which in many cases deserve more attention than is given them.

A very important part of this advance has been recognition of the fact that many conditions heretofore regarded as distinct individual maladies and treated accordingly, are in reality merely manifestations of functional disorder elsewhere. No more interesting example of this can be adduced than anæmia. But a few years ago we were taught that anæmia was a state in which the blood was impoverished, and these conditions of anæmia might be divided into those which were simple and essential—or in other words those which would respond to treatment and those that would not. We had this empirical information, and we also knew by experience that while iron was useful in one form of simple anæmia independent of malignant disease, arsenic was more valuable in another. Later than this we came to regard anæmia chiefly as a manifestation of disease in certain blood making organs or an important symptom of many perverted functions, and finally the invention and employment of the hemacytometer and the hemoglobinometer has enabled us to separate anæmia into a condition in which there is a decrease in the number of corpuscles or a decrease in the amount of hemoglobin in each corpuscle. In other words, we now know that pallor may be due to too few corpuscles or too little hemoglobin, and this being known it is only a step to the understanding of the empiricism of years ago in regard to the use of iron and arsenic, namely: that in that form of anæmia due to a diminution in the number of blood cells arsenic did good because by its alterative powers it increased cell activity in blood cell making organs, while where hemoglobin was lacking iron came particularly into play. For these reasons we find that small doses of alteratives, such as corrosive sublimate and other mercurials, often overcome the anæmia due to deficient manufacture of cells, and we may explain why it is that arsenic usually fails to do good in chlorosis, an anæmia of deficient hemoglobin, and succeeds in pernicious anæmia, which is characterized by a deficient number of corpuscles but relatively increased hemoglobin.

It is unfortunately only too true that the entire

subject of blood making and blood breaking is as yet very imperfectly understood, but our therapeutic facts rest on rational grounds now, if not before, and if the pathologist will give us more information upon these subjects, other remedial measures will be introduced or the empirical employment of others still further explained. Practically speaking, the therapist recognizes two very important points, the causes of which the pathologist must eventually solve, namely: that one class of anæmias are due to defective or deficient hemogenesis and another to excessive hemolysis. The former are generally believed to form the simple class and the latter the essential or pernicious class. It is in the deficient hemogenesis class that we fail. More than this, the causes of excessive hemolysis are so various that we can further divide them into removable and permanent; the removable being represented by the cases in which copræmia or auto-intoxication takes place, and the others by the true pernicious anæmia, about which we really know very little, save that most observers find evidence of profound hemolysis in the percentage of iron in the liver; while in the dark colored urine they believe a destructive agent exists which prior to its excretion has slaughtered many corpuscles. Unfortunately it is at present impossible for us to separate clinically the hemogenous anæmia from that of hemolytic excess unless we find evidence of great corpuscular disintegration in a copious elimination of hemoglobin in the urine, or a jaundice evidently hematogenous in character, or a large number of defective corpuscles which would perhaps indicate defective hemogenesis rather than that they were scarred veterans of a battle with a poison in the liver cells or elsewhere. Post-mortem signs often aid us in the differential diagnosis, but this is too late to do any good to the doctor or patient.

There is one point, however, about which there can scarcely be any doubt, and that is that in many cases iron is greatly abused, being given where there is no indication for it, or more frequently given in excessive doses. By excessive doses I refer to as much as six to twelve grains a day of reduced iron. The amount of iron in the human body is very small, and every study ever made of its absorption and elimination after absorption has shown that these processes are very slow. Hamburger recovered from the feces nearly all the iron administered, and Jacobi proved that even when the iron was injected into the veins 10 per cent. was at once eliminated by the bowels, liver and kidneys, and the remainder deposited in the liver, spleen and other tissues in the same manner as is any metallic substance. The researches of Gottlieb have also been in confirmatory lines. When we consider that there is in the human blood only about thirty-nine grains of iron all told, we can see that the use of twelve grains a day in the course of a little over three days places a double quantity of the metal in the economy which is not needed, and is either cast out or deposited at any convenient spot to lie undisturbed until it can be extruded.

Much of course depends upon the cause of the anæmia, but there is only one excuse for the use of the doses named, viz: a condition of the digestive apparatus which results in the formation of a sulphide of iron in great quantity, so that only an infinitesimal amount escapes into the system. This explains the empirical fact that in some cases of chlorosis or intense anæmia iron has to be given in large doses to accomplish any good.

One of the best and most recent papers on this subject is that of Ralph Stockman, who gives a masterly summary of the subject of the absorption of iron in chlorosis. In this summary he points out that we have three chief theories as to the action of iron in anæmia. The first, the absorption theory, is based on the fact that as iron is taken into the body with the food, the iron of the hemoglobin must be obtained from this source, and therefore that medicinal iron given by the mouth must be absorbed. The second theory rests upon the belief that iron is not absorbed when given by the mouth, in addition to that in the food, but simply acts as a stimulant to the mucous membrane of the alimentary canal, therefore increasing the digestion of food and so overcoming anæmia by the general improvement coincident upon proper nutrition. The third theory is that of Bunge, namely: that in chlorotic conditions there exists an excess of sulphur or sulphuretted hydrogen in the bowel, which changes the iron in the food into a sulphide of iron which he says can not be absorbed. He believes that the inorganic iron which is given as a medicine saves the organic iron of the food by combining with the sulphur, and so indirectly cures the anæmia by the protection afforded the food iron. It is important to remember that each of these theories have been supported by many careful experiments, but it is also well to bear in mind that both the hypotheses and the experiments supporting them may be erroneously based. Thus we have no right to imagine that the inorganic preparations of iron have a stimulating power over the alimentary mucous membrane, or even if they have, that this power is exerted in the peculiar line of aiding in the absorption of the organic iron of the food. Again, the researches of Hamburger, Damaskin, Gottlieb, Muller, Jacobi and Socin which show that after the internal use of inorganic iron there is no increase in the iron in the urine, are valueless so far as the conclusions drawn by them are concerned, namely: that as there is no increase in iron in the urine there is none in the blood and therefore it is not absorbed. These conclusions are not justified, because they are based on the erroneous view that because iron is not in the urine it is not in the blood, and because it is not in the blood it is not absorbed. Every one knows that in the case of chronic lead poisoning when the body is saturated with the metal there is often no lead in the urine, the poison being deposited in the tissues, and if this is true of lead it may be of iron. Particularly is this to be remembered when we find Stockman quoting the researches of Mayer, Bidder and Schmidt and a host of others who have proved that we are not to look to the kidneys as the path for the excretion of iron, but to the intestinal walls. Finally, Stockman has proved that when iron is used hypodermically it cures anæmia when it can not stimulate the digestion or counteract sulphides.

Leaving the interesting and intricate subject of anæmia and its diagnosis and treatment we find another condition now recognized as a symptom, though still often classed as a disease, namely asthma. In reality asthma is no more a distinct disease than is dropsy. It is a manifestation of disease or disorder in other organs which result to some extent in local pulmonary signs. I need only mention the fact that every case of this condition will prevent some evidence of reflex irritation or other extraneous cause if it is carefully sought for, such as metallic poisoning,

hay fever, cardiac, or naso-pharyngeal disease. We have therefore made an advance in the gradual knocking away of the props holding asthma on the pinnacle of being a distinct disease and in a given case must direct our diagnostic and therapeutic powers first to the discovery and removal of the cause and second to the relief of the local manifestation at the time of the attack, including too, in many instances the treatment of the secondary conditions caused by the paroxysm. It will be remembered that at one time we had two schools of thought concerning the actual local cause of an asthmatic seizure: the one claiming that the obstruction to respiration was due to swelling and hyperæmia of the mucous membrane of the bronchial tubes; the other that it was the result of a spasm of the muscular fibers of these tubes. Now we know that both conditions exist and that both are probably the result of irritation or perverted function of the vagus nerves, for the filaments of this nerve are not only supplied to the bronchial muscles but also the local vessels. Further than this, the peculiar relation of these important nerves to the cardiac, gastric and pulmonary area and to the recurrent and superior laryngeal nerves all tend to complete a chain of physiological evidence hard to equal, particularly when we remember that the vagus is the governing nerve of the respiratory function and that its origin is intimately associated with important vital centers and nerve roots in the medulla. Here, then, we have an improvement in etiological knowledge which enables us to discern a cause, and give an explanation of almost every empirical fact regarding the use of anti-asthmatic drugs, since nearly every one of these we now know depends upon its action upon the unstriated muscular fibers, the vagus nerve or on the depression of reflex activity, for its therapeutic power.

There is still another condition which is gradually passing from the list of diseases into the list of symptoms, namely diabetes mellitus. Its passage from the dignity of a disease in itself to the less important place of a manifestation of a disease process underlying it, is only delayed because the physiologist and pathologist have not succeeded in fully explaining the process of sugar manufacture in the body in health and disease. Even at the present time we scarcely appreciate the numerous causes which have already been discovered as capable of producing this symptom. Not only does injury to Bernard's center in the fourth ventricle result in hepatic hyperæmia which in turn results in glycosuria, but section of the vaso-motor fibers in the spinal cord at such a point as to involve the nerves of the liver results in similar disorder according to Schiff. Pavy has proved that destruction of the superior and inferior cervical sympathetic has this effect and it has been known to follow intense inflammation or irritation of such nerves as the sciatic and trigeminus, and some have gone so far as to explain the glycosuria seen sometimes in those suffering from sciatica to the sciatic irritation.

Aside from these nervous factors governing glycosuria very much more recent studies have shown that the gradually growing recognition of diabetes as a symptom is founded on a sound basis, for we have now before us undeniable evidence that such a thing as pancreatic diabetes may occur. Years ago it was first noted as a physiological possibility, but the recent studies of Minkowski and von Mering with

several others have placed the entire question in a better light. Extirpation of this gland results in glycosuria but if one-fifth of it is left behind the sugar does not appear in the urine and this, with other facts, points to the pancreas having a power through a ferment rather than by its general secretion. Clinical cases are also now on record in which after death there has been found a condition of fatty degeneration or atrophy of the gland, either as the result of some morbid process or indirectly through the impaction of calculi in the pancreatic duct which led to fatty degeneration or a cirrhosis as in the cases recently recorded by Freyham. Therapeutics can do more for the diabetic than the pathologist can tell him of the cause of his disease, but the recollection that diabetes is a symptom of a number of conditions should lead the physician to the recognition of the fact that if a remedy successful in one case fails in another it is probably because he has failed to discover that the cause in each case is not identical.

The ability to apply observation to cases with resulting accurate diagnosis and still more accurate therapeutics can be admired in every instance where it is observed, but it would be difficult to name a more eminent illustration of the beneficent results of such a trinity of good offices than is pictured by the work of Lauder Brunton on the nitrites. Brunton had noticed two facts, the one in the sick room, the other in the laboratory. By the bedside he found that in many cases of angina pectoris a condition of intense arterial tension existed which was manifested not only in the cord-like condition of the arteries but also by the pallor of the skin due to contraction of the peripheral capillaries. This condition often preceded the attack of pain. Instead of tossing this discovery aside with the dogmatic belief that it was a secondary result of severe pain, he looked further to see if there was a causal relationship between the two conditions. Remembering that the over-distension of any muscular cavity such as the bladder or intestine results in pain, it occurred to him that a spasm of the arterial system might result in such over distention of the heart muscle, already feeble, as to cause the typical pain of angina pectoris and this hypothesis was supported by a recollection of several facts, namely, that exercise always produces contraction of the blood vessels partly by the contraction of voluntary muscles on large areas of capillaries by the increased demands on the circulation, and finally that it is in gouty persons with irritable blood vessel walls that angina pectoris most frequently asserts itself.

In the laboratory Brunton had found that the nitrites all lowered arterial pressure and by so doing caused the heart to empty itself very readily of blood, partly by depressing the vagus nerves and so permitting increased cardiac action. Here then was, in theory at least, the very remedy which should meet the indications in heart-pang and the practical application of the hypothesis has given us that valuable method of treatment so universally employed.

The interesting relationship between physiological and chemical research and practical therapeutics when they are associated through logical deduction can also be readily studied in the production and use of a number of compounds, but in none other more satisfactorily than in the nitrites. Chemistry showed the various combinations which could be

formed in this series and proved that some of them were more stable than others, the pharmacologist showed that those who had stability were more slowly decomposed in the animal organism, and in consequence that their action was not so sudden nor so fleeting, and the therapist recognizing that an unstable preparation, such as nitrite of amyl, could only be used for momentary effects at once found the stable compounds of peculiar value when continued action was desired. It is because of this stability and consequent comparative slowness of action that the nitrite of sodium, potassium and nitro-glycerin find favor and that the still more recently employed and more stable compound, cobalto-nitrite of potassium bids fair to come into general use.

I can not leave this subject without pausing for the moment to insist on the importance of this question of seeking always for the cause producing any symptom, in order that our therapeutic measures may be well applied. Many of us have doubtless experienced in boyhood "the pain in the side" about the heart which was such an annoying and incapacitating complication of foot races or the game of hare and hounds. For a number of years I wondered what the explanation of this pain was, and still more why it passed away as the boy gets "his second wind." The reason is now evident. The first effect of severe exercise is to cause a rise of arterial pressure by reason of increased circulatory activity; this is soon accentuated by the obstruction offered to the flow in the capillaries of contracted muscles which ordinarily are vast capillary areas, and finally the effort generates an increased amount of carbonic acid gas in the blood which stimulates the vasomotor center and still further increases arterial resistance. As a result of these agents and the altered pulmonary circulation the heart becomes distended with blood and pain results. Almost at once, however, the natural demand for blood made by all organs when in activity causes secondary hyperemia in the peripheral capillaries, the lungs are able to catch up to and eliminate the CO₂ and the heart is able to carry on its duty with ease, even though the excessive exercise be continued or in other words the boy gets his "second wind." There are good reasons, therefore, in the custom which prevails among some athletes of taking strychnine or caffeine or black coffee before a foot-race on the ground that it saves their wind. By means of these powerful cardiac and respiratory stimulants they enable the heart to overcome resistance and avoid distension of its cavities and also increase the ability of the nervous centers to discharge impulses which the nerve trunks may the more quickly carry to the more tributary muscles. Such a form of explanation underlies the pathology and treatment of "shock," a condition often wrongly treated because its rationale is not understood. All causes which give rise to great nerve impulses result in some degree or stage of shock and these states are chiefly manifested in the heart and vasomotor system. As has been well pointed out elsewhere, any frightened woman will exclaim, "you frightened me so my heart stood still," and a second later will remark, "just feel how fast my heart beats." The primary shock has so stimulated her inhibitory cardiac nerves that they at first inhibit the action of the heart muscle and then having acted excessively reaction sets in and they permit the heart to move on uncontrolled even to an ordinary degree.

This condition in a more or less modified form is found in all cases of "shock." It has been proved by experimentation on the lower animals that it is practically impossible to produce death by irritation of the vagus and we know that death rarely occurs in the first stage of shock unless there exist previously cardiac disease in the muscle or valves. We very rarely see shock in its first stage except in the man who has "his breath knocked out of him" by a blow, not over his lungs, but over the solar plexus which reflexly results in vagal irritation. It is the second stage of shock which we are called upon to treat. Here we have the entire vascular area in a condition of profound relaxation, a condition exceedingly dangerous to cardiac integrity. Nothing is more stimulating to a man in accomplishing a task than a moderate amount of opposition or number of difficulties, and nothing is more stimulating to the heart than the normal resistance offered by a blood pressure maintained by an intact vasomotor center. The blood vessels relaxed the heart pumps, as it were, into vacancy or as impotent of result and as exhaustingly as the wheels of an engine on a slippery rail. The result is rapid failure of the cardiac muscle by reason of futile endeavor and because the coronary arteries are imperfectly filled. The great arterial relaxation also results in serious changes in nutrition and the profuse sweat weakens and chills the body. It is at this time that the employment of belladonna or atropine becomes valuable in the extreme. By its peculiar influence on the vasomotor center it produces normal vascular tone, stops the leaking skin and steadies the circulation, simultaneously tending to raise bodily temperature. If at the same time hot coffee be given as a cardiac tonic containing heat, and strychnine is used we have a fulfillment of every indication.

Elsewhere I have called attention to what seems a common error on the part of many practitioners, namely, an unnecessary dread of good sized doses of strychnine. We frequently see $\frac{1}{60}$ or $\frac{1}{80}$ grain given at a time when better results would be obtained if $\frac{1}{10}$ to $\frac{1}{5}$ grain was used hypodermically. Profound collapse or advanced shock enable the patient to withstand large doses of this drug, as does severe pain enable him to withstand full doses of opium, and full doses must be used if good results are to be expected. The question of the effect of mental shock or fright upon surgical shock is of great importance. Even animals, when brought directly from the street to operating table, show these signs most markedly, and how often does the gynecologist try to get his patient away from the sight of the preparation for the operation, or away from the little children to whom the mother bids a tearful goodbye before going on the table for a severe operation.

A valuable illustration of advances made in our understanding of certain diseases is afforded by epilepsy. There is probably no one here to-day who does not remember the time when the seat of origin of the epileptic seizure was in dispute, some holding that it was due to disorder of the circulation at the base of the brain, and others that it arose from disturbance in the cerebral cortex. Thanks to the studies of Ferrier and a host of others in England and on the continent, we now know that true epileptic seizures have their origin in the cortex and practically nowhere else. This being known, the rationale of the employment of the bromides in this disease

was speedily explained through the researches of Albertoni and of Seppilli, who found that these preparations so depressed the cerebral cortex in its motor area that far stronger currents were required to elicit muscular response when the animal was under the influence of bromides than when in his normal state or under the influence of the ordinary anæsthetics. At the same time that this depressant action of the bromides was discovered, its powerful influence as a depressant to reflex action became fully appreciated, and its influence in a convulsive disorder such as epilepsy became the better understood. It is true that there is still a great deal to be done before we discover the cause of the epileptic attack, or in other words, the changes in the cerebral cells which permit of epileptic discharges, but even in so strange a disorder there is reason to hope that improved methods of research may eventually remove this blot on the fair fame of modern pathology. Nor is this hope without foundation for its accomplishment. Those of you who have had the opportunity to study the elaborate research of Hodges of Madison, in this State, will already have reasoned that if the changes in the nerve cells produced by excessive exercise can be studied by means of staining and the microscope, that it is not impossible for the changes in epileptic cells to be noted by methods of a similar character, particularly as epilepsy is a disease which is seen in the lower animals as well as in man. While such studies as those which have just been mentioned show advances in the indications for and rational employment of drugs, instances are not lacking in which contra indications to the use of some remedies have been developed or the empirical knowledge of their contra indication explained. Thus it had been a recognized fact in therapeutics that quinine when given in full doses always caused an increase in the number and severity of epileptic seizures in those who were subject to this malady, but it remained for the experimental therapist to show that quinine stimulated the cerebral cortex and so caused increased irritability of the motor area.

Again, the knowledge of the depressant action of chloral on the motor tract of the spinal cord and the same effect of bromides on the sensory tracts has placed in our hands the best antidotal treatment for strychnine poisoning, while the discovery that conium produces muscular quiet by depressing the motor nerves and not by acting on the spinal cord shows us that in spinal convulsions its employment is irrational because it only blocks the pathway to the muscles instead of preventing the discharge of impulses by acting on the parts directly at fault.

The discussion of this topic would not be complete did I not refer to one very familiar example of the value of physiological and pathological research in relation to disease, namely, the discovery of the malarial germ and the fact that quinine kills this organism. Only ten years ago we were taught that the use of quinine in malarial disease was purely empirical and to-day its rational employment is accepted universally all over the world.

In our pride over our advances made because of good sense we should not, however, sneer at some improvement equally valuable which are in our hands to-day rather because good luck than by logical deduction. Thus the scarcity of quinine and its consequent high price forced the chemist to seek for a method of producing this drug by synthesis, and the result has

been not only the direct discovery of the value of salicylic acid in rheumatism, but indirectly the development of that invaluable class of remedies of which antipyrine is the chief. Nor does the value of acetanilide, phenacetine and antipyrine rest upon the action for which they were introduced into medicine, namely, the reduction of fever but rather upon their power, accidentally discovered, to relieve pain.

The value of some of the compounds derived from the same sources is in several instances quite equal to that of the integral parts. Thus salol is a remedy which many of us would no more dispense with in intestinal diseases than we would give up opium, quinine and digitalis.

Of the prospective value of the treatment of infectious diseases by infections of serum from those who have been rendered immune, of the promises held out to us by the pathologist of a more clear understanding of many puzzling diseases and of the possibilities of drug therapeutics in the near future I shall not speak. Much might be said of them, but in their present condition they exist more in the future than the present.

We are certainly passing through the golden age of medicine, and by the rational line of our advance are avoiding those theories which have misled our predecessors into beliefs since proved to be erroneous.

The American Medical Association not only links the profession into a chain which overcomes superstition and discovers fallacy, but by its ennobling influence produces unconsciously a wave of medical advance which sweeps on as grandly as does that of any other art or science known to man.

GOLD; WITH ESPECIAL REFERENCE TO ITS CLINICAL APPLICATION.

BY JOHN V. SHOEMAKER, A.M., M.D.

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Pharmacology.—The only form in which gold is officinal is that of the so-called double chloride of gold and sodium, a combination of equal parts of the two salts, the compound corresponding to 32.4 of the metal. Auric chloride, though itself soluble in water, is not well absorbed. The dose of the chloride of gold and sodium may be stated as from $\frac{3}{16}$ to $\frac{1}{16}$ grain.

The bromide has been employed, but has the disadvantage of being a less soluble salt than the double chloride. The bromide may be given in daily doses varying from $\frac{1}{16}$ to $\frac{1}{8}$ grain. The cyanide of gold has also been used. This salt is a yellowish crystalline powder devoid of taste, insoluble in water, alcohol and ether. The dose of the cyanide is $\frac{3}{16}$ to $\frac{1}{16}$ grain.

Physiological Action.—Concentrated preparations of gold have an escharotic effect when locally applied. When taken internally in small doses gold promotes the functions of the gastric tubules and hepatic cells. It consequently facilitates digestion. The composition of the blood is likewise favorably affected. The double chloride occasions constipation. A tonic and antispasmodic influence is exerted upon the blood by preparations of this metal. In some instances it produces exhilaration of mind. Gold contributes to vigor of the muscular tissue and strengthens the action of the heart. It is thought to have a decided aphrodisiac effect. In men it may give rise to pain-

ful erections and in women may increase the menstrual flow. It excites the action of the kidneys, augments the quantity of urine and communicates a yellow color to that fluid.

Large doses of gold excite salivation without producing any effect upon the teeth or gums, diminish the oxidizing power of the red blood corpuscles and give rise to what has been called auric fever, in which the perspiration, saliva and urine are increased. Metabolism of tissue is rendered more rapid and waste is in excess of repair.

Excessive doses are followed by the phenomena of irritant poisoning, gastro-enteritis with burning pain along the alimentary tract, vomiting and retching, depressed circulation, etc. The antidotes to this condition are albumen and demulcents.

Gold is eliminated chiefly by the kidneys, but to some extent by the liver and bowels.

Therapy.—In chronic dyspepsia due to depressed vitality with deficient secretion of the digestive fluids, the administration of small doses of chloride of gold and sodium is frequently attended with much improvement. This remedy is of especial service in derangements of digestion caused by nervous strain, such as anxiety, suspense, dread of misfortune, excessive devotion to business, etc., influences so common and so potent in modern life. The reflex influence of dyspepsia upon the nervous and circulatory systems is also relieved by the employment of the double salt of gold and sodium. Vertigo dependent upon disturbed digestion is often notably benefited. Preparations of gold are likewise serviceable in the treatment of chronic gastric or gastro-duodenal catarrh. The physical and mental symptoms associated with habitual inactivity of the liver are favorably influenced by the administration of the double chloride. A case aptly illustrative of dyspeptic and nervous trouble due to sluggish liver, in which marked improvement attended the administration of gold, may here be briefly described:

A man thirty-four years of age, of sallow complexion and subject to occasional attacks of jaundice, had suffered for three years from labored and painful digestion. His bowels were habitually constipated, the alvine evacuations being dry and putty-like in appearance. He was subject to numbness and prickling sensations in various portions of the body. He complained of frequent attacks of headache, lack of attention and memory and a loss of self confidence. He was habitually troubled with insomnia.

Gold is of avail in certain structural diseases of the liver. In acute yellow atrophy, before degeneration of the hepatic cells has taken place, Professor Bartholow has suggested that the chloride of gold and sodium might stay the progress of the degenerative alterations. The same writer believes that the preparation just named has some real power in arresting amyloid degeneration of the liver. I have witnessed good results in the early stages of cirrhosis of the liver from the employment of the remedy. It checks the production of interstitial connective tissue and is perhaps able to cause absorption of the newly formed material. Reference may here be made to two cases of cirrhosis of the liver in which the chloride of gold and sodium was serviceably employed:

A woman fifty years of age, stated that she had generally enjoyed good health. Many years previously she had suffered from attacks of intermittent fever but had never had articular rheumatism. Three