load in her stomach after meals. Organs generally found healthy except stomach, which was moderately dilated, extending down to half an inch below the umbilicus, with delayed emptying. The gastric analysis showed only a very small amount of free HCl (.014) though the T. A. was 66, representing largely fermentation products. There was much mucus in the stomach. I advised lavage and the combination of HCl and pepsin as the main treatment. On account of marked starch indigestion, she also took Taka-Diastase for a time, and Roncegno Water was taken for some weeks to bring up the quality of the blood.

On April 9, 1898, I found the stomach much retracted in size, the lower border being one and a half inches above the umbilicus, and the gastric analysis showed T. A. 56; free HCl .075; mucus a very small amount. She had had no severe headaches with vomiting for three months, and had regained a normal color, though her gastric catarrh is not yet entirely well.

Case 4.—Gentleman, aged 66, consulted me July 21, 1897, in Atlantic City on account of chronic indigestion, from which he claimed to have suffered nearly all his life. Painful accumulations of gas and obstinate constipation were prominent features. The external physical examination revealed nothing abnormal. Gastric analysis: T. A. 16; free HCl wanting. Starch digestion good. Mucus very small amount. He was placed upon HCl and pepsin in the usual way. He has since seen me several times on account of his wife, but reported that he himself was doing so well on the digestive mixture as not to require any further medical assistance.

December 16, he was seen and was then feeling well. On April 22, 1898, his wife called to consult me for herself and reported that her husband had been continuing his HCl and pepsin, though less regularly, having virtually recovered his health. He had taken no other medicine except a little nuxvomica during the first few weeks and a laxative at night. He had not had massage except such kneading over the abdomen as he had been able to give himself.

In this case no opportunity has been offered of testing the stomach contents again, but it is highly probable, from the decided improvement in the patient's digestion as well as in his general health, that the gastric glands are now doing much better work.

Reports of a number of other cases might be added in which under a treatment consisting either entirely or mainly of the administration of HCl and pepsin, conditions of apepsia or hypopepsia improved more or less markedly, the gastric secretion having returned to the normal. Without claiming that such fragments of clinical experience can be accepted as demonstrating beyond question that HCl stimulates the gastric glands, it must be admitted that a strong presumption is thus established as to the existence of such an action.

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RECENT THERAPEUTIC APPLICATION OF THE VALERIANATES OF CREOSOTE AND GUAIACOL.

Presented to the Section on Materia Medica, Therapeutics and Pharmacy, at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

BY J. W. WAINWRIGHT, M.D.

NEW YORK CITY.

It can be safely assumed that the marvelous evidences of progress which the world has witnessed during the last quarter of a century in the science of medicine, especially in the department of clinical medicine and surgery, in very great measure may be justly attributed to the discovery of the relationship which exists either directly or indirectly between certain diseases and a comparatively small group of micro-organisms which are now known to be pathogenic. Out of this application of bacteriology or microscopic botany to the practice of medicine has been developed our present aseptic and antiseptic methods of wound treatment and also our therapeutics of many

infectious diseases. The knowledge that we now have of the causes of infection in wounds we owe to the genius of Lister, who has taught us also how we may securely guard against suppuration and other germ-induced pathologic conditions. Similarly Pasteur, Koch, Klebs and others have not only enlarged our sphere of information as to the nature of many diseases to which mankind is liable, but have also clearly indicated the only means of preventing their future progress by isolation and disinfection.

Sepsis therefore occupies an important position in the mind of the clinician, and in consequence, imperative demand has arisen for a class of remedies known as antiseptic agents on account of their ability to counteract the pernicious activity of pathogenic micro-organisms. The chemists have been diligent in their investigations and have placed in the hands of the therapist powerful weapons to be used in the warfare between the human body and the invading hosts of disease-breeding cocci and bacteria.

We must not fail to recognize and fully acknowledge the important rôle played by the white blood corpuscles in protecting the human organism from infection; without such natural antiseptics the human race would have disappeared many centuries ago. The aim of therapeutics in this class of diseases is to aid in the battle between the leucocytes and the germs by increasing the functional activity of the former and weakening the virulency of the latter. It is also important to acknowledge the indispensable aid to be derived from hygienic measures in this direction, and especially the great value of sunlight, pure air, and wholesome, easily assimilated food, all of which, from this standpoint, may be regarded as accessory antiseptic agents.

Many of the chemic antiseptics are poisonous to all forms of life, and when these agents are used in medicine it is necessary that we be careful that in our efforts to destroy the bacteria, we do not inflict permanent injury to the patient. One of the most remarkable of our antiseptic remedies and at the same time perhaps, the least poisonous to the human system, is beechwood creosote, which has had an established place in medicine for more than half a century; but as you are aware, creosote has been largely adulterated in the shops and impure carbolic acid substituted, and thus the best results were not at first secured. As a result of Sommerbrodt's efforts on behalf of creosote from beechwood, however, it received greater consideration in the treatment of phthisis, and this interest resulted in our obtaining it finally in a pure state. Creosote being a compound of various elements, chiefly guaiacol and creosol, it was thought by some that more favorable results might be obtained from the principal ingredient, guaiacol, and this was isolated and used with results known to all. In these remedies we found prompt antiseptic and germicidal properties with less poisonous effects upon human beings than from the common phenol or carbolic acid, which in the early day of Listerism was the most prominent among our antiseptic agents. Guaiacol has also become widely known through its remarkable power of reducing temperature when applied to the surface of the body, which discovery is due to Sciolla.

This brings us to the consideration of the newer of the many derivations or compounds of creosote, the valerianates of creosote and guaiacol, for brevity denominated eosot and geosot. They are nearly neutral

esters, having an odor resembling somewhat that of the English walnut, and boiling under normal atmospheric pressure at about 260 degrees C; are soluble in alcohol, ether and benzine. They are administered internally in coated gelatin capsules, each containing $3\frac{1}{2}$ min. and in liquid form either diluted with absolute alcohol and flavored with oil of peppermint, cinnamon or cloves or directly in milk. The dose is from $3\frac{1}{2}$ to 9 min. three times a day.

A convenient formula is as follows:

R Eosot or geosot, 20 ccm. (fl. dr. v).
Alcohol 95 per cent., 80 ccm. (fl. oz. ii dr. v).
Ol. menth. pip., 0.6 ccm. (gtt. x).

M. Each tablespoonful contains about 12 min. of eosot or geosot. Mix dr. i to dr. iii with plenty of milk and give this dose in three equal parts daily.

It is generally conceded that in the treatment of phthisis, for a decade at least, creosote or its derivatives have given the best results of any of the multitude of remedies lauded, but creosote has been so destructive to the digestive and alimentary functions that but seldom a patient would be found who could continue its use sufficiently long or in large enough doses to produce a lasting or permanent effect. The poor patient would lose his appetite and desire for food and consequently his physical strength and power to battle with the disease. Besides this, there was ever present the depressing and self-conscious factor of his own limitations toward ultimate recovery increased by the never-ceasing gastric distress.

The valerianates seem to meet all the requirements as remedies destructive to this disease without untoward effects. They increase the appetite and weight, relieve cough, hectic and night sweats. The valerianic acid component, by its sedative action on the nerve centers, particularly the sympathetic, enables the patient to enjoy quiet and refreshing sleep as well as a sense of ease and comfort not secured by other remedies. Being eliminated largely by the mucous membrane their bacteriologic effects are quickly apparent when used internally in bronchitis, acute gastritis, chronic gastrectasia, typhoid fever, and intestinal irritation; when used externally in lupus and all purulent inflammations, as well as subcutaneously in glandular enlargements of tubercular origin, in hip joint and other bone complications, and as a spray in all nose and throat affections.

Physiologic action—Providing the amount of acidity of the secretions be sufficient to replace that of the acid in the combinations, the valerianates of creosote and guaiacol would be decomposed in the stomach. The hydrochloric acid of the gastric secretion varies greatly in different people as well as in the same patient from day to day and as the estimate is made before or after meals. There is also a great variation of acidity in consequence of the character of the diet as well as at different periods of the day. All these conditions must be considered in determining to what extent a combination will be separated into its several constituents in the stomach; hydrochloric, being the stronger of the acids, would under certain conditions replace the valerianic acid or have the effect of decomposing the combination of the valerinate, thus releasing the creosote or guaiacol in the stomach, but such a degree of acidity would very rarely occur, and without an abnormally large amount of hydrochloric acid one would not find the decomposition take place there, but that the remedy would pass on into the intestines and upon encountering the acid antagonist, alkalinity, would then and there be resolved into the two con-

stituents, guaiacol or creasote and valerianic acid. This would be the usual method, but it might occur that the alkalinity of the intestinal secretions would not be of sufficient degree to decompose a compound, especially if the remedy were of a character to resist its action. This would occur to a greater or less extent with a combination whose constituents were chemically firmly fixed. The more stable the combination the more surely would a greater or less amount escape in the feces unchanged. It is not at all probable that this decomposition is brought about by the ferments or the products of fermentation, as has been claimed necessary for the decomposition of the carbonates of creosote and guaiacol, but that the remedies would act largely in the alimentary tract as they do in the test tube, due allowance being made for slight variations not likely to be material. If the liberation of the several components depended upon the products of fermentation alone, or even to a quite considerable extent, we would not be able to secure the germicidal effects of the creosote or guaiacol in organs or tissue remote from the intestinal tract as in phthisis, for the creosote or guaiacol having once rendered the intestinal tract aseptic it would remain so for a considerable time, and if the remedy were continued it must necessarily pass on through unchanged, not encountering the products of fermentation necessary to decompose it.

This theory can not be reasonably assumed, for clinically we know that the creosote or guaiacol can be pushed to such an extent as to completely saturate the organism. It has been claimed that the extreme volatility of the valerianates admits of their absorption directly into the circulation as the valerianates, and without the necessity of a chemic action; that they are separated into their component parts after entering the circulation by the alkalin constituents of the blood, as is evidenced by the odor of creosote or guaiacol so quickly appearing upon the handkerchiefs of those using them for coryza. This property is of great advantage, as it is apparent that the patient would thus be quickly under their influence without the necessity of chemic changes in the intestinal tract to prepare them for absorption by a decomposition necessary in the more stable compounds such as salol, resorcin, the carbonates, etc. To this property may be attributed the small doses necessary when compared with other remedies, as the whole of the valerianates is utilized.

As regards the rationale of the action of guaiacol,¹ it has been found that "the beneficial effect of guaiacol in tuberculosis is chiefly due, not to any direct action upon the digestive organs or the blood, but to its combination in the blood with the albuminous bodies (toxalbumins) derived from the growth of the bacilli; that the absorbed guaiacol combines with these products and renders them harmless, and that they are further changed by oxidation, the guaiacol being liberated as a salt of ethyl-sulphuric acid, and the other decomposition products being eliminated in the urine. The products of the bacilli bring about the fever sweating, disordered digestion, etc., and with their destruction the ill effects pass away." This appears a very probable explanation and it is evident that an organic compound such as the ester of valerianic acid, which is quickly and easily decomposed, yielding nascent guaiacol in a condition ready for immediate absorption into the blood-vessels, is the most efficient

¹ Berliner Klinische Wochenschrift, Jan. 18, 1892.

and economical method of administering this invaluable remedy. It would also seem that this is the best form in which to give guaiacol in the treatment of typhoid fever and other intestinal disorders.

The clinical results obtained with the valerianates of creosote and guaiacol may be summarized as follows:

Dr. Rieck, Bassum, Germany, has an article in the August number of the *Medizinal Zeitung* of Berlin, August, 1897, on the valerianate of guaiacol in the treatment of tuberculosis which shows the following results: Of seventy-six cases treated in the various stages and forms of tuberculosis, he reports thirty-one cures, and thirty-two of the remainder so much improved as to have almost reached complete recovery; nineteen of the thirty-two giving up all treatment because they felt perfectly well. There were eight fatal cases in the whole number treated; rapid and extensive destruction of the lung three; cerebral tuberculosis two, and general tuberculosis three. The Doctor says that during his whole experience he has never been able to obtain results which even approximated those treated with the valerianate of guaiacol (geosot), not only in tuberculosis but in bronchitis, especially of children, in broncho-pneumonia, catarrh of the bronchi, larynx, pharynx and nasal passages; in acute gastric catarrh and in bone tuberculosis by injection directly into the bone tissue, and finally in lupus. In the cases of catarrh of the apex treated, twenty-four in all, there was quick and permanent relief, night sweats disappeared, sensitiveness to atmospheric changes lessened, weight and appetite increased and the cough was reduced to an occasional evacuation of mucus which soon became less tenacious and was easily ejected. It acts pre-eminently upon the mucous membranes and is therefore useful in diseases of the stomach, intestines and the respiratory passages. It is especially a remedy for tuberculosis, producing no irritation whatever, but in a few days bringing a feeling of comfort and ease.

Dr. W. Zinn of the "Second Medical Clinic University of Berlin," known as Professor Gerhardt's Clinic, published in *Therapeutische Monatshefte*, Berlin, 1898, a communication entitled "Further Results with the Valerianate of Creosote (eosot)," in which he states that: "Dr. Grawitz reported in the *Therapeutische Monatshefte*, Berlin, July, 1896, thirty-five cases of tuberculosis treated with the valerianate of creosote (eosot) as well as a number of stomach and intestinal disturbances, stating that the remedy was taken in all cases without ill effects to the digestive functions. I have now to report that since the publication of Dr. Grawitz's article we have treated eighty more cases of tuberculosis with the valerianate of creosote. As a rule, the remedy was given in capsules, each containing $3\frac{1}{2}$ min., one or more capsules three times a day. In several cases the medicament was continued for several months. It was used in all forms of tuberculosis and it was especially noted that there was in no case disturbance of the gastro-intestinal canal. It is accepted that of all the many remedies which have been recommended for tuberculosis the beech-wood creosote alone retains a prominent place notwithstanding its use has so often been productive of disagreeable effects. The valerianate of creosote is therefore worthy of especial mention because of its freedom from these disturbing influences. Particularly in the early stages of tuberculosis the eosot will be found of great service. Finally,

according to the experience had with the eosot in the Gerhardt Clinic, we can say that it fulfils all the requirements of a reliable preparation which can be taken and well borne for long periods."

Dr. Frank Woodbury of Philadelphia, in a paper read before this Association at its meeting in Philadelphia last year, reports having used the valerianate of guaiacol in full strength and diluted with liquid alboline as an anesthetic in nasal operations, as a substitute for cocain, and found it to possess decided anesthetic effects, slower in appearing than from cocain and not followed by secondary hyperemia. The antiseptic power is also of great value in throat and nose operation. In painful affections of the skin attended by hyperemia the guaiacol valerianate relieved pain and checked further pus formation. Small compresses wet with the guaiacol valerianate applied over the painful spot afforded almost immediate relief in neuralgias. Dr. Woodbury "also found the valerianate highly useful in erysipelatous conditions, in rhus poisoning, in acute and chronic rhinitis, in all inflammatory conditions associated with or producing fermentation, when administered internally."

In Langsdale's *Lancet* for March 1898, I find a report of three cases of phthisis by Dr. C. F. Wainright, Professor of Clinical Medicine, University Medical College, Kansas City, Mo. I quote Dr. Wainright: "In each case treated, tubercle bacilli were detected in the sputum." I venture to make a brief abstract of these clinical reports:

Case 1.—Man, 32 years of age. With tubercular antecedents. The disease of lung was of two years' duration and attended with usual symptoms, fever, chills, loss of flesh, night sweats, cough, etc. Upper portion of right lung consolidated and left upper lobe partially. Five drops of geosot (valerianate of guaiacol) was given every four hours and continued with very little cessation for five months. The patient at last report had resumed his daily occupation, was coughing very little, temperature had been normal for a month or six weeks, he had gained ten pounds in flesh, the consolidation had gradually lessened and he was apparently on the way to complete recovery. No other medicines had been used in this case.

Case 2.—A man in first stage of acute tuberculosis. Had been sick only five or six weeks. The lower lobe of left lung was consolidated and there were also signs of pleurisy. The usual symptoms were manifested, loss of flesh, night sweats, anemia, indigestion, diarrhea, cough, and sometimes bloody expectoration. Eosot was given commencing with two drop doses, gradually increased to eight drops four times daily in milk. This was continued three months and the patient gradually improved but had not yet fully recovered.

Dr. Wainright "believes that this man's life was saved by the remedy, as from all appearances he would have died in a few weeks had not the eosot been given."

Case 3.—A young lady 16 years of age, mother dead of tuberculosis, had two or three years previously suffered with tuberculosis of the shaft of the tibia requiring surgical treatment. She developed a tuberculous process of the left apex which in four or five weeks had consolidated the entire upper lobe. Guaiacol, creosote, oil of cloves and other remedies were tried and had to be abandoned on account of great irritability of the stomach. She was then given the eosot (valerianate of creosote) in capsules, and after four weeks, when the fever had subsided, she removed to New Mexico, and by the influence of climate together with the eosot which she has taken constantly she is now doing well.

Dr. Wainright concludes: "I have reported these cases, they being typical of many cases I have been treating. Am using these preparations extensively in other cases and have had uniformly good results."

The valerianates are being used at the Loomis Sanatorium for Consumptives, Liberty, N. Y. Dr. Stubbart, the physician in charge, in an article published in the *New York Medical Journal*, April 2, 1898,

says that "geosot, valerianate of guaiacol, proved an agreeable form of administering guaiacol. It was found less irritating to the stomach than creosote." I have very little time to refer to other valuable uses of eosot and geosot, such as their value in overcoming irritability of the stomach as in cases reported by Dr. W. E. Anthony of Providence, R. I., where in the nausea of early pregnancy and the sick stomach of Bright's disease of the kidneys they gave prompt relief. Having indicated some of the applications of the valerianates of creosote and guaiacol in clinical medicine and surgery, with one further reference I will close. Surgically Dr. Rieck refers to two cases of lupus of the face cured by applications of geosot and also to two cases of tuberculosis or white swelling of the knee and hip joint cured by injections of geosot into the capsule of the joint. Dr. Rieck also positively states that the valerianate of guaiacol cures bone tuberculosis, though not through the usual channels of absorption but by direct local application and declares that there is no question but that the use of the valerianate of guaiacol will permit of a marked extension of conservative measures in the treatment of tuberculosis of the bones and joints.

THE GENERAL PRINCIPLES OF ALKALOIDAL MEDICATION.

Presented to the Section on Materia Medica, Pharmacy and Therapeutics at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

BY W. C. ABBOTT, M.D.

CHICAGO.

My purpose in coming before you is to present some of the general principles governing that form of medicinal treatment which I have denominated "Alkaloidal Medication," and I trust that I may be enabled to present them with sufficient force and clearness to make my meaning distinctly understood. I am prompted to this effort by the belief that by bringing the subject before this Section of the great Association, we may correct some mistakes which my experience shows to exist very generally among the members of our profession.

There is an erroneous idea abroad that those who favor alkaloidal or dosimetric medication aim to establish a distinct system of practice. This is a great mistake, and a careful perusal of the literature of the subject will show that the word "system" is used by its opponents while the word "method" is used by its friends. In other words, what we claim for alkaloidal medication is that it is simply an up-to-date method for the treatment of disease, whereby departures from physiologic equilibrium can be controlled more quickly, safely and pleasantly than by any other known method. This claim we base upon the fact that alkaloidal therapy is founded upon the use of remedial agents in a state of chemic purity, completely prepared outside the body for ready absorption, leaving practically no chemistry at all to be performed by the ailing and weakened cells.

The agents we utilize are the active principles of plants—alkaloids, resinoids, glucosides and concentrations—and certain mineral preparations, all in a state of chemic purity. In fact, we use the same remedies we always did, but with the "dirt left out." For convenience in dispensing, these agents are usually given in the form of granules or minute tablets, accurately divided and measured to minimum dosage, to be given

at frequent intervals until effect. By this means one is always absolutely safe, utilizing the smallest possible quantity of the best obtainable means to produce the desired therapeutic result. How to obtain this result most speedily, safely and pleasantly should be the study of every practitioner of our art. The use of these "arms of precision," in cumulative minimum doses, gives us such perfect control of the physiologic disturbance at the beginning of an acute disease that we promptly restore the normal equilibrium, jugulate the attack, and cure the patient before serious organic lesions have been produced. This effect may be secured in all cases depending upon a controllable congestion, such as bronchitis, pneumonia, peritonitis and kindred conditions. Eruptive fevers will pass through their cycle under any form of treatment, but when treated alkalometrically they do so in a mild and greatly modified form; while that class of affections of which typhoid fever may be taken as a type, may either be aborted in the early stages or, if seen too late for that, may be conducted through the regular course to a quick and safe termination, like the eruptive fevers. The early control of the congestive element means much as to the subsequent course of any febrile attack, whether it be that of a specific fever or of a local inflammation.

In the practice of alkaloidal therapy certain customs or basal principles have been developed, which, though not confined to this therapeutic method alone, have become, in a manner, habitual to its followers. Whether or not these principles are well-founded you may easily determine. I will first mention the giving of small doses, frequently repeated, until the desired effect is produced; that is, every fifteen to thirty minutes, according to the severity of the attack, until some improvement is manifest. Such doses should then be given, at greater intervals, as will keep up this effect. By adhering closely to this method it is simply impossible to overdose the patient. In this way the alkaloids and other active principles and the most powerful mineral drugs may be used with perfect safety. Here we have the first illustration of the value of the alkaloids in promoting accuracy of medication. These agents are clean-cut and well-defined in their effects and totally devoid of the uncertainty which hangs over the galenicals. For instance, when we give pilocarpin we direct the dose to be given every fifteen minutes until sweating occurs. We *know* this will be the effect; and no one who has enough intelligence to be left in charge of a patient can possibly mistake so simple a direction. But if we were to give the fluid extract of jaborandi we could not know whether it would induce perspiration or dry it up, because the way it will act depends on which of its alkaloids—pilocarpin or jaborin—happens to be in excess. Consequently we have to go into a long explanation to the nurse, which she is not likely to comprehend, because we do not really know just what effect the medicine is going to exert.

I will not occupy your time in detailing more of such illustrations, but will merely ask you to call to mind the great number of drugs that contain more than one active principle, some of which are antagonistic to the others, as in digitalis, ergot, hyoscyamus, opium, etc. Observations made in India upon the treatment of dysentery with ipecacuanha deprived of its emetin render it probable that many plants now thought to possess but one useful active principle may contain others of no less value. When applied