O. Hotchkiss (Wisconsin), Collier Cobb (North Carolina), H. F. Cleland (Massachusetts), Herman Gunter (Florida), W. A. Nelson (Tennessee), George Otis Smith, E. O. Ulrich and Charles Butts (Washington, D. C.).

THOMAS L. WATSON,
Secretary

THE AMERICAN CHEMICAL SOCIETY. VII

DIVISION OF BIOLOGICAL CHEMISTRY

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Chemotherapy of organic arsenicals: C. N. MEYERS. A discussion of the transitions of arsenic therapy leading up to the production of salvarsan. A chart showing the methods of approaching the mother substance is presented. The reduction process is briefly discussed, followed by a consideration of the chemical and physical properties, the toxicology, the impurities, and the preservation of salvarsan. The chemical and physical factors as related to the administration of the drug are discussed based upon clinical observations as a result of an extensive investigation of the methods used by leading dermatologists. Standard methods are recommended in order to eliminate reactions which unnecessarily result from faulty technique and improper use of chemical laws when salvarsan is used in organotherapy.

The chemical composition of arsphenamine (salvarsan): G. W. RAIZISS.

A comparative study of the trypanocidal activity of arsphenamine and neo-arsphenamine: J. F. SCHAMBERG, J. A. KOLMER AND G. W. RAIZISS.

Chemotherapeutic studies with ethylhydrocuprein and mercurophen in experimental pneumococcus meningitis of rabbits: J. A. KOLMER AND GORO IDZUMI.

Coordination of the principles of chemo-therapy with the laws of immunity and the successful application in the treatment of tuberculosis: BENJAMIN S. PASCHALL. The tubercle bacillus is protected by waxy substances consisting chiefly of unsaturated highly complex alcohols and equal quantities of phosphatides with which they form a colloidal complex and which in turn exists in close union, possibly physical, more probably chemical, with the protoplasmic substances of the tubercle bacillus, both proteid and carbohydrate in nature. Saponification breaks up this complex without destruction of the important immunizing substances and makes possible separation by solvents. By this means toxic and caseating substances of the Cholin Muscarin group are eliminated as well as the ordinary poisons elaborated by the tubercle bacillus proteins and protein derivatives. Esterification of the fatty acids with ethyl alcohol forms a valuable immunizing substance as these fatty acids have so far been found not to conform to those found in our common food products. Esterification of the higher alcohols with salicylic benzoic, acetic or other suitable acids establishes a new side chain or anchoring group which greatly enhances the reactivity between the antigens themselves and the receptors of the tissue cells so that absorption of these alcoholic esters takes place in the tissues in a few days without producing caseation and tissue necrosis even when given in doses of from 3 to 5 c.c., and following these injections of the mixed esters specific wax digesting ferments form in sufficient concentration to split the protective waxes from the tubercle bacillus living within the host whereby disorganization and destruction of the organism ensues and the patient absolutely recovers and remains well. Thus combining the principles of chemico-therapy with the laws of immunity, a new substance was found for the treatment of all forms of tuberculosis which was successfully used in our own practise and named by us Mycoleum.

The chlorinated antiseptics: Chloramine-T and dichloramine-T: ISAAC F. HARRIS, Ph.D., Research Laboratories, E. R. Squibb & Sons, New York. Toluene-p-sodium-sulfonchloramine (chloramine-T) when prepared in state of high chemical purity is an extremely stable compound, both in crystalline form and in solution. Toluene-p-sulfondichloramine (dichloramine-T) is quite stable when prepared in very high purity chemically dry and protected from dust, organic matter and sunlight. Pure dichloramine-T can be kept in pure, anhydrous chlorcosane, without appreciable decomposition, for several months, if protected from continuous action of direct sunlight. In the reactions between the proteins of the tissues and Dakin's solution, chloramines of the proteins and free sodium hydroxide are formed. The latter furnishes the solvent power attributed to Dakin's solution. When the chloramines react with bacteria and necrotic protein matter, chloramines of the proteins are formed and toluene-p-sulfonamide is set free. The latter is inert and innocuous. The chloramines can be employed with more precision and in greater concentration than Dakin's solution.

An agent for the destruction of vermin-method of application: ALBERT A. EPSTEIN. (By title.)

The purpose of the communication is to put on record the composition of an active vermicide and a suitable method of its application, which was primarily intended for the army. The vermicide is a solution, the base of which is kerosene. The odor and irritating properties of kerosene are disposed of by a special process. To this as a base are added heavy oils and demulcents which promote the retention of the vermicide and repellent properties, by the objects to which the solution is applied. The solution destroys lice within one minute, and nits fail to develop after about eight minutes contact with the solution. As proven by various tests the solution is destructive not only to lice, but to a large variety of insect-parasites affecting man, animals and plants. The solution is applied by means of a spraying device.

An iodine preparation for intravenous and intraspinous use: ALBERT A. EPSTEIN. (By title). It is possible by means of heat under pressure to dissolve native iodine in solutions of dextrine without the aid of the usual solvents. The amount of iodine thus brought into solution bears the approximate relation of 1: 35 to the quantity of dextrine present. The solution thus obtained is homogeneous and fairly permanent. It is strongly bactericidal, its potency ranging from 2½ to 25 times that of the better known antiseptics. Its action is rapid. It is relatively non-toxic when given intravenously and intraspinously. Animals rendered septic by experimental means have been freed of bacteria by intravenous injection of the solution. Clinical application has been made in cases of bacterial endocarditis and typhoid; the clinical course of the disease having been modified by its use. One of the constant effects of intravenous injection is a febrile reaction followed by a very marked leucocytosis. Intraspinous injection has been attempted in tuberculous meningitis. Although the ultimate course of the disease has not been modified by this procedure the solution itself proved to be innocuous. The subject is undergoing further investigation.

The local anesthetic actions of saligenin and other phenolic alcohols: A. D. HIRSCHFELDER, A. LUNDHOLM, H. NORRGARD AND J. HULTKRANS. Since Macht had shown that benzyl alcohol has local anesthetic properties, other members of the phenolic alcohol series, phenylethylalcohol $C_6H_5CH_2CH_2OH$, phenylglycol $C_6H_5CHOHCH_2OH$, cinnamic alcohol $C_6H_5CH=CHCH_2OH$, saligenin $C_6H_4OHCH_2OH$ (salicylic alcohol), methyl saligenin $C_6H_4OCH_3CH_2OH$, ethyl saligenin $C_6H_4OC_2H_5CH_2OH$, piperonylic alcohol $C_6H_3<\begin{matrix}O\\O\end{matrix}>CH_2CH_2OH$, and homosaligenin $C_6H_3OHCH_2OHCH_3$ (1: 2: 4) were investigated. Lengthening of the side chain diminishes the local anesthetic power. Saligenin is the best of the series. It is the least irritating to the tissues, much less so than benzyl alcohol. It is only half as toxic as the latter, longer and in half the concentration. It is a practical surgical anesthetic, and in six tonsillectomies and one tumor removal in man proved to be as good as procaine. Lethal dose for man would be more than a liter of 4 per cent. solution. Covering the phenolic hydroxyl diminishes the local anesthetic power. Homosaligenin is a good local anesthetic, but more irritating.

The effects of drugs which inhibit the parasympathetic nerve endings upon the irritability of intestinal loops: A. D. HIRSCHFELDER, A. LUNDHOLM H. NORRGARD AND J. HULTKRANS. Drugs which inhibit the parasympathetic nerve endings, such as atropin, amyl nitrite, benzyl alcohol, benzyl benzoate and saligenin cause a definite elevation of the threshold of irritability of loops of intestine to intermittent electrical stimuli. The normal rabbit's intestine responds with an annular contraction to a stimulus from a Harvard induction coil at 10 to 12 cm. After painting the mesenteric border of the intestine with any of the above-mentioned drugs in 2 per cent. solution or emulsion the stimulus must be raised to one with the coil at 4 cm. This rise in the threshold, or decrease in the irritability, is probably due to the transition from response by the nerve to response by the muscle after the nerve impulse has been blocked. The same strength of impulse was required after all the paralyzing drugs.

The effect of fever upon the action and toxicity of digitalis: A. D. HIRSCHFELDER, J. BICEK, F. J. KUCERA AND W. HANSON. The action of the drug was studied in cats and frogs whose body temperature had been raised by immersion in a water-bath. Increasing the body temperature in both cats and frogs diminished the size of the dose necessary to cause death. This is less marked at the lower ranges of temperature than in the higher temperatures, and it is most marked within one or two degrees of the thermal death-point of the animal. At 41° the lethal dose for cats is not reduced, at 42° it is one half to two thirds the normal, at 43° it is only one third to one half the lethal dose in normal animals. This proves the necessity of caution in the administration of large doses of digitalis to patients with high fever.

The toxicity of tobacco smoke from cigars, cigarettes and pipe tobacco: A. D. HIRSCHFELDER, A.

E. Lange and A. C. Feaman. Previous investigators had shown that the amount of nicotine in the smoke from a cigar or a cigarette or from smoking pipe tobacco bears no relation to the nicotine in the tobacco itself. "Light" tobacco may give smoke rich in nicotine, "strong" tobacco may give smoke poor in nicotine. Storm van Leuven in Holland showed that smoke from the so-called nicotine-free cigars gives a smoke that contains a good deal of nicotine. Since nicotine is not the only poisonous constituent of smoke, Hirschfelder and his collaborators studied the poisonous action of the smoke itself, or rather the poisonous action of extracts made from passing the smoke through salt solution and through ether. The amount necessary to kill a frog was determined. Using several popular-priced brands of cigar, cigarette and pipe tobacco, it was found that the smoke coming from a given weight of tobacco varied somewhat, but not very greatly in its poisonous action on frogs. When the same weight of the same sample of tobacco was smoked in the form of a cigarette and in a pipe and as a cigar there was sometimes very little difference in the poisonous quality of the smoke, but usually that which was smoked as a cigarette was somewhat less poisonous. Nevertheless, cigars and pipes seem much stronger than cigarettes. This is because since the burning occurs chiefly along the surface of the tobacco, so much more tobacco is being converted into smoke at each instant in these than in the cigarettes. It is largely a question of cross section. Cigars have about four times the cross section of cigarettes, pipes nine or ten times. If all three were smoked equally fast, the smoker would get an overwhelming dose of nicotine from cigar and pipe. Therefore, these must be smoked more slowly than the cigarette and can not be inhaled. If the smoker did not inhale the smoke, the cigarette would be the lightest form of tobacco.

Some applications of protein chemistry to medicine and pharmacy: I. F. Harris.

Action of trichlorotertiary butyl alcohol (chloretone) on animal tissue: T. B. Aldrich and H. C. Ward. The action of chloretone on animal tissue has not been studied, although glands of various kinds have been preserved in a sterile condition in chloretone water for a number of years, without any apparent injury to the active principles they contain. In order to test the action of a saturated aqueous solution of chloretone on animal tissue pieces of various organs were removed from the animal (dog) as quickly as possible after death, cut into small pieces and distributed among several sets of bottles containing water saturated with chloretone. One set was kept at 37°, one at 15°, while others at summer room temperature. One set at room temperature was inoculated with *B. Proteus*. Control tissue with only distilled water showed a high degree of putrefaction in two days. Every few days the tissues were examined and the general appearance, color, odor, etc., noted. In general the tissues became soft and spongy and lost much of their normal color. There was at no time a suggestion of putrefaction. In fact, cultures made every few days from all the bottles showed their contents to be sterile. Histological studies show that while there is no evidence of bacteria, there is evidence of autolytic changes, since some normal cell constituents are entirely lacking. It would seem that chloretone is one of the few substances (in weak dilution) that will allow autolysis to proceed under sterile conditions.

Conclusions. (1) Chloretone in saturated aqueous solution exerts a definite bactericdal action at all temperatures. (2) Chloretone in saturated aqueous solution prevents the development of the common molds. (3) Chloretone solution is not suitable as a fixative for histological materials. (4) Chloretone solution while acting as a bactericide, does not inhibit autolytic action as evidenced by our histological findings. (5) Chloretone solution is a desirable agent for preserving glands and gland extracts from which the active principles are to be obtained.

The outlook for chemotherapy in the chemical industry of America: C. L. Alsberg. (By title.)
Blue eyes: W. D. Bancroft.

Charles L. Parsons,
Secretary

(*To be continued*)

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