reaction, which appears only when the matrix in which the urates are deposited has begun to soften.

But as the term "gout" is generally used, both in theory and in practice, it is applied to all kinds of functional derangements and organic lesions, which are then described as visceral or irregular gout, and are supposed to be due to uric acid in the blood. Oftener than not that substance is not then found where it is supposed to exist. If it happens to be present, there is not the least evidence that any of those symptoms are produced by it, as it is met with in the ascitic, the pericardial, and the pleuritic effusions in connexion with such various diseases as valvular lesions of the heart, tuberculosis of the lungs, the pleura, and the peritoneum, with or without amyloid degeneration of the kidneys or the spleen; in acute pneumonia, in cirrhosis of the lungs and in pneumothorax; in marasmus due to stenosis of the pylorus due to a cicatrix of a gastric ulcer; in cirrhosis and cancer of the liver; in chronic interstitial and chronic parenchymatous nephritis; in amyloid degeneration of the kidneys; in pernicious anaemia; in chronic lead poisoning; in the contents of ovarian cysts; in hydrocele fluid, and in the ichor of gangrene of the lower extremities. On the inflamed or obsolete tissues, into which such transudations or effusions may have taken place, the uric acid may crystallize out of its solutions, and generally does so with the receding tide, but no one will seriously maintain that it is the cause of those various lesions. Uric crystals never occur in the circulating fluid; their deposition is an epiphenomenon, and is observed only in joints in which the cartilage was inflamed or has undergone amyloid degeneration or other changes; in the tissues of a degenerating cutaneous tophus; upon an atheromatous intima of the aorta; upon inflamed meninges; upon ulcers of the rectal mucous membrane, and within the corpora cavernosa of the penis, if they contain decayed or decaying matter.

Thus the clinical data afford no proof whatever of any pathogenic property of uric acid. Nor do the results of experimental inquiries. Subcutaneous injections of that substance into rabbits, and occasionally into guinea-pigs and dogs, have in no case produced a gouty inflammation of a joint or a tendon; they have led merely to deposits in the skin outwardly resembling tophi; but even that effect was obtained only by quantities thirty times as large as occur in man. Van Loghem introduced uratic crystals into the peritoneum of animals, and with the exception of a slight exudation of leucocytes, as may well be expected from the presence of such foreign bodies, he saw no deposits of crystals in the liver nor inflammatory reaction of its tissue. Leber, therefore, holds that only in considerable concentration does uric acid exhibit a very slight tendency to cause inflammation. Ibrahim, on the other hand, injected into himself a solution of 6 grains of uric acid with 9 grains of piperazin in 2 oz. of distilled water. The injection was very painful at the time, and continued to be so for hours or days; but the tissues, though hard and infiltrated, showed no sign of any nutritive changes. Freundweiler, however, alleges that he produced tophi which became inflamed; if so, these results are different from what takes place in the human subject, in whom the tophi generally remain an inert mass until the matrix softens. Whether he carried out his experiments with all necessary precautions does not appear from his reports of them.

In view of these facts, many clinical observers deny the causality of uric acid in gout and hold that the materies morbi is here a particular poison the nature of which is unknown. They make this unwarranted assumption because they hold that the gouty process takes place in previously healthy tissues.

There is consequently no indication for an exhibition of a uric acid solvent, because that substance is readily soluble in the tissue juices and is not the cause of the symptoms observed. Even if those alleged solvents served to remove all the uric acid from the blood, even then the patient would not be benefited thereby; for in the experience of His an intense treatment with radium completely drove out all uric acid from the blood, yet the gouty attacks returned with the same frequency and the same intensity as before. Moreover, such of the alleged solvents of uric acid which contain salts of soda have the undesirable consequence of favouring a deposition of uratic crystals.

Not only is the use of the pretended remedies to cure

the various functional derangements and organic lesions which are wrongly attributed to uric acid recommended upon a baseless hypothesis, but it is mischievous also, because it allures the unwary sufferer by specious advertisements of its effectiveness to have recourse to it and continue with it until its failure is evident. Thus valuable time is lost before he submits himself to rational treatment while there is still a reasonable prospect of satisfactorily coping with his disease.

ACETOZONE AS A GENERAL SURGICAL ANTISEPTIC.

BY

G. GORE-GILLON, LIEUT.-COLONEL R.A.M.C.,
CONSULTING SURGEON TO THE AUCKLAND HOSPITAL, NEW ZEALAND,
AND

R. T. HEWLETT, M.D., F.R.C.P.,
PROFESSOR OF BACTERIOLOGY, KING'S COLLEGE, UNIVERSITY OF LONDON.

The important properties of an ideal antiseptic appear to be (vide Browning and others, BRITISH MEDICAL JOURNAL, January 20th, 1917) that it has (1) great potency against all micro-organisms in presence of protein material, as serum, etc.; no deleterious effect on phagocytosis; (3) is innocuous to the tissues; has (4) a stimulating effect on connective tissue cells, so that it promotes healthy granulations; and is not toxic.

In benzoyl-acetyl-peroxide we have a preparation that fulfils these conditions. After previous experience of this substance in my surgical wards, I introduced it into this country in May, 1915, and have used it extensively in military hospitals since then as an antiseptic solution in the treatment of septic wounds. Its formula is $C_6H_5CO.O.COCH_3$, and it is known as acetozone. It has been used for years as an intestinal antiseptic in enteric fever and mucous colitis, and as a throat spray.

It may be used cold as a bath: (a) containing 5 grains to the pint (the cost is 8d. a gallon at army prices, and plenty of it is available); (b) or as a 7-grain solution with one-third hot water added. Its action is very rapid; unhealed amputation stumps heal quickly if put into a bath of this solution for half an hour daily, and dressed afterwards with dressings of sterile lint or gauze soaked in the 10-grain solution.

I have seen numerous cases of septic wounds which have resisted all other treatment for four or five months heal up in three weeks by this method.

It can be applied to deep wounds by Carrel-Dakin tubes, by the bath method, or in a waterproof bag, or by wet dressings of 10 grain strength solution, renewed two or three times a day.

Mode of Preparation.

1. The solution must be made by adding 5 to 7 grains to 1 pint sterile water at 112° F., left to stand for two hours, and should not be filtered.
2. Or a 10-grain to 1 pint solution can be used with dressings or Carrel-Dakin tubes, etc.
3. In very septic cases, swarming with anaërobcs, etc., a 20-grain to 60-grain solution may be used.
4. It should be made fresh every seven days, and the bottle shaken before using.

Pure hydrogen peroxide is very unstable and momentary in its oxidizing power, while acetozone in solution is a fairly stable antiseptic, and its ozone-producing power is prolonged. Acetozone has a remarkably pleasant, pungent ozonic odour, the solution is colourless, and does not stain linen. Used in a 20-grain solution it is an efficient sterilizer of the skin.

Professor Hewlett has made bacteriological experiments with this drug, and reports as follows:

REPORT ON TESTS OF THE GERMICIDAL POWER OF ACETOZONE.

By PROFESSOR HEWLETT.

At the request of Lieut.-Colonel Gore-Gillon, R.A.M.C., we have carried out a number of tests on the germicidal power of acetozone (benzoyl-acetyl-peroxide). The tests have been done with the *Staphylococcus pyogenes aureus*

and *Bacillus mycoides* (the latter as a type of a sporing organism). The method employed has been as follows:

A saline emulsion of an agar culture is made containing an approximately known number of organisms. Measured volumes of the emulsion and of acetozone solution (unfiltered) of known strength are mixed, kept at 37° C., and subcultured at certain time intervals. In some instances serum or broth has also been added to the mixtures. The following table shows some of the results obtained:

Staphylococcus Pyogenes Aureus.

SALINE MIXTURES.

Approximate number of organisms in mixtures = $2,000 \times 10^6$ per c.cm.

Strength of Acetozone in Mixtures.	Time of Exposure at 37° C.	Result.
1 in 1,750	1 hour 45 minutes	+
1 in 875	" "	+
1 in 5:3	30 minutes	-
1 in 437	24 hours	-
1 in 5:0	24 hours	-
1 in 872	24 hours	-
1 in 1,744	24 hours	-
1 in 4,370	24 hours	+
1 in 4,370	24 hours	-

This table shows that in saline mixtures acetozone 1 in 600 or thereabouts kills with an exposure of thirty minutes; and 1 in 4,000 or thereabouts kills with an exposure of twenty-four hours.

With an addition of one-third sterile human serum to the mixtures, acetozone 1 in 437 killed, and 1 in 654 did not kill, the staphylococcus with an exposure of twenty-four hours.

With an addition of one-third sterile nutrient broth to the mixtures, acetone 1 in 1,744 killed, and 1 in 4,370 did not kill, the staphylococcus with an exposure of twenty-four hours.

With sporing *B. mycoides* in saline mixture, acetozone 1 in 437 killed with an exposure of one hour. With an exposure of twenty-four hours, acetozone 1 in 1,744 killed, 1 in 4,370 did not kill.

With the addition of one-third serum to the mixtures, acetone 1 in 437 with an exposure of twenty-four hours did not quite kill (there was no growth in the subcultures after twenty-four hours, but some growth after forty-eight hours' incubation). This was the highest strength tested.

With the addition of one-third sterile nutrient broth to the mixtures, acetone 1 in 1,744 killed, 1 in 4,370 did not kill, with an exposure of twenty-four hours.

We were able to make only one experiment with pus (staphylococci). Equal parts of pus and acetozone solution (giving 1 in 437 in the mixture) did not kill with exposures of 20 minutes, 40 minutes, 60 minutes, 1½ hours, and 18½ hours.

Finally a meat-broth anaerobic culture made from a septic wound was tested; it contained large numbers of mixed anaerobic sporing bacilli. Acetozone 1 in 290 with an exposure of twenty-four hours killed.

The results show that acetozone is a potent disinfectant. In saline mixtures it kills the staphylococcus in strengths of 1 in 600 in thirty minutes and 1 in 4,000 in twenty-four hours. The addition of serum and of broth reduce its germicidal power, but it is still effective in strengths of 1 in 437 and 1 in 1,744 respectively with an exposure of twenty-four hours.

With sporing *mycoides* in saline mixture it kills in strengths of 1 in 437 in one hour and 1 in 1,744 in twenty-four hours. With an addition of one-third serum 1 in 400 kills in twenty-four hours. With a mixed culture of sporing anaerobic bacilli grown from a septic wound, 1 in 290 killed in twenty-four hours. (1 in 290 = 30 grains to the pint; 1 in 437 = 20 grains to the pint approximately.)

We are much indebted to Miss Lettice Digby, assistant in the laboratory, Military Hospital, Richmond, for the care and labour she has devoted to the conduct of the experiments.

At a meeting of the medical profession held in Osler Hall, Baltimore, on May 23rd, £28,560 was subscribed for Liberty Loan bonds.

THE number of past and present students of St. Thomas's Hospital serving in connexion with the war up to August 8th was 972, of whom 39 have been killed in action or died on service, 60 have received British honours, 10 have received foreign honours, and 3 the Order of the Hospital of St. John of Jerusalem, while 101 have been mentioned 146 times in dispatches and for valuable services.

THE BACTERIOLOGICAL EXAMINATION OF THE BLOOD IN CASES OF IRRITABLE HEART.

BY

GRACE BRISCOE, M.B., B.S.,

PATHOLOGIST UNDER THE MEDICAL RESEARCH COMMITTEE AT THE HAMPSTEAD MILITARY HOSPITAL,

AND

CAPTAIN LYN DIMOND, R.A.M.C.,

BACTERIOLOGIST TO THE HAMPSTEAD MILITARY HOSPITAL.

(Report to the Medical Research Committee.)

In the BRITISH MEDICAL JOURNAL of November 13th, 1915, a letter was published which intimated that organisms had been found in the blood of patients complaining of the symptoms associated with the condition known as "irritable heart," namely, breathlessness on slight exertion, palpitation on excitement or moderate exercise, giddiness and sometimes fainting, precordial pain and a general lassitude. Further investigation showed that the first conclusions were not warranted. The following note gives the results of the blood examinations in two series of patients. The first series was examined at University College Hospital, the second at the Hampstead Military Hospital, Mount Vernon.

First Series.

In all, 92 cultures from 27 patients were examined. The first 32 cultures gave only one positive result, a Gram-positive micrococcus in pure culture. The organism grew in minute colourless colonies, and had to be frequently subcultured, as it died out in three or four days. It was difficult to class it either as a streptococcus or as a staphylococcus. In a hanging drop short chains of three and four could be seen, but diplococci were most common. In a film short chains of three and four could be seen, but the arrangement on the whole was staphyloid. The colonies remained minute after several subcultures. The organism, incubated at 37° C., produced acid when grown in saccharose, lactose, raffinose, inulin, salicin, mannite, and litmus milk. There was no liquefaction of gelatin at 20° C. The remaining 60 cultures of this series gave 8 positive results at a temperature of 37° C., and 14 positive results in duplicates incubated at a temperature of 20° C. The majority of the cultures produced a micrococcus similar in type to that described above, but some showed a bacillus.

Such a high percentage of positive results raised the question of contamination, and the suspicion was increased by the larger number of growths found in the duplicates incubated at 20° C. A series of control blood cultures in normal people was therefore undertaken. Twenty-four cultivations were made; cocci or bacilli were found in four instances. Tentative cultures made from the skin and the syringe, after sterilization, showed that the method used to sterilize the syringe was faulty. The syringes had been sterilized by drawing up into the barrel, three to six times, oil heated to 140° C., according to the method recommended by Sir A. Wright.²

Subsequent experiments³ showed that syringes may not be rendered sterile even by six syringefuls of oil heated to 140° C. A satisfactory method of sterilizing syringes was found to be as follows:

An all-glass syringe is fitted together with the needle attached. Alcohol is drawn through to ensure the absence of moisture. The piston is withdrawn about a quarter of an inch to prevent it adhering to the neck of the barrel after heating. The syringe is placed in a large test tube with a wool pad at the bottom, and the tube is plugged with wool. The whole is placed in the hot-air sterilizer, and the temperature raised gradually to 160° C. and kept at this height for fifteen minutes. The air is allowed to cool gradually, and the syringe is ready for use as soon as it is cool. It need not be handled or exposed to the air until the moment of employment. This method of sterilization was controlled by contaminating the syringes with known organisms. It was found that all organisms tested, including the spores of *B. subtilis*, were killed by this treatment. In the second series of observations this method of sterilizing the syringes was used.

Second Series.

The patients in this series were of the same type, and presented the same clinical syndrome as those in the first series. The skin was sterilized by lysol or sublimate, 1 in 1,000. Alcohol and ether were subsequently employed. The blood was taken from the median basilic vein. Various methods of cultivation were used:

(a) 4 c.cm. of blood were taken and distributed between four tubes, each containing 10 c.cm. of broth. (b) 6 c.cm. of blood were distributed between twelve tubes, each containing 10 c.cm.