

11 days in hospital, and less than 7 days under treatment we now know to be insufficient.

The complications arising in cases under acriflavine treatment were as follows:

1. *Epididymitis* (2 cases). In both the epididymitis developed while the patients were undergoing dilatation treatment with bougies for glandular involvement, and in both cases the customary insertion of atropine suppositories had been neglected. Infective material expressed from the diseased glands would be carried into the posterior urethra by the bougie, the passage of which would, in the absence of atropinization, excite reversed peristalsis. After the withdrawal of the bougie the patient filled the bladder as usual with acriflavine solution, but gonococci had meantime been carried along the common seminal duct beyond the reach of the antiseptic, and in due course an epididymitis resulted.

2. *Subacute Prostatitis* (2 cases). Both had an acute posterior urethritis and probably some prostatitis when admitted.

3. *Cystic Abscess* (3 cases).

Clinical Course.

When a case of acute gonorrhoea with profuse purulent urethral discharge is put on acriflavine lavation the inflammatory symptoms quickly subside. Within twenty-four hours the discharge has decreased to one-third, and by the third day it has usually disappeared, leaving perhaps a trace of moisture expressible in the morning. After three or four days' treatment gonococci are absent from smears taken from the urethra, nevertheless if the lavage is discontinued at this time discharge and gonococci will return within a few days in many cases. The treatment should therefore be maintained for ten to twelve days, when, with the smear negative, no discharge expressible in the morning, and the morning urine showing neither pus nor filaments, all treatment may be suspended. The patient receives a change of underclothing and remains under observation for four days longer, when he may be discharged to duty should no symptoms of relapse have developed.

Cases which have not cleared up on the tenth day fall into one of the following groups:

I. When the discharge is scanty but diffuse pus is present in both urine glasses, there is probably some degree of cystitis present with a secondary infection by some other organism. In such case a urinary antiseptic—for example, hexamine—is indicated; and, in addition, a small quantity of the acriflavine solution may be left in the bladder overnight. Should these measures not be quickly effective, oxycyanide of mercury solution (1 in 5,000) may be substituted for the acriflavine.

II. In the presence of a continued urethral discharge there is probably a cystic abscess in the anterior urethra or an infected para-urethral passage or other duct where the gonococci are beyond the reach of the acriflavine, and special treatment is therefore required.

III. If filaments are present in the urine glandular involvement is suggested. The prostate should be examined per rectum, and the urethra should be explored with an acorn-tipped bougie and examined through the urethroscope, and treatment appropriate to the condition found should be instituted.

Before any instrumentation involving the posterior urethra, and also before any thorough rectal examination is attempted, atropine suppositories (1½ grain) should be used to obviate the risk of vesiculitis or epididymitis being excited.

Mode of Action of the Acriflavine.

Acriflavine acts both on the medium and on the invading organism.

1. That the acriflavine penetrates the tissues is indicated by the staining of the mucous membrane which is apparent after its use. The mordant action of sodium chloride may have some effect in delaying the disappearance of the dye. There is evidence in the urine of the presence of acriflavine for several hours after lavation, and the mucosa therefore is kept in a condition which renders it unsuitable as a medium for the growth of gonococci. This effect of the acriflavine can be demonstrated in the laboratory by washing a sloped tube of gonococcus medium with acriflavine solution; gonococci will not grow on medium so treated.

2. Acriflavine is a gonococcicide. Colonies exposed to the action of a 1 in 4,000 solution are killed in two minutes.

There are no contraindications to the use of acriflavine, and the only drawback to its use is the staining by this powerful dye of clothing and hands. This can be

reduced to negligible proportions with sufficient care; a perforated rubber apron and rubber gloves may be used. Stains may be removed from fabric by means of eusol, and from the skin by 1 per cent. hydrochloric acid in methylated spirit.

Acriflavine, in my experience, has proved a distinct advance on any antiseptic previously used for the treatment of gonorrhoea. In attempting to improve on the results achieved by lavation with potassium permanganate I have tried many other antiseptics—for example, brilliant green, auramine and other dyes, eusol, chloramine-T, etc.—and, instead of lavation, I have experimented with instillations and injections of acriflavine, brilliant green, etc., in various oils, but so far I have found nothing to alter the conclusion reached over a year ago, that lavation with 1 in 4,000 acriflavine is the most satisfactory routine treatment for acute gonorrhoea at present available.

THE VALUE OF "BIPP" IN PRIMARY OPERATIONS FOR GUNSHOT WOUNDS OF JOINTS.

BY CAPTAIN F. HOLT DIGGLE, O.B.E., F.R.C.S.,
R.A.M.C.,
SURGICAL SPECIALIST—C.C.H., E.E.F.

THIS war has been responsible for bringing before the notice of the profession many antiseptics, of which some are new and others have been revived. Bipp (bismuth, iodoform, and paraffin) is one of the latter, but, as with many other things, its results are disappointing unless one carries out to the letter every detail in the preparation of the material and surgical technique as laid down by Rutherford Morrison.¹

If strict attention to detail is observed, it is my opinion that surgeons will find in bipp a valuable asset, particularly so in the case of joint wounds. Its value here is obvious if one can obtain primary union of skin and bone as well as good functional result; for not only has the limb been saved, but the actual time taken in recovery is far less than by any other method of treatment, and I venture to say that the ultimate functional result will be much better.

The two cases I am about to record were each wounded by shell fragments, and naturally the wounds were in a very lacerated and dirty condition, being covered with sand.

CASE I.

Sgt. A. was admitted to the casualty clearing hospital on May 17th, 1918. There was an extensive shell wound of the left elbow, a semilunar flap of skin including the olecranon process of the ulna had been reflected upwards, and there had been free bleeding from the interosseous recurrent artery. The joint was completely exposed from behind and the synovial membrane and skin edges severely bruised.

Operation.

The skin was cleansed with ether, methylated spirits, and carbolic lotion (1 in 20), but the wound itself, including the exposed joint, was cleansed with methylated spirits and flushed with saline. No carbolic solution was used for fear of irritating the joint. Extreme care was taken to get as much sand as possible out of the wound by lightly rubbing with a swab whilst the saline was flowing. When the wound was thoroughly cleansed the skin edges were excised, lacerated muscle and ligamentous tissues removed, and the edges of the lacerated synovial membrane trimmed. All the bleeding points were secured. The wound was again flushed with saline, a swab steeped in methylated spirits was applied, and fresh towels arranged. Bipp was then lightly rubbed into every crevice of the wound and the olecranon was secured in position by passing iodized catgut smeared with bipp through the periosteum of its posterior surface and the periosteum of the shaft of the ulna. The synovial membrane was likewise sutured with fine catgut and the wound closed with a continuous stitch of thread smeared with bipp. A spirit gauze dressing was applied and the limb secured to an anterior straight splint.

I kept the patient under observation for seven days, during which time the temperature twice rose to 100.6°, but the pulse never rose above 80. On the fourth day I had to change the dressings because there had been a copious serous exudation. The wound then had a sodden appearance, but was otherwise healthy. I squeezed out a quantity of serum and reapplied a spirit dressing. On the fifth day the temperature subsided and remained normal until the patient was evacuated on the seventh day. Five weeks later I learnt from the base that there had been primary union of the wound, that the functional result was already very good and would be still better.

CASE II.

Pte. D. was admitted on June 11th, 1918. There was a compound comminuted tri-radiate fracture of the right patella exposing the knee-joint. The synovial membrane was much injected and the whole wound covered with sand. The same method of cleansing the skin and wound was adopted as in the former case.

Operation.

A tourniquet was applied. The wound was extended on the outer side by making a semilunar incision upwards so as to expose the joint more fully and facilitate the better apposition of the upper fragment of the patella. The bruised skin edges were excised, the joint thoroughly cleansed as before. The fractured surfaces of the patella were thoroughly scraped with a Volkmann's spoon so as to get rid of the sand, but nevertheless it was deemed advisable to remove a small portion on the outer side about $\frac{1}{2}$ in. in diameter. After thorough cleansing with saline the whole wound was gently rubbed with bipp and about 3ij of bipp, previously "let down" with sterile liquid paraffin until it had a more oily consistency, was run into the joint. The bony fragments were approximated as in the other case and the skin was closed with interrupted sutures. A spirit gauze dressing was applied and the dressings firmly bandaged on before the tourniquet was removed, a back splint with foot-piece was then applied.

The patient stayed for seven days, during which time the wound was never dressed. The temperature rose to 101° and 101.2° on the third and fourth day respectively, but the pulse was never over 85. The patient had no pain, and the temperature subsided before evacuation.

I am indebted to Captain Bannister, F.R.C.S., R.A.M.C., for the following notes, dated July 11th, 1918:

"When admitted to the base hospital the temperature was 101° and the pulse 96. The dressings were removed, and there was some slight surface inflammation of the lower end of the wound over the patella. The wound was dressed twice daily with eusol. The temperature reached normal the fourth day after admission, and the stitches were removed on the fourteenth day after the operation. The wound is now completely healed, except for a small area of granulations with some exposed fibrous tissue covering patella at the lower part of the wound. There is certainly fibrous union of the patella, and I think it will eventually become osseous. He can now move the knee about 30 degrees, but I have not allowed him much movement yet."

REMARKS.

I think there are several points of importance to be gathered from the above cases:

1. The thorough cleansing of the wound—this entails a considerable amount of time.
2. Discrimination in the quantity of "bipp" used: I have noticed that if it is used too liberally there is an extensive exudation which gives the wound a sodden appearance and necessitates the changing of the dressings, which is not desirable in fracture cases.
3. The importance of rest to the joint by splinting. This I regard as a most essential factor, whether there is any fracture or not.
4. The pulse, in conjunction with the temperature, is a better guide as to the necessity for changing the dressings and having a look at the wound than is the temperature alone. "Bipp" cases frequently run a high temperature, but if the pulse-rate remains slow there is no need for anxiety.

My thanks are due to Lieut.-Colonel H. A. Bransbury, D.S.O., R.A.M.C., for permission to publish the notes of these cases.

REFERENCE.

- ¹ BRITISH MEDICAL JOURNAL, October 20th, 1917, p. 503.

ON April 12th the "Mary Kingsley" medal of the Liverpool School of Tropical Medicine was presented to Dr. J. W. Scott Macfie, a former student of the school, in recognition of his distinguished researches in tropical medicine and allied subjects.

THE Société de Biologie has appointed a committee, with Professor Charles Richet as chairman, to study the physiological and hygienic problems of industrial life, including such matters as the physical and psychical qualities required for any particular occupation; work for persons with a physiological defect; the re-education of crippled and injured; the effect of diet, of hours of meals, of wine, alcohol, coffee, tea, and tobacco; and of factory conditions. Stress is laid on the necessity of close collaboration of scientists with heads of great industrial establishments and public authorities, which can be carried out only by a permanent committee, having at its disposal a fully equipped laboratory and funds adequate for the remuneration of full-time workers.

The Lumleian Lectures ON CEREBRO-SPINAL FEVER.

DELIVERED BEFORE THE ROYAL COLLEGE OF
PHYSICIANS OF LONDON,

BY

SIR HUMPHRY ROLLESTON, K.C.B., M.D., F.R.C.P.,
EMERITUS PHYSICIAN, ST. GEORGE'S HOSPITAL; PRESIDENT,
ROYAL SOCIETY OF MEDICINE.

LECTURE III.

(Abstract.)

In the third lecture the mortality, prognosis, prophylaxis, and treatment of the disease were discussed.

Serum Treatment.

The influence of the serum treatment on the prognosis was dwelt upon; its effect had been shown to depend to a very considerable extent on its early use. It was particularly in the septicæmic or premeningitic stage that early and vigorous intravenous administration of serum might cut short the disease. Herrick had recently shown that the free administration of serum intravenously reduced the mortality to 18.5 per cent. from 62.5 per cent. obtained in severe cases treated either by intrathecal injection alone or by intrathecal injection combined with small amounts of serum intravenously. Another important point was that the serum should contain the antibodies specific to the infecting strain of the meningococci. Flexner's multivalent serum from the Rockefeller Institute, made by the use of forty strains of meningococci, had on the whole given better results than any other serum, and the use of a multivalent serum, or of a pooled serum of the more probable infecting strains, until the actual type of the infecting organism was determined, when the univalent type serum was employed, would obviously be the most promising method.

Effects of Serum Treatment.

By comparison of the duration of the disease in various series of cases in the pre-serum era with 830 serum-treated cases that recovered Flexner found that the period of active symptoms shortened and that the cessation of symptoms, which in the natural history of the disease was almost always by lysis, was by crisis in 30 per cent. of the cases.

To sum up: although the infectivity of the disease was low, and a small proportion only of the population was affected, the prognosis of cases untreated by serum was bad, the death-rate varied in different epidemics from 20 up to 90 per cent., and was very rarely less than 50 per cent.; whereas with serum treatment the mortality should not be above 30 per cent., and, with further improvement of the methods and serum, might be much less, the duration of attack was shortened, and the incidence of sequels diminished.

Prognosis.

A very acute onset with sudden loss of consciousness—the *apoplecticiform onset*—had a serious outlook, but if the acute stage did not prove rapidly fatal recovery might eventually occur.

The outlook was bad in the fulminating cases also. The presence of a *rash* without further qualification did not affect the prognosis to any considerable degree, but a distinction must be made between the hæmorrhagic rashes, and more especially large purpuric extravasations, and the non-hæmorrhagic rashes. No prognosis as to a fatal result can be made from the leucocyte count. Similarly the temperature and the degree of headache had little, if any, ultimate prognostic significance.

Synovitis was a metastatic complication which, according to Netter, was seen in cases which eventually were cured. Possibly the local focus acted as a "fixation abscess" and raised the resistance to infection in the same manner as a vaccine. Fairley and Stewart found that a low blood pressure during the first three days was associated with a severe infection, and was therefore of bad omen. From routine examination of 184 patients, 116 of whom had optic neuritis, they found that the presence or absence of optic neuritis was of no value in prognosis, but they regarded *nystagmus* as pathognomonic of internal