Some Recent Advances
in the
Practice of Minor Surgery
being
A Thesis
for
The Degree of M.D. Edin.
by
James Hay Murray M.B. C.M.
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Contents

Introduction ........................................ 1

Anestile and Ethyl Chloride ........................................ 9
  Comparison with other local anaesthetics .......... 9
  Comparison with cocaine .............................. 11
  Disadvantages of cocaine ......................... 11
  Cases of cocaine poisoning ...................... 14
  Advantages of cocaine ............................. 22

Infiltration Anaesthesia ...................................... 24
  Disadvantages ..................................... 26
  Advantages ......................................... 28
  Conclusions ........................................ 29

Properties of Ethyl Chloride and Anestile .......... 31
  List of suitable operations ....................... 38
  Operation for circumcision ........................ 39
    Amputation ........................................ 41
    V. fingers ....................................... 41
    Removing the nail ............................... 43
    Case ............................................. 46
    Extraction of foreign bodies .................. 47
    Case ............................................. 48
    Incision of abscesses ............................ 49
Contents.

Operation for Extraction of Teeth...... 51.
  Curettage & Excision of small Tumors .... 53.
  Case.................................. 55.
  Paracentesis and Aspiration.............. 57.
  Removal of External Haemorrhoids...... 57.

Celloidin................................ 58.
  Comparison with other dressings..... 64.
  Advantages of Celloidin................. 64.
  Case.................................. 66.
  Disadvantages of Celloidin.............. 70.
  Comparison with Collodion.............. 74.
  Cases illustrating advantages of Celloidin........ 75.

Conclusions............................ 80.
Introduction.

Nothing strikes a hospital surgeon, especially a junior member of the staff, more than the fact that a large percentage of the cases of hospital abuse falls under the category of Minor Surgery.

As the methods I intend discussing in the following pages tend, in my opinion, distinctly to reduce the evil mentioned, I consider that it would not be out of place to briefly classify the ordinary kinds of hospital patients dealt with.

Considering together the nature of the case and the social status of the patient I have come to the conclusion that the following three classes embrace all except, perhaps, very occasional cases.

The poor who cannot afford to pay for medical attendance under any circumstances.
The respectable working class, who only require hospital relief in consequence of pro-
longed illness or serious accident, when the cost of medical or surgical attend-
ance for weeks or months would be more than their resources could meet.

Fairly well to do people—
who come under the category of hospital patients in order to escape specialists' fees
e.g. for a major operation;
but who can easily meet the expense of ordinary medical attendance.

What we have to consid-

er at present are cases of hos-
pital abuse occurring principally in division II but occasionally in division III of this clas-

ification.

On looking into the mat-
ter one finds that the fault
lies not so much with the
patient as with the general practi-
tioner. The general prac-
titioner finds from experience
that the remuneration which he receives from these cases is inadequate to compensate him for the time, skill, and worry which they necessarily entail!

This being so, the general practitioner refers them to the hospital, and gradually an idea gets abroad amongst patients requiring minor surgical treatment that the hospital is the proper place for such cases whether or not they are able to pay.

The question then, which one must consider is, "Why does the general practitioner object to treat cases of Minor Surgery?"

In interviewing a series of general practitioners upon this subject the following are the reasons which have been mostly emphasized.

Even for minor surgery an anaesthetic of some kind is usually required, and, until the introduction of Sowaine, no satisfactory local anaesthetic had
been brought into general use. The disadvantages of a general anaesthetic for small operations are evident to every one, viz., the danger necessarily involved, usually the presence of another practitioner, the necessity of preparation, the time lost in waiting while the patient recovers, the bad effects which sometimes follow as sickness, bronchitis etc.

Since the advantages of antiseptic and aseptic surgery have been so thoroughly proved expensive dressings are no longer a luxury but a necessity, hence the expenses of the practitioner may almost more than swallow up the fees which he receives.

The length of attendance often necessary is out of proportion to the severity of the case, and, now-a-days, since our methods require to be so scrupulously and carefully carried out in order to insure success, the surgeon must himself attend to the dressing during the after-
treatment, instead of leaving it in the hands of inexperienced friends of the patient which was often formerly the case.

If a case turns out well it does little but little credit, whereas, if a case goes wrong the whole neighbourhood and his reputation speedily suffers.

These and other minor objections have caused many private practitioners to allow this branch of their Profession to diminish almost to vanishing point as regards their practices.

The practitioner's enthusiasm for Surgery wanes; he does nothing but what is practically forced upon him; and for lack of reading about what interests him little his methods gradually become old-fashioned; and from want of practice his Operations are clumsily performed, and his attempts at making and keeping his wounds aseptic, failures.
To emphasize the point that many practitioners do no surgery but what is practically forced upon them and sometimes not even that, I may mention a class of case that one sees come to hospital every day. I allude to those large abscesses in strumous children or weakly adults, where, for lack of a simple incision, destruction of tissue has been allowed to go on to an enormous degree. When asked what treatment they have received, the answer is, "He gave me a bottle and told me to poultice."

It is therefore apparent that any modification of our present methods which will help to free the practice of minor surgery from these drawbacks will not only be a gain to the general practitioner and to the patient, but will also assist in removing one of the greatest evils the profession has to deal with, namely hospital abuse.
It is my intention in the following pages to discuss a few methods which have lately been brought before the notice of the profession, and of which I have had considerable experience, the introduction of which into general use would considerably diminish the objections which the general practitioner has to undertake such work.

By far the most important points are:

I. The selection of an efficient and reliable local anaesthetic which will compare favourably with those already in general use.

II. A method of dressing recent wounds, which, granted that ordinary care has been taken in the procuring of asepsis, will lead to the satisfactory healing of a wounded with a minimum
Of expense and trouble to the Surgeon, and at the same time procure an increased degree of comfort to the patient.
Anesthile and Ethyl Chloride.

It is now my intention to discuss the merits of two local anaesthetics which have very similar properties, namely Anesthile and Chloride of Ethyl and to compare them with the local anaesthetics which have hitherto been used.

At page 304, Edition 1891 of "Pharmacology, Therapeutics and Materia Medica" F. Lauder Brunton says, "The chief local anaesthetics are cold, cocaine, carbolic acid, isoforine.

"For the purpose of producing local anaesthesia, cold is generally applied by means of Ether spray, until the part is all but frozen and is insensible, when slight operations may be made without the patient feeling any pain. The Ether may perhaps have itself a certain amount of physiological effect in diminishing
"ing sensibility when applied it this manner.
"Carbolic acid painted over the surface also causes it to become white and to lose its sensibility and may thus be used to lessen the pain of opening an abscess.

The Ether spray has largely fallen into disuse chiefly from the fact that the anaesthesia produced is extremely superficial and its duration hardly permits of a larger operation than a mere incision.

The local anaesthesia produced by Carbolic acid is still more superficial than that of ether. I have never seen Iodoform used as a local anaesthetic in the sense in which I am now using the term. Besides its other properties it certainly has a soothing effect upon painful wounds when used as a dressing.
Thus there are only two of the local anaesthetics mentioned in Brunton's list which have proved of any practical value in minor Surgery, namely Cold and Cocaine.

The use of the former as produced by the Ether spray has been almost absolutely abandoned, and although Cocaine still holds its own and has many points in its favour, it has some disadvantages which must be considered in comparing it with Anestic and Ethyl Chloride.

Disadvantages of Cocaine

Many have objected to Cocaine on account of its toxic qualities, but in my experience cases of Cocaine poisoning following hypodermic injection or application to mucous surfaces for surgical purposes are extremely rare. Only on one occasion have I seen untoward symptoms follow its use, and...
that was after the injection
of \( \frac{3}{4} \) grain into the submucous
tissue of the rectum for the
removal of a small cancerous
node.

But, certainly, when one
considers the mode of action of
the drug, the rationale of lo-
caine poisoning is very evident,
and the uncancerous cases of such
poisoning described in the Med-
cal and Surgical Journals
cannot be ignored.

Subcutaneous injection or
application to a mucous sur-
face of cocaine produces Anae-
thesia by paralysing the sensory
nerve at the point of appli-
cation. A large dose of cocaine
acts by paralysing the Vagus
nerve causing greatly accelerated
action of the heart. The blood-
pressure first rises and then
falls. Respiration rises in fre-
quency, is disturbed in rhythm
and finally ceases.

In the British Medical
Journal, December 1st, 1894 Epi-
tome No. 427, there is an extract
from an article by Maurel of Toulouse entitled "Mechanisms of Death under the Influence of Cocaine." He reports a series of experiments which show that under the influence of cocaine the leucocytes undergo changes, they become spherical, rigid, increase in size, and no longer adhere to the walls of the vessels. "These changes," he says, "in the leucocytes are seen even after small doses of cocaine of a strength of 1 in 10; this explains the serious accidents which sometimes follow the administration of concentrated solutions even in small doses."

He further states that pulmonary embolism is the accident more particularly to be feared in cocaine poisoning. He also thinks that the toxic action of cocaine is not confined to its effects on the leucocytes, but that it produces several other effects, in the joint rank of which must be placed contraction of the small vessels.
Illustrative Cases

I think it well here to refer to a few of the many cases that have been published illustrating the alarming symptoms which sometimes follow the administration of cocaine. It will be seen from these that the dose necessary to produce these symptoms in different individuals varies in amount in an extraordinary degree.

(1) Dr. A. March in a memorandum on "The Dangers of Cocaine", in the British Medical Journal, September 28th 1895 says, "The advantages of cocaine as a local anaesthetic are so generally admitted, that there seems to be a danger lest the risks, attendant on its use in certain individuals, should be overlooked. He then describes three cases in which 20 minims of a 10% solution of the hydrochlorate of cocaine, that is, two grains of the salt, were injected into the urethra, and within
five minutes "alarming symptoms of collapse manifested themselves."

(2). In the British Medical Journal, December 14th, 1895, page 1492, in a Memorandum, Dr. A. Carter Maeter describes a case in which he instilled three or four drops of a 5% solution into each conjunctival sac of a man twenty-five years of age preparatory to evacuating a Chalazion from each eyelid. While operating on the second one "the patient suddenly became blanched, perspiration broke out on the forehead, the pupils dilated, the respirations became rapid, and after a slight convolution he became rigid. All the symptoms passed off in a few seconds, though the patient remained pale and complained of feeling faint for some time. In this case alcohol was applied to the conjunctiva.

(3). In an Epitome of "Danger of Local Use" British Medical Journal
August 25th, 1894, R. W. Haynes records two cases.

"A child two and a half years old received at the hands of an experienced Surgeon a urethral injection of 10 grains of cocaine to facilitate the introduction of a sound. In a few minutes tonic convulsions and wandering delirium set in, with the usual train of symptoms of acute poisoning ending in death in three days."

(4). The other case recorded is that of a friend of Haynes who had 4 grains of cocaine injected into the gums before the extraction of teeth. He died of convulsions within an hour; probably, Haynes surmises, from the drug entering the circulation immediately.

(5). In the British Medical Journal, November 9th, 1895, page 1162, G. M. Johnstone Lethieux mentions a case in which two draughts of a 10% solution of
locane taken by the mouth for toothache, by a girl aged sixteen, proved fatal in 40 minutes. This was equal to 12 grains of the salt.

J. O. W. Barratt in the British Medical Journal, April 25th, 1896, page 1032, records a wonderful case of recovery from 14 grains injected hypodermically. The case was that of a medical man who accidentally injected 40 minims of a 35% solution to relieve local rectal pain.

These six cases may be regarded as fairly representing many others of a similar nature which have been published. I must say that in the majority of them the dose of drug administered is greatly in excess of the quantity usually given. In some of them the quantity injected is greater than the maximum dose to be administered by the
month which, according to the British Pharmacopoeia is one grain.

It is difficult to see for what purpose these large doses are given, as they certainly greatly increase the risk of poisoning; while many authorities are agreed that the more dilute solutions are quite as efficient as local anaesthetics as the more concentrated ones.

It is therefore evident that poisoning by cocaine may either be due to the administration of too large a quantity of the drug, or a greater susceptibility, which certain persons seem to possess, to its action when given in ordinarily safe doses.

In the British Medical Journal, August 5th, 1894, page 555 in answer to a query, the following sentence appears, which sums up very tersely the toxic properties of cocaine. "That cocaine is dangerous in certain cases there is, unhappily, no
"doubt, nor can it be discovered in what instances untoward symptoms will arise."

If one administer Locaine to a patient whose cardiac mechanism is in any way impaired, and either from abnormal susceptibility to the action of the drug, or from a slightly larger dose than is necessary, one has the above mentioned implication of the nervous system and its consequences, it is not outside the bounds of probability that a disastrous result might follow.

But it is a matter of great difficulty to differentiate between syncope, the result of the action of Locaine upon the nervous system, and syncope from mental emotion. In a certain number of cases, especially in those of highly strung and nervous patients, syncope will take place, however slight the operation and whether or not means are taken to prevent or remove the pain.
we will always have those people among us who fear at the sight of blood or at the idea of an operation. And even when pain is completely abolished by means of local anaesthesia, it does not lie in the slightest degree (and this is where a general anaesthetic has an overwhelming advantage) deprive the patient of his mental faculties, and prevent their being aware or even seeing that his tissues are being cut.

Another objection to the hypodermic injection of local anaesthesia is the necessity of using a needle. Many patients have a deep-rooted horror of a hypodermic needle and will not be persuaded that the pain of the prick is trivial and modulatory. It often requires very considerable persuasion on the part of the surgeon to overcome this reluctance of the patient to allow the use of the needle.

Moreover, in some operations where the area to be anesthetised
is considerable. The needle has to be inserted not only into one but into several sites and in that case the repeated prickling certainly becomes a serious objection to the hypodermic administration of cocaine.

Another disadvantage of cocaine which might be mentioned is the time and trouble involved in preparing and cleaning the syringe before and after each application. The use of a hypodermic syringe unless extremely carefully sterilized always involves the risk of introducing noxious organic substances into the tissues along with the solution. This accident might quite logically be put down as the cause of abscess formation, failure in healing of wounds, etc. Solutions of cocaine unless quite freshly prepared or with the addition of some antiseptic substance are very liable to decompose.

A further disadvantage
of Cocaine is its frequent failure to produce anaesthesia in highly inflamed tissues. This is sometimes well seen when an abscess is opened, under its influence.

Advantages of Cocaine. The chief advantage that Cocaine possesses over Anesthe and Ethyl Chloride is that it can be applied in certain sites where these cannot be applied at all. In Ophthalmic surgery, as far as our present knowledge goes, it is the one invaluable local anaesthetic which we possess. From the ease with which it can be applied by means of a swab to uncooled surfaces which are inaccessible to the Chloride of Ethyl spray as at present made, it is of great value in preventing the pain attending minor Operations in the Surgery of the nose, ear, throat, feminine vagina or urethra.
With the exceptions of operations on the lips which is one of the best sites for the application of Anestile and Ethyl Chloride; and the extraction of teeth where I cannot say that I have ever seen Beacnie of much value in preventing pain; in all minor operations in the cavity of the mouth Beacnie is perhaps easier of application than Anestile or Ethyl Chloride.

In all these sites which have been mentioned the disadvantage on account of the use of the hypodermic needle is absent.

Perhaps the most real advantage which Beacnie possesses is that the duration of the Anesthesia is longer than that produced by Anestile or Ethyl Chloride. This advantage, however, only applies in operations which require a considerable time for their execution.
Infiltration Anaesthesia.

A criticism of local anaesthesia cannot be considered complete without at least alluding to a new method of obtaining it, and termed by its Author, Dr. Schlich, "Infiltration Anaesthesia."

I have not had an opportunity of giving this method a trial and due only in a position to make a brief critical digest from what I have read of it.

Short articles have appeared in the British Medical Journal within the last year briefly alluding to the mode of procedure in producing Infiltration Anaesthesia; but a more detailed account of the method may be found by Bransford Lewis M. D., St. Louis, in the Medical Annual for 1896 page 14 et seq.

The principle of the method
is based upon the fact that injections of fluid into the tissues in considerable quantity will cause a deadening of the sensibility of the part. The fluid must be of a certain density, and it is largely due to this given density that the results here obtained, as fluids of a higher or lower Specific Gravity, are said to be useless. The author claims that operations of considerable magnitude can be performed flawlessly by means of this method.

Shortly the method is as follows. A small quantity of a suitable fluid is injected by means of a syringe needle obliquely into the skin, the point of the needle reaching just below the epithelial layer. A small wheal is the result, and this, when tested with a knife is found to be absolutely insensible. The sensibility of the skin beyond the predetermined area is not dis-
turbed in the least.

Through this anaesthetic area, the needle is again inserted farther on, causing a new area of anaesthesia, and so on until the required surface and depth of tissue has been anaesthetised.

"Every tissue of the body," says Lewis, "without exception (skin, muscles, glands, muscular membrane, nerves, etc.), become insensible to pain when infiltrated in the manner described."

**Disadvantages**

It may be well to begin by stating the disadvantages which this method appears to have.

The initial pain of the insertion of the needle. This the author has overcome by producing a point of anaesthesia first of all by means of Chloride of Ethyl or the Ether spray.
The primary irritative pain produced by the presence of the fluid, before the secondary anaesthetic effect becomes apparent. This the author says is almost nil in healthy structures and he seems to have overcome it in either of two ways:
(a) By beginning the anaesthesia in healthy structures and continuing it into unhealthy ones.
(b) By using in his solutions (and this is the generally adopted plan), very minute quantities of drugs which have an immediate anaesthetic effect such as Locaine or Morphia or both. The proportion of Locaine is 1 or 2 per cent and thus no risk of poisoning is present. The solution acts best when cold and ought to be kept surrounded with ice before and during the operation. This is a most inconvenient thing to carry out in detail.
4. Fluids of different composition are used according to the condition and structure of the tissue to be operated upon. Thus Dr. Schleier has three stock solutions, No. I for inflamed areas, No. II for most operations, No. III for superficial operations on normal structures. Nerve trunks have to be separately anaesthetised, first by applying a 5% Carbolic acid solution and then injecting the fluid.

D. Lewis mentions the risks of piercing bloodvessels, nerves, etc.

Advantages

The advantages of this method seem to be as follows.

1. The anaesthesia lasts from fifteen to twenty minutes. Compared with either Cocaine or Ethyl Chloride, this certainly admits of more extensive operations.

2. The anaesthesia is immediate, and here there is a
slight advantage over cocaine, but not over Chloride of Ethyl. The extremely small percentage of drugs in the fluid admits of no chance of poisoning. Here again the advantage is only over cocaine.

Aquaeula is one of the effects of this method and consequently there is less haemorrhage than under ordinary circumstances. There is also a temporary anaesthesia following the use of Chloride of Ethyl or Aquaeula.

Conclusions.

My conclusions as regards this method are that in experienced hands it will be of service in major and larger minor operations in cases where the administration of a general anaesthetic are considered dangerous.

In small minor operations the long duration of the anaesthesia is of no value.
as the operation can usually be performed in a very short time.

All the advantages of the method, i.e., minor surgical operations in general, seem to be neutralised by the complicated method of procedure which has to be followed, in order to carry it out efficiently.

In fact, the method which may give excellent results in Dr. Aleich's hands requires too much nicety of touch and judgment, and, in fact, is too complicated altogether for the busy practitioner. It seems to rule that it is more a method for hospital than for private practice.
Properties of Ethyl Chloride and Anesthezic.

The Therapeutic Gazette of April 15th 1892 says of Ethyl Chloride (C₂H₅Cl), "There can be little doubt that in this substance we have a valuable local Anæsthetic. It is a colourless, mobile, liquid, having a peculiar and pleasant odour, and a sweetish, burning taste. It boils at 123° at 0° possesses a specific gravity of 0.874. It is slightly soluble in water, but dissolves readily in alcohol."

Dr. Boegue has invented a method for its application, which consists essentially of a tube with a screw stopper. The fluid escapes from the tube by means of a very fine capillary caudal, running lengthwise through a piece of glass inserted into the neck of the tube. It only requires the screw stopper to be removed and
the warmth of the operator's hand, to cause a very fine jet of the Chloride to be projected on the part to be anaesthetised. These tubes are supplied by B. Kuhn, 36 St. Mary-at-Hill, Eastcheap E.C.

The Medical Record for 1893 states that Drs. A. C. Wood and David Boas have made a series of experiments with this fluid and have come to the following conclusions.

1. That the Chloride of Ethyl is capable of acting as a general anaesthetic, but that it is eliminated with extraordinary rapidity and that its action is extremely fugacious.

2. That anaesthesia is accompanied by a fall in the blood pressure which is probably, at least in part, due to direct depressing effect of the drug upon the heart.

3. That the fugaciousness of the action of the drug must interfere with its use.
as a general anaesthetic, and that its depressing effect upon the circulation is too pronounced for it to be a safe anaesthetic.

On the other hand the small amount of Chloride of Ethyl which is used in producing local anaesthetics, has practically no effect upon the human system, any of the drug that is absorbed into the system being eliminated in the course of a few minutes. The first three conditions show that, like cocaine, the drug in large quantities is capable of producing poisoning; but the fourth frees it from any suspicion of toxic qualities when applied locally.

Lauder Brunton suggests that, "Othe may perhaps have itself a certain amount of physiological effect in diminishing sensibility, when applied in this manner," that is by means of the spray. It is quite as probable
that Chloride of Ethyl, possessing as it does, many qualities in common with Ether, has also a certain amount of physiological effect in diminishing sensibility, besides that extremely marked quality of vaporising at a low temperature and producing insensibility by cold.

Aeustile is very similar to Chloride of Ethyl and the remarks which follow regarding their uses are applicable to both.

Aeustile differs from Chloride of Ethyl in that a quantity of Chloride of Methyl is added. They act in exactly the same way as the Ether or Carbonic Acid spray, that is, they evaporate at a very low temperature and when applied to the surface of the body produce an area of anaesthesia by virtue of the great reduction of temperature which takes place in the tissues.

Aeustile possesses certain advantages over Chloride of Ethyl.
and on this account I have used it much oftener than the latter in very cases.

These advantages are—that it evaporates at a lower temperature than Chloride of Ethyl and thus anaesthesia is produced more quickly and with a smaller amount of fluid; also the cylinder in which it is stored is large and made of metal and can be re-filled, that for the storage of Chloride of Ethyl being made of glass and when empty is useless. Both these advantages in the long run considerably lessen the expense.

The simple expedient of testing the fluid on the back of one's own hand or arm suffices to show that it is entirely harmless to the tissues.

 Anaesthesia is produced in from ten seconds to one minute, the time depending upon the temperature of the air which regulates the rapidity
of evaporation. To some extent also the heat of the part influences the tincture required.

When the part becomes white anaesthesia has been produced, but it is well to continue for a very little longer with the spray to ensure ample tincture for the performance of the operation.

At first, on applying the spray a sensation of cold is produced in the skin. This is very soon followed by a sensation of "pricking heat." This continues until the skin becomes white. As the circulation returns the part becomes itchy and is evidently hyperaemic from the red appearance of the skin. These phenomena disappear in a few minutes and are analogous to the sensations which are experienced in the nose, ears or extremities when these parts are recovering from intense cold.

I have found from a series of small experiments
that the best distance from which to apply the spray is about six inches. From that
distance I have frequently succeeded in making the part white in eight seconds. In mov-
ing the spray either nearer to or further from the part, the true required is proportionately
greater.

On one occasion only have I produced the slightest evidence of tissue death. I applied the
spray to a spot on the back of my hand for four seconds. Some little time afterwards a small blister appeared. This tissue, however, is far
in excess of that ever required to anaesthetise any one spot
during an operation.

The following is a list of minor surgical operations in which I have applied Aurestol or Chloride of Ethyl with success, and I purpose giving a short account of the method followed in each operation, in relation to applying Aurestol or Chloride of
Ethyl which I have found most suitable in each case.

List of Operations.

1. Communion and closing the wound.
2. Amputation of fingers and toes.
3. Opening abscesses, whitlows, incisions in cellulitis etc.
4. Extraction of ingrowing toenail
5. Extraction of foreign body
7. Paracentesis of the abdominal cavity, aspiration of the pleural cavity, hydrocele, abscess, etc.
8. Extraction of teeth
Circumcision.

In this operation anaesthesia can be more efficiently brought about in conjunction with cocaine at a certain stage.

The method I have found most suitable is to use aqueste for the skin and then to deal with the mucous membrane after the application of cocaine.

Grasp the foreskin with a pair of dressing forceps in the usual way, raising the whole part to be cut off in front of the blades. Then apply the aqueste to a ring of skin immediately in front of the forceps taking care to apply it all round until it is white. It will then be found that the frozen ring in front of the forceps is no longer pliable but quite stiff. Then steadying the part to be cut away with fingers or fixation
forceps, slice it off in front of
the dressing forceps with a
knife.
This the first part of
the operation is easily performed
within half a minute of the
commencement of the applica-
tion of the spray.
Retract the skin and
apply a 5% solution of cocaine
on a swab for a few minutes
to the exposed raw surface.
One can then deal painlessly
with the mucous membrane
according to any of the var-
ious methods one may choose
to follow.
In stitching the skin to
the mucous membrane the
patients do not complain of
pain. This, I believe, is due to
the fact that the cut edge of
the skin absorbs some of the
/local analgesia.

I have performed this
operation several times on adults
and many times on children
and consider that the advan-
tages over the use of cocaine
alone or a general anaesthetic are very clear.

In slitting the foreskin for phymosis, gonorrhoeal warts, etc., a director is pushed between the foreskin and the glans as far back as the corona. Then the line of the incision has simply to be anaesthetised and the incision made.

Amputation of Fingers.

In amputating a finger anaesthesia is most quickly produced if the finger is first rendered bloodless. It is quite sufficient to raise the limb, squeeze the blood out of the finger and grasp the vessels on either side.

It is also of advantage to wrap a piece of cotton wool round the finger, a
little behind the place where the incisions are to be made. The cotton wool if well sprayed keeps at a low temperature much longer than the tissues and in absorbing heat from the tissues lessens the anaesthesia considerably.

Owing to the relatively large surface to be anaesthetised, it will frequently be found advantageous to hand the spray to an assistant with directions to keep it directed on the skin a little way in front of the knife. The bleeding after an amputation of the finger by this method is often so slight that no ligatures are required. This is undoubtedly due to the great contraction of the vessels under the influence of extreme cold. I have never found it necessary to remove the dressings for reactionary haemorrhage although one might think it liable to occur, seeing that the part, in a little while.
becomes hyperaemic.

Case: A. R., a girl aged 13 came under my care suffering from a crushed finger which required amputation through the second joint. Acetate was employed as an anaesthetic in the way described above. The girl said she felt no pain except during the stitching, and then it was trivial. No vessels required ligation and healing took place by first intention.

Ingrowing Toenail.

The extremely painful method of procedure which is required in many instances for the alleviation of this common malady can, by the use of Acetate or Chloride of Ethyl be rendered perfectly bearable and often almost absolutely painless.

In using cocaine for this
operation the insertion of the needle is often of itself an ex-
tremely painful procedure; and to anaesthetise the whole area
from which the nail has to be removed, it is necessary to
move the point about or to insert the needle at several
different points.

Also, unless the plunger of the syringe is perfectly fit-
ting, the resistance which the very dense tissue of the matrix
offers to the escape of the fluid from the needle, causes
the fluid to be forced back into the empty part of the
barrel behind the plunger.

It is well in this
operation before anaesthetising
the part to wrap a piece of
cotton wool round the toe,
leaving about one third of
an inch of skin between
the wool and the nail. This
is done for the reason men-
tioned in the remarks upon
amputation of a finger.

Thou thoroughly anaestheti
ise the whole dorsum of the toe, both nail and skin together with the front portion of the wool.

When this is accomplished, quickly divide the nail up the central with sharp scissors and remove one or both halves with strong forceps. The frozen nail is more brittle than normal and care has to be taken that it does not break. Any redundant overhanging skin can be cut off with scissors.

Sometimes, although little or no pain has been experienced during the operation, the patient soon afterwards complains of an intense pain on the raw surface. A swab applied, after the bleeding has been stopped, containing a 3% solution of cocaine will quickly alleviate this.

I might mention here that in applying cocaine to a freshly raised surface the bleeding must, of course, first be stopped, else the flow of
blood will carry the poison away with it. The best way, I find, of doing this is to follow the plan of applying a piece of protective tissue between the raw surface and the pressure pad. This was introduced by Halsted of Baltimore in relation to Hirsch's method of skin grafting and is described in Watson Gray's "Treatment of Wounds, Abscesses and Ulcers," page 132.

Case: In September last a young man consulted me about his great toe nails. I found them both in a very bad "in-growing" condition and recommended excision under Chloroform. He objected very much to chloroform and I decided to remove the nails, one at a sitting, with the aid of Acetone. The excision of the first nail caused him such trivial pain that the patient was quite willing to have the other nail "done" at the same
true and the double operation was performed at a single sitting.

Occasionally one finds that the nail has been partially lifted from its bed by an exostosis growing from the terminal phalanx. In such a case after the nail has been removed the spray must be again applied to the base of the exostosis and the growth removed with a gouge.

Extraction of Foreign Bodies.

The foreign bodies in the extraction of which, Acetol and Chloride of Ethyl have proved of value, have in my experience chiefly been of the nature of needles, fishhooks, pieces of glass, splinters of wood, and small bullets from toy pistols.

In most cases all that
can be done is to fix the body, anesthetise the surface over it, and then cut down upon it and remove it.

In a few cases of need, lees and fishhooks, one is able owing to the sharpness of the body, to force the point out through the skin from within, thus dispensing with the use of the knife.

Case I. A boy one year old was brought to me by his mother August 9th 1896. She stated that she had discovered something hard under the skin of the child's belly. How it got there and how long it had been there she did not know. A long slender hard body could be distinctly felt thing in the muscles of the abdominal wall on the right side. The body was fixed with one hand and a needle was made down on to the end of the body. It
Incision of Abscess etc.

It is a well-known fact that in acutely inflamed areas, cocaine often fails to act efficiently as a local anaesthetic, and in small operations such as incision of abscesses, whitlows etc., adesine possesses a very material advantage over cocaine. In acute abscess the area which it is most advisable to incise is often hot, red, and swollen, and in such cases the increased flow of blood through the part materially interferes with the freezing of the tissue. By gentle
pressure with the thumb and forefinger of the left hand, one can very gradually and without pain to the patient, prevent the flow of blood, the part becoming pale instead of a deep red.

By this simple manipulation, or application of the spray anaesthetica is produced sooner and remains longer. All that is required is to make the incision.

If we take for example a case of cellulitis of the arm, we can at once see what a decided advantage Chloride of Ethyl or Acetile possesses over Locaine.

In order to prevent destruction of skin numerous incisions require to be made. Incising intensely inflamed tissue is an extremely painful procedure, and an anaesthetic is some form or other is almost a necessity.

The use of Locaine or
account of the numerous sites to be treated is impracticable. The choice therefore lies between A nestsé and Chloride of Ethyl or some other local anaesthetic on the one hand and a general anaesthetic on the other, and I consider that the points in favour of A nestsé and Chloride of Ethyl are very decided.

Extraction of Teeth.

I believe that Chloride of Ethyl was first used in surgical practice in the extraction of teeth. The Medical Annual for 1893 referring to it at page 233 says, "It has so far been chiefly employed for dental operations and we have seen very complete anaesthesia produced by its use. As far as my exper-
Nurse goes it is of great service in the extraction of incisors, canines, bicuspids, and sometimes the first molars on both upper and lower jaws. On account of their position there is difficulty in its application for the extraction of the remaining teeth.

The method which I have found best in the performance of this little operation is as follows.

Pieces of cotton wool are placed upon the gum around the gang of the tooth to be extracted, leaving the mucous membrane beneath which the gang is situated bare. This is done on both internal aspects of the alveole.

This serves the double purpose of limiting the anaesthetic area to the size required and, as mentioned before, of slightly prolonging the anaesthesia. The two small surfaces surrounding the wool are sprayed till white.
and the tooth extracted. Although a shock is nearly always felt when the tooth is lifted from its socket, yet that most unpleasant part of the operation, namely the application of the forces, is rendered absolutely painless.

Enucleation or Excision of Small Tumours.

A considerable variety of small tumours can be removed with the aid of Chloride of Ethyl or Acetate. Small naevi, warts, facial cysts, papillomata, fatty tumours, fibromata, epitheliomataous warts, epitheliomata of the lips, are among the ulcers that have been removed. The method will, of course, vary in each case according to the size, situation, etc.
tive and form of each individual tumour.

I consider that the removal of large with the aid of Chloride of Ethyl or Aseptol is, par excellence, one of the most satisfactory operations that one is called upon to perform.

The patient experiences the trivial sensations of cold and heat on the application of the spray. An incision is made into the cyst and the cyst pulled out with forceps, and a dozen were may be thus removed before the patient thoroughly realises that the surgeon has commenced.

In removing an epithelial cyst of the lips, due care must be taken before applying the spray to determine definitely the lines of the incisions to be made.

In this operation this form of anaesthesia has an important disadvantage. The freezing causes the tissue around the tumour to become
as hard as the tumour itself and therefore one must decide upon the line of incision and have some landmark to guide one before applying the spray. Otherwise the operation is extremely satisfactory; the anaesthesia is being very complete and the bleeding slight.

Cotton wool placed round about is an advantage and of course, the mucous membrane as well as the skin aspect of the lip must be sprayed.

Case: O. S., a man aged 45, sought advice on account of a cancerous nodule on the lower lip about the centre. He had had a nodule removed on two previous occasions on both of these occasions had been used.

On this occasion Aurelie was used as an anaesthetic and the nodule removed by a V-shaped incision. The man stated that
all three operations were painless as far as the cutting was concerned. There was slight pain immediately on the injection of locoain in the two previous operations.

In cases of tumours such as facial cysts where more dissection than was anticipated is sometimes required, a solution of locoain applied with a swab to the deeper part of the dissection is of great service.

Small pedunculated tumours may be satisfactorily removed by freezing the pedicle and a small portion of the skin around and then using knife or scissors.
Paracentesis and Aspiration.

In these operations the insertion of the trocar and cannula causes little inconvenience to most individuals; but the anæsthesising of a small spot when it can be done so easily is certainly an advantage.
The little ared becomes hard and chewy and the trocar and cannula can be pushed through it very readily.
All operations involving the use of a trocar and cannula can in this way be rendered absolutely harmless.

Removal of External Haemorrhoids.

This operation is practically the removal of a series of small tumours. Thoroughly freeze the base of the pile. Then seize it with a micelle and slip the pile off through the frozen area with scissors.
Celloidin.

I intend now to discuss the second subject of this paper, namely a method of treatment of aseptic wounds without bandages or dressings, in the ordinary acceptance of the term.

For the first mention of this method which came under my notice, I am indebted to Dr. James Mackenzie & Burdick who describes it in a paper in the British Medical Journal vol. 1896 page 967 etc.

The substance known as Celloidin has long been in use as a surgical dressing. It is prepared by dissolving Pyroxylin or gauze cotton in Ether and Alcohol. Flexible Celloidin is of a tough consistency caused by the addition of Canada Balsam and Castor oil and does not crack so readily when the skin moves.
Lauder Brunton in his "Pharmacology and Therapeutics" page 444 says, "Collodion applied to the skin acts both as a protection, and also, through its contraction exerts a gentle pressure on the part, and is hence applied to cut surfaces, chapped nipples, and to check haemorrhage from leech bites. The flexible Collodion does not crack and is therefore more useful as a protective but it exerts less pressure than ordinary Collodion.

A substance which has recently been brought before the notice of the profession, namely Celluloidin, is, I believe, an extremely pure form of Pyroxalide. It is manufactured by E. Shering of Berlin and can easily be obtained from any chemist. It is sold in the form of pale yellow somewhat opaque, twisted shavings, and to prepare it for use one cannot do better than
follow the method laid down in Dr. MacKenzie's paper already referred to.

He says, "The solution of Celliodine is made by dissolving one part of Celliodine in four parts each of Absolute Alcohol and Sulphuric Ether." This solution when thoroughly dissolved is of proper consistence; but in course of time it gets thick and all that is necessary to restore it again to its proper consistence is to add, by guess, a little of equal parts of Absolute Alcohol and Sulphuric Ether.

The most satisfactory way of treating the wound is that described by Dr. MacKenzie in his paper. He uses catgut for ligatures, deep sutures, and superficial sutures. The deep sutures are put in in rows, commencing at the bottom of the wound and gradually approaching the surface. The skin sutures are
brought into opposition by a continued cauteriul cautery em-
compassing but a small extent of the cut edges of the skin.
After waiting until the ooze, has stopped he dehy-
paids the surface of the skin first with a piece of lint
soaked in Rectified Spirit and then with a piece of lint
soaked in Absolute Alcohol; and while the part is still
moist with the absolute al-
cohol he paints the Alloetin
over the surface of the wound
and half an inch of the
skin on each side.

He adds, "very fre-
quently one light painting
suffices to cover the part long
after the wound has safely
and soundly healed."

This is very shortly
the method which is much
more fully described by Dr.
Mackenzie in the article pre-
viously referred to.

Although Dr. Mackenzie's
method is, I believe, the best
which can be adopted, it need not necessarily be followed out in all its details, in order to make Calloidal a successful dressing for wounds.

For instance he recommends the use of a continuous catgut suture for closing the wound. The advantage of catgut is obvious to anyone who has used Calloid. A week or ten days after the wound has been dressed the Calloid begins to curl up off the skin at the edges, and when the surgeon removes it he finds that it is not necessary to remove the stitches in the ordinary way, because that part of the catgut beneath the surface of the skin has been absorbed, and the part outside the skin lifts off with the Calloid.

If the surgeon prefers to use interrupted sutures of catgut, they are quite as applicable to the method as the continuous suture.
One disadvantage is that the knots and ends stick up and are apt to project through the Celloidin. This is easily obviated by using the needle recommended by Professor Cheyne in the British Medical Journal October 6th 1897. In this method the thread is simply passed three or four or five times as in the first part of a common reef knot and is then drawn tight and the second part of the knot is not required. This possesses amongst other advantages that of being perfectly smooth.

Then again, good aseptic cautery may not always be at hand. In such a case horsehair stitches act perfectly well. In taking off the Celloidin they must each of course be snipped through with scissors.

Celloidin is also an excellent substance to apply to any wound however large, as a protection after
the usual dressings have been taken off; and before one is inclined to leave the wound quite exposed.

Celloidin compared with other Dressings.

I think it best now to discuss the advantages and disadvantages of Celloidin over other methods of dressing wounds.

Firstly it may be compared with those methods in which gauze, wool, bandages, etc. are deployed.

Secondly it may be compared with dressings of a like nature, namely the different forms of Celloidin.

**Advantages of Celloidin**

(1) A great deal of expense can be saved by using this substance as a dressing.
It is not easy to determine the relative expense of the two methods. But it is no exaggeration to say that the amount of solution of collodion used in dressing a comparatively large wound costs only the fractional part of a penny.

The comfort of the patient is greatly increased. This is seen to very great advantage in the case of wounds about the head, face, and hands. A bandage is in many cases very unseemly to the wearer and, at these situations at least, they are a great disfigurement; and I imagine that statistics would undoubtedly show that accidental wounds about the hands and head greatly predominate in number wounds of all other parts of the body.

It is a great relief to a patient suffering from a scalp wound if one can assure him that he will require to wear neither a band-
day or a piece of sticking plaster.

One can leave one's patient with the certainty that if the lobe or duc is not deliberately picked off, it will lie in its proper position as a covering to the wound when one returns.

However careful one may be in applying a bandage, to make it comfortable, a restless patient will easily succeed in wriggling himself, at least partially free, or an interfering friend may relieve him of it altogether.

case The following are a few notes on a case which illustrates this advantage very clearly. Mr. M. a man aged 30 came under my care on July 23rd 1896, suffering from concussion of the brain and a large scalp wound over the vertex, the result of falling upon his head by stepping out of a train in question.
The wound was treated by thorough cleansing with 1-20 Carbolie Lotion, and brought together with cal gilt sutures and then Alloidin was applied.

Soon after the patient regained consciousness he became acutely maniacal and remained so for many days.

Notwithstanding that he tore his clothes and tossed about continually, the wound healed by first intention and the Alloidin was removed about the ninth day.

In this case a dressing secured by a bandage would certainly have been torn off again and again, and early healing of the wound could not have been expected.

In cases of constitutional disturbance with rise of temperature, quickening of the pulse, etc., one can at once determine whether it is due to a local cause at once without removing the dressing.
Since Collodion is transparent any reddness of the lips of the wound, a tight stitch, formation of pus, etc. can at once be detected through the thin film.

If asepsis has been gained in the purification of the wound and the skin around, there is almost no possibility of conveying infection from the Collodion applied to the wound.

I believe that the carrying of organic material to the wound by means of dressing, to be a frequent source of infection of wounds where wool etc. is applied as dressing. It often passes through several hands and may come in contact with dirty blankets, towels, etc., before it comes into the hands of the Surgeon.

In the case of Collodion it is kept in a stoppered bottle and applied with a clean brush.

It can be applied
to parts of the body where bandages render really insufficient, for example when a wound is near one of the natural orifices.

Case. The following brief note on a case illustrates this point.

A child aged two years came under my care on November 3rd 1896, suffering from a deep and ragged wound of the buttock about four inches long, the result of sitting down on a corn-mode, the edge of which was indented. The wood from which was very near the anus was cleaned, stitched with catgut, painted with an antiseptic and healed readily.

In this case the child was too young to be cleanly, and would much benefit would very quickly have become infected, resulting probably in delay in healing. In small superficial wounds about the face it is
stitches or strapping need be used because if the edges are held in proper apposition for a few minutes until the Celloidin has set it exerts sufficient tension to retain the edges in apposition.

In a wound of this kind the advantages are very striking. The dressing is almost invisible, there is none of the irritation and discomfort like that caused by a bandage or a piece of sticking plaster, and stitch marks which often leave more conspicuous cicatrices than the cicatrix of the wound itself are, of course, absent.

Disadvantages of Celloidin.

(1) In the case of large wounds more than ordinary care must be taken to have the bleeding points secured, in order that as little oozing as
possible way follow, and alloidie can be like gauze and other substances, be applied directly to the wound has been stitched. One must wait until all oozing has ceased and this is sometimes a considerable time.

If oozing is troublesome a good plan is to dress the wound with gauze, wool and bandage at once and apply alloidie the following day.

It can only be employed when the wound is presumably septic.

If the wound does become septic the method is still far from useless, as a small piece can be picked off and the tension relieved by letting the pus out, and these cases often do very well. But when this does happen I do not see any advantage over an ordinary dressing, as something must then be applied for the dis-
Dr. Mackenzie has described a way by which ordinary drainage of a wound may be carried out from the time of operation or accident. It consists in making a small hole through the broken skin and bringing the end of the drainage tube out through it and fitting on a small rubber bag for the discharge.

I consider that this is a complicated method of draining a wound and prefer the wounds under very close care, when drainage is required, to be dressed in the ordinary way with gauze etc. The utmost care should be taken to avoid any valuable functions of wool and bandages in acting as a splint, keeping the part at rest; and as expositors of pressure which by their aid can be applied with great exactness, and also as a means of prote-
tions from cold.

Celloidin certainly does act to a slight extent as a splint, because it exerts a certain amount of traction on the part when it has set. For small wounds this is all that is necessary, but in the case of an excision of the Mucous Membrane such as that described by Dr. M'Keehan in his paper, although I believe that Celloidin is quite as efficient as gauge next the wound, I consider that the junctions of the wound and Bandage, namely, keeping the part at rest, the pressure exerted and the warmth are all very important factors in the healing of such a wound. But at present I am only advocating the use of Celloidin in minor Surgery.

After excision or glands in the neck I have frequently employed Celloidin as a dressing. But such a
dressing is not complete without a splint to keep the head and neck at rest, and the best splint for the purpose is wool and a properly applied bandage.

Comparison with dressings of a similar nature.

Celloidin may secondly be considered compared with dressings of a similar nature, namely, the different forms of Celloidin; and I think that this can be satisfactorily done in a few words.

It is much more flexible than even flexible Celloidin and does not crack even though placed over a joint. Its power of adhesion is infinitely greater and this may be easily tested by allowing the two to set in the shoe at the same time and observe which is the more difficult to pick off.
It possesses a greater power of contraction and hence bears a much greater pressure on the part where it has set.

With all these qualities a very thin film of collodion suffices, while the best way of applying collodion is a tedious process, necessitating the application with it of five layers of cotton wool.

Another advantage which it possesses over collodion is its transparency already alluded to.

One or two cases added to those already given may help further to illustrate the advantages of collodion as a dressing.

Case: J. M., a boy six years of age fell from the top of a wall and in the fall received two severe lacerated wounds of the thighs by con-
ing in contact with the spines of a railing.

The wounds were each between four and five inches long and extended through the jaw and deep fascia down to the muscles.

Having been washed with 1-80 Carbolic acid lotions, and the bleeding vessels ligatured, the deeper parts of the wounds were brought together with buried catgut sutures, and a row of superficial sutures inserted into each wound to bring the skin surfaces together.

The wounds were dressed with gauze until the oozing had ceased, and then they were painted with a solution of Celloidin.

The position and extent of the wounds rendered it necessary to keep the patient in bed. Through the transparent Celloidin I had an opportunity of examining the wounds daily. There never was the
slightest appearance of redness about the lips of the wound or round the stitches. The celluloid, along with the stitches, was removed on the eighth day. The result of the treatment was a perfect linear cicatrix. The accompanying chart shows a remarkable absence of constitutional disturbance.

Case. M. S., aged 38, had his nose severely lacerated by the fall of this own dog. He objected very much to a bandage as he was a shopkeeper. After a thorough cleaning up a continuous catgut suture was inserted and celluloid applied. Notwithstanding the dirty nature of the wound it healed up without further trouble.
Case: Mr. A., aged 65, received on October 30th, 1896, a severe wound of the forehead, the result of a fall down a staircase. The wound was semicircular and about three inches in length and the flap of skin was hanging down over her eye. This flap was stitched in position by means of waxes, uninterrupted catgut sutures, no knots being used, and instead the simple twisting before referred to.

Celloidin was then applied in the usual manner. The celloidin was removed on November 10th. The unabsorbed portions of the stitches coming away with it and the wound was found to be perfectly healed.

During the whole term of healing the woman had pursued her usual occupation and stated that she had experienced remarkably little inconvenience from the accident.
Case

Mrs. A., aged 43, received a blow on the forehead on November 3rd, 1896, which split the tissues vertically from the hair to the root of the nose. The wound was deep, extending down to the bone.

She was treated exactly as in the previous case, interrupted catgut sutures being again used.

The Alloidic was removed on the eighth day, the wound being found healed.
Conclusions.

I shall now briefly sum up the chief points which I have endeavoured to make plain.

Quinine and Chloride of Ethyl are very efficient local anaesthetics especially where the operation is of short duration. Applied locally it is absolutely non-poisonous and its application is extremely easy, and as a very small quantity suffices it is inexpensive.

In some of the more complicated and longer minor operations it is best used in conjunction with cocaine. A smaller quantity of cocaine being consequently necessary it greatly lessens the chances of cocaine poisoning.

At present cocaine is its only worthy rival but its privy use really exists as Quinine and Chloride of Ethyl.
are admirably suited for some operations, while benzine acts best in others, and when necessary as before mentioned they can be used in conjunction.

In Celloids we have an excellent dressing for certain varieties of wounds, namely those in which there is a probability of their being acute at the time of application of the dressing.

It is more convenient, more comfortable, less expensive, and quite as efficient as the dressings now commonly in use.

In large wounds requiring great support, and pressure, and fixation of surrounding structures, it may be used as a substitute for gauge, or in such a case wool, etc., is also required for the above mentioned purposes, when used for large wounds it has the disadvantage of being impermeable to discharges.

In small wounds on
exposed parts—head, face and hands— it is especially serviceable since it is neat and comfortable and does not attract attention.

Were these two methods used to the extent to which I think they ought to be by general practitioners, it would be found that in them they have the means of overcoming some objections they have to perform minor surgical operations; and we should hear of fewer unseemly persons receiving hospital treatment; and thus one of the crying evils of the day, as regards the Medical profession, would to some extent be diminished.

Fellis.