Paracentesis By Aspiration

With A Few Suggestions

As To The

Improvement Of The Instrument.

ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
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Thesis

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Written By

William B Sewell
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Of Paracentesis in general, much has been written, both in the earlier epochs of medicine and at the present time. These writings have however been chiefly confined to one particular operation, namely that of tapping the chest.

Of this operation Hippocrates spoke, being followed in his teaching by Galen and his adherents. In the middle ages, interference with the chest walls, was considered so dangerous, that paracentesis was resorted to only in effusions from traumatic causes. Fabricius regretted that the operation was falling into disuse, and in his advocacy of it he seemed to recognise the importance of excluding the air as far as possible, and recommended the closing of the wound after operating, in order to ensure a rapid recovery. The notion that admission of air to the Pleural cavity was hurtful, was at the time scoffed at by Bontius, who however found an opponent in Bartholin. In the middle of the eighteenth century, this vexed question regarding the admission of air, was again raised, and in 1765 Lurd, adhering to the views of Fabricius and Bartholin, recommended the use of a trocar and cannula,

with this special observance that during inspiration, the canula should be closed by the finger. Chopart and Desault however, like Bonbius maintained that the admission of air was harmless.

Up till the beginning of this present century, the rapid evacuation of the contents of the cavity of the Pleura was considered very detrimental, nay even disastrous, but in 1808 Audouard showed this idea to be a mistaken one. The bias in favour of exclusion of air greatly preponderated, valvular canulas being used, and to the opinion of this School of Physicians was added the weight of that of Laennec, who strongly recommended the operation, only however in cases of rapidly accumulating effusions. He considered that it was rarely successful in Empyema.

The mere operation had still its opposers and while, between 1835 and 1840, the names of Davies of London, Schuh and Skoda of Vienna, might be seen amongst its advocates, Sir Thomas Watson Dr Stokes and Dr Hope warmly opposed it, the last maintaining that the resources of the Materia Medica, were always sufficient for the treatment of Pleuritic effusions, whether Recent or Chronic.

In 1844 Paracentesis received an impulse as

decided, that ever after its course has been that of Progress. Trousseau by a vigorous advocacy, showed that from it, in cases other than of traumatic origin, was obtained the maximum of relief, with the minimum of danger; and in support of his carefully formed convictions, brought cases forward, where the effusions were of an idiopathic beginning, and where the tapping had been followed by a cure.

The impetus given to the operation by Trousseau was as yet confined to the propriety of operating, and until 1850 when Dr Bowditch of Boston detailed his new modus operandi, no attempt had been made to improve the instrument by which tapping was then performed. Knowing that "nature abhorred a vacuum", Dr Bowditch caused the fluid to flow into a previously air-exhausted chamber, and was the first to apply this principle to paracentesis.

On this natural law, the perfected pneumatic Aspirator of the present day is formed, and though in a crude state in 1850, it was improved upon in 1870, when M. Dieulafoy introduced his exhausting syringe. This latter instrument, which has since been greatly perfected by Weiss & Sons

and some Parisian makers, is the one most approved of at present.

Having given a short resumé of the history of Thoracentesis, I shall now mention the purport of my paper. It is my intention first to suggest a few alterations on the aspirator and then to advocate its more extensive use. These changes I should make both in the needle and exhausting syringe, and when speaking of the instrument, I shall explain and illustrate them fully. With those suggestions on the instrument, I shall attempt to show, how paracentesis may be performed by the aspirator with every antiseptic precaution; and in chronic cases, such as in empyema, in chronic abscesses or in cysts where it may be deemed prudent to wash out the cavity and inject it with a medicated solution, I shall try to explain how this may be attained without the admission of air and without the inconveniences attending on the free incisions now practised.

The different diseases in the treatment of which the aspirator is admissable, I shall take up briefly; but in dwelling on them, it is my intention not to linger on the many points of the diagnosis or prognosis, nor to enter

into the minutiae of the different lines of treatment but in enumerating those affections, I shall speak only with regard to their management by aspiration, and will try to form a few rules of a general nature, as to the time when aspiration should be performed, as to the mode of using the instrument, as to the proper site for the puncture, with cautions, such as when the operation should be stopped, and what indications point to this, as well as to the exhausting force to be applied.

In particularizing those complaints, I shall cite cases illustrating the benefits accruing from the operation, and others illustrating the evils arising from its misapplication. Those examples I shall take from the cases in which I operated, and from those which were under my care, while I acted respectively as house Surgeon in the Royal and as house Physician in the Western Infirmaries of Glasgow, quoting also portions of cases selected from writings on these ailments.

The aspirator in common use consists of a bottle or chamber from which at the will of the operator, the air can wholly or partially be exhausted by means of a suction pump. To this chamber is attached a tube leading to a capillary needle or canula, through which, when introduced into a fluctuating cavity,

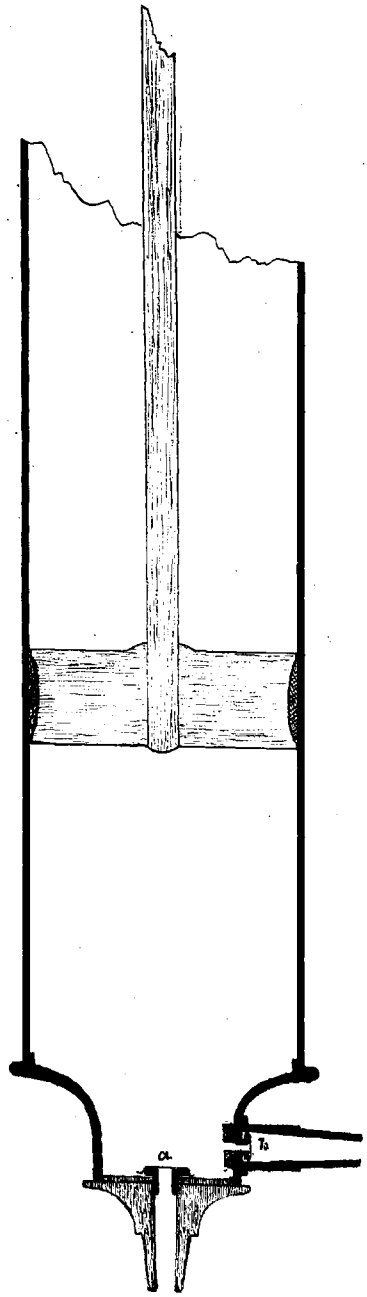
the fluid contents flow to the chamber to replace the exhausted air. This is Weiss and Son's instrument.

M. Dieulafoys on the other hand consists of a strong glass syringe the body of which is itself the chamber of which the piston is the exhauster. The needles attached vary in calibre and are ~~frequently~~ generally self-pointed, but in Dieulafoys some are Cannula pointed and accompanied by a trocar for puncturing.

For the ordinary operation these instruments are almost complete, but for the further perfecting of aspiration in the treatment of many diseases of the human frame, they do not altogether suit.

The objections I have to those instruments are, first of all to the syringe. This in Weiss and Son's has the exhaustive power alone, which limits its adaptation only to the pneumatic abstraction of fluids; but where the cavity has contained pus, as in empyema or in chronic abscess; where the destruction of the secreting surface of a shut sac is desirable, as in a hydrocele; or in short where the washing out of a cavity subsequent to Aspiration may be thought expedient, this instrument is useless; the needle has to be withdrawn, and incision made with the bistoury and the air admitted, if the washing out is prosecuted in the ordinary way. What I would suggest is, that the

exhauster should not only have that action, but in addition, like the Stomach pump, it should have the action of a Syringe properly so called. This double action is present in Dieulafoy's instrument, but to it I would also take exception. In it there is no means of regulating the suction force to be applied; the piston is withdrawn fully and locked, reducing the chamber as near as possible to a complete vacuum, the force being according to the size of the barrel or chamber and to the calibre of the needle used. This I think is undoubtedly an error, and I maintain that to have the air chamber separate from the suction apparatus as in that of Weiss & Sons is the more correct basis upon which to work in the formation of an aspirator. For this belief I have many reasons, two of which I shall mention; first, because the chamber can be wholly or partially evacuated of air at will, and the force so regulated; and secondly, because the chamber can be emptied of air and filled with fluid by degrees, so as to maintain a gentle and uniform force throughout. A third and most important reason I might adduce, namely the great ease to the operator; for in using Dieulafoy's Syringe to evacuate a large accumulation, the amount of physical energy required to work it, and the constant supporting of it in the hand, is of itself most fatiguing to the Surgeon.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Again, should the washing out of the cavity be requisite the Syringe by a simple mechanical arrangement could be disconnected from the air chamber and attached to the tube of the needle; and here the stomach pump action of the syringe would be of immense value, for taking up the medicated solution by suction, the cavity could be injected by its expelling power without a change in the position of Surgeon patient or needle. Thus a cavity could be washed, the injected solution being withdrawn in the same way as the effusion, and with the same precaution, namely that of the air chamber intervening between needle and suction pump.

The accompanying sketch roughly shows the valvular end of the syringe suggested. It is simply that of an ordinary stomach pump, with this exception, that, for simplicity the valves are self acting. The withdrawing of the piston opens valve (a) and shuts valve (b) while the pushing of it down reverses the action. It is somewhat difficult to get valves which are self acting and at the same time airtight, and which will withstand the action of medicated solutions. Those shown in the diagram are of oiled silk, are perfectly air tight and are the best for the suction action. When the silk wears it can be replaced in a few seconds by a fresh piece. When solutions are to be used, the silk should be renewed before each operation.

One word more concerning the syringe. The barrel should be of glass, protected by a skeletoned metallic casing. so that in the injecting of cavities, air bubbles might be detected, and by position of the syringe, their entrance through the needle prevented.

The needles on the other hand, which have until very recently been in ordinary use, are pointed tubes, but such needles should rarely, if ever be used, and certainly should never be employed in tapping the abdomen or in Thoracentesis. Many reasons for this opinion might be adduced but I shall confine myself to one which is in itself indisputable. The Pleura or the peritoneal coating of the bowels is often injured during tapping by such a pointed extremity. The injury may be caused by too great a suction power, but generally speaking, the damage when done is due to the impinging of the lung or bowel on the needle point, during respiration.

In all probability, in many of those cases of empyema, in which the Pus has burst into the lung, immediately or a short time after paracentesis, the cause has been the injury from the point of the needle. This liability to injury from pointed instruments remaining during a lengthened operation in the chest or abdomen, is not theory, for frequently have I in operating felt the bowel or more especially

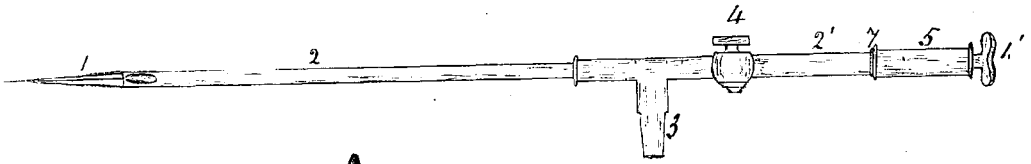
the lung impinge on the needle while using it. To this cause, I attribute also many of the little inconveniences and annoyances to the patient, and I have even seen cases where pleuritic stitches have been apparently produced by using such an instrument. So serious did these dangers appear that in future I resolved to substitute for this kind of needle, one with a canula point.

But again, a canula simply is not all that is required to carry out aspiration in its entirety; for should the canula get blocked by a small piece of fibrine, or by the lung or bowel impinging on its mouth, no fluid could pass, and to remove the obstacle, disconnection of instrument and needle would require to be made, thus throwing aside the principle for which aspiration has been introduced.

It is to this defect that I would draw attention.

Assuming then, that a canula pointed needle is the only true one to employ in those cases, I shall try to show how by a little simple mechanism, a needle could be so constructed as to fulfil all the requirements for a thoroughly safe operation without the burden attending on antiseptic dressings &c.

The needle suggested will be canula shaped, the trocar of which can be attached or disconnected at pleasure, and if necessary a probe may be substituted for it during the operation,



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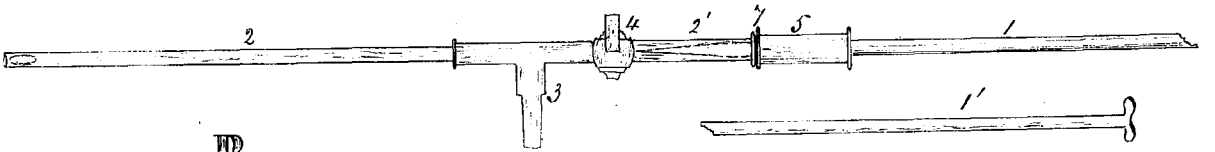

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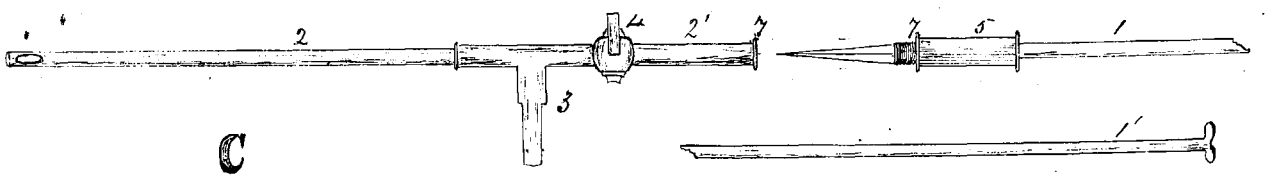

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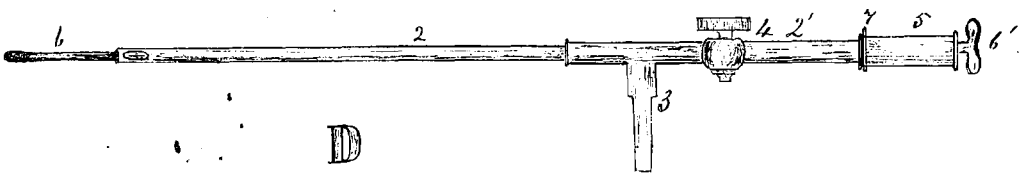

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A— Needle ready for introduction. B. Needle after introduction, trocar withdrawn. C— Trocar disconnected from canula. D— Probe attached and in use. E— Trocar with cross section of connecting tube upon it showing the stuffing at 8. F— Probe with cross section of connecting tube. H— Connecting tube alone.

Fig A— 1-1'— Trocar — 2, 2' Canula — 3 tube to exhausted chamber — 4-Air tight tap. 5. Connecting tube. 7 Junction of connecting tube with canula.

and all these changes accomplished without the admission of air. This needle may be seen in its entirety or in its component parts in the accompanying diagrams. Figure A represents the needle ready for introduction into a cavity to be aspirated, and in the main, consists of a trocar and canula with the addition of an air-tight tap in the back part of the canula. This tap is so constructed, that while the trocar is in use, the tap is open, but that after the introduction of the needle and the withdrawal of the trocar, it is shut for the more perfect exclusion of air, as in figure B. The trocar can then be disconnected (Fig C.) and should the accidental plugging of the canula take place its throat can be cleared, by a probe, which is so constructed as to supply the place of the trocar, and is attached to the needle in the same manner (Fig. D). This attachment is by means of a short tube one end of which has a screw thread upon it (Fig E). Through this the probe or trocar glides piston like and both being of equal diameter throughout, this action can also be made almost perfectly airtight by the addition of a little stuffing; and so by means of this short tube the trocar and probe may be joined to the canula or disconnected at will.

The probe and trocar should have each a connecting tube, from which they can not be entirely withdrawn. This piston like action, enables the trocar to be withdrawn after puncturing

and the tap shut; it enables also detachment to take place, and the substitution of the probe if necessary, but should there be no call for the probe, the shut tap is all that is required to render the needle safe as regards the entrance of air.

Thus the puncture can be made and the trocar laid aside the cannula can be cleared and the probe withdrawn without inconvenience to the patient, or anxiety to the Surgeon, and at the same time without losing sight of the principle for which the instrument is employed.

Fig. A.- shows the needle before introduction - tap being open.

Fig. B.- shows it immediately after introduction, trocar being withdrawn beyond the tap - free end of cannula in cavity being harmless - tap closed.

Fig. C.- shows the disconnecting of trocar from cannula - tap being closed. (Probe is attached and separated in same manner.)

Fig. D.- shows probe attached and in use - tap being open (as in Fig A.) to allow of passage of the probe.

Fig. E.- Trocar alone, with its connecting tube

Fig. F.- Probe alone, with its connecting tube

Fig. H.- Connecting tube separated from trocar or probe.

In the figures, numbers 1 and 1' mark the trocar, 2 and 2' being the cannula - 3 marks the tube leading to the exhausted chamber - 4 is the airtight tap - 5 the connecting tube - 6 and 6' being the probe, while 7 is the point of attachment of connecting tube with cannula.

With a carefully constructed needle such as this paracentesis may be performed, with the least possible anxiety, and with increased hope of ultimate success. In addition to the value of the probe as a clearer of obstructions a great deal of important information may be obtained from its use as a probe properly so called, and its utility in this respect may be of more especial service in chronic abscesses.

With these remarks on the instrument I shall now mention a few well known hints, as to its use, and shall then pass on to the enumeration of those ailments in the treatment of which the Aspirator plays a most important part.

I Previous to use the needle should be well smeared with Carbolised oil (one part of acid to twenty of oil).

II Asuction power of too great a strength should be most stringently avoided, as a cupping of the cavity, towards the termination of the tapping, may thereby be induced.

III The needle should be of a fine size at first, and then others of increased calibre if necessary. The finer the needle the less strongly will the exhaustive force act.

IV The effusions in Pleurisy should never be entirely evacuated at one operation, as the chest walls require some little time to accommodate themselves to the diminished contents. This is not of such paramount importance in paracentesis

of the abdomen or in the tapping of abscesses or cysts.

II When the peculiar pain, choking sensations or feeling of collapse of the chest walls, so often described by patients, during the progress of thoracentesis, are complained of, the suction should be at once shut off, and after a few minutes' delay, should they again set in, on renewing the aspiration, the needle must be removed and the patient laid on his back and enjoined to keep perfectly quiet. A stimulant may often in such cases be administered with benefit.

III Syncope followed by death is happily a rare concomitant of this operation. Trousseau knew only one such case but remedies should be at hand against this accident.

In tapping the chest or abdomen, the time when the operation should be proceeded with, varies in different cases and the Surgeon must decide for himself in each.

A few recognised rules regarding this point may however be here not out of place.

A. Never tap till after the fever of acute pleurisy has abated.

B. When the fluid accumulates rapidly, filling one pleura and encroaching on the other, after the ordinary means to dispense it have failed, then aspirate.

C. Act before orthopnoea sets in. (If it is a simple serous effusion tapping pneumatically does little harm).

D- In empyema, where the abscess is threatening to point the aspirator should be employed to prevent this, previous to opening by free incision antiseptically.

E- In all cases of urgency act at once; but it may be too late if only employed in absolute emergency, as for example in those cases of empyema, where the pus has burst into a bronchus previous to or immediately after aspiration. A timely interference might have prevented the perforation of the lung and its constant concomitant Pneumo-thorax.

F- Operate soon in effusions of the pleura as by it you may prevent the formation of thrombi in the pulmonary veins. These thrombi, on expansion of lung, being consequently displaced are a frequent cause of convulsions and sometimes even of death.

G- In all cases in which the fluid has been diagnosed as pus, operate soon, and evacuate as completely as necessary, washing out the cavity subsequently with a medicated solution if circumstances and strength of the patient will permit of it.

Of those morbid affections to which the human frame is often subjected and in the line of remedies for which, the aspirator gives good promise of being one of the ~~most~~ valuable, I will

first mention

Pleuritic Effusions:-

In Pleurisy of a simple nature, the effusion when it exists is generally serous, and as convalescence sets in is gradually reabsorbed. The ordinary therapeutic agents for the attainment of this end being, slender diet, purgatives, diaphoretics, diuretics, and blisters sometimes repeatedly applied. In those cases of serous effusions however, where a rapid increase of fluid is taking place, and where those agents to which we generally resort in the primary stages have been of no avail in retarding its advancement, we have still another and a more potent agent in the Aspirator. By the introduction of a needle of fine calibre into the secretion, the alarming nature of the case is for the moment dispelled, what fluid would otherwise require to be absorbed is removed, and a rapid recovery often brought about. But in every case of uncomplicated pleurisy with the effusion serous, I am not altogether in favour of delay, and would not always advise thoracentesis to be deferred, until all other methods of treatment have been tried; In so delaying the fluid may have become turbid or purulent, thrombi may have formed in the pulmonary veins, or the fluid may have burst into the lung; while the patient may on the other hand, have been so weakened

by the many purgatives, diaphoretics, diuretics, and re-
peated blisterings, to which he will have been subjected,
that an operation even of so harmless a nature, may act injuriously.

Dr Balthazar Foster, in his work on Clinical Medicine, records a case where, in a strong man aged 26, he aspirated to relieve urgent distress, and drew off 130 oz. of clear albuminous fluid. No cough, no faintness, no discomfort whatever was experienced during the operation. Lips and face though previously livid and dusky became clear on relief being obtained. This benefit was unfortunately only temporary, and next day, was followed by gangrene, first of one leg and then of the other, from embolism of the iliac arteries. This was evidently due to the great pressure being removed from lung, as nearly the whole of the fluid was evacuated, thus setting free the thrombi in the veins. This removal of as much fluid as can be got, is I think a great error. More success would probably have attended the operation had it been done earlier. Dr Scott Orr of Glasgow is inclined to think that the operation of Thoracentesis would have a better chance, if carried out before the urgent symptoms appear.

Dr Evans of St Thomas's Hospital insists on an early evacuation. He is of the belief that many of the sudden deaths in pleuritic effusions are due to the coagulation of the blood in the pulmonary arteries.

The following is the report of a case of simple pleurisy, which

came under my own personal observation when Resident Physician in the Western Infirmary.

P. C. aet. 20. a labourer was admitted into the Institution on Febuary 11th 1876. Although of a weakly looking nature himself, his family history was excellent, in a large family no deaths having occurred. Until this present illness, with the exception of measles, he never remembers having had any sickness. Three weeks previous to admission, he felt a lancinating pain in the left side of the chest, but persevered at his calling, until weakness forced him to apply at the Hospital. His decubitus was on the affected side. Temperature 102·4. Respirations 24. Pulse 100 weak and thready. The Physical examination showed the whole of the left side to be dull from spine to sternum. At the top of left lung the breathing was harsh, and with an occasional cooing râle. At base the breath sounds were nearly absent and cooing faint. Vocal fremitus and Vocal resonance were diminished. Heart was pulsating one inch to the right of the sternum, apex beat was not punctuate, but sounds were pure. Intercostal spaces on same side were almost obliterated. The right lung was healthy. Sulphate of Quinine grs 3.2 and Iodide of Potash grs 10 were given him thrice daily, with a view to improving strength and bringing about absorption. Hyoscine was administered at night. Still the fluid increased, blisters had

been applied before admission and time did not permit of their renewed application; the dyspnoea was becoming extreme and on the 19th or eight days after admission, the needle of the aspirator was inserted by Dr McCall Anderson into the eighth intercostal space, and 120 oz. of clear olive green fluid were drawn off. Before the operation there was marked orthopnoea, but no sooner had a few ounces of fluid passed through the instrument, than the breathing became easy. The pulse, at first 125 weak and thready, improved in regularity, steadiness and markedly in strength, as the operation proceeded, and when finished, it was 120 full and regular, and the anxious and harassed look of patient was gone. The operation, the conduct of which was intrusted to me by Dr Anderson, was concluded, not from any alarming symptoms, but because I thought a sufficient quantity had been taken from him at the time. No discomfort was experienced by patient. In the evening no evil effects had manifested themselves, the pulse was 120 of good strength and regular, and patient expressed himself as feeling in great comfort. The following morning he seemed refreshed and had passed a better night than he had for weeks. The fourth day after the dyspnoea showed signs of returning, the pulse was 120 and weak, and the respirations 26. The tongue was natural the bowels were in perfect order and the temperature was gone down.

With Dr Anderson's permission I again operated, the needle being inserted as before and 123 oz. of fluid of a similar character were evacuated, the operation lasting an hour. At this stage a drop or so of blood had been drawn into the needle, (probably from the suction power being too great), and this caused the coagulation of the serum, and the consequent blocking of the tube, thus bringing the operation to a close.

When concluded the pulse was 116 and full, the respirations 28. No evil effects resulted, the fluid did not reaccumulate, his recovery became gradually established, and in the end of May having undergone a tonic treatment he was dismissed well. His condition was not plump, but emaciation was gradually diminishing, and his colour was regaining its healthy appearance. The left side of chest was flattened to a slight extent, and movements were a little impaired but otherwise he had made a good recovery.

In the above case, I afterwards regretted that the operation was not had recourse to at an earlier date, and before the patient had been reduced to so low an ebb. In all probability had no delay taken place, the recovery would have been better and more rapid. There is I think a grave error in delaying too long. Why wait, until the patients strength has

gradually waned; why delay, until the resources of the Pharmacopoea have been exhausted in vain; why lay aside an instrument so valuable until such time when the patient in his great agony, beseeches his doctor to relieve him at all hazards; why put Aspiration as an operation in the same category as Caesarian Section, Craniotomy or Amputation through the hip joint; why use the Aspirator as a <u>dernier ressort</u> or a do-no-better?

Such is not the end for which it was introduced. The use of such an instrument is not hazardous to life but the reverse. It is applicable, whenever there exists the slightest obstinacy in the discussion of the fluid, whenever there exists the merest tendency to its increase, whenever good grounds exist for believing the effusion to be purulent, and whenever respiration seems to be in the least degree impeded by it. Such an agent should be amongst our <u>primier ressorts</u>. It will be then and then only that a just estimation will be conceived of its value in such diseases.

"In cases of double pleurisy with copious effusion on both sides", says Sir Thomas Watson, "the person must presently perish by apnoea, unless his condition is recognised and free vent given to the fluid." Delay under such circumstances would in other words be death to the patient.

Pleuritic fluid, though at first serous may afterwards become, through delay, turbid and finally purulent.

But this puriform action may often be due to the admission of air, through accident when operating, or to the using of the needle without having previously rendered it antiseptic; or it may be due to the admission of air when clearing a needle if plugging of it has taken place. These accidents if they may be called so, may I think be obviated by using a needle such as the one described in this paper.

When those effusions have become puriform, or when empyema has been diagnosed, the fluid should be evacuated at the earliest opportunity, and completely as far as is consistent with a gentle exhaustive power.

If the liquid is merely turbid, a few tappings may be all that is required, to bring about a recovery, but if it putrefy, or should the pus no longer be laudable, I would, (recommended) the cavity after aspiration, to be gently injected with a mild antiseptic solution of a temperature about 99° or 100° Fahr.t.

But even this may not be required, and as a proof that Empyema may be treated from beginning to end successfully by the unaided aspirator, we have only to read the well known case in the Belvidere Fever Hospital Glasgow, under the care of Mr J. H. Lilly L.R.C.P.E. (Glasg. Med. Journal Nov. 1872).

Here was a case of Empyema pure and simple in a

lad aet. 18. Altogether the amount of pus evacuated was upwards of eight gallons. At first the pus was laudable, but afterwards assumed a bloody tinge, and finally the effusion seemed to be serum with a small deposit of pus in it, which in the end totally disappeared. The lad was dismissed, certainly with the usual deformities, but in good vigorous health and rapidly making up his lost weight.

The needle was inserted upwards of thirty times, yet no harm accrued from the puncturing. At the first few operations, the quantity evacuated was to be reckoned in pints, but as the treatment progressed, in ounces and half ounces, and the last six punctures brought no fluid at all.

The cavity in short was at first as thoroughly emptied as possible, and was kept so by the daily puncturing, which was almost tantamount to the employment of drainage tubes.

I think this is an illustration which should not be lost sight of. The Aspirator got a fair and impartial trial, and the result was as perfect a recovery as we have from any other kind of treatment, and with considerably less annoyance to the Surgeon, who must assuredly be thought of, especially if he lives at a distance from his patient, who in a thoughtless moment might by displacing the loose dressings accompanying the treatment by free incision send the surgeons antiseptic precautions to the winds. Such an unfortunate event is

not to be dreaded by any one who uses the Aspirator.

The following case came under my immediate supervision, while I was Resident in the Western Infirmary.

A. R. aet. 21 was admitted into this Hospital on January 12th 1876, suffering from an attack of Pleurisy of the left side of about 2½ years duration. The existence of the effusion could be traced back for more than two years. He had been repeatedly blistered, had had sea voyages, and all without much benefit. On admission he complained greatly of dyspnoea. His decubitus was on affected side. Pulse 106 weak. Respirations 25. Temperature normal.

The whole of the left side was dull, the dulness extending to the right of the sternum, at the upper portion 1½ inches, and at the nipple 4½ inches. The breathing was faint, tubular in character below the left clavicle, and muco-crepitant on a level with nipple. There were evidently signs of tubercular mischief. V. F. and V. R. were suppressed on left side. Cardiac dulness could not be made out, but sounds were normal in character; apex beat was behind the sternum.

On January 17th Dr McCall Anderson introduced the needle of the aspirator into the 8th intercostal space, about one inch to the left of a line perpendicular to the inferior angle of the scapula. During an operation of ¾ hour, 70 ounces

of a turbid amber coloured fluid were drawn off. At this period the patient had a violent and sudden seizure of coughing with a peculiar tendency to faintness, and the needle was therefore withdrawn.

On calmness being restored the Respirations were 22 and quiet, the Pulse was 88, while at the beginning they were respectively 26 and 106. In the evening he complained of a pain and feeling as of collapse of the chest walls. The heart had returned to its normal situation and breath sounds were clearer over lung. The fluid on being allowed to stand deposited a thin white sediment, which Dr Coats on examination, found to be pus cells in a state of fatty degeneration.

Nine days afterwards I again operated and 69½ oz. were withdrawn, but the operation was terminated on account of the same symptoms seizing patient as on the first occasion. In addition, a great dragging pain was felt in the region of the heart for a few seconds, patient at the same time stating that he felt that organ give a roll. Before the operation the heart was pulsating 1½ inch from right nipple but after this seizure the apex beat was close to the inside of the left nipple. In the evening the same feelings of collapse of the walls was experienced as on first occasion, and the breathing was short and slightly spasmodic evidently owing to this overpowering sensation. The Pulse was 90 full and regular.

On February 10th I again operated and drew off 49½ ounces. The fluid was of the same nature as before. Again the old symptoms while operating returned and to a most alarming extent, the feeling of collapse being very great.

On the following morning, pleuritic stitches were complained of, but on the application of a fly blister, the pains greatly subsided. From this date until April 23rd when the last tapping was performed, the patient was enjoined to take exercise in the grounds and he was at the same time undergoing tonic regimen.

At this operation the feeling of collapse of the ribs alone made its appearance; 46 ounces were drawn off.

He got gradually stronger and on July 4th was dismissed improved, but the fluid had never been completely evacuated as the lung could not expand. The improvement I am afraid would be only temporary, as tubercular mischief was evidently present though at that time in abeyance.

With regard to those seizures which attacked the patient during each operation causing its termination, I think all that can be said is simply that the lung had become carnified, or it was bound down by strong bands of false membrane which had formed during his long illness, and that while part of the fluid was being drawn off, a vacuum was being formed in the pleura; and this brought on the feeling of collapse of the walls and as a consequent the faintness.

The violent and sudden fit of coughing which attended the first aspiration, was I think due to the impinging, which I distinctly felt, of the lung on the needle; the one in use being a pointed one, requiring no trocar for puncturing.

In cases such as the above where tubercle is lurking behind or where the pleuritic affection is complicated with malignancy, the operation is only palliative, and to use the words of Sir Thomas Watson "may sometimes be resorted "to for the purpose of relieving urgent distress and of prolonging "it may be a doomed existence."

In the treatment of effusions without accompanying Tubercular or Malignant mischief, I should recommend the aspirator to be used early before the lung has lost its power of expansion & I should recommend the Surgeon to aspirate until the fluid ceases to collect. Should the fluid become puriform however, aspirate as before, and if the discharge is no longer laudable but takes on a foetid character, inject a solution of Carbolic Acid of the strength of one part of acid in 60 or 80 parts of water, at a temperature of about 100° Fahrenheit, and continue the aspirations almost daily until the pus ceases to be secreted.

Those medicated solutions may be of several kinds but should not be strong. Carbolic acid of the strength above named is one of the best; Bondys red solution of the

Permanganate of Potash, weak, is excellent; or a weak solution of Iodine or Salicylic acid may safely be used.

In washing out the Pleura, distension of the cavity should be guarded against, not more than half as much of the medicated solution being used as there was of effused fluid drawn off.

As regards these medications, if Carbolic acid is used, it should be very dilute, as it when absorbed often causes pain in the head, oppression, or gives rise to a febrile attack, sometimes also causing the urine to assume a black colour, which on the uninitiated has a very alarming effect.

A case of this nature occurred with me when in the Western Infirmary. An old man of between 60 and 70 years of age was suffering from a large nephritic and perinephritic abscess extending down over the crest of the ilium and pointing there; pus was also discharged per urethram. With the intention of preventing the opening of the abscess, I aspirated it twice without the desired effect, and afterwards treated it by incision syringing it out with Carbolic solution (1-40). The absorption of the acid, from the cavity of the abscess caused in this instance, the urine to be excessively black to the great terror of the patient who thought his end was then nigh.

It is for the injection of shut cavities, such as that of the pleura that I should advise the use of an aspirator, whose needle and syringe are of the nature of those described

in the first part of this paper. With such an instrument the Thorax can be evacuated of its fluid contents, and the cavity washed out previous to concluding the operation, without withdrawing the needle or admitting the air. It is for this quality that I claim its superiority over ordinary aspirators.

In a majority of cases, I think this mode of treatment ought to supercede the method by free incision now followed, with its complex but necessary antiseptic appurtenances.

All Hospital Surgeons will probably take exception to this latter opinion, and those also who, to quote the words of a writer on this subject, have been "accustomed to the routine of Listers method", but I feel sure it would prove an incalculable boon to those of our profession who pursue their avocation over a wide country district, and the frequency of whose visits must necessarily often depend on the distance, as well as to those practising amongst the working classes of our towns and villages where no hospitals exist, and where the weekly incomes are often barely sufficient to supply the food requisite for life, without being called on to bear also the expenses attending on the use of Antiseptic gauze, protective, drainage tubes and all the accompanying bandages and belongings.

Aspiration of the Pleural cavity has nevertheless its disadvantages, as is seen from the record of a case under

Dr Broadbent of London in the Med. Pres + Circ. Nov 1876.
A shoemaker aet. 62 had an effusion on the left side for which aspiration was performed about mid-day and 80 oz of fluid removed. No tendency to faint manifested itself and no powerful suction was employed. Three hours afterwards he had tea which he seemed to enjoy, and in half an hour afterwards was found dead. At the Autopsy no thrombosis nor embolism was discovered.

Dr Cayley reported a case in the same periodical where the patient was tapped several times. Bye and bye, pus was evacuated, and the cavity washed out with a weak solution of iodine; the same treatment was followed ten times and with apparent success. At the last washing out a stronger solution of iodine was used, when patient got immediately comatose and died in 16 hours. Nothing could be found at the post-mortem examination to account for the seizure. There was neither thrombosis nor embolism.

Three other cases of a similar nature occurred in France. Was the fatal issue in those cases due to the washing out or to the Aspiration? Dr Broadbents case would lead us in the latter direction, while from that of Dr Caley we would infer it to be due to the syringing.

If due to Aspiration may the suction power not have been too great? But Dr Broadbent tells us, that here it was not powerful.

If such occurrences be due to too great distending force in washing out the cavity, could not this be obviated by injecting a quantity of a certain proportion to the amount of effusion drawn off, say about half or one fourth; Dr Caley used one pint. Dr Easter recommends for the purpose of washing out the use of a double tube similar to that used in washing out the bladder. This he asserts prevents too great pressure and by examining the fluid as it escapes by the open tube, one can see when enough has been done.

To Dr Easter's recommendation I would however take exception, as the calibre of the double tube required, were the operation to be conducted antiseptically, would be large and would entail upon the Surgeon the use of antiseptic dressings, which as I have said before, can only be thought of in Hospitals or in the treatment of patients of the wealthier class. Such extensive appliances would seem to the patient a more formidable operation than the careful washing out through the same needle which evacuated the pus.

Should however the needle wound inflame at a future period and pus begin to appear externally, the wound should only then be enlarged antiseptically and drainage tubes inserted, this latter operation being secondary to that of Aspiration.

In cases of Empyema about to point, Dr Hector Cameron maintains the best treatment to be free incision antiseptically;

but I think that here again the aspirator should have the precedence, and only when it fails should the free incision be resorted to.

Where the seat of puncture in Thoracentesis should be, may entirely be left to the discretion of the operator. Some and amongthem Laennec recommend the site to be between the fifth and sixth ribs, but as a general rule this is too high a situation. The spot in operations of choice is generally between the 6th and 7th or 7th and 8th ribs. On the right side if the liver is high it may be necessary to pierce as high as the fifth intercostal space.

Dr McCall Anderson inserts the needle in the eighth intercostal space in ordinary cases, a little external to a perpendicular line drawn from the inferior angle of the scapula.

Dr Macleods rule is to take the level of the nipple half way between the spine and sternum.

Sir Thomas Watson in speaking of this operation, advises us "to operate while there is choice" that is soon, but if not till "a soft fluctuating tumour has appeared then no choice is permitted as it has become an operation of necessity and the puncture must be near the spot where the tendency to point exists."

As regards the exhaustive force to be applied, all late English writers are agreed that a strong force is to be deprecated, sufficient to cause slight suction being all that is required.

Drs. Gairdner and M'Call Anderson impress this strongly on their students.

In drawing to a close my remarks on treatment by Thoracentesis, of Pleuritic effusions, I cannot refrain from quoting a sentence from the last edition of Sir Thomas Watson's book on the Practice of Physic. "Tapping" he says, "of every patient having manifest effusion, would greatly "augment the mortality in uncomplicated pleurisy;" the danger of the operation being, he asserts, "that it will probably induce "suppuration or cause putrefaction of the fluid from the "admittance of air." His opinion was given before the perfecting of the aspirator. In another passage he advises the employment of the grooved needle to find out the nature of the fluid, the puncture being he says "quite harmless and "it inflicts very trifling pain."

The former remarks though required at the time of his writing, are not applicable now; and the harmlessness of the puncture of the grooved needle, I claim for that of the tubular needle of the Aspirator.

Thoracic Abscesses may be treated in the same way as Empyema.

In addition to that of the Pleura, there exists within the Thoracic walls yet another serous sac which is frequently the seat of inflammation and an

accompanying effusion; I meand the Pericardium.

In Hydrops Pericardii in extreme cases over which there seems to hang an imminent death, tapping is ~~generally~~ frequently productive at least of relief, if not of a more lasting benefit, although in many victims to this affection the fatal termination has not been warded off. The cases in which treatment of this kind, can be thought of in this disease, are unfortunately rare. Many examples however are recorded where paracentesis of this cavity has not only averted an immediate death, but has afforded a recovery lasting in some instances for years, and in others for a lifetime.

Trousseau mentions the case of a man suffering from this complaint, on whom the operation was twice performed and where, when patient left the Hospital, no reproduction of the effusion had taken place, the same condition being found after an interval of months, at which time unfortunately the patient was lost sight of.

He records the above as an encouragement to perform Paracentesis pericardii where circumstances warrant its performance. He records a second instance where first 350 and again 1350 grammes of fluid were evacuated and where on each occasion, 65 and 100 grammes respectively, of a solution of iodine were injected into the cavity, without

any harm accruing; and at the conclusion of his report the same distinguished Physician adds, "This patient may "consider himself completely cured of an affection which "had brought him to the very brink of the tomb."

As an operation, Trousseau considers it to be, were it not for the diagnostic difficulties attending it, as simple as tapping of the thorax or abdomen.

On the other hand Professor Gairdner of Glasgow is not so sanguine of a favourable result. In twenty years extensive experience, he has only seen one case "in which "he was tempted to use the trocar." In that case he was unsuccessful as no fluid followed the introduction of the instrument. His misfortune was probably due to the canula not having entered the sac, the trocar merely having pierced the pericardium, or being blunt, having pushed the sac in front of it.

Bouillaud remarks that exaggerated notion of the dangers of pericarditis has been probably entertained, and adds, that to prevent the reaccumulation of the fluid, we must have adhesion of the sac, the sole means to attain which being pericarditis. He is evidently of opinion that a slight pericarditis artificially produced, would be beneficial rather than the reverse in those cases.

In operating, as regards the seat of puncture, different men have selected different sites. Laennec recommended

the trepanning of the sternum above the ensiform cartilage; Larrey wished to puncture at a spot between that process and the cartilage of the eighth rib on the left side; Trousseau advises it to be performed immediately external to the sternum about the fifth, sixth, or seventh sterno-costal cartilage, at the point of greatest dulness, and where it is most difficult to perceive the cardiac movements. Dr Walshe practises it a little lower than the upper angle of the fourth costal interspace, the patient lying on his back.

The instrument to be used should be one in which the point can be immediately sheathed, one of the nature of a trocar and canula being best suited. Trousseau used a bistoury in preference to a trocar. Sir Thomas Watson supports the employment of a needle or canula of fine calibre, and this is the kind of instrument generally approved of at present.

Bouchut advocates the use of the aspirator as being preferable to the trocar alone, and in adding that small wounds of the heart are not dangerous, evidently is of opinion, that the finer the needle employed the more favourable will the result be.

The fluid effused should be drawn off as completely as practicable, as a more complete adhesion of the sac, which is the end we have in view, will be brought about.

In employing the trocar, care should be taken that

the point is sharp, otherwise the sac may be carried in front and not pierced. On the canula gaining entrance to the effusion, the trocar should be immediately sheathed, in order as far as possible to avoid wounding the heart.

In the use of the Suction a very gentle force only should be employed

This operation we shall rarely be called on to perform and in those cases alone where the effusion has increased to such an alarming extent as to imminently imperil the life of the sufferer, should Paracentesis of the Pericardium be resorted to.

Paracentesis Abdominis on the other hand is an operation even more harmless, than that of the Thorax.

The exclusion of air in this operation requires by no means the rigid care which ought to be observed in Thoracentesis.

The walls of the abdomen being lax and pliable, easily accommodate themselves to the diminishing bulk of the contents as the operation proceeds, and so prevent a vacuum existing in the peritoneal cavity.

The ultimate success of instrumental interference in great measure rests on the primary disease on which the effusion is dependent. In effusions from heart affections for example, it is more of a palliative and temporary

than of a curative remedy; but in those resulting from peritonitis simply or from strumous affections of the abdomen, such as tabes mesenterica, an issue more favourable may sometimes be obtained, when aspiration is employed in conjunction with anti-strumous and liberal regimen.

Professor McCall Anderson in the Glasgow Medical Journal for July 1874 reported the case of a boy, aged three years suffering from an accumulation of fluid in the abdomen. Aspiration was performed and 60 ounces of a pale green oily fluid was withdrawn, and two days later 42 ounces were evacuated.

Nourishing diet, cod liver oil and cinchona, with a small allowance of wine was administered, and from this time his recovery dated. A third time was he aspirated and 41½ ounces of fluid removed; a still more generous diet was prescribed, no reaccumulation took place, and with the exception of a few slight attacks of diarhoea, the boy rapidly became convalescent, and after a short time was removed home in good average health.

Mr McCrea of Dublin records two cases of Hepatic ascites cured by tapping, one a child of three years, the other a man aet. 35. He recommends its early employment, and believes it to be in many instances a radical mode of treatment.

Instances such as the above, though not frequent, are by no means rare, but as a rule aspiration is generally resorted to as a temporary measure, to relieve any importunate symptoms, which may be occasioned by the existence of such accumulations.

By aspiration relief is obtained, in cases of oppressive distension from the accumulating fluid; in cases where the effusion by pressing the liver and other organs upward, so fix the diaphragm that respiration is greatly impeded; and in all cases where the fluid has resisted the action of the diuretics, purgatives, and other remedies, which may have been employed, with a view to its discussion.

I had under my own care a boy aged 16 who, when three years younger, received a stroke between the shoulders from a brick bat. This had evidently occasioned rupture of the auriculo-ventricular valves, and so had permanently crippled the heart, the auscultation of which revealed nothing but loud rasping murmurs. Several times had attacks of slight ascites seized him, and as often been repelled by means of the resources of the materia medica. Latterly however the dissolution of it was more difficult and the boy sought admission to the Hospital at Gilmorehill.

Diuretics were plied and purgatives pushed, but the accumulation increased, the kidneys could not be got to act, and the bowels when attacked reduced him to great weakness.

The boy was at the point of death, orthopnoea being persistent and sleep impossible. The needle of the aspirator was inserted by myself into the right flank and six pints of an olive green fluid were drawn off, to the immediate relief of the little sufferer, who expressed himself as being in a new world. The mention of the operation to the boy at first drove him into an indescribable state of terror, but after he had experienced the grateful results, he would have allowed me to perform any operation, I might choose, on him. He was tapped weekly and life was thus prolonged for about four months. The poor boy ultimately succumbed from sheer exhaustion.

In tapping the abdomen the seat of puncture is generally one or other flank, but care must be taken to shun the line of the artery.

A trocar and canula should be used in preference to a pointed needle in order to avoid injuring the peritoneal coat of the bowel. A bandage round the body is often a great aid in this operation, and it prevents to a great extent attacks of syncope, which sometimes accompany it. It is not of such importance if the patient is in the horizontal position.

Ovarian Dropsy may be treated in this way, and though generally affording only temporary relief, it in some

instances has been known to induce a permanent cure. It is not of great clinical importance in multilocular cysts of this nature.

Monsieur Dieulafoy recommends Aspiration also in cases of distended Bladder from retention, where cath=:eterism is difficult or where the surgeon has failed to pass the catheter.

The seat of punchure in these cases is above the pubes and not from the rectum as in the puncture by the old curved trocar and canula.

Dr Joseph Bell highly recommends this method of treating retention. He used it in an urgent case with a most satisfactory result.

Mr Henry Taylor has employed it seven times on one man without any ill effect.

Mr William Brown and Mr Harrison speak highly of its efficiency in retention from enlarged prostate.

In diseases such as the foregoing, though Aspiration may not always be productive of a cure, and though we occas=:ionally find illustrations, happily rare, where death has immediately followed its use, yet in Sir Thomas Watson's words when speaking of the use of the trocar and canula "If it save life for the time, if it prevent impending suffocation, relieve existing

"distress, and postpone the fatal event, it is not without its value."

Suction has under its sway another and most important disease viz. Hydatid Cysts.

Hydatids of the liver have been most successfully treated by the aspirator of late years. M. Dieulafoy records seven cases cured by this method. I never had the opportunity of seeing a case treated in this way and am dependent on the experiences of others for my information.

Dr Bradbury of Cambridge mentions two cases cured by this method (B. M. J. Nov 1870). The first was a gentleman aet 36 suffering from a large tumour in the liver. This was diagnosticated as Hydatid. On two occasions, the tumour was aspirated, on the first, pure hydatid fluid being drawn off, and on the second 1½ pints of a purulent liquid. No further interference in this way was necessary, the gentleman gradually got well and continued so.

The other case was that of a boy aet 16 with a tumour the size of a foetal head in the right hypochondrium; the aspirator was used once after which the boy thoroughly recovered.

Dr Bradbury concludes by saying "I now prefer to perform successive aspirations rather than convert the hydatid sac into a large abscess unless serious constitutional symptoms demand a free opening."

Cystic Tumours or effusions into sacs, as in Hydrocele may be treated like pleuritic accumulations, the medicated injection being thrown in, at the time of operating, in the same manner as in the washing out after the evacuation of pus in empyema.

In Effusions into the joints especially the large ones, aspiration may often prove of marked benefit in reducing the distension and lessening the pain; and in chronic synovitis where the cartilage is ulcerating, and pus being effused, I would recommend the aspirator to be applied before condemning the limb to amputation. Nay in the earlier stages of the effusion suppuration might sometimes be averted by a timely application of this form of treatment. Where however pus has formed, the evacuation of the contents should be followed by a washing out of the cavity with an antiseptic solution; and I feel sure in many cases of fluctuating knee joints an early interference of this nature might avert a subsequent call for the knife, and be the saving of many a life and limb.

I have seen cases such as the above, where amputation was performed but where the application of such a method, as I have endeavoured to describe, had it been applied at an early stage, might probably have been followed by the

alleviation of the pain, the destruction of the pus secreting and ulcerating membrane, the restoration of the limb, and the ultimate recovery of the invalid.

Ulcerations of the integuments where the diseased surface has been so treated by stimulants as to induce healthy granulations, immediately take on a healing action, and the same must hold good in such affections of the joints, if the opposed surfaces are treated in a similar manner.

Mr J Warrington Haward acts upon this principle, when in a boy aet. 8, suffering from Chronic synovitis of the knee with abscesses, and much reduced by the severity of the affection, on finding the cartilages and ligaments gone injected Sulphuric acid one third of the full strength into the diseased joint. This caused several sloughs which came away through an opening made: the joint affection was overcome and the bones anchylosed with a good and permanent result.

Although not advocating this method <u>in toto</u>, I should suggest that the acid be more dilute and that it be used at an earlier period. The weaker injection would destroy the diseased portion more gradually, and without large sloughs. I should advise this to be done before the disease advanced so far, and by

the aspirator; the joint to be washed out daily, in the way pointed out when describing the double acting syringe.

Dr C Reyher says that in acute purulent or serous gonitis, where the synovial capsule is distended and the joint semiflexed, the fluid contents should be removed by aspiration before applying extension.

In Arthritic disease Dr Ramskill in a man aet. 40 had both knee joints tapped for synovitis of some weeks duration.

Mr Heath in the "Lancet" May 1874 narrates a case of stricture in which acute synovitis of a joint occurred and in which he aspirated successfully.

In a lad aged 16, acute suppuration of the Elbow joint took place; Mr McCormac of Dublin drew off with a fine needle 3 or 4 ounces of pus by aspiration. The puncture healed at once the arm was put on a splint and the cure was permanent.

These are a few instances of how this instrument might be of especial benefit in those diseases of the large joints.

After attempting to reduce the inflammation and effusion by the ordinary means at our disposal, I would recommend an early trial of the aspirator before the disease shall have advanced to any extent. Where suppuration has taken place a mild escharotic should be early employed to check if possible

the further ulceration. The joint should be evacuated the escharotic injected and retained for a few minutes only and washed out before withdrawing the needle, fomentations being applied afterwards to counteract if possible a temporary aggravation of the inflammatory tendency.

In the treatment of large Abscesses of all kinds, this instrument is admissable and amongst the many remedies employed, Aspiration does not hold an inferior place. In simple and acute abscesses, evacuation of the contents by this means is preferable to any others for several reasons. It is less formidable to the patients who have a great horror of the lancet; it leaves a much smaller scar, generally none at all; no wound is left to dress; and one complete evacuation almost invariably is followed by recovery.

In acute abscesses of the neck, the absence of a scar is a very great recommendation indeed; and for this end I have of late in cases in the country, where an aspirator cannot always be at hand, tapped these gatherings with a fine trocar, in preference to using the bistoury.

In Chronic abscesses I would also advocate its employment. When these are treated by free incision

antiseptically, the pus gets freely away, the cavity is syringed out, and a complicated dressing applied; while on the other hand, tapping pneumatically where carefully done is tapping antiseptically, the pus is removed, the cavity is washed out, the wound is almost imperceptible, and a slight dressing will protect it until healed, which generally speaking is within a few hours.

Sometimes however the needle wound inflames, then and then only should the method by free incision be followed. Where this accident does take place, we generally find that the abscess has been too long in being tapped. Dr Callender of St Bartholemews has suggested for chronic abscesses, free incision and hyper-: distension with Carbolized fluid (1-30) His method of treating them has been very successful in his hands.

Mr Edmond Owen treats Psoas Abscesses in this way and records two cases successfully treated by him. But the hyperdistension of a cavity may be more easily accom-: plished where the wound is small, by the application of the double acting syringe, without the lancet being unsheathed.

In large Strumous abscesses the needle used should be large in calibre, and the operation of evacuating and washing out should be performed daily. In this way the decomposition of the pus could be prevented.

Hydrocephalus has been treated by Aspiration but no one encouraging result as far as I am aware has followed its application.

Hernia one of the most sudden and most dangerous of diseases has of late been found on many occasions to yield to aspiration. Cases in which the taxis has failed, have on applying this means been instantly disarmed of all urgency, the bowel has been returned and a fatal issue averted, without having recourse to that undesirable expedient Herniotomy.

The operation here consists in inserting a fine tubular needle into the most prominent part of the sac; the faeces and flatus are drawn off, the fluid in the sac, if any be present is evacuated; the swelling falls, and an easy reduction of the protrusion is thereby induced.

Dr Bramwell in the Edinburgh Medical Journal for 1874 records a case of hernia strangulated for 15 hours in a man aged 50. The centre of the tumour was punctured the bowel being pierced, gas and fluid escaped, and on withdrawing the needle into the sac, five ounces of fluid were withdrawn. The protrusion suddenly disappeared and the man recovered.

Dr Leon Labbé aspirated a hernial tumour with the

same good result.

In the Medical Press and Circular "Mr O'Neil of Athy Workhouse mentions a case of Scrotal hernia in a man far advanced in Bright's disease. The protrusion which had been present for some time had never been past the external ring, but on the man exerting himself while unprotected by a truss, it suddenly descended to the scrotum, where in a short time it "became as large as a football."

Taxis failed to reduce it, ¼ grain of morphia was given to relieve pain, and again the taxis brought about no discussion of it; warm baths were given and the taxis re applied without any further result. The aid of the aspirator was called in, red fluid contents were withdrawn and flatus escaped, the tumour fell to half the size, and the merest effort afterwards reduced it. The patient had afterwards a stool daily and suffered no inconvenience in the abdomen.

Mr O'Neil concludes by remarking that here in Bright's disease, where a most inflammatory tendency exists, no peritonitis ensued, and that after the tapping the tumour was reduced with great facility.

Dieulafoy in his book mentions 24 cases treated by the aspirator; twenty of these were easily reduced after its application.

Mr Jessop has been very successful with it.
Monsieur Demarquay is a strong advocate of aspirating these protrusions, and gives the following circumstances, as indicating the use of the instrument.

It should be used "In all congenital herniae or in "recent herniae which have become strangulated at the "moment of their formation": "In old herniae that "were perfectly reduceable a few days a few days before "strangulation took place; and in recently strangulated large "umbilical herniae; and the operation in all cases should "be performed only at an early period before the bowel has "undergone any destructive change".

These illustrations all point out the most indisputable success which has attended the aspiration of Strangulated Herniae.

The aspirator has still before it a wide field of usefulness. As a Guide and Aid to Diagnosis in obscure cases it is invaluable. The value of pneumatic puncture as confirmatory evidence in doubtful cystic tumours can not be over estimated. When fluid contents are desired for minute examination, such as in doubtful abdominal tumours, it is our best auxilliary.

It comes to our aid where doubts exist as to whether

a swelling is solid or fluctuating. In swellings in the neighbourhood of the groin, trochanters, or tuberosities of the ischium, where psoas abscesses may be suspected, or where uncertainty reigns as to the presence or not of deep fluctuation, it removes our embarrassment and clears our uncertainty; and the examination in cases such as those I have instanced with proper care is free from danger.

In the Summer of 1875 while a resident in the Glasgow Royal Infirmary, I had under my care a strumous lad of 18 years of age. He had for long been an Hospital inmate, and had about four weeks previous been sent to recruit at the Convalescent home.

He returned to the ward complaining of severe pain, and extensive swelling of the left buttock. We suspected the existence of hip-joint disease but on examination no evidences in support of our suspicions could be educed. Fomentations were applied and each successive morning a fresh examination was made. In a few days our attention was drawn to slight tenderness on pressure over the tuber ischii.

The swelling and pain increased. To Dr Edwin Watson the visiting Surgeon of the ward, there then occurred the possibility of a Psoas Abscess pointing in

that direction. It was thought that very deep-seated fluctuation could be felt, but the evidences of abscess were not at all conclusive, and to clear up the mystery the aid of the aspirator was considered requisite.

The needle was inserted on the inner aspect of the tuberosity to the depth of about 2 or 2½ inches, when the appearance of a few drops of pus in the bottle attached cleared up the uncertainty. Two days afterwards the abscess was again tapped, several ounces escaped, and Dr Watson using the needle as a director plunged in a bistoury and opened it freely.

Dr Spiegelberg in speaking of its value in aiding the diagnosis of doubtful abdominal collections of fluid, mentions the following cases

(a)- One, where tapping was omitted, in which a hydatid cyst of the kidney was mistaken for an ovarian cyst and Ovariotomy was performed. This ended fatally.

(b)- Another where in a tumour of doubtful origin, the puncture revealed a left-sided recto peritoneal hydatid cyst. It was partly excised and partly left to suppurate and recovery ensued.

(c) A third case he mentions of a woman sent to him as suffering from ovarian disease. Aspiration showed its serous character, Death subsequently resulted from oedema

of the lung.

(d) — In a fourth doubtful abdominal tumour, glutinous fluid containing cholesterin crystals was drawn off, pointing to its ovarian origin, thus bringing conclusive evidence to bear on the case.

Bouchut in a little girl of eleven years, punctured a hepatic cyst, which he suspected was serous in character, but found instead the fluid to contain echinococci. The girl recovered.

The benefits that aspiration affords over ordinary tapping, are at once apparent.

It prevents admission to the part operated on.

It does not necessitate so large a wound, the puncture generally healing readily and rapidly.

It can be used with greater frequency, owing to the comparative absence of danger attending it, and to the little damage done to the integument; as well as to the ease with which the operation can be performed.

And it has this great advantage, that the progress of an operation, in cases where discomfort pain or distress is is experienced during its performance, can be arrested for a short time without the withdrawal of the needle, and then proceeded with as before, without any inconvenience being felt

in the interval.

Many illustrations might be given of the inestimable value of this little instrument of Monsieur Dieulafoy; of the many morbid affections to which it can afford relief or cure; and of the vast range over which its influence can be exerted; but in a paper such as the present, a lengthy discussion is to be avoided.

I have endeavoured to suggest an alteration on the instrument itself, which I believe will be found a great improvement; but time alone will test this.

I have attempted to enumerate shortly the most prominent of those diseases, in which Aspiration mitigates distress, postpones a fatal issue and in many instances establishes a cure; and if in so doing I have induced a higher appreciation of the value of the instrument, I shall rest satisfied.