

Alcohol and alcoholic preparations in surgery : their influence on union by the first intention, etc., etc. / by F.J. Batailhé and Ad. Guillet. To which is added a letter containing clinical observations on the same subject ; by J. Le Coeur.

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ALCOHOL

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AND

ALCOHOLIC PREPARATIONS IN SURGERY

THEIR INFLUENCE ON UNION BY THE FIRST INTENTION, ETC., ETC.,

BY M. F. J. BATAILHÉ

Professeur particulier d'anatomie, secrétaire de la Société médicale du Panthéon, etc., etc.,

AND M. AD. GUILLET

Docteur en médecine,

TO WHICH IS ADDED

A LETTER CONTAINING CLINICAL OBSERVATIONS ON THE SAME SUBJECT

BY M. J. LE COEUR

Professeur de l'École de médecine de Caen, etc., etc.

Translated from the French.

PARIS

TYPOGRAPHIE DE HENRI PLON

RUE GARANCIÈRE, 8

1860

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ALCOHOL

AND

ALCOHOLIC PREPARATIONS

IN SURGERY.

A juvantibus et lædentibus sit indicatio.

Amidst all the numerous recipes, which have come down to us from the old surgeons, for wounds, we have observed that the greater part contained either alcohol or alcoholic preparations.

This has led us to consider whether the alcohol might not be the active agent in these recipes, and whether it might not be rendered useful in surgery.

We have examined the subject by the threefold light of theory, experiment, and history; the following are the results we have arrived at :

THEORETICAL CONSIDERATIONS.

Alcohol coagulates albumen in whatever liquid it may be, and consequently in blood; the synovia of synovial membranes, of articulations, the serosity which bathes the meshes of cellular tissue, and that which moistens the surfaces of serous visceral cavities.

Alcohol applied to living tissues on the surface of a wound provokes no sort of accident. We are convinced of this from repeated experiments.

It coagulates the albumen on the surface of wounds, forming it

into a greyish-white-pellicule. It stops the hemorrhage of the small vessels. It hastens the secretion of plastic lymph on the surface of the wounds. By separating the lips of the wound soon after the application of the alcohol we can watch the lymph in the very act of gluing them together; that is to say the same thing is taking place there which takes place on the surface of serous membranes.

From these facts and these principles it results that alcohol exercises a great influence on union by the first intention, that it prevents diffuse erysipelatous inflammation, purulent infusion of synovial membranes, and purulent infection.

Let us explain ourselves :

Alcohol favours union by the first intention, by stopping hemorrhage of the smaller vessels (since the blood is a great obstacle to a perfect coaptation of the parts) by immediately producing a coagulum on the surface of wounds, and by accelerating the plastic secretion.

It prevents diffuse suppuration by coagulating the albumen of the cellular tissue, which immediately becomes thick and is rendered impermeable to the unhealthy liquids which bathe their surfaces.

Alcohol prevents the purulent effusions of synovial membranes by the immediate coagulation of the synovia, by causing the opposite surfaces to adhere, by rendering them impermeable to the liquids which moisten the surfaces of fresh wounds, and by encouraging an adhesive inflammation of the synovial membranes near the wound.

Alcohol prevents purulent infection, by coagulating the blood in the open and even gaping veins, on the surfaces of wounds, thus instantly plugging them and favouring an adhesive inflammation.

The theory of purulent infection has been much discussed. There are three different opinions in vogue at this moment.

1st. That which regards purulent infection in the light of an essential fever, a purulent fever (Tessier). 2ndly. The more generally received one, to a certain extent the classical one that which

attributes purulent infection to suppurative phlebitis or angeioleucitis. Pus, secreted by the walls of veins, or lymphatics, mixes with the blood, infects it, and through it the whole economy. 3dly. The third one, which in these modern times has scarce any other partizan than Mr Velpeau and might therefore be well termed the theory of Mr Velpeau, admits that liquids secreted at the surfaces of wounds, penetrate the still unclosed veins, and infect the whole system.

It is not our intention to discuss these theories, others, far more competent than we are, have already done so.

Let us only state which one we accept. We will not stop to discuss the first. It has few partizans and further that is no theory which is a purely negative one.

The second does not appear to us to bear investigation, after the objections Mr Tessier has raised against it (journal *l'Expérience*, n° 50). All the efforts of the elder Bérard in behalf of this classic theory have not been able to refute Mr Tessier's objections (article *Veine du Dictionnaire en 30 volumes*).

The third theory still remains, this is the one we accept. It is the one which has the fewest partizans, but if suffrages are rather weighed than counted, it will not be found wanting in authority, for Mr Velpeau is its supporter. — Mr Velpeau, although admitting this theory, does not, it is true, reject the second; but it has always seemed to us judging from his writings and more especially from his teaching, that he gives this one the preference. This too is the only one which is admissible in those cases where there is no pus in the veins, cases which Mr Velpeau has shown are far from rare.

Further, the second theory cannot be admitted, in those cases where there is no pus either in the veins, or in the lymphatics near the wound, we must then necessarily have recourse to the third. But even when there is pus in the veins and the lymphatics, near the wound. Is the second the right theory or ought we not to adopt the third?

In our minds there is no doubt. The third theory is the only true one and is always true. From the first day of a wound or of

an operation, unhealthy liquids penetrate the open veins. These liquids can infect the blood and the whole system, without there being any pus either in the veins or in the lymphatics near the wound. This is the case with patients who succumb during the first few days after an operation or a wound (before the 7th or 8th).

In these self same cases one can find after death no abscesses by metastasis, only apoplectic clots (*noyaux apoplectiformes*) or perhaps not even these. The fact is that the abscesses have not had time to form, but despite the want of abscesses the infection of the whole system, through the blood is perfectly manifested by the infected odour which exhales from all the organs and by the rapid putrefaction of the body.

In other cases however where the patients have fallen victims to purulent infection we not unfrequently find pus in the veins or lymphatics near the wound. But is it the pus contained within the vessels which has infected the system? By no means. The infection of the blood preceeded the formation of abscesses and in no way depended on it. Liquids from the surface of wounds, by penetrating the veins and remaining there for a longer or a shorter time, can determine suppurations within the cavity, but the general infection has preceeded these local suppurations, so that, in fact, in these cases also we must have recourse to the third theory, the theory of Mr Velpeau.

Lastly one can easily understand that liquids can remain in the veins or lymphatics near the wound and no further infect or but slightly so, the rest of the circulating stream. In such cases the patient, if he succumbs, will not do so from metastatic abscesses, nor from purulent infection, but from suppuration of the vessels near the wound. In the spongy tissue of the bones especially, one sometimes sees an extended suppuration of the veins, which can of itself account for death without having recourse to any general infection.

From what we have said on the theory of purulent infection, it is evident that alcoholic preparations, by rapidly coagulating the albumen of the blood, by instantaneously stopping the hemorrhage

of the veins, by producing an adhesive phlebitis, prevent purulent infection.

We can add that for the same reason alcoholic preparations prevent the formation of pus in the veins and lymphatics near the wound, in one word, prevent phlebitis, angeioleucitis, diffuse and suppurative.

EXPERIMENTS.

We have inflicted simple wounds with a sharp instrument in the limbs and trunks of animals; which penetrated to the bone, and wounded the periosteum. After we had carefully washed the lips of the wound with alcohol or some alcoholic compound, we united the deep parts by the quill suture, and the superficial ones by the interrupted suture.

We have occasionally obtained union by the first intention. We have not lost one single case. We have sometimes removed the superficial suture, half an hour after it has been applied; we have then always observed, between the lips of the wound a gluey adhesive matter, the plastic lymph. There were no traces of hemorrhage from the small vessels, a condition absolutely necessary for a perfect coaptation of the parts and consequently for union by the first intention.

We have also applied the same treatment to amputations and desarticulations, we have generally obtained union by the first intention, diffuse suppuration has never occurred.

Under the same treatment, contused wounds have rapidly healed with little or no suppuration.

Compound comminuted complicated fractures healed rapidly, with little or no suppuration. Sometimes there was no pus, but a liquid half purulent half plastic; there were never any traces of suppuration, either in the cellular tissue or in the sheaths of the tendons.

Compound fractures of the anterior limbs treated by suture and alcohol have healed rapidly and without suppuration.

We have effected wounds with fire arms, we have always

practised immediate enlargement of the wound. Although we have obtained some cures, we are not able to draw any conclusions from our experiments because the injury to the animals was so great, that they soon died of the shock, still amongst those who died, we have never found anything in the wounded limb, except a cavity circumscribed by a false membrane, never diffuse suppuration.

Simple wounds communicating with an articulation (treatment : suture, alcohol) have always healed by the first intention.

Simple penetrating wounds of the abdomen have likewise always healed by the first intention during the first 24 or 36 hours.

In simple penetrating wounds of the chest when air has penetrated the cavity of the pleura, we employed the same treatment and obtained the same result. We have not operated on the lungs, pericardium or heart.

We have effected wounds in the intestines longitudinally, transversely, obliquely (suture Jobert, alcohol). The abdominal walls were brought together by the quill and the twisted suture. Whenever the suture was well made so as to prevent all effusion of fecal matter we obtained a cure. But when the matter penetrated, at that point where the lips of the wound were brought together, there were adhesences between the lips of the intestinal wound and the abdominal walls.

After inflicting simple wounds on the liver and having compressed it between our fingers, we obtained recoveries without any accidents (alcohol in the wound of the liver, suture in abdominal walls, alcohol). We dare not from these experiments predict a similar result in all cases, especially in man. But in these less favourable cases, alcohol would be useful from its stiptic action and by determining immediate adhesences between the parietal and hepatic layers of peritoneum and consequently preventive of peritonitis.

In wounds of the bladder with an accompanying injury to the peritoneum (suture of the abdominal walls, alcohol), recovery.

These experiments ought to be repeated after the operation of lithotomy. Alcohol, besides its beneficial action on other accidents

(purulent infection, peritonitis), would here be preventive of infiltration of urine.

Wounds and operations of the scalp we have not as yet tried on animals, but if we consider that, in such wounds and operations, it is diffuse inflammation of the pericranium which we have to fear, or purulent infection due to the veins of the diploe or the sinuses opened widely through the mechanical action which the inspiration exerts in the advance of the venous blood, or diffuse and suppurating meningitis owing to the looseness of the subarachnoidean cellular tissue, we cannot help admitting that alcohol would be applicable here *à par excellence*. « But although we have no experiments of our own to refer to, we can invoke the clinical teaching of the ancients, who did not dread wounds of the scalp or the operation of trepanning half as much as we do.

We have not had any opportunities of operating on the uterus, but we believe that here too alcohol would be of great service.

In the first place, these preparations are here perfectly innocent. We know that Guénin-Ruleau after having successfully performed the *cæsarien* operation, injected wine into the uterus, and put the alcohol vulnèraire between the lips of the wound of the uterus and that of the abdominal walls.

The vulnèraire assists in healing the uterine and abdominal wounds. It produces immediate adhesion of the parietal and uterine layers of peritoneum, and is an obstacle to peritonitis.

But the advantages of alcohol are not probably restricted to such cases as these. No one can have failed to recognize the analogy between the uterus just emptied of the products of conception and a vast, open, and recent wound. Here are veins widely open (uterine sinus), voluminous lymphatics which admit into themselves and the veins, matters secreted in the uterine cavity : thence possibly purulent infection, thence the chance of abscesses, thence, perhaps, death with or without infection.

Alcohol would probably prevent all those accidents which taken collectively bear the name of peritonitis.

Of the alcoholic preparations we have chiefly made use of alcohol, brandy, and alcohol vulnèraire. Brandy appeared to us to be

too weak. We have experimented also with the tinct. of iodine; but our experiments are not sufficiently numerous to enable us to judge of the relative value of the different alcoholic compounds.

We have also made some comparative experiments, by leaving the wound either totally undressed, or dressed without alcohol. We have generally failed in obtaining union by the first intention and seen suppuration succeed which rapidly wore out the poor little animals. The majority died.

Experiments on animals teaches us nothing of the influence of alcohol on purulent infection, phlebitis or inflammation of lymphatics.

HISTORICAL CONSIDERATIONS.

Such there are the results to which our theories and experiments on the use of alcohol in surgery have led us.

We think we have shown ample grounds for fixing the attention of any one who makes a business of the « healing art. »

But perhaps some persons may be inclined to ask us, from whence we have our clinical facts and observations, and may refuse to listen to any other evidence.

This is a vicious mode of reasoning and one which would throw obstacles in the way of many discoveries.

It suffices to read our memoir in order to see that the clinical verification of its contents demands nothing less than the concurrent application of many surgeons through many years.

Is this then as much as to say that we have no clinical facts, no medical authorities in support of what we have advanced; whoever thinks this does but exhibit his own ignorance.

We assert without fear, that no medical work ever rested on authorities of so great weight.

Were we not afraid of incurring the charge of profanity we should say that we are the fellow workmen of Hippocrates, Galien, Dionis, Ambroise Paré, in fact of almost all the old surgeons till the end of the last century.

In nearly all their recipes for dressing of recent wounds and

operations, alcoholic compounds are contained. All these authors are unanimous in forbidding compounds of oil, fatty bodies, emollients, « les pourrissants » to revive the energetic language of Dionis. (Lessons on wounds of the scalp and the operations of trepanning.)

They did not, it is true, make use of the same language as we do. They did not say that their recipes insured the wounded, or the patient they had operated on, against all danger of diffuse erysipelatous inflammation or of diffuse suppuration of synovial membranes. These terms are not even met with in their works.

This is a precise and anatomical language which these authors from the anatomical knowledge of their days could not have used.

Do we mean by this that diffuse inflammations and suppurations of synovial membranes were unknown to them? Whoever examines their works will find these accidents plainly indicated. (Hipp., *Wounds of the head*. — Ambr. Paré, *des Plaies*, livre des *Fractures compliquées*, etc.)

Only these accidents, which, in our days, have been the subjects of admirable works and descriptions, which are the bane of our wounded patients or of those who have been operated on, which make the surgeon tremble before he amputates even a finger, were to them rare and exceptional events. They even attributed them to dressings badly done or done too late. Their dressings with alcoholic preparations whether for wounds, or after operations, prevented these accidents, and this too, although their operations were, compared with ours, most imperfect.

Nor were the ancients ignorant of purulent infection from wounds and operations. It is impossible to doubt it after reading some of their observations; but they were to them rare and quite exceptional cases, which even astonished them, and on which they did not therefore dwell long, and it is remarkable that the majority of cases of purulent infection were not subjects operated on, but wounds in the head, that is cases which were badly dressed or done too late.

When was it that this dangerous complication of wounds (especially of those of the scalp) and of surgical operations first engrossed

the attention of surgeons? It was at the beginning of this century at a period when for fear of irritation the prescriptions of the old surgeons especially those containing alcohol were abandoned. Then, all of a sudden, a multitude of writings on purulent infection, which alone would fill a library, appeared.

But this fatal complication of wounds and operations, is it a discovery of which modern medicine ought to be proud? Or is it not like diffuse suppuration or inflammation of synovial membranes one of the sad effects of the neglect of the practice of our ancestors and our masters?

We need not state our opinion; in our minds there is no doubt.

We trust that thanks to the spirit of the times which is at last bringing back the medical profession towards therapeutical researches, the question will be speedily settled. To do this what is required? Try these dressings on animals, try them upon men, we repeat it, try them upon men, and we do it without advising any rashness. One could scarcely accuse the surgeon of rashness who made use of agents which are found invariably useful upon animals, which are daily used by the uneducated and empirics, agents which the old surgeons employed and which modern surgeons inject into the peritoneum and other serous visceral cavitiès.

We trust both for the sake of the progress of our profession and the interest of humanity that this question will be settled in accordance with our hopes and expectations.

In this memoir we have confined ourselves to the consideration of alcohol and the alcoholic compounds, we do not by this mean to say that there were no other agents recognised by the old surgeons. On the contrary, in their prescriptions, especially for old wounds one sees in combination with alcohol a vast number of other substances : resins, essential oils, pitch, incense, aloes, sal ammoniac, alun, blue vitriol, green vitriol. There is an art to study and recover.

Indubitably alcohol and alcoholic compounds are the active agents in the prescriptions of the old surgeons for recent wounds and operations, and from the facility with which it can be obtained, its action on albumen, its influence on the plastic secretion and

consequently on adhesive inflammations, it may well be doubted whether any other agent will ever be able to replace it.

CONCLUSIONS.

1st. Alcoholic preparations favour union by the first intention (therapeutical and experimental proofs drawn from the practice of the common people. Historic proofs).

2dly. They prevent diffuse suppuration (therapeutic, experimental and historic proofs).

3dly. They prevent inflammations of the synovial membranes (same proofs).

4thly. They prevent purulent infection (therapeutic and historical proofs).

5thly. They prevent phlebitis and angeioleucitis (same proofs).

6thly. We must, therefore, in dressing recent wounds abandon the use of fatty bodies and poultices, and return to alcoholic preparations; in a word we must return to the practice of the ancients.



To Mr le Dr. Batailhé, professeur particulier d'anatomie, secrétaire particulier de la Société médicale du Panthéon.

MONSIEUR ET TRÈS-HONORÉ CONFRÈRE,

In the first place I must thank you for your pamphlet, which you have had the kindness to send me. I have read it with all the attention and interest which it deserves, an interest which is increased by the community of ideas, which I find exists between myself and you and your honorable colleague.

For four years I have been collecting facts on the same subject, with the intention of publishing them some day or other, but I hesitate to do so now that I find that, without our knowing one another or either of us being aware of the identity of our experiments or of their results; you have bravely grappled with the subject and taken the initiative in propagating a therapeutical means, which has been far too much neglected lately.—Were I now to carry out my former intention, one of two things would happen. Either I should come too late and might incur the charge of plagiarism or I should appear to claim a priority to which, I confess, I do not attach any great importance and to which in point of fact your publication undoubtedly entitles you. — I much prefer therefore communicating to you some of the principal facts which I am able to dispose of, leaving to your loyalty a free and entire latitude to use them as you may judge best for the interest of the subject, which I consider to be one of great practical importance.

About five years ago a woman, a cook presented herself at my consultation suffering from an accident of a grave nature on the middle finger of her right hand. Five to six weeks before, whilst cleaning a fish, she pricked herself with one of the bones of the fin, a whitlow was the result. Owing to its having been treated in a most irrational manner by the old women to whom she applied in the first instance, it was then in a very aggravated condition.

The sheaths of the tendons were affected, numerous abscesses had formed and opened themselves spontaneously. The result was several fistulous openings. The finger was greatly deformed three times its natural size. From the tissues which were of a dark violet colour and of a fungous appearance, a fetid discharge was poored out. All movement was lost and I can compare it to nothing else than, if you will excuse the expression, a black pudding.

I examined her with great care, at several intervals, and introduced a probe through the different openings; the bone was everywhere denuded, and the abscesses communicated together.

I considered her finger irretrievably lost, and recommended an amputation as the sole means of cure. After many difficulties it was agreed to and the next day was fixed upon for the operation.

The next day the patient sent to tell me that she had changed her mind, that she had rather die than lose her finger. I therefore concerned myself no further in the matter.

Three or four months later I happened to see the same woman on some totally different business, when to my surprise the finger which I supposed would have been an « *inutile pondus* » to her, had almost recovered its normal form; cicatrisation was perfect in all points, and the movements of flexion and extension although imperfect and difficult, were beginning to be reestablished; in a word the woman might be considered cured.

I asked the meaning of it. She then told me that one of her friends, a hatter, I think, to whom she had related her misfortunes and had confided her fear of the operation, had undertaken and accomplished the cure in 20 days. His treatment was : « *to hold the injured part for a quarter of an hour morning and evening in a bath of comp. tinct. of aloes (Elixir de longue vie)* and afterwards apply a dressing of charpie well soaked in the same preparation. The first bath caused a feeling of burning which however was supportable. From the second day the parts began to assume a healthier appearance, and cicatrisation advanced without any accident.

This, as you can imagine, made a great impression on me. Fortunately it was not long before I had an opportunity of experimenting for myself.

A man came to me with his index finger crushed by a large stone, which he was trying to raise, falling on it. The soft parts were much torn, the bone and articulation were laid bare, but unhurt; the sheath of the flexor tendons were torn at several points, the vessels were bleeding profusely.

This again was a case for immediate operation, so great was the injury to the part. Nevertheless I washed and bathed the finger with cold water, in order to cleanse the wound and stop the hemorrhage. I brought the parts together as well as I could covering the surface of the bones, and kept the whole together by a small linen bandage of a spiral form, and dressed it with charpie soaked in cold water and ordered it to be often repeated.

Two days after, the finger exhaled a fetid odour, the wound was of a palish grey colour with an ichorous discharge, the sphacelus threatened to invade the whole organ. I did not hesitate to substitute charpie soaked in the *elixir de longue vie* for the water dressing. It was applied fresh morning and evening. The next day an improvement in the wound was apparent. A rapid cure followed without any accident intervening or any deformity resulting.

Since that occasion I have employed these means about 50 times, and I can add always with the same success. In very few cases has the inflammation been intense enough to require a suspension of the treatment.

The principal cases are :

1stly. In two vast wounds, the result of extirpation of a whole breast for a cancerous affection. They were dressed after the operation either by the twisted or the quill suture. When this was removed, two or three days after, I applied the comp. tinct. of aloes. In both wounds by the next day a modification of the supuration was observable and cicatrization was complete in from seven to ten days.

2dly. In three cases of reopening of the wound after amputation of the leg accompanied by an unhealthy discharge.

3dly. In several cases of whitlow.

4thly. In an unhealthy wound of 9 to 10 centimetres of diam. with sphacelus and loss of tissue from an enormous carbuncle of

the lumbar region, which had been left to itself without any incisions or opening.

5thly. To several furuncles and carbuncles of moderate dimensions and ordinary gravity.

6thly. In several fungous degenerations of the great toe from onyxia, which in some instances had been operated on, in others not.

7thly. In a vast ulcerating wound of the leg, the result of the laceration of the soft parts by the bursting of a bomb before Sebastopol.

8thly. To produce a healthy modification of indolent chancre on the penis or vagina or in severe venereal buboes with considerable loss of skin.

9thly. Lastly in a quantity of small wounds or traumatic lesions, or ulcers of no great importance in different parts of the body.

In all these cases which have been thus briefly enumerated. I have exclusively made use of the topic which I mentioned before, *the comp. tinct. of aloes.*

But to confess the whole truth I must add that I have never had the hardihood to apply this treatment in the first instance to severe wounds whether resulting from accident or operations. I have often thought of doing so, and wished to do so, but I have not dared, I feared, unnecessarily perhaps, the developement of severe inflammation. I have generally had recourse to in the first instance to the topical application of astringents or irrigation. I have only used alcohol in the second or third dressing to modify accidents which had already occurred, not to prevent them.

Such then, honoré confrère, are the facts which the perusal of your interesting memoir has led me to lay before you. I trust that they may prove of some use in a future edition.

Agréez, etc., etc.

JULES LE CŒUR,

D. M. C. P.

Caen, sept. 10, 1859.

It has been remarked to us that we have been very brief in our notices of the substances which can or ought to be added to alcohol in the treatment of wounds.

To this, we have answered and might do so again that we did not wish to write a book; we have only wished to explain and reestablish the practice of the ancients (a thing which we look upon as a duty), and that for their numerous recipes we could only advise them to consult the authors themselves.

Still in deference to the well intentioned observations, which have been made us, we will add a few words to what we have already said on that subject.

In the treatment of recent wounds from operations, the ancients had arrived at using scarcely anything except alcoholic preparations (*esprit-de-vin*, *eau-de-vie*, *vulnéraire*) as we gather from the works of J. L. Petit. We are doubtful whether the different substances added at all to the value of the alcohol. — Was their practice however the same for old wounds with sanious secretions, wounds with gangrenous eschars or fetid suppurations (as those from abscesses of the parotid or in the neighbourhood of the anus) in fistulous abscesses? No. Here we have resins, turpentine, goudrons, aloes, myrrh, almost always added to the alcoholic preparations. It would be strange that this practice should have maintained itself so long, had it not had some solid grounds to rest on. The people of the Midi employ turpentine in these cases, and the practice is not modern; J. L. Petit writes :

« In going to Spain, I saw in the country of Bordeaux an ostler, who, from the account given to me, appeared to have had a malignant fever. It had been much neglected : the patient had been neither bled nor purged. About the tenth day a parotitis appeared, to which they had for twenty days applied nothing but honey mixed with a common sort of turpentine called *goudrou* (*goudron*) which is obtained from a fir which is very common in that country. Eight days after the application of this the tumour terminated by gangrenous suppuration. The flaps separated and left an opening through which the sanies flowed and through which a laudable suppuration was issuing. The patient was at the thirtieth

day of his illness; there was no more fever : I advised him to continue the use of the same medicament. Three months after, on my return to France, I saw this same ostler, fat and hearty, cured long ago. I should never have recognised him as the same man, had it not been for the cicatrice. It was solid, well united together a little sunk and adherent to the masseter. »

In what cases and at what stages ought each particular prescription to be employed? This is the art which we have before said has to be studied and regained.

In our experiments, we employed the same treatment for gun shot wounds as the ancients did, viz to enlarge the wound. We have been asked for some further information on this point.

In wounds from balls, one should always like the ancients (whether there be fracture or not) make an immediate opening, and, as a preventive means, that opening should be large. In this way the extraction of balls or splinters is facilitated, a more favourable form is given to deep and anfractuous wounds, the application of topical remedies is facilitated, strangulation is prevented. If alcoholic dressings are employed, no inconvenience will result. They prevent purulent infection and diffuse suppuration by forming a false membrane round the wound. The ancients invariably practised enlargement of the wound whereas the modern authorities are divided on that point.

Much more if resection of the osseous extremities is practised (as M. Marmy has proposed and practised with success in fractures of the arm from balls) ought one to dress the wound with brandy.

Resection requires large incisions.

NOTE.

Since the publication of the 3rd edition of this memoir, some further clinical experiments have been made.

At the hospital of St-Louis, Mr Dolbeau applied dressings of *eau-de-vie camphrée*. After fifteen important operations (amongst which were one of the thigh, one of the arm and one of the breast), he experienced no sort of ill result. The innocence therefore of alcohol, as a therapeutical means, has, by these recent experiments combined with the practice of the ancients, been amply demonstrated, and, who will, may now make use of it without any fear of harm to the patient.

Facts, too, confirmative of its influence in producing union by the first intention have been imparted to us.

Mr le Dr Ad. Guillet obtained union by the first intention after an operation to remove a ganglionic tumour from the lower jaw.

Mr le Dr Lacane, surgeon of the hospital of Calvi (Corsica) made use of alcohol in the case of a regimental cook. The articulation between the 1st and 2nd phalanx had been penetrated by a large knife. A flap of skin on the palmar surface was all that remained. The lips of the wound were washed with alcohol (strength, 36°) and a perfect coaptation of the parts was effected. Charpie soaked in alcohol was applied on it; and, at the end of 24 hours, union by the first intention was perfect. There was no suppuration.

Mr Batailhé, after laying these facts before the medical society of the Pantheon made some remarks on the mode of obtaining union by the first intention; the following is an analysis.

In the larger operations, as those of the arm, one often fails to obtain union by the first intention, because a perfect coaptation of the parts is not effected. The numerous threads used in ligaturing

the arteries and the effused blood prevent this coaptation and so hinder union by the first intention.

We ought therefore to tie the larger vessels only and those with small ligatures and give a twist to the smaller ones with a forceps. The alcohol will stop the hemorrhage from the minute vessels. A firm compression by means of a pair of forceps and a cushion should then be made. Thus we shall obtain a perfect coaptation of the parts and consequently union by the 1st intention. Why should we not obtain the same results in large wounds which we do in small ones? It is a purely mechanical affair, one of exact coaptation of the parts, and nothing else.

To prevent purulent infection, the alcohol must be applied to the orifices of the cut veins at the surface of the bone and be held there for some time by means of a roll of lint soaked in alcohol in the same way as the ancients used to do (J. L. Petit, etc.).

The alcohol must, at weakest, be 36°. Brandy is evidently too weak for these cases. The final coaptation of the parts and the final dressing should not be arranged till some time after the first application of the alcohol.









