

**An essay on the means of lessening the effects of fire on the human body /
by James Earle, Esq. F.R.S. surgeon extraordinary to the King and to his
Majesty's household, and senior surgeon to St. Bartholomew's Hospital.**

Contributors

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AN
E S S A Y
ON THE
Means of lessening the Effects of Fire
ON THE
HUMAN BODY,

BY
JAMES EARLE, Esq; F.R.S.
SURGEON EXTRAORDINARY TO THE KING AND
TO HIS MAJESTY'S HOUSEHOLD,
AND
SENIOR SURGEON TO ST. BARTHOLOMEW'S HOSPITAL,

L O N D O N:

Printed by *C. Clarke*, Northumberland Court, Strand.

And sold by *JOHNSON*, *St. Paul's Church-yard*; and
FAULDER, *Bond Street*.

1799.

TO EDWARD ROBERTS M.D.

My dear Sir,
I have the honor to acknowledge the receipt of your letter of the 11th inst.

and in reply to inform you that the same has been forwarded to the proper authorities for their consideration.

I am, Sir, very respectfully,
Your obedient servant,
J. H. R.

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TO *EDWARD ROBERTS*, M. D.

FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS,

AND

PHYSICIAN TO ST. BARTHOLOMEW'S HOSPITAL.

DEAR SIR,

I HAVE taken the liberty
of addressing to you the following Essay, and
'beg the favor of your acceptance of it, as a
small token of the great regard and esteem
with which I have the honor to subscribe
myself,

DEAR SIR,

Your faithful

humble Servant,

*Manover Square,
Nov. 16, 1799.*

JAMES EARLE.

ERRATUM.

Page 8, Line 11 *for* aqua-fortis, *read* the flame of alcohol.

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THE Publication of "*Observations on the Cure of the Crooked Spine,*" which were advertised, has been delayed some short time, that the opportunity might be taken of accompanying them with remarks on the following subject, which have been rather hastily drawn up, that they might appear before the winter season, as they were thought important and interesting, in no small degree, to every family, more especially in the present times, on account of the prevailing fashion in female dress.

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ESSAYS

The object of the ensuing pages is to
endeavour to present in plain and
clear of any, when applied to the human
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these the two sections are intended to
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A N
E S S A Y, &c.

THE object of the ensuing pages is to endeavour to prevent or lessen the destructive effect of fire, when applied to the human body, by means which seem to be not generally known, or not sufficiently attended to.

There are few accidents or maladies to which mankind are subject, which have met with a greater variety of treatment than burns; and, as it appears to me, these various methods have in general been received and adopted as things of course, and handed down without any fixed principle or determined idea annexed to them: as we continually see

in similar cases of burns, scalds, &c. applications made use of which entirely vary from each other in their nature and effect.

If we consult the ancient writers on this subject, we find a great variety of remedies, consisting of decoctions of different herbs and ointments of various ingredients, many of which form compositions totally opposite to each other; but which were all in their turns recommended and brought into use.

There does not appear any great improvement in the applications introduced by the moderns on such occasions. As far as I have been able to collect from observation and enquiry, the treatment of these cases for years past has been confined to the following or similar remedies.

Linen dipped in spirit of wine, applied to the burn and often renewed, is now in frequent use. This was also advised by Sydenham and other authors; but whatever advantage

tage is to be derived from it, it can only, with propriety, be applied to superficial burns; should any ulceration, or even excoriation have taken place, spirituous applications would be more likely to increase than abate the pain and inflammation.

Some practitioners think it right to bleed, to take away the wrinkled cuticle, and then to apply to the part, ointments composed of preparations of lead, and poultices impregnated with this mineral.

Some recommend the extract of lead and tincture of opium, mixed with water to be applied immediately, and simple dressings afterwards.

Or a mixture of vinegar and water, or of fine oatmeal and cold water.

Or spirits of wine and vinegar, in the proportion of two ounces of each, mixed with eight ounces of water, and applied *warm*.

Another remedy which has been much

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commended, consists of potato-juice and distilled water, to which is added as much common salt as can be dissolved in it, with a small quantity of crude opium.

Greasy applications also are commonly used, such as olive oil by itself, or mixed with spermaceti ointment, or oil and lime water well shaken together.

There are other formulæ which might be mentioned; but these will suffice to shew the common practice, and to prove the discordance and uncertainty prevailing in the treatment of burns. In general they appear to be intended to cool, relax, or give ease, and several of them answer these purposes in some measure, but they certainly do not furnish effectual means to stop the progress, or lessen the powerful action of the matter of fire, in whatever it consists, but which probably continues to exist in the burnt part, and to extend its influence for some time.

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I must confess that I had been long dissatisfied with all these methods of treatment, as they seemed of very little efficacy, for notwithstanding their application, I had too often witnessed that the pain was very little abated, that blisters arose, and floughs took place in no very inferior degree to what might have been expected if no means had been employed; these observations often led me to wish for a better method than the usual practice seemed to offer; when, some years since, I was sent for to a medical gentleman, who being near a bottle of spirits of wine, which had been imprudently heated to a great degree, by some accident it took fire, the bottle burst and its contents flew over his hands, face, and upper part of his neck, all of which were miserably burnt. At a consultation on this unfortunate case, the usual modes of treating burns were discussed,

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and from a thorough conviction of the little good to be derived from the applications in common use, it was agreed that after the loss of some blood, cold water alone should be applied to bathe the parts ; and this, being found to give ease, was continually renewed, and the patient during several days drank nothing but cold water, and took very little nourishment. By these means he was kept in a cool and tolerably easy state, though the pain often returned at short intervals ; some blisters arose, which however in little more than a week subsided and no scar was produced.

A misfortune of a similar nature is related to have happened to the illustrious Boerhaave by the bursting of Papin's machine or digester, in consequence of which his face and arm were scalded by hot water. The whole face was in a little time blistered and the eyelids so much swelled as totally to obstruct his sight.

sight. He immediately ordered himself to be bled *ad deliquium*, and the next day caused the venæsection to be repeated; and afterwards took a pretty strong purgative, although he had been reduced nearly to *a state of fainting* by the flighter purgatives. He took care to have his face anointed only with unguentum nutritum, and covered with emplastrum ex lapide calaminari. After these profuse evacuations the tumour of the parts subsided and by the use of a thin diet, and the plentiful drinking of cooling liquors, the cure of this dangerous scald was so happily advanced in eight or nine days, that he was able to appear again in public, his eyes having escaped from so great a danger; an unsightly scar however remaining in his arm after a *tedious suppuration*.

Now it appears to me that in this case had more cooling topical applications been used, such plentiful evacuations and such severe treatment of his constitution would not have

been necessary. If for instance some cooling fluid had been applied which would have been soon evaporated, instead of the burnt and inflamed parts being covered with greasy ointments and plasters, which necessarily stop the pores, obstruct perspiration and confine the heat, perhaps the accident might have ended still more favorably, and possibly without any tedious suppuration. We know from experiment that the effects of aqua-fortis when applied to the body are more violent than those which arise from hot water, yet the gentleman before alluded to, by the plan which he pursued, avoided any suppuration, and even the separation of the cuticle to any considerable extent. As I had every reason to be pleased and satisfied with the termination of his case, I frequently afterwards on similar occasions used cold water, and all applications in as cold a state as possible, notwithstanding the opinion of many respectable

respectable authors and practitioners in favour of warmth to be applied to the parts. The good effect of this mode of treatment I experienced on many occasions, yet something further seemed wanting; for though this plan well followed up and renewed as often as possible, lessened the pain, and abated the heat, it did not quickly subdue them; and in large and severe burns it seemed disproportioned to the violent effect produced by the fire.

Some years after this, I was sent for to a lady whose neck and face were very much burnt, from her neck-kerchief having taken fire: at a consultation on her case, Sir Walter Farquhar, who was present, proposed to apply ice to the whole of the burnt parts, although they were very extensive. As my experience had hitherto been so much in favor of cold applications, my assent to the proposal was most readily given, ice was accordingly applied, and appearing to give immediate ease, was conti-

nued unceasingly during several nights and days, after which I had the satisfaction of seeing the lady recover without any scar remaining, and without any injury to her health from the cold state in which she had so long remained.

Not long after this accident, I had occasion, in my own family to make trial of this plan. A little boy about three years old, playing with his brothers, was thrown down on the hearth, and to save himself caught hold, with one hand, of a hot bar of the grate. Before I saw him, which was in less than a quarter of an hour, the nurse had wrapped his hand in oil. I found him in exquisite pain, and instantly sent for ice, with which I covered the hand. The child felt immediate ease; but as soon as the ice was melted, which was at first in a short time, the pain returned, and he cried out for more. A blister arose, which, by degrees, in one large
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bladder, occupied the whole of the palm of the hand, and the inside of the thumb and fingers, and it increased so as to become globular, and nearly of the size of a hen's egg. The opening or breaking of this was most carefully avoided; and ice was constantly applied to the whole hand, it being immersed, during the day, in a basin of ice and ice-water, and at night wrapped in cloths, or covered with scraped potatoes, soaked in it. Whenever this application was recent, the child was easy and slept; but at intervals, as the hand grew hot, from the melting of the ice, he became restless and cried until it was renewed, when his sleep was again composed. This plan was continued during a week, at the end of which an absorption of the extravasated lymph took place, the cuticle which had been elevated, to so great an extent, began to shrink and shrivel; in a few days it became ragged and torn, and was

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taken away, without any painful sensation, a perfectly well-healed surface appearing underneath.

This method having been thus fortunately pursued, I have the happiness to say that my boy enjoys the perfect use of his hand, and I take this opportunity to express my obligation to Sir Walter Farquhar for the first suggestion of the plan, and for his obliging attention on this occasion. In some subsequent conversations which have passed between us, it has been mutually regretted that this practice was so little known, which has probably given rise to the present attempt toward introducing it to more general notice.

If I am allowed to judge from the severity and situation of the burn and from the soft and tender structure of the parts concerned in the case just described, and to reason from what I have seen, in many others, I am decidedly of opinion that, had it been treated by any of
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the means commonly employed, the inflammation would have risen much higher, and continued much longer; consequently the pain would have been more severe and of longer duration, accompanied with fever. From the greater degree of heat and irritation the blister would have continued to increase, and, if the intentional opening of it which by some was advised, had been avoided, it would have burst. The admission of air would have produced a slough, in which the tendons would have been implicated, in consequence the muscles no longer serviceable would have become contracted, and the hand for ever been left maimed and useless.

Some years previous to this accident my own leg was scalded with hot oil, on the outside, from the knee to the ankle. The best remedies then in practice were applied, but did not prevent my suffering excessive pain for many hours, which was followed by the separation

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ration of the cuticle and an ulceration which was not healed for a considerable time.

Since I have found the advantage arising from ice, I have had many opportunities of using it on large and extensive burns, which have served to confirm me in my good opinion of its beneficial effects, whenever it has been timely and properly applied. In several cases it has happened, that either from motives of delicacy on the part of the patient, or from the attention of every one concerned being occupied with the most apparent injuries, parts which were burnt have not been discovered in time to receive benefit from the cold application, in consequence of which the cuticle in those parts has separated, floughs have formed, and have been cast off, leaving sores difficult to be healed; while the parts in their neighbourhood more severely burnt, but covered with ice, have escaped without a blemish.

I could detail many instances of mischief
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prevented, and cures effected by these means ; but as the progress of them was in general similar to the two cases already mentioned, it does not appear to be necessary to add to their testimony.

I shall however take notice of one which occurred very lately.—A gentleman was much scalded by the overturning of a tea-urn. I saw him soon after the accident, and sent to the nearest confectioners for ice, with which the burnt parts were bathed ; the heat and pain were soon lessened, and afterwards he felt very little inconvenience.

And I cannot pass over another unhappy case of a poor woman, who, in a fit, fell into the fire. The injury extended over the whole of the neck, back and breasts, in short nearly half of the body was scorched, and there was one continued burn, which made a surface, by measurement, of more than four hundred inches. A considerable time had elapsed after

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the accident before she was brought to the hospital, so that the heat of the fire had had scope enough to do great mischief; added to this, the inflammatory attack had been aggravated by the injudicious application of spirits of turpentine, so that her sufferings were extreme. The burnt parts were covered as soon as possible with pounded ice and ice-water, from which she found immediate ease, and lived three weeks without complaining of much pain, and without that distressing fever, which usually accompanies severe burns; after which she sunk under the profuseness of the discharge from so large a surface, and expired.

In this case probably the injury was too deeply inflicted at first, to allow of a possibility of the burnt parts being prevented from sloughing off and leaving a sore; for it cannot be supposed that any means can prevent the effects arising from the destruction which the first contact of the fire has caused. If
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that has been sufficiently violent to destroy the living principle of the parts in the first instance, ice being applied may take off the heat, abate inflammation and give ease, but if the patient lives, the dead parts must be thrown off by the living, as happens in all cases of mortifications from other causes.

Yet, severe as this case certainly was, it is impossible to say what a more early application of ice might not have effected ; but in my opinion, much greater advantage would have been obtained ; since in other instances, where it has been applied early, and where, though the burn has been both extensive and deeply inflicted, a stop has been put to the heat and inflammation, and sloughs have been prevented from forming. But considering this case abstractedly, if ice could act with such effect as to keep this patient so long alive and easy, what may not be expected from it in slighter burns ?

From repeated observation of similar cases, I am confident that this wretched woman by the common modes of treatment would have continued to suffer great pain, and would have existed but a few hours longer.—Perhaps the prolongation of life in such a situation, and under such circumstances is not greatly to be desired ; but to preserve it in all cases, as far as lies in our power, is our duty.—The rest we leave to Heaven.

It was not my intention, as I have observed, to adduce any more instances, but since the preceding pages were printed, I have been favoured with an account of an accident which happened to a young lady, in Curzon Street, May Fair, written by herself, and which having permission to insert, I conceive it would not be doing justice to the subject of this essay if it were omitted ; it will therefore be related in her own impressive words.

Early

Early in the month of March, 1792, one morning just after breakfast, I went into the parlour, to speak to my mother who was sitting by the fire-side, so that I stood on the hearth with my back to the fire; and as soon as I had communicated what I had to say to her and my sister, who was with her, I was going to quit the room, when the latter looking up, perceived that the back of my dress was on fire. Fright deprived her of all power to act, but my mother immediately endeavoured to extinguish the flames by wrapping her clothes round me, but in vain; the fire was become too strong; and as she concluded the carpet was nailed to the floor, she went out of the room to get something to throw over me; my first impulse was that of following her, when, providentially, I had the presence of mind to see that such a step must prove fatal;

tal; and throwing myself down on the carpet, I rolled over and over, begging my sister would try and cover me with it, which she could not do, being deprived of strength by her fear; my mother soon returned with a large mat, and the servants, who had been alarmed by my screams, came in at the same instant to my assistance; they threw the mat over me, and themselves upon it, in order to smother the fire; and after some little time succeeded; but not before I was severely burnt in two places in the small of my back; the back of my neck, and the under parts of both arms, just above the elbows. I had burnt the fingers of my right hand in attempting to untie my muslin sash. My mother's hands also suffered; as, on raising me from the floor, some fire still blazed from the back of my handkerchief and cape of my gown, which she stroked down from my head and pressed out with her hands.

When

When I had a little recovered from the shock, I sent off directly to request the favour of Mr. Farquhar, if at home, to come to me immediately; if not, that he might be informed of the accident as soon as he returned, and that I was impatient to see him; three or four hours having elapsed, I sent again to Mr. F. and as he was not come home, one of the gentlemen from his house very obligingly came to me; yet I declined availing myself of his advice, being determined to wait till Mr. Farquhar could come to me, owing to the anxious wish I had of having his opinion and advice in preference to all others. In the mean time I had applied scraped potatoes to my hand, and some oil to the rest of the burns. About ten o'clock in the evening Mr. Farquhar arrived; and after he had seen the places which were burnt, he ordered some ice to be sent for instantly, and that I should have somebody sit up with me

all

all night, who was to keep constantly applying to the burns cloths dipped in the ice, and to be changed as soon as the chill went off; that if I became weary, and could sleep, they should get some fresh hogs-lard, and first wash it extremely well with water; after which it was to be beat up with ice spread on linen, and laid on the burns: but as soon as I waked, to use the ice simply as before. When Mr. F. left me, I had my bed immediately laid on the floor, as being more easy and convenient to those who attended me, and strictly followed Mr. Farquhar's directions the whole night. On first applying the ice, it made me shudder for a minute or two; but the pain I felt was soon abated, and in the course of the night I got a little sleep. At noon, next day, when Mr. Farquhar came, he found me in a fair way of doing well, and only requested I would persevere in applying the ice frequently, and in the intervals keep the hogs-lard

hogs-lard and ice to the burns. I soon experienced the benefit of this method of treatment, for in a few days the fire was entirely drawn out, and though all the blisters had broke, not one of them had the least tendency to become a sore. Considering how much I was burnt, the pain I suffered was comparatively trifling ; which I am persuaded, was entirely owing to the application of the ice : and my mother, who also used the ice to her hands, was cured in a few days. In the course of a month or five weeks, I perfectly recovered ; and have never since suffered the smallest inconvenience from that accident ; nor did I at the time catch any cold, though I sat up for the most part of the first night, with scarce any cloathing, and as the ice dissolved, of course I was very wet, and although I had before this accident, been for more than two years greatly indisposed by nervous complaints, I had not any fit, or those nervous

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symptoms

symptoms which my friends were apprehensive would have been the case after the terror and fright I suffered by the accident.

A considerable time appears to have elapsed in this lady's case before the ice was resorted to, notwithstanding which it seems to have acted with great power and efficacy. On the whole I cannot too strongly recommend the use of this remedy in burns of every description, as I presume we may fairly conclude from what has been premised that it possesses great capability of giving ease, and preventing the deplorable ravages and mischief which suffering the heat to remain in the part produces, for from every observation I have made, the fire does not produce all its effects on the first attack, or immediate contact with the part; but afterwards lies rankling in
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it, and continues to spread its destructive influence until its fury is spent, or its power counteracted : as is evident from the continuance and even encrease of the excessive pain and inflammation.

Whether modern philosophers will allow that fire applied to any part of the human body does remain united to it for a time, I am not certain ; but such appears to me to be the fact, and this opinion has, I find, been maintained by several very respectable authors.

Hildanus mentions it as his opinion, and seems to lay great stress, as indeed most of the old writers did, on the frequent change of the dressings in burns. In a case which he describes, he says, that he renewed the plasters four times every hour, for the first day, and by those means drew out the greatest part of the fire.

Fernelius asserts that fire itself applied near, is its own antidote to drive out the fire of the burnt part, and by which pain is aba-

ted. He adds that some remedies applied to the parts entice out the fire.

Ambrose Parey also says, if we carry the burnt part near to a candle, or live coal, and hold it there long enough, the fire will attract the igneous particles which have been imbibed, and which are the cause of the pain. This, though a painful process, will, I believe, be generally allowed to be efficacious, as it certainly does after a time cool the part and give ease. May not this effect be caused by the attraction which takes place between similar particles, and from the absorption of a smaller body of fire into the larger mass? Or may it not happen from the air surrounding the burn being rarified and deprived of its oxygen by the presence, of the larger body of fire, so as to become less capable of affording pabulum to the heat in the burnt part, and which is thus gradually extinguished? Or does it arise from the same principle, whatever

ever that may be, by which the rays of the sun thrown on a fire extinguish it ?

However, in whatever way it is accounted for, if it be admitted that, by any means, we can immediately abate pain by lessening heat in a burnt part, it surely proves that it did there superfluously exist ; and as there is perhaps but one species of heat throughout all nature, which, whether evident to the sight or only sensible to the touch, whether it gives life to the blood and vegetation to plants, or fuses metals, and decomposes combustible substances, is still only a different modification of the same element, it may be easily conceived that a much greater quantity of its particles may be added to a living part, to which fire itself has been applied, than can possibly be produced by the powers of animal life ; and with regard to the retention of it, the temporary continuance of superabundant heat in every species of matter is self-evident. If then
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dead animal parts are capable of retaining it for a time, is it not likely to be longer preserved in living parts, whose powers of perpetually keeping up a considerable degree of heat under every variety of climate are so universal? In some measure to prove that this is the fact, it may be observed, that if any such substance as scraped potatoes be applied to a burnt part of the body, it will very soon become heated, and to such a degree, as to emit smoke; and if the same be made to cover an inflammation on the surface of the body, from an internal cause, it will certainly grow hot, but in a very inferior degree: which surely shews, that heat in a part arising from a burn, is something more than mere inflammation.

But whether the theory be doubted or not it must be universally allowed, that the most rational and best practice will be to oppose the action of fire as soon as possible, by every means in our power. And to effect

fect this purpose, I must again observe that I think myself well warranted in maintaining ice to be super-eminently useful. The mode of its action on a burn may possibly be accounted for on the same grounds as the passage of the electric fluid, by the doctrine of plus and minus, ice being a substance which has acquired solidity by the deprivation of heat, readily absorbs it from warmer bodies till they become of the same degree of temperature. Ice applied to a hand in a natural healthy state, gives pain, and why? because it deprives it of its due, inherent, vital heat; on the same principle if a part suffers pain by being overcharged with heat from having been exposed to the application of fire, ice will give ease, by absorbing the super-abundant heat which had taken possession of it.

It follows then that the sooner it is applied after the accident has happened the better, as
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the fire will have less time to do mischief, if the application be deferred till blisters are formed, and floughs produced, a great degree of ease may be obtained, but the destruction of parts which has already taken place, cannot entirely be prevented from going through its usual course of floughs and suppuration.

In London this remedy may be readily procured, indeed it is now so common an article of luxury, that in most large towns, and often at gentlemens country seats, it is to be had at all seasons. If however it should at any time be wanting, the coldest water, or any other good conductor of heat may be substituted. The method of freezing water by the solution of neutral salts may in cases of urgency be well adapted to our purpose; and as this can be performed with materials to be procured in almost every neighbourhood, we have happily this valuable application seldom out of our reach.

Equal

Equal parts of sal ammoniac and salt-petre finely powdered and mixed together, in the proportion of three ounces of each put into four ounces of water, produce a solution which sinks the thermometer thirty six degrees, and as it is easy even in summer to procure water as cool as fifty degrees, a sufficient degree of cold may be obtained at once to freeze water in a glass vessel immersed in it.

Even a saturated solution of common salt in water, will considerably increase the cold of water immersed in it.

Cold fluids may be used either by plunging the burnt parts into them, if the limbs have received the injury, or by scraped potatoes, or linen moistened with them, or by other means, and the plan should not be discontinued so long as heat and pain remain, the idea being constantly kept in view, that the effect of heat in these cases is best counteracted by cold.

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and very repugnant to our feelings, in the application of so cold a substance as ice to a large surface of the body, particularly of persons of a weak and delicate constitution ; and it cannot be wondered at if the friends of the party, and also medical men should at first object to it, as likely to give cold, cause rheumatism, or do perhaps as much harm, as the burn itself might have occasioned ; but from repeated experience, I can affirm that it may be used with safety ; indeed it appears that the same effect does not follow the application of cold to the body in this situation, as would infallibly happen at any other time ; which may, I think, be accounted for from the body being in a state of heat and irritation, and therefore capable of resisting the effect of cold more than at another time, or in other words, from the additional heat counteracting the cold, and preventing its usual effect on the constitution.

Ever

Ever since I have been convinced of the powerful effect of ice in these cases, I have endeavoured by practice and conversation to inculcate the use of it. If by thus making it more publicly known I shall at all contribute to restrain the ravages caused by fire applied to the human body, or prevent the deformity which is the usual consequence of severe burns, my feelings will be abundantly gratified.

Having mentioned the deformity which is often caused by burns, I shall take the opportunity of adding a few words on that subject.

The cicatrix which takes place on the healing of a wound, after the destruction of the skin and cellular membrane by fire, generally makes a very unseemly appearance,

even where it is superficial, owing principally to the contraction of the circumference toward the center, and the loss of the true skin which is never perfectly restored. But when unnatural adhesions take place between parts which should be separate, it becomes an object of infinitely greater importance, as besides the shocking sight which such instances exhibit, the use of the parts concerned, if not wholly destroyed, will be, more or less according to circumstances, restricted and diminished. Every one must have observed melancholy instances of this nature, and professionally I have been obliged to see many; in some the head drawn down sideways has been fixed to the shoulder, in others the fore arm bent has adhered to the upper arm: the leg I have seen contracted and firmly in contact with the thigh. Such and similar cases are not infrequently brought to St. Bartholomew's Hospital, in hopes that the parts may
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be restored to their natural functions ; but in general, the assistance which surgery can afford in these cases is by no means adequate to the expectation or wishes of the unfortunate sufferers, for although the most prominent part of the contraction, and that which appears to be the main cause or hindrance to the replacement of the parts in their natural situation be divided, such is the rigidity produced in all the neighbouring parts, from the loss of the cellular membrane, and from that degree of crispation which is caused by the fire in all the surrounding muscles, membranes, and ligaments, that after the division of the principal cord, as it may be called, is performed, the parts contiguous will not recede or give way ; and when joints are included in the burn they too often remain completely locked, or retain a very confined motion. But although a complete cure cannot be promised, these miserable cases are not to be abandoned without

out attempting some means for their relief, as they may sometimes receive advantages beyond what could be expected.

I have lately seen a boy about six years old, who nine months before had been most dreadfully burnt in the neck and face, the cicatrix had drawn the under lip down toward the lower part of the neck, over which the saliva was constantly flowing, the under jaw was connected by a tight rigid cord to the breast ; on the whole, as may be easily conceived, the child was a most pitiable and frightful object.

Although considerable benefit was not expected to be derived from any operation in this case, it was in itself so deplorable, that it was determined to give it the chance of what might arise from the division of that part of the cord, which appeared to be the prominent or principal cause of detaining the chin in so distressing a situation, more especially as it appeared to be formed in a great degree

degree of hardened skin which with perfect safety might be divided. On the division I found as I had suspected, that it was composed of a rigid mass which gave but little way, while all the parts contiguous retained an unalterably fixed contraction, and no great advantage appeared likely to be gained from the operation; however, the edges of the wound being kept apart as much as possible during the healing of it, I had the pleasure to find, that by the assistance of sticking plaster and bandage we were enabled to raise the chin, and bring the lip much nearer to the mouth; and thus, with constant attention, the appearance which such a distortion of so principal a feature had occasioned is considerably lessened, the saliva and food no longer escape from the mouth and the speech is rendered articulate.*

* The case was so remarkable that I have been induced to insert two sketches, one drawn before the operation, the other to represent its present state, by an ingenious student in surgery.

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But though the chirurgical art is much restricted in its powers of remedying these dreadful consequences of fire, it can do a great deal by way of preventing them from taking place. This however will depend not only on the skill and management of the surgeon, but often on the attention of nurses, and in many cases the resolution and assistance of the patients themselves must be called in aid.

If the effect of the fire has been so violent as to cause the skin and cellular membrane and perhaps the fascia, or even the parts still deeper to separate from the living, at the time when the sloughs are casting off and during the healing of the wounds, great care should be taken to keep the parts asunder by every means in our power; if for instance the fingers are burnt, they should be carefully kept apart by dressings and bandages, otherwise they will adhere together and become one mass as I have often seen. When the parts
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surrounding joints are burnt, the patient, if left alone and trusted to his own judgment and discretion, in order to obtain a little ease will generally place the suffering limb in a state of flexion ; but this should be opposed as much as can prudently and properly be done, and the patient also should be warned of the ill consequences arising from such position, and be persuaded to lend his assistance toward placing and maintaining the limb in a proper situation ; for if the joint must necessarily be locked, as frequently in spite of all our endeavours will be the case, the parts connected with the joint will be more useful in an extended than in a contracted state. But though this will apply to joints in general, as the neck, knee, or ankle, the lower-arm is an exception ; for if the parts surrounding the joint of the elbow be so burnt that all hopes of preserving its motion are given over, and consequently there is no expectation when the

wounds are healed, but that it must remain locked, it will be a more useful member in a bent position than in a straight one. The fingers also will be most properly left in a state of semiflexion.

What has been observed with regard to the burns of the arm will apply to fractures in the elbow joint, in which it sometimes happens that a portion of one of the condyles of the humerus, or the head of the radius is broken off and forced into the joint, or placed in such a position as to cause an anchylosis. In all these cases when it can be brought about, the arm should be placed in a bent position : if then a stiff joint be the consequence, the hand can assist in administering food, and be useful for most of the ordinary purposes of life. These circumstances may appear too obvious

obvious to require to be noticed ; but the plainest facts do not always occur most readily to the recollection. And this is a case which requires immediate decision ; for if the limb be not laid properly very early, before tension and inflammation take place, it soon becomes out of our power to alter it. I have more than once seen an arm laid and kept strait with a fracture in the joint of the elbow, in consequence of which an anchylosis was formed, and the limb became irrecoverably useless : I have therefore thought the caution not unnecessary.

However severe and irremediable the effect of fire on the joints may be, in many instances, after the first and most violent inflammation is a little subsided, some degree of motion may be given, at least an attempt from time

to time should be made, and continued if possible during the progress of suppuration and cicatrization.

Parey and Hildanus advise opening the blisters arising from burns, and some modern surgeons recommend this practice, but I am clearly of opinion that the cuticle should not be removed so long as it will remain to cover the part and defend it from the air. Every one knows how extremely painful it is to have any part of the body touched from whence the cuticle is abraded ; if the blisters are let alone, the extravasated lymph will often be absorbed and dissipated, and when the subjacent skin is covered with a new cuticle, that which was elevated into blisters spontaneously separates of itself without any pain. Soft ointments, fomentations and poultices may be occasionally applied, but great attention should be paid to repress and keep down the granulations, which in the healing of wounds after burns,

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are particularly apt to be luxuriant, and to cause an uneven, unsightly cicatrix.

That miserably maimed and deformed objects arising from burns, often happen through neglect, I am ready to admit ; but am far from concluding that the surgeon is always to blame : I know the peculiar difficulties which attend these cases, where, besides the disposition which after loss of substance by burns, the parts surrounding have to contract, the natural inclination which patients feel to obtain ease, by putting the parts in a wrong situation, will often counteract the best intentions ; and in infants, added to the cries and resistance of the child, the misplaced tenderness of parents and nurses is sometimes to be encountered. But in spite of every obstacle, it should never be suffered to escape the memory, that if ulcerations arising from burns, are not watched with the most scrupulous and daily attention, contractions and unnatural adhesions will

will often take place, which will remain to the end of life ; but which, by artificial and skilful management, may be very frequently prevented. However, I shall conclude with repeating what I firmly believe to be true, that these dreadful cases would happen much less frequently, or might often be totally and absolutely prevented by the timely application of ice.

F I N I S.

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