An essay on burns : submitted to the examination of the Royal College of Surgeons of Edinburgh ... for admission ... / by Adam Macdougall.

AN

ESSAY ON BURNS:

SUBMITTED

TO THE EXAMINATION

OF THE

Royal College of Surgeons of Edinburgh,

WHEN CANDIDATE

FOR

ADMISSION INTO THEIR BODY.

BY

ADAM MACDOUGALL, M. D.

FELLOW OF THE ROYAL COLLEGE OF SURGEONS OF EDINBURGH,
EXTRAORDINARY MEMBER, AND LATELY ANNUAL PRESIDENT
OF THE ROYAL MEDICAL SOCIETY OF EDINBURGH.

EDINBURGH:
PRINTED BY C. STEWART.

1818.

AN

ESSAY ON BURNS.

By the term Burn, is understood an injury, resulting to the body, from the application of heat. The action of heat, however, is greatly modified by the previous state of the system: when, for example, the body has been exposed to a low temperature, even a moderate degree of heat, if rapidly communicated, is sufficient to produce all those effects, which, in opposite circumstances, only follow from the agency of an elevated temperature. The effects to which I allude evidently depend on the sudden increase of this power; for the system can bear the gradual exposure to a temperature, much above its own, without sustaining any injury.

In ordinary circumstances, if a substance at a temperature exceeding that of the human body by 20° or 30° be suddenly applied to it, even for a short time, the sensibility and vascular action of the part are increased, or a state of inflammation is produced. If a more intense heat be applied and continued for a longer time, an effusion of serum under the cuticle takes place, and, in general, considerable injury is done to the cutis

vera. By a still greater accession of heat, the vitality of the part is destroyed, and the integuments are converted into a dry ash-coloured crust, to which the term eschar has been applied.

From a consideration of the effects of heat, of various degrees of intensity, authors have divided burns into different species. Such distinctions, however, can be founded only on the degrees of injury which the parts have individually sustained; since it is no uncommon thing to observe the various appearances which give rise to this division, existing simultaneously in the same burn. Dr Kentish has divided burns into two species, the first including those in which the action of the part is only increased, and the second, those where the action of some parts is increased, and the organization of other parts destroyed.* Mr John Pearson, on the other hand, divides them into three species, namely, the superficial, the ulcerated, and the carbunculous.† This latter division appears to me to be well calculated for practical purposes, as it is not founded on vague or assumed principles, but on the usual train of symptoms which such injuries exhibit. The division of burns into three degrees is commonly to be met with in both ancient and modern, domestic and foreign writers; yet it is obviously to be regarded more as an artificial than as a natural division, for the the first degree of burn only can exist separately. On this subject Boyer justly remarks, " Quand le second degré de la brûlure a lieu,

---

* See an Essay on Burns by Dr Kentish, page 102. Lond. 1817.

† See Principles of Surgery, by John Peason, F.R.S. page 180. Lond. 1808.

il est accompagné du premier; et quand le troisième existe, il est accompagné du second et du premier."*

1. The superficial burn is distinguished by a diffuse redness of the skin, generally disappearing on pressure, terminated by a distinctly circumscribed edge, and attended with a painful sense of heat. Corresponding to the discoloration of the integuments, we can generally observe a diffuse swelling with an elevated margin, produced perhaps by an affection of the cutis vera. In the course of twenty-four hours, in slight cases, these symptoms go off, leaving only a faint blush of redness, and a sensation of tenderness in the affected part. But in other cases, at periods varying according to the severity of the injury, the cuticle is detached from the cutis vera, by the interposition of a watery fluid, forming vesications of different sizes. When these vesications are opened, the cutis vera is found uninjured and entire, of its natural red colour, and is speedily again covered with a new epidermis. This species of burn is seldom attended with constitutional symptoms of any importance, although, when it is of considerable extent and accompanied with vesications, it sometimes terminates in a mode which brings it under the following species, viz. the ulcerated burn. It is generally produced by the instantaneous application of watery fluids, whose temperature is considerably above that of the human body.

2. In the ulcerated burn the injury is more severe, generally of greater extent, and is always attended with

---

* See Traité des Maladies Chirurgicales, et des operations qui leur conviennent; par M. le Baron Boyer. Tome Premier. p. 165. A Paris 1814.

more lasting pain and constitutional irritation than the former. Together with the local symptoms above-mentioned, the swelling is greater and accompanied with tension, the vesications are more numerous and of a larger size, the pain is more acute and pungent, and attended with a most distressing sensation of heat in the injured parts. Among the constitutional symptoms, which generally supervene from twelve to twenty-four hours after the occurrence of the accident, we find rigors more or less severe, with a sense of coldness over the whole body, but especially referred to the extremities; the respiration hurried, anxious, and oppressed, and the pulse frequent, weak, and small. This condition of the system is, however, soon succeeded by reaction, in which the prominent symptoms are, a quick vibrating pulse, intense thirst, with dry and furred tongue, heat and restlessness, and in some instances complete mental alienation, a febrile excitement, the crisis of which only takes place on the occurrence of suppuration in the injured parts. If the suppurating surface be extensive, and the purulent discharge abundant, the patient, unless of a vigorous constitution, is commonly reduced to extreme weakness, to which hectic fever succeeds. In other cases, and especially where the burn is almost general, reaction never occurs, but the patient rapidly falls into a state of insensibility, with languid respiration, feeble and intermitting pulse; symptoms which speedily terminate in death. This species of burn is usually occasioned by lightning, the explosion of certain inflammable gases, gun-powder, and the immersion of the body in boiling water, or other fluids susceptible of a more elevated temperature.

These accidents, however, not unfrequently occasion the third species of burn, or that which is followed by

sloughing; in particular the electric fluid, and which may operate in two ways, *first*, by the intensity of the heat, which it imparts to the body, and *secondly*, by setting the clothes on fire. In a fatal case of burn, which happened to a young woman, a servant in this neighbourhood, in the month of June 1811, the injury which she sustained, appeared to be principally owing to the combustion of her dress. I shall here insert some notes of this case taken by my friend Mr George White, at that time House-Surgeon in the Royal Infirmary. "On the admission of this young woman into the hospital, about two hours after she had been struck with lightning, the following appearances were observed. Both sides and back of the neck were covered with small vesications. Between the shoulders down the back, for about six inches in breadth, and over the glutæi muscles, the integuments had a dark scorched appearance. Where the thighs had suffered, the skin in several places was of a bright red colour. The forepart of the body escaped without injury. The electric matter appeared to have run over the shoulders, and down the back, continuing its course over the breech and along both thighs, and terminating immediately below the knees by a very vivid red line. In two places over the right shoulder, diverging in an oblique direction from the spine, a number of red lines resembling a good deal the branch of a tree, were very distinctly observable. This arborescent appearance, the mark which is supposed to distinguish the effect of lightning from that of common fire, could be detected in no other part of the body, except that in many places, the burnt part was bounded by a remarkably bright red margin." This patient survived the accident for about three weeks, when she sunk apparently

from the great degree of irritation and exhaustion, with which the processes of suppuration and sloughing were accompanied. The constitutional symptoms did not vary materially from those that might have been expected to follow an equally severe and extensive burn arising from any other cause, if we except perhaps a more than usual degree of stupor.

3. In the carbunculous burn, again, a portion of the integuments, or even of the subjacent parts, is either at once converted into a black or ash-coloured crust, or the inflammatory action which is produced, is so violent as to terminate speedily in gangrene or sphacelus. The constitutional symptoms in this, differ but little from those enumerated in the preceding species except in severity. The parts which have been most exposed to heat, and which are least able to resist its action, separate in the form of mortified sloughs, and in this state, if the hands have been exposed, some, or even the whole of the fingers may drop off. The time at which the sloughs separate, varies in different individuals, and will of course depend on the degree of injury, on the constitution of the patient, and on the mode of treatment. When the vitality of the skin is destroyed, vesications do not occur, but the cuticle appears in some parts shrivelled, and in others entirely removed. From the extent and depth of parts destroyed in burns of this description, a great length of time, even where the case proceeds most favourably, is usually required to effect the healing of the ulceration. The accidents which commonly give rise to the carbunculous burn, are the application to the body of ignited or melted metals, burning coals, boiling oil, and those which

happen to women and children, and to persons in a state of insensibility, from their dress taking fire.

The symptoms which have been detailed, so far at least, as they are objects of chirurgical treatment, naturally resolve themselves into two great classes, the immediate or primary, and the more remote or secondary. Among the primary symptoms, we find all the marks of local inflammation and the accompanying symptomatic fever. By the secondary or more remote effects of the accident, may be understood the suppuration, ulceration, and sloughing, with the hectic fever, so generally an attendant on these processes.

Prognosis.—A Prognosis in the primary stage of burns, may be formed from a consideration of the extent and severity of the injury, the age and constitution of the patient, and in some cases also from the situation of the burn. The constitutional symptoms which follow the infliction of this, as well as of other severe injuries, will also assist materially in forming a judgment as to the probable event. Extensive burns, although superficial, are always to be viewed with alarm, on account of the high degree of constitutional irritation which they seldom fail to excite; an irritation, which in every case is proportionate rather to the extent than to the severity of the injury. With respect to the age of the patient, children and old people are in greatest danger, such persons having seldom sufficient strength to support the suppuration which usually succeeds; and, indeed, when large eschars are produced, persons of the middle age, and of the best constitutions, cannot be considered as exempt from danger. The particular constitution of the patient will also merit attention. Such injuries occurring to

persons of great irritability, of delicate health, or of a habit of body in which gangrene or sphacelus is apt to supervene, are of course much more to be dreaded, than when they occur to persons in opposite circumstances. With regard to the situation, Mr Pearson observes, that a burn on the head is more dangerous than one of the same extent on an extremity *. This may depend on two circumstances, *first*, on the thinness of the parts covering the cranium, and *secondly*, on the contiguity of an organ, the integrity of which is so essential to life: from the former circumstance, part of the external table of the cranium may be deprived of its vitality; and from the latter we may anticipate inflammation of the brain, or of its membranes. In like manner, extensive burns, situated either on the chest or abdomen, as they are apt to excite inflammation of the contents of these cavities, thereby acquire more than ordinary importance. Mr Russell, in his treatise on the morbid affections of the knee-joint, also states, that he has met with cases of extensive burns in the latter situation, which by producing sloughs, ultimately deprived the subjacent parts of their natural covering and protection. "The uncovered parts (Mr Russell adds) consisted chiefly of tendons and ligaments, which are not of a nature to granulate kindly, nor to promote the formation of new skin. The cure was therefore protracted to a great length of time, and the sore became excessively painful, as the parts, now subjected to irritation, possess the highest degree of morbid sensibility when under the pressure of disease. In this situation of circumstances, the cure became sta-

* See Principles of Surgery, p. 917.

tionary, and the discharge of purulent matter from the surface of the sore increased in quantity, till at last the duration and severity of the pain, together with the copious discharge of matter, excited an attack of hectic fever, which gradually undermined the patient's strength, exhausted the substance of his body, and reduced him to an irrecoverable degree of weakness, so that, after languishing for a time in this condition, he ultimately sunk under the continuance of his distress." * The concluding paragraph of the preceding remarks describes, very accurately, a not unfrequent as well as distressing termination of burns, in other parts of the body.

In the secondary stage, the prognosis will be unfavourable, if the granulations become stationary and assume a glazed appearance, if the discharge of purulent matter become very scanty, with weak and frequent pulse, and rapidly increasing debility and emaciation. A favourable termination may be expected on the contrary, when the granulations are firm in structure, have a healthy florid aspect, the purulent discharge being neither scanty nor excessive, when they make progress towards the repair of the loss of substance, and begin to cicatrize at the margins of the sore, and when at the same time there is no great degree of constitutional disorder.

Treatment.—As external applications, remedies apparently of very opposite qualities have, from the remotest periods, been employed in the treatment of burns; from which it may be inferred that no very precise notions have ever been entertained as to their

* See a Treatise on the morbid affections of the knee-joint, by James Russell, F. R. S. E. page 3. Edinburgh, 1802.

mode of operation. Some authors, indeed, from their attachment to one plan of treatment, have recommended the same remedies indiscriminately in all cases of burns, disregarding too much perhaps the testimonies in favour of other modes of practice. It is obvious, however, that some remedies must be better adapted than others to the different degrees of the injury. A more uniform mode of practice has prevailed, with respect to the use of internal remedies, authors pretty generally concurring in the propriety of a combination of the Antiphlogistic Regimen, with the exhibition of large and repeated doses of opiates; a practice which is rendered peculiarly necessary, in consequence of the distressing local pain and general restlessness.

The curative indications are,

First, To obviate the effects of local inflammation.

Secondly, To moderate constitutional disorder.

Thirdly, To prevent deformity.

For these purposes, a great variety of means, as topical applications, has at different times been employed; the chief of which, however, may be referred to the three following classes of cooling, stimulating, and emollient remedies. Among the remedies of the first class, may be enumerated, cold in various forms, and the preparations of lead; among those of the second class, the essential oil of turpentine, spirituous embrocations, vinegar, and even heat itself; and in the last, the numerous unctuous substances which have always been so much in use as domestic remedies. Under these heads I shall treat of those remedies only which appear to me to have the strongest claims to our consideration; for, it would equally exceed the bounds of convenience and utility, to particularize all the reme-

dies that have been recommended in the treatment of accidents of this kind.

Of Cooling Applications.—It is now very generally admitted, that the pain and inflammation attendant on small and superficial burns, are more speedily and completely removed by the application of cold, than by any other means; and accordingly, in such cases we find it has always been more or less in use. So highly, indeed, have some authors rated its efficacy, that they do not scruple to give it in all cases, an exclusive preference to every other remedy. The following quotation from Sir James Earle's essay, on the means of lessening the effects of fire on the human body, points out the advantages to be derived from its employment. "In several cases (Sir James observes) 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, sloughs 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." * Sir James also states, that as the application of cold to extensive burns may be safely continued for several days and nights together, it ought not in general, to be removed, so long as any painful sense of heat remains. Cold may be applied by means of water, powdered ice, snow, scraped potatoes, evaporat-

* See an Essay by Sir James Earle, on the means of lessening the effects of Fire on the Human Body, p. 14. 8vo. Lond. 1799.

ing lotions, as æther, &c.; the necessity of its frequent renewal as the parts recover their morbid degree of heat must be obvious.

With cold may be combined preparations of lead, which in addition to their cooling effects are supposed to possess a specific power as sedatives, by allaying pain and diminishing morbid sensibility. One of these known by the name of Goulard's extract of lead, or the vegeto-mineral water, is in such high repute with the continental practitioners, that they seem to depend on its application almost exclusively in the first species, and as a powerful auxiliary in the two last. According to the formula recommended by M. le Baron Boyer, in his treatise on surgical diseases, two spoonfuls of the liquid acetate of lead, (Extract. Saturn.) are to be added to a pint of very cold water, into which the part is to be plunged; and, if this, from the situation of the burn, be impracticable, it is to be applied constantly in the form of lotion, by a piece of fine sponge, or by pledgets of charpee soaked in the liquid, and laid over the part. *

Along with the external use of cold in the treatment of burns, the antiphlogistic regimen has commonly been recommended; though Sir James Earle only adverts to its use in one case where it was strictly enforced, the patient having been allowed nothing to drink but cold water, and very little solid nourishment for several days.

The plan of treatment above-mentioned, appears to me, to be best adapted to the case of superficial burns of small extent, as in them it affords instant re-

---

* See Traité des Maladies Chirurgicales, &c. Par. M. le Baron Boyer, Tome Premier, p. 167. A Paris, 1814.

lief from pain, prevents inflammation, and can in almost every instance be continued a sufficient length of time to effect a cure. It, exclusively of the others, has this circumstance in its favour, that it can in every instance be immediately put in practice, on the occurrence of the accident. But when the injury from its extent and severity, produces depression of the vital powers, and when situated over the chest or abdomen, the propriety of using cold applications, becomes somewhat ambiguous, nor can they always be resorted to without considerable risk. * Analogous to these objections, though of minor importance, is the occurrence of an inflammation resembling the rheumatic, occasionally met with, especially in burns situated over the larger articulations.

Of Stimulating Remedies.—Of these, I shall consider two separately, namely, the essential oil of turpentine, and vinegar; because, of the remedies of this class, they have been most frequently resorted to, and most highly recommended. Although the essence of turpentine is enumerated by the early writers, as a remedy in the cure of burns, yet it is not particularly distinguished from a great variety of others among which it is placed; and in modern practice it was much neglected, until lately reintroduced by Dr Kentish. It has now come into very general use, particularly in those districts of England, where extensive burns most frequently occur. According to Dr Kentish's plan of treatment, the burnt surface whatever be its extent, or the degree of injury it has sustained, is to be well bathed with warm oil of turpentine. After this it is to

* See Lectures on Inflammation, by Professor Thomson, p. 591. Edin. 1813.

be covered with plasters spread with basilicon ointment, reduced to a thin consistence by the addition of heated turpentine; the intention of which is to prevent the pernicious chilling effects that would otherwise arise from the quick evaporation of the essential oil. This dressing is allowed to remain undisturbed for the first twenty-four hours. Dr Kentish then directs that, "When the injured parts are again to be examined, it will be necessary to have fresh plasters ready spread, previous to exposing the injured surface: only one plaster should be taken off at a time, and that immediately replaced. In some instances it may be necessary to repeat the wash with heated essence of turpentine on the second day, but in general a wash with some heated tincture of opium will be preferable. By proceeding in this manner, the rigors which frequently occur when evaporation is permitted to take place from a large heated and exposed surface, will be avoided."* In superficial burns a change of treatment is required after the third or fourth day; milder applications are then to be employed, such as Goulard's cerate, the emollient poultice, or the zinc ointment, as circumtances may direct. "These emollient cataplasms (Dr Kentish remarks) should not be continued longer than a day or two, so as to overcome the irritation; for, if longer continued, they relax the surface of the sores, and cause a profuse secretion of pus, which it is difficult to restrain."†

The internal treatment recommended by Dr Kentish, and which in many particulars is directly opposed to that formerly in use, consists in the early administra-

---

* See Essay on Burns, by Dr Kentish, page 119.

† See Essay, page 120.

tion of powerful stimulants; a large dose of warm spirits and water, with sixty or a hundred drops of the tincture of opium, and a tea spoonful of sal volatile being ordered, immediately after the receipt of the injury. "On the following day, negus, with an occasional opiate if the pain continues, should be administered. As secretion frequently appears on the third day, the necessity for stimulants will cease, and they must give way for a different mode. Saline purgative medicines should be given after secretion takes place, both with a view of tranquillizing the system under the inordinate action excited by the stimulants, and to lessen the secretion of pus. The internal treatment, as well as the external, is only to be continued during a certain time; for, though proper in the first instance, they are both pernicious if too long continued." *

The above plan of treatment has been found very successful in the severe and extensive burns, which frequently occur from the explosion of the inflammable gas of coal mines mixed with atmospherical air, particularly in the collieries in the neighbourhood of Newcastle, where Dr Kentish formerly resided.

The intention of the treatment proposed by Dr Kentish, is to restore what he has termed the unity of action between the burnt part and the rest of the system. This he endeavours to accomplish in two modes, *first*, By gradually diminishing the increased action of the part, and *secondly*, By increasing the general action of the system. It appears to me, however, that a simpler mode of restoring unity of action, if this alone were wanted, might be found merely in the vigorous appli-

* See Essay on Burns, by Dr Kentish, page 122.

cation of cold and sedatives to the injured part. But as it is my intention to treat of burns in a practical, and not in a theoretical point of view, I purposely avoid entering into a more minute consideration of the theories advanced on this subject by Dr Kentish or by other writers.

Not very dissimilar to the preceding is the plan of treating burns, recommended about twenty-five years ago by Mr Cleghorn, a brewer in Edinburgh, the account of which was first published in the second volume of Medical Facts and Observations. Mr Cleghorn reports several cases of very extensive burns to have been speedily cured by the use of his remedies, which under different treatment, would, in the opinion of regular practitioners, have proved at least very tedious in their progress towards recovery, if not ultimately fatal. The burnt part, according to Mr Cleghorn, is to be well bathed with the best white wine vinegar, so long as the sense of pain or heat remains; and when the burn is of small extent, it may be immersed in the vinegar. In a superficial burn of small extent, this alone will be sufficient to effect a cure. But in the ulcerated burn, and that attended with loss of substance, the vinegar is to be applied on linen rags for the first twelve hours; the sore is then to be covered with a common poultice, which is allowed to remain for six, or at most eight hours. On the removal of the poultice the sore is to be covered entirely with finely pounded or scraped chalk, until the discharge is quite absorbed, and the powder appears dry all over it. A fresh poultice is next laid over the whole, and the same routine of dressing, with chalk and poultice, is repeated morning and evening, until the ulceration is completely healed. When poultices cannot be conveniently applied

during the day, or if at any time they appear to relax the sores too much, a plaster of white lead ointment, is to be substituted in their place, the chalk being always previously dusted on the part. If there are large vesications on the burnt surface, they are to be punctured before using the vinegar. When vinegar has not been applied within twenty-four hours from the occurrence of the accident, it almost always occasions considerable pain; but even then its application is beneficial, although it cannot be so long continued, as in cases in which it had been used from the first. If the patient however cannot bear the stimulus of the vinegar on the raw and tender parts, they are in that case to be covered with a plaster of the white lead ointment, and the edges only of the sore bathed with it, after which the chalk and poultice are applied. In treating extensive burns, Mr Cleghorn was in the habit of warming the vinegar to blood-heat, to prevent the accession or increase of rigors which is apt to take place, from its being employed in a cold state. Such is the practice directed by Mr Cleghorn to be employed externally.

" With regard to diet, (he observes) I allow my patients to eat boiled or roasted fowl, or, in short, any plain dressed meat they like; and I do not object to their taking (with moderation, however) wine, water and spirits, ale, or porter." * He appears to have confided more in the proper regulation of the diet of his patients than in the use of internal remedies, as he notices only laxatives, on which he makes the following remarks. " When a

* See Medical Facts and Observations, Vol. II. page 144.

patient is costive, I order boiled pot barley and prunes, or some other laxative nourishing food, and sometimes an injection, but never any purgatives. It is distressing to a patient with bad sores to be often going to stool. Besides, I have remarked that weakness and languor (which never, in my opinion, hasten the cure of any sore) are always brought on more or less by purgatives. From the effects too I have felt them have on myself, and observed them to have on others, they do not seem to me to have so much tendency to remove heat and feverishness as is generally imagined; and I suspect that, contrary to the intention of administering them, they oftener carry off useful humours than hurtful ones." *

The practice recommended by Mr Cleghorn has not come into very general use, nor does it seem to possess any peculiar advantages over that subsequently employed by Dr Kentish. When, however, vinegar is at hand, and oil of turpentine cannot be immediately procured, I would have no hesitation in employing the former, and in conducting the subsequent treatment as Mr Cleghorn directs. The chief difference, I presume, between the two applications, is, that the vinegar is less stimulating than the essential oil. But whichever is employed, it must be understood, that its application is to be continued only for a certain time; it is then, as was formerly stated, to be laid aside, and milder applications had recourse to. In the after treatment, as the curative indications are the same, namely, to lessen the purulent

* Loco citato, p. 145.

discharge, and effect the healing of the ulcers, both modes of practice might perhaps be combined with advantage, viz. the saline purges and moderate diet of Dr Kentish, and the chalk and other dressings of Mr Cleghorn, especially in cases where the discharge is very copious, and the patient of a good habit of body.

With respect to the constitutional treatment, however, I should be less disposed to follow the practice of these gentlemen, as to the free exhibition of stimulating liquids and nutritious diet. Immediately after the receipt of the injury, indeed, when the vital functions are languid, it can hardly be doubted, that the administration of cordials is indispensably necessary. But after reaction has taken place, I should consider the stimulating treatment as being, in some measure, inconsistent with the established principles of practice in analogous cases. Nor does there appear to me, to be any good reason for deviating in this instance, from the usual treatment of constitutional excitement, from whatever cause arising. Opiates, however, as was formerly remarked, are much required in the constitutional treatment of burns; in the early stage, they relieve local pain, check the tendency to rigors, and by inducing sleep, afford a respite to the patient's sufferings. Subsequently, they are eminently beneficial, by relieving the pain necessarily attendant on dressing, and thus render supportable, an irritation which, without their use, the system might be unable to withstand.

Of Emollient Remedies.—With few exceptions, the most that can well be said in favour of these, including the unctuous substances, is, that they are of easy application and removal, give no pain, are in some degree soothing, and afford a convenient defence to the burnt

parts from the action of the air. The best of them undoubtedly is a liniment formed by shaking together equal parts of lime water and linseed oil, a preparation well known in this country by the name of carron-oil. That this substance is possessed of considerable efficacy, may be inferred from the great length of time it has continued a favourite remedy, both in this country and on the continent. It merits consideration, too, from its being the remedy, if there be any such, that may be applied indiscriminately, in burns of every description. To burns of the face in particular, the careful and frequently repeated application of this liniment, without removing it, and thereby allowing its different layers to form a thin crust or mask, is perhaps the most effectual practice that can be employed, to prevent the subsequent contraction of the integuments. It is also better adapted than any other application, for those cases, where, either from the irritability of the patient, or the particular stage of the burn, the essence of turpentine or vinegar would prove too stimulating; as well as for those aggravated forms of the injury, in which there is little prospect of recovery, and where more stimulating applications would only add to the patient's sufferings.

In this brief enumeration of remedies, it would be improper to omit noticing the warm emollient poultice, and various warm fomentations impregnated with vegetable substances of narcotic qualities; but it is a matter of doubt with me in what class they ought to be placed, the stimulant or the emollient. From the temperature, however, at which the emollient poultice is commonly applied, and on which probably its efficacy chiefly depends, I am inclined to consider it as belonging rather to the former than to the latter

class of remedies; and viewing it as such, it will not be difficult to determine to what species of burns it is most applicable. It has accordingly been found most useful in the ulcerated and carbunculous burns, where there is reason to expect the formation of sloughs, or to hasten their separation when already formed. In the latter case, it is usual to conjoin with it substances of more active operation, such as warm dressing, composed of essential oil of turpentine and resinous ointment. While the dead parts are treated in this manner, the parts from which the sloughs or eschars have separated, are to be dressed simply or otherwise as their state may require. Poultices have been with reason objected to, on account of their supposed effect in rendering the suppuration profuse. This objection, however, cannot be urged against their employment before suppuration has taken place; and by promoting the occurrence of this process, they must undoubtedly prove useful in facilitating the removal of the dead parts, which is the first step towards a cure. And, indeed, whether they have been applied or not, profuse suppuration, as was formerly noticed, and in the sequel will be more particularly stated, will be found to be a very common occurrence in the secondary stage of the ulcerated and carbunculous burns. With regard to anodyne fomentations, they are generally applied at the temperature of the human body, and of course, the heat which they contain cannot be regarded as stimulating. Of these, decoctions of poppy heads are often employed; I cannot however regard them as efficacious applications; and if a local anodyne were at any time required, should expect more advantage from an aqueous solution of

opium, or of any of the other narcotic extracts, such as hemlock or hyoscyamus.

I am indebted to Professor Russell for pointing out an application to burns, which deserves to be more generally known. The remedy alluded to, is the application of carded cotton to the burnt surface. An account of it was first published in America in the year 1811, from which it appears that its beneficial effects were discovered by accident. In the Medical and Physical Journal for February 1813, page 136, will be found an extract from the Baltimore Medical and Philosophical Lyceum, containing the histories of several cases of burns, to all appearance perfectly authentic, in which cotton acted like a charm in allaying pain and inflammation. The burnt parts were merely covered with finely carded cotton, which was allowed to remain so long as any symptoms of inflammation existed. In a severe burn from boiling water, it is reported to have had the effect of diminishing the heat of the burnt parts, even below the ordinary temperature of the skin. Mr Russell also stated, that he had seen it advantageously employed in two cases of superficial burns.

Having considered the best modes of treating burns, and endeavoured to point out the particular species of burn, to which in general, each plan of treatment will be found most suitable; I am yet aware that in practice it is often impossible to say beforehand, what remedies will afford the most immediate relief. The practice in such circumstances, must depend on the effects of the remedies at first employed; when, for example, refrigerants and soothing applications give no relief, this will often be obtained from stimulants: and, on the other hand, when the latter appear to

aggravate the symptoms, it will be proper to omit their use, and instantly have recourse to the former set of remedies.

The local treatment of the ulcerative stage, will, of course, fall to be conducted on general principles, the particular cause from which the ulceration originated, making but little difference in the practice. It may not, however, be improper to notice some circumstances, which may be considered as peculiar to this species of ulceration. Of these, I may mention the remarkably copious, and long continued secretion of purulent matter which frequently takes place, and which it is often very desirable to restrain. Did the sores granulate kindly while this inordinate secretion is going on, the quantity of the discharge, indeed, would be a matter of less importance, but this is far from being the case, for they very often continue in other respects extremely indolent. Accordingly, in such cases, it is necessary to have recourse to stimulants, astringents, absorbents, and to a variety of other dressings, with a view to change the action of the sores. The stimulants usually employed for this purpose, are, some of the essential oils, as the oleum terebinthinae, either alone or combined with a small proportion of the oleum origani, or the camphorated ointment of the Royal Infirmary of Edinburgh. *

---

* This ointment is prepared according to the following formula:

℞, Camphorae Lauri Camphorae ℥i.

Ope alcoholis teratur in pulverem tenuissimum.

Ung. Resinosi ℥iii.

Cerae Flavae.

Olei volatilis Pini Laricis utriusque ℥i

Misceantur igne lento, et fiat Unguentum, quo ulcera more solito curentur.

The astringents may be, a weak solution in water of the nitrous acid, or lime-water; and the absorbents, pounded chalk alone, or in combination with camphor*, prepared calamine, or dry lint; the variety of other dressings alluded to, need not here I conceive, be more particularly specified.

Another circumstance deserving of notice, is, the slow tendency which the sores sometimes have to cicatrize; the granulations continuing prominent and spongy, even when the purulent discharge is moderate. In such cases, it is usual to have the sores touched at the time of dressing, with some escharotic, such as sulphate of copper, solutions of the nitrate of silver, or muriate of mercury, red precipitate, burnt alum, &c. and in some instances the tincture of camphor, or lavender water may be successfully employed.

In concluding the observations on the local treatment to be followed in the ulcerative stage of burns, it may in general be remarked, that so long as the sores continue to do well under the particular treatment at first employed, (unless this prove very inconvenient to the patient) it would of course, be improper to make any change; but since it frequently happens, that sores of this description, either become stationary or alter for the worse, it will in such instances be necessary, to vary the dressings, according to circumstances.

---

* I am assured by surgeons of experience, that this powder, prepared according to the following formula, has the happiest effects in allaying pain and promoting cicatrization.

℞. Camphorae Lauri Camphorae ℥i.
Ope alcoholis teratur in pulverem tenuissimum.
Carbonatis Calcis praeparati ℥i.
Terantur simul et probe misceantur, quo ulcera singulis curationibus aspergantur.

As much inconvenience, and sometimes deformity, follow from the mode of healing of the sores, and from the ulceration of contiguous parts, these circumstances, it is obvious, ought from the first, to be carefully guarded against, by the proper adjustment of mechanical contrivances. These occurrences, however, cannot always be imputed to inattention on the part of the surgeon, or of the patient, but are often the result of a natural process which follows cicatrization. This process consists in the absorption of the spongy granulations, and in the general contraction of the edges of the sore, so that its opposite extremities become connected, by a tense bridle of hardened cellular substance, covered with a diseased skin. Mr H. Earle recommends the entire removal of the diseased cicatrix by excision, the approximation of the divided integuments in a lateral direction, and the subsequent extension of the part by means of a splint. It is material to the ultimate success of this operation, that the extension be continued for a sufficient length of time after the cicatrization of the sore, in order to prevent the recurrence of contraction, more particularly as a splint can be worn with little restraint or inconvenience to the patient during the night. *

With respect to the position of the sores, when situated on the extremities, advantage will be derived from their being kept as much as possible in the horizontal posture.

Of the constitutional treatment in the ulcerative stage of burns, it is only necessary to observe in this

---

* See two papers on this subject by Henry Earle, Esq. the first in Vol. 5th. p. 96. and the second in Vol. 7th. p. 411. of the Medico-Chirurgical Transactions.

place, that it will differ in no respect from that which is followed in the cure of ulceration from any other cause. The chief objects to be attended to in both, are, to support the strength by means of food of easy digestion, with a suitable allowance of cordials, to allay pain by the liberal use of opiates, and to keep the bowels regular, by the occasional employment of gentle laxatives.

FINIS.

EDINBURGH:
Printed by C. STEWART.