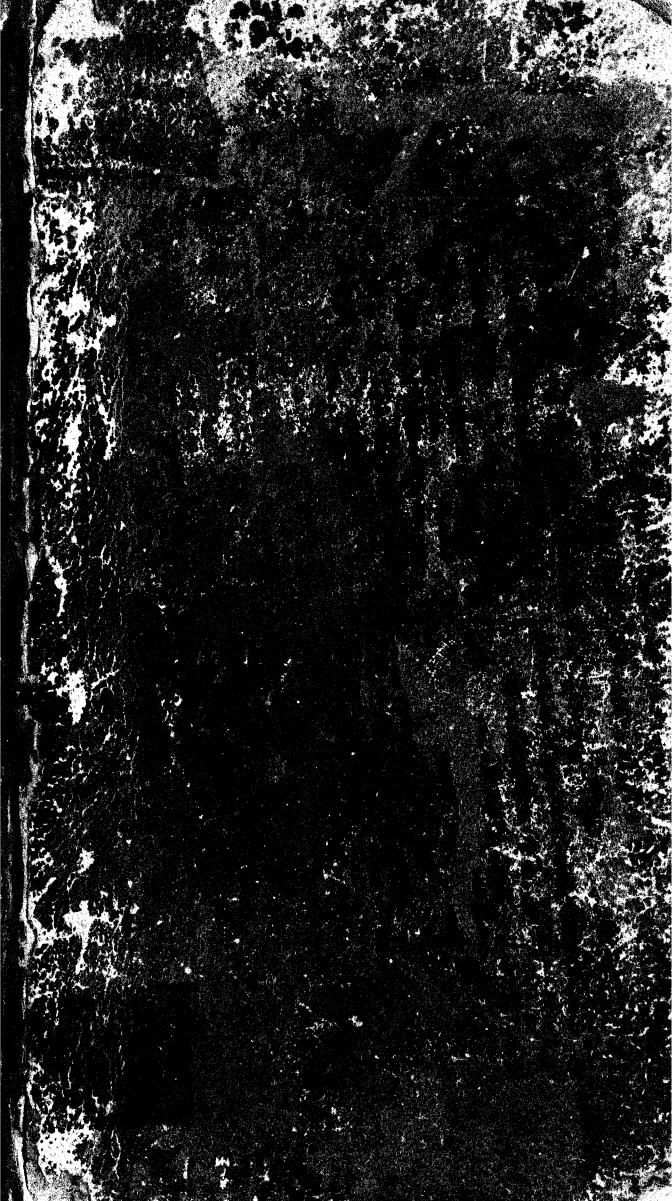

A

PRACTICAL ESSAY

ON THE

ART OF RECOVERING

SUSPENDED ANIMATION.

Printed by B. M'Millan,
Bow-Street, Covent-Garden.

J. F. Day

A

PRACTICAL ESSAY

ON THE

ART OF RECOVERING SUSPENDED ANIMATION:

TOGETHER WITH

A REVIEW

OF THE MOST PROPER AND EFFECTUAL MEANS TO BE ADOPTED IN

CASES OF IMMINENT DANGER.

TRANSLATED FROM THE GERMAN OF

CHRISTIAN AUGUSTUS STRUVE, M.D. &c.

SECOND EDITION.

LONDON:

PRINTED FOR MURRAY AND HIGHLEY,
32, FLEET-STREET.

1802.

TO THE

ROYAL HUMANE SOCIETY OF LONDON,

WITH RESPECT AND GRATITUDE,

BY THE AUTHOR.

——— δοσις ὀλιγηπε φιληπε.

HOMER.

ADVERTISEMENT.

THE translation of the present Treatise has been undertaken with a view to supply an apparent defect in English medical literature. For, though many essays and pamphlets have lately been published on this most important of all *physical* subjects, yet there exists no work which, in so small a compass, affords that comprehensive survey of "Suspended Animation."

The Translator can offer no other apology for any imperfections, than that this was his first attempt; and that his friends have, perhaps, not used the *pruning knife* with sufficient severity. Besides, the German style of Dr. STRUVE is frequently obscure, or ambiguous,

biguous, and abounds with repetitions, many of which have been carefully avoided.

For the information of the English reader, it may not be improper to observe, that the Author has been elected an honorary member of the Royal Humane Society of London, and a copy of all their printed works has been transmitted to him, as a testimony of their approbation of his popular Tables, in which he has exhibited a view of the whole Resuscitative Process, in one sheet of German letter-press. Hence Dr. STRUVE was induced to dedicate this Treatise, originally written in his native language, to that illustrious Body of Philanthropists.

London, April, 1801.

PRE-

PREFACE.

THE Author devoutly wishes that the small Treatise here submitted to the Public, may afford some degree of satisfaction to those who are acquainted with his former writings, which have experienced a very extensive circulation. He feels, indeed, the most ardent desire to contribute his share towards instructing those who study the humane art of assisting the unfortunate, or rescuing them from perilous situations. As, however, he is unfavourably situated for obtaining literary information, he trusts the candid reader will ascribe the defects of this work partly to that circumstance, and partly to the difficulties connected with the subject.

His

His principal motive for publishing the present Treatise, was to exhibit a cursory view of a rational method of treating persons apparently dead, or exposed to imminent danger. Such a retrospect appeared to him a *desideratum*, especially to young medical practitioners, who will thus be enabled, on urgent occasions, to adopt the most speedy and proper means of resuscitation.

Görlitz, February, 1797.

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OF THE

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ERRATA.

Page 65, l. 13, instead of "*negative means* for," read, *positive means* of.

Page 180, l. 15, read, upright meadow crowfoot, &c.

A

PRACTICAL INQUIRY

INTO THE

ART OF RECOVERING

SUSPENDED ANIMATION.

SECTION FIRST.

Observations on the History of Humane Institutions for recovering the Lives of those who are apparently dead, or exposed to imminent Danger.

THERE is no branch of medicine, of which its professors have greater reason to be proud, than the art of restoring to life persons apparently dead; an art with which our predecessors in medical science, for want of anatomical knowledge, were not sufficiently acquainted; but which, in the present age, is progressively advancing towards perfection.

No stronger argument can be opposed to the sophistical assertions of TEMPLE*, ROUSSEAU, and subsequent writers, than the modern history of resuscitation. Indeed, no scientific researches have greater claims to public gratitude, and none deserve to be held in greater estimation, than those which relate to the recovery of persons apparently dead: from whatever cause this suspension of vital powers may have taken place.

The ancients, who duly acknowledged the great merit of their physicians, revered them, according to the ideas peculiar to their age, as demigods. Such were HERACLES, ASCLEPIOS, EMPEDOCLES, who enjoyed divine honours, and owed much of their celebrity to the successful restoration of those who were apparently consigned to the grave. When we examine the pages of the history of medicine, we find among the ancient Egyptians, Greeks, and Romans, many accounts of successful attempts at resuscitation, and of the respectful attention bestowed on the preservation of human life; but there are no records of

* Les œuvres meliés du Chevalier TEMPLE, t. i. pp. 246. Utrecht, 1693.

publie

public institutions for that benevolent purpose.

In the middle ages, when medicine, as well as all the other sciences, were totally neglected, this important object was likewise entirely abandoned.

In the seventeenth century, however, the attention of the public was again directed to this philanthropic aim, and there appeared several works on the subject. Among these are the productions of KIRCHMAYER*, and a few others, that display the character of the age in which they were written, namely, a strong desire of perpetuating superstition, and recording marvellous events. Yet, notwithstanding many useful hints contained in these works, they neither excited general attention, nor engaged the notice of the rulers of the country.

The present century claims the merit of having more fully discussed the subject; a circumstance which, though it cannot be considered as a consequence of the more refined

* *Dissertatio de Hom. Apparent. Mort. Wittemb.* 1651.—HENR. KORNMANN, *de mortis miraculis.*

moral feelings for the value of human life (for the contrary is too strongly proved by sanguinary wars) may, nevertheless, be ascribed to the great improvement which has been made of late years in the art of healing.

Induced by the example of her scientific neighbours, the attention of Germany was called to the important object of applying medicine to the improvement of the resuscitative art. For, though some German writers had published their sentiments on this subject, yet they only produced a slight impression upon the minds of their countrymen. Nor did the famous story of the goldsmith's wife at Dresden*, strike them with awe. WINSLOW and BRUBIER, indeed, had previously written on this subject in France; but many years elapsed before their publications were translated and read in Germany. They, however, produced several German pamphlets on the

* *Nachricht von der aus ihrem Grabe wieder auferstandenen Goldschmieds Frau in Dresden; nebst Errinnerung von der unerkannten Sünde, die Leute zu begraben, ehe sie noch gestorben:*—or, an account of the goldsmith's wife at Dresden, who rose alive from her grave; together with an exposition of the secret crime of burying people previous to their death, by M. PAUL CHRIST. HILSCHER, Dresden, 1773.

treats

treatment of the apparently dead, some of which are not destitute of merit*.

At length, Professor HUFELAND excited the attention of the public, by his excellent work "On the uncertainty of the Symptoms of Death, and on the only infallible means of preventing persons from being consigned to an untimely grave;" printed at Weimar, in the year 1791.

As the uncertainty of relying upon the signs of apparent death was thus more generally acknowledged, institutions were progressively effected for the recovery of drowned persons, or others whose lives were endangered by similar accidents.

In the year 1767, a Society for the recovery of drowned persons was established at Amsterdam: they published rules for proceeding in such cases, and offered premiums to those who were successful in the application of these rules. One of their most active members, JOHN ABRAHAM WILLINK, procured a translation of the history and transactions of this Society, in the German language. On

* *Das grosse Unglück einer zu fruhen Beerdigung.*—On the great misfortune of premature interment, by C. F. STRUVE, physician at Neustadt, 1785.

the very day of its foundation, the Society had the satisfaction to see the first person on whom their method was tried, rescued from aquatic suffocation; and, in the same year, two other cases, equally successful, occurred at Amsterdam.

In most of the Dutch towns, similar philanthropic institutions were formed. Indeed it appears from a list published in Holland, that by means of these establishments the following number of persons, who must otherwise have perished, were restored to their friends and society:

In the year 1767	3 persons
——————1768	24 do.
——————1769	44 do.
——————1770	35 do.
——————1771	34 do.
——————1772	34 do.
——————1773	35 do.
——————1774	41 do.
——————1775	37 do.
Total	287 persons.

The

The premiums were accordingly paid; but beside these, many were recovered for whose preservation no premiums had been offered: among those were three from a state of suffocation, and one from strangulation, restored to life by the same process as is adopted with those who are drowned. According to later registers of this Society, from its foundation to the year 1793, during twenty-five years, 990 persons have, by its patriotic exertions, been restored to the community.

There likewise were published at Venice, in the year 1768, directions for the resuscitation of the drowned, and premiums promised to those who applied them with success. Similar institutions were established in several other parts of Italy, especially at Milan, and throughout Lombardy: while the transactions of the Dutch Society were translated into the Russian language, by the Imperial Academy at Petersburg.

In the year 1772, a Humane Institution for the same benevolent purposes was formed at Paris*, under the direction of M. Pia.

* Detail du succès de l'etablissement que la ville de Paris, a fait en faveur de personnes noyés.

But

But the most celebrated association in the world, for this purpose, is the *Royal Humane Society of London.* Dr. COGAN's translations of the transactions of the Society at Amsterdam, first excited the attention of the English to this important subject; he soon sketched a plan for a similar institution, which met with universal approbation, and speedily obtained the sanction of the legislature.

In the year 1774, several medical gentlemen, as well as others of the first respectability, associated for the purpose of resuscitating persons drowned, suffocated, &c. The founders of this Society were Dr. COGAN and Dr. HAWES: they afterwards requested the patronage of HIS MAJESTY, and the institution was consequently called the *Royal Humane Society.* They immediately published concise directions for the treatment of the drowned, or otherwise apparently dead by suffocation, &c. of which many thousand copies were distributed. These directions are very elegantly printed on cards, of a pocket size. A reward of two guineas was offered to those who should first rescue a person from danger; and four guineas to him who should be successful in employing

employing the restorative process. The Society then nominated a considerable number of medical assistants, especially such as resided near the banks of rivers and the sea-coast, in order to afford the most speedy relief to persons drowned, suffocated, &c.; the instruments necessary for saving life being deposited in adjacent houses. To excite emulation and stimulate industry, a gold and silver prize-medal* were granted by the Society as a reward.

In 1775 and 1776 institutions similar to that of the Royal Humane Society, were formed in all the large towns of the kingdom, especially at Norwich, Hull, Liverpool, Worcester, Chester, and Kidderminster; as well as in Scotland and Ireland. This respectable Society annually increased in the number of its members, who were active in their endeavours to diffuse the knowledge of those principles, so that the prejudices against the institution, and the resuscitative process, soon vanished; for,

* One side represents a Genius breathing on the half-extinguished flame of a taper, with the inscription—"*Latent scintillula forsan*;" and below: R.H.S. In resuscitat. inter mortuorum ins. M.DCC.LXXIV. On the reverse, a laurel is represented with this inscription—"*Hoc pretium cive servato tulit.*"

within

within the short period of a few years, they had demonstrated, by several hundred successful instances, that their benevolent plan was by no means chimerical. Contributions, some of which amounted to a hundred pounds, were sent from every part of Great Britain, and even from America; collections were made in the churches of London, by which the Society was enabled to extend the sphere of its operations, and to appropriate considerable sums for the purchase of the requisite implements, and for bestowing medals and rewards. In order to carry their intentions into effect, as extensively as possible, several houses were erected for the reception of bodies apparently lifeless; where all the necessary apparatus, such as blankets, a portable bed, copper kettles for heating water, and an electrical machine, were always kept in readiness.* These small buildings were erected in different parts of London, and chiefly in the vicinity of rivers and other waters, where such accidents were most likely to happen.

* The Society has caused the plan of such a receiving-house to be engraven, and printed on a card.

In

In the year 1780, Dr. HAWES read a gratuitous course of public lectures on the principles of resuscitation.

The increasing popularity of the Society was highly conducive to its success: physicians, clergymen, painters, and poets, exerted themselves for the honour of the institution. The speeches of the Bishop of St. DAVID'S, and Mr. HAWTAYNE, on the duty of assisting our fellow-creatures, and the panegyrics on the regulations of the Society, are valuable specimens of that impassioned eloquence which readily finds its way to the heart. Artists immortalized the most remarkable scenes of resuscitation, by excellent prints and paintings; while some of the most eminent British poets composed odes for the celebration of the anniversary festival.

Indefatigable in the improvement of this philanthropic art, the Royal Humane Society collected, and profited by, the experience of other nations. Prize-medals, value ten guineas each, were also offered, and given by the Society, for the best treatises on the restorative process. To this excellent institution we are likewise indebted for the valuable essays on

this

this subject, written by GOODWIN, KITE, COLEMAN, and FOTHERGILL.

The zeal for promoting human happiness, which animated every member of this Society, also glowed in the breasts of philanthropists in remote parts of the globe: in consequence of which, similar institutions were established in the West Indies, namely, in Jamaica and Barbadoes, in Hudson's Bay, as well as in the American cities of Boston and Philadelphia, and even at Algiers, in Morocco. Among these, the most distinguished are, the Preservative Society of Northamptonshire, America, instituted in the year 1789; and the Massachuset's Humane Society, at Boston, which was founded in 1792. The zealous members of the former recovered in the last mentioned year, four; in 1793, eight; in 1794, eleven; and in 1795, five persons, most of whom were rescued from a watery grave.

The anniversary festival of the London Society is truly sublime and affecting. On this solemn occasion, the annual lists of both the preservers and preserved, are publicly read, the accounts balanced, and new premiums proposed.

The

The celebration of the annual festival on the 22d of July, 1796, was particularly splendid. Philanthropic songs, accompanied by instrumental music, excited the most sublime emotions in the minds of the hearers. What an impressive scene!—A long procession of men, women, and children, who all were indebted for their lives to this Society, proceeded in several divisions. Each of these groups followed their colours, which were adorned with an inscription. That of the first was, *Thanks to the Supreme Being*; and that of the second, *Resuscitation*. The Medical Assistants were the next in succession; and, after these, the *Guardians of Life*, preceded by Dr. LETTSOM. Another division was distinguished by a flag, with the words *Divine Mercy*; and again another, with that of *Humanity*. The last banner displayed the inscription, *Return to Life*. The list of restored persons was read, by which it appeared, that, from 1774 to the 22d of July, 1796, a period of twenty-two years, two thousand one hundred and seventy-five persons* were restored to life.

Huma-

* We give this statement on the authority of an Occasional Address spoken by Mr. HELME, at Jones's Royal Circus,

Humanum genus ante 1774,
Quasi mortuum, ultimo receptaculo
Depositum erat:
Nostro autem feliciori ævo
Hac dira calamitate
Absolutum est.

This benevolent association, which is continually increasing, consists of several hundred members, including Noblemen, Gentlemen and Ladies of the first respectability and opulence. The President of the Society is at present Lord STAMFORD.

The Society for the Encouragement of Useful Arts, at Hamburgh, set a meritorious example to Germany. Among other excellent plans for promoting happiness, an institution was formed for the re-animation of persons drowned. Its directions relative to the proper method of treatment, in such cases, were distributed in the year 1768, and a premium of twenty rix-dollars was offered for every successful case. In the following year, 1769, institutions more peculiarly devoted to the restoration of the drowned, were also

St. George's Fields, on Friday the 22d of July, 1796, for the benefit of the Royal Humane Society.

founded.

founded. These establishments were essentially improved in the year 1786, and have been gradually advancing towards perfection, in every succeeding year. A committee, which was appointed for the regulation of this Society, devoted houses to the reception and treatment of the drowned; and the most accurate instructions for the assistance of such as had suffered apparent privation of life by sudden accidents, were communicated to the surgeons, and exhibited in conspicuous places.

Implements, such as large poles, and tongs for extracting bodies out of water, ice-boats*, blankets, carpets, GORCY's improved bellows, &c. were procured, and kept in readiness at those places where there was the greatest danger of such accidents. In short, this institution surpasses all others of the kind in Germany.

The success of its experiments completely answered the philanthropic view of the Society; while, by its improvements, the art of preserving the lives of human beings daily attained a higher degree of perfection, and

* A correct representation of such a vesse', is given in the DOMESTIC ENCYCLOPÆDIA, No. I. and it is described under the article *Boat*.

the number of successful cases annually increased.

In the course of five years, the following cases occurred:

In the year	Successful.	Unsuccessful.	Total.
1790	8	4	12
1791	17	9	26
1792	19	8	27
1793	31	18	49
	75	39	114

Another Society which particularly deserves our attention, is the Humane Society of Mohrungen, in East Prussia. It was founded in the year 1795, by the Rev. Dr. DIETMAR, of Blumenau. Its chief design is to instruct common people in the management of persons apparently dead; and much real good may be expected from the zeal of the respectable gentlemen who have united for this beneficent purpose.

It is, indeed, much to be regretted, that in the extensive German Empire, no other institutions similar to those I have mentioned, have hitherto been established. May the speedy return of peace inspire men in general with a zeal for the preservation of human life.

How-

However, as the resuscitation of persons apparently dead, has, during the last twenty years, been more generally attended to by the governments of different countries, we may rationally hope, that these humane institutions will annually increase. Of the public proclamations relative to the subject in question, which have appeared under legislative sanction, I am acquainted only with the following: Those by the

Emperor, in the year -	1769
Duke of Saxe-Gotha -	1770
Elector of Saxony - -	1773
Elector of Bavaria - -	1775
King of Prussia - -	1775
Duke of Saxe-Weimar	1776
Senate of Bremen - -	1776
Duke of Brunswic Luneburg - - -	1708
City of Strasburg - -	1787
City of Erfurt - -	1783
Duke of Mecklenburg	1783
City of Rostock - -	1784

Indeed, the design of these benevolent rulers was attended with good effects, since the attention of the public has thus been directed to a subject the most interesting to mankind.

It affords me infinite pleasure to remark, that in consequence of the regulations issued by the ELECTOR of SAXONY in the year 1773, the public mind was in a manner roused from its lethargy. Since that period, the cases which occurred have been more carefully recorded, and a more general interest was excited, in proportion as the attempts proved successful. Although the endeavours to reanimate the unfortunate be not always crowned with success, yet it is a consolation to the philanthropist, that all the means of restoration are duly resorted to. Since the appearance of the above-mentioned regulations, however, many successful cases of resuscitation have proved a source of satisfaction to the benevolent ELECTOR of SAXONY; and the number of those who were restored to life, has by far exceeded that of any former period. Every year additional rewards have been distributed; and in 1773, thirteen premiums were paid for successful assistance.

Two other equally judicious proclamations were published by the same prince; one of which first appeared in the year 1782, and was re-published with considerable improvements,

ments, in the year 1796; it relates to the prevention of canine madness: the other, concerning the management of dead bodies, and the precautions necessary to avoid premature interment, was enacted in the year 1795.

It is to be hoped that an institution for recovering persons apparently dead, will soon be established at Leipzig. In the year 1796, the magistrates of that city published instructions respecting the treatment of the drowned, till the arrival of some medical practitioner.

According to the degree of sensation produced on the public mind by institutions of this nature, their importance and utility will be more generally acknowledged. Nothing is more desirable than the general publication of all cases in which medical aid proved efficacious, as well as of those in which it was administered without effect. By such information, both morality and the art of medicine would be mutually promoted. Every province, therefore, ought to be in the possession of registers, in which the attempts of restoring to life individuals apparently dead, should be carefully and circumstantially recorded, whether these endeavours have been attended with success, or

failed.

failed. I have attempted to form a collection of casualties which happened in the small province of Lusatia, and have found with heart-felt satisfaction, that during a space of twenty years, thirty-six drowned persons were restored to society. Some of the circumstances attendant on these cases of resuscitation are very remarkable.

I think it a duty, to mention the philanthropists to whom these humane institutions are highly indebted; and whom history will record to the remotest posterity; namely, VAN MARUM, Count BERCHTOLD, and VINCENT ZARDA.

The first of these exalted characters is the celebrated Dutch naturalist, who first taught the proper application of electricity, to be used in the resuscitative process.

Count LEOPOLD BERCHTOLD, during his travels through Europe, obtained universal esteem by his humane inquiries into this subject. In the year 1792, he presented to the National Assembly of France a plan for preventing premature interment. The city of Vienna is indebted to him for the introduction of the ice-boat; he likewise disseminated in that metro-

polis,

polis, instructions for the recovery of persons apparently dead, stated in a familiar treatise; and during his travels in Spain, he was instrumental to the establishment of similar institutions in the sea-ports of that country.

ADALBERT VINCENT ZARDA*, has for many years read public lectures on the resuscitative art, in the city of Prague; he also published in the year 1796, a very useful German pocket-book, containing a description of the apparatus necessary for the restorative process, arranged in alphabetical order.

Although I have related these facts, taken from the history of humane institutions, in a concise and cursory manner, yet they serve to shew that the respective exertions made in different countries, were not in general unsuccessful, and consequently beneficial to mankind. They may likewise tend to convince those who are not acquainted with medical science, of the possibility of reviving persons apparently dead, by a proper application of its principles; and, lastly, we may learn from such histories, how much yet remains to be

* This gentleman, as well as Count BERCHTOLD, has been elected honorary governor of the Royal Humane Society.

accom-

accomplished, before these humane institutions can arrive at a greater degree of perfection.

II. *General Reflections on Humane Institutions.*

The following thoughts, on the management and improvement of humane institutions, are not merely founded on conjecture, but they have, in a great measure, already been realized; especially by the exertions of the Society at Hamburgh, originally instituted for the encouragement of useful arts.

The phrase Humane Institutions, is, in this instance, applied to every effort made by magistrates, physicians, and the public in general, to prevent and diminish the dangers which threaten individuals apparently dead, or whose vital powers are suspended.

All establishments for the preservation of life may be divided into—

1. *Preventive Institutions, or such as are calculated to avert impending danger.*—Under this head may also be classed the investigations made by order of government, respecting circumstances by which the attempts to effect the resto-

ration

ration of life have proved unsuccessful; admonitions relating to danger; such as information concerning poisonous plants; the bad effects of damp habitations; mephitic vapours; unwholesome food and drink; the deleterious influence of quackery; cautions against *dangerous* places for bathing, and directions to such as are perfectly safe, by stones with inscriptions; the inclosure of deep ditches and waters, &c. Farther, it is a duty incumbent on magistrates, to promote a speedy publication of those means which are best adapted to relieve persons exposed to dangerous casualties. These printed guides ought to be in general circulation, and perfectly intelligible, so that when an accident happens, they may be immediately resorted to. Where simple admonitions are disregarded, the interposition of legislative authority will become necessary. Great care should likewise be taken, that the regulations published by the Medical Board, be duly enforced.

2. *Preparatory Institutions for affording relief on sudden emergencies.*—These ought to provide the necessary implements for the restoration of life, as well as to appoint the requisite assistance; to select bold and experienced persons,

sons, who should without delay afford their aid, and whose exertions should be duly rewarded. In almost every town and village of Germany, *regulations* are published for saving goods and houses in cases of fire. Would not, therefore, Institutions for the resuscitation of persons apparently dead, be of equal importance? It would be particularly desirable, and even necessary, to appoint, in every place, experienced men, for immediately discovering drowned bodies; as the efficacy of the restorative process depends more upon that circumstance than upon any of the means made use of for such purpose. The great utility of ice-boats, instruments for extracting the unfortunate from water, and drags, must be obvious. Those particularly, who have an opportunity of being often present at accidents of this nature, ought to be well instructed in the art of resuscitation. No fisherman or waterman ought to be admitted a member of the Corporation, unless he be perfectly acquainted with the method of treating the drowned. Directions for managing these casualties ought to be distributed among people living in the vici-

nity

nity of rivers, that the means of resuscitation may always be in readiness.

3. *Institutions for saving life, when a dangerous accident has recently happened.*—In this case, speedy notice ought to be given, proper assistants and a physician immediately called in, to direct the means of resuscitation, and to prevent crowds of people from assembling: thus the resuscitative process ought to be employed with indefatigable assiduity; the persons engaged in the operation encouraged by promises of rewards, &c.

A government which patronizes Humane Institutions, manifests at the same time its regard for the value of human life. By such measures, sovereigns would evince true patriotism; and, even in these revolutionary times, the union between the prince and the people would be thus more firmly cemented.

III. *On Apparent Death.*

It is impossible to give a satisfactory explanation of the nature of apparent death, without having previously defined *vital power*. But,

as the definition of a power which we only know by its effects, would be inconclusive, I shall state but one of its principal manifestations. This idea being more accurately elucidated by HUFELAND, in his work entitled "Pathogenia," than by any other writer on the subject, I shall, without hesitation, avail myself of the result of his inquiries; nor do I claim any other merit, in this instance, than that of having applied his hypothesis to practical purposes.

Vital power is the ability of an organized body to receive impressions, and to exert a re-action.

There are two modifications of this *effect* of vital power; viz. *susceptibility of stimulus*, and *irritability*. The former implies the capacity of the organic fibre, to be affected by stimuli; it is the result of the vital power, and may exist in the system, though the irritability be not manifested by any external symptoms. *Irritability*, on the contrary, is peculiar to the muscular fibre, which is in a state of re-action, either by the contraction, or approximation of its constituent parts, in consequence of any stimulus applied to it, though confined to a particular spot, thus partially affected.

Upon

Upon this theory is founded the idea of apparent death.—*Apparent death is that state, in which the vital power is suspended, or in which there is a want of the susceptibility of stimuli.*

Apparent extinction of vitality, therefore, is a lower degree of re-action of the vital power, disproportionate to the action of stimulants. Hence the different degrees of apparent death are easily accounted for: they depend on the more or less observable suspension of the vital power, and on the proportion of susceptibility of stimulus that remains.

This suspension of life consists of infinite modifications, from the transient momentary fainting fit, to the death-like torpor of a day's duration. The susceptibility of irritation may be completely suppressed, and the person apparently dead, may be insensible of the strongest stimuli, such as the operation of the knife, and the effects of a red-hot iron; and yet the vital power may not be extinct. In this state, however, apparent death very nearly borders upon actual dissolution.

Death may be defined to be a dissipation or destruction of the vital power itself; or, perhaps, of the most essential *organs*, by which

that power exerted its influence on the body. For, if we are capable of forming an abstract idea of this power, and of conceiving that it is universally diffused throughout nature, it follows, that such an agent cannot be completely annihilated. The dissolution of an individual body only prevents its influence, and operation, on that body with which it was formerly connected. Perhaps it is now employed by the Author of Nature to animate another organized substance. One part of the vital power which directed the actions of the living man, may probably give life to the plant that blossoms upon his grave. I hope to be excused for this digression, as it is the result of those reflections which were naturally suggested by HUFELAND's idea of vital power.

Apparent death is that state of weak and latent life, from which the person thus affected may recover, if the activity of the vital principle be gradually excited. The due proportion between the action and re-action of vital power may, in this manner, be restored, and the system again become susceptible of stimuli.

Although the susceptibility of the subject be restored, vital action still remains in an imperfect

fect state. Doubtful signs of re-animation are so far from being harbingers of success, that they but too often suddenly disappear, and leave the operator in a hopeless situation.

This *susceptibility of excitement* is the principal requisite to successful resuscitation. *The state of perfect vital action* cannot be recovered, unless the heart and lungs again duly perform their respective functions.

We ought, however, anxiously to watch the first symptoms of returning life; or, rather the signs of the susceptibility of excitement, as our conduct in the resuscitative process entirely depends upon them.

We should therefore distinguish, with particular care, that state, from perfect animation; lest we might pursue a method not adapted to time and circumstances.

1. *State of the susceptibility of stimulus.*—It is difficult, and sometimes impossible, to discover its diagnostics, when the vital principle is entirely suppressed. But, if it manifest itself in an unequivocal manner, the vital power then is in a progressive state of developement; on the other hand, this susceptibility may be imperceptibly lurking in the body. The drowned

person, in most cases, becomes susceptible of irritation, as soon as he is taken out of the water; and is consequently in a situation in which the vital power may be excited. It would be of considerable importance, if these symptoms of susceptibility could be timely discovered, because it will appear from the sequel, that we ought to regulate ourselves accordingly, in determining the proper degree of stimulants.

These symptoms, however, are often mistaken for signs of animation in general. Such indeed, in some measure, they are; but so feeble and uncertain are the criteria of successful resuscitation, that we may, with greater reason, merely consider them as vestiges of the returning susceptibility; because the modifications of vitality have hitherto not been ascertained with sufficient precision, nor have the symptoms of that susceptibility been accurately investigated. I earnestly exhort all medical men, to be assiduous in making their observations on this part of semiology; for I am persuaded, that the result will prove highly beneficial to the practitioner.

2. *The state of perceptible active vitality*: which is manifest from all those symptoms of animation, that leave no doubt of its real existence. In this state, irritability is not impeded in its free progressive action: respiration, pulse, and animal heat, are completely restored. There are, however, many modifications of that state, the particular characters of which ought to be accurately distinguished.

Such symptoms of animation are most remarkable during the resuscitative process; they generally afford flattering hopes, and even guide the operator in adopting the best means of assistance.

Beside these signs of animation, observable in cases where the vital principle appears to be extinguished, there are others which can be perceived only by the patient. For instance, the retention of the faculty of hearing, when all other sensations have entirely ceased; but more particularly a flash of fire before the eyes, at the moment of returning animation; likewise the slowly expiring spark, observed by persons exposed to intense cold, previous to their sinking into a state of insensibility; the sudden darkness

darkness before the eyes of those who are attacked by a fainting fit; the inexpressible comfort experienced by such as are on the point of expiring under the influence of an intense degree of cold, &c.

REVIEW OF ALL THE SYMPTOMS OF LIFE,

EXHIBITED IN THEIR NATURAL ORDER.

I. *Signs of an existing susceptibility of stimulus.*

1. A slight degree of warmth in the region of the heart.

2. Contractions and dilatations of the heart.

3. A vibrating motion of the whole body, especially after being sprinkled with cold water.

4. A convulsive tension of the muscles in some parts of the body.

II. *Doubtful signs of returning irritability.*

1. A slight degree of rigidity in the limbs.

2. The skin acquires a gradual smoothness.

3. Different parts of it become warm and red.

4. Hiccough.

5. Contraction and hissing of the nostrils.

6. Trembling of the whole body, even without the previous application of stimulants.

7. Mucus untinged with blood, issuing from the nose, during the inflation of the lungs.

8. A slight convulsive motion of the mouth.

9. A firm compression of the teeth.

III. *More*

III. *More certain signs.*

1. Gentle throbbing of the heart.
2. Pulsation of the vessels of the heart, and the temporal arteries.
3. A slight convulsive motion of the inner corner of the eye.
4. A gently undulating motion of the eye-ball.
5. A slight convulsion of the muscles of the neck.

IV. *Distinct signs of Life.*

1. A weak motion of the jaw.
2. The lips and face becoming red.
3. A contraction of all the muscles of the face.
4. Convulsive motions of the toes.
5. Sneezing.
6. Agitation of the whole body.
7. Vomitting.
8. Respiration, interrupted by coughing.
9. Groaning.

The duration of apparent death depends upon the proportion of vital power in the individual. Hence children and young persons will endure this state longer than the aged. It also depends upon the influence of external causes to which the body is exposed; upon the nature

of the element in which the accident happened, whether it contained a greater or less proportion of oxygenated or carbonic acid gas, or caloric; on the constitution of the body, and those circumstances which preceded or accompanied the accident. For instance, if the person plunged or fell into the water with his head foremost: in this case, he probably died of apoplexy, and all assistance will be unavailing; lastly, whether at that time he was in a state of perspiration.

But the latent vital power seems to be much longer preserved, where animation has been suspended by cold. A man had been forty-eight hours in snow, and yet was restored to life, though he expired within an hour afterwards.

We shall next consider the duration of life in those children, who are apparently still-born. While they continue in the womb, they possess only a small share of vitality, which is constantly supplied or reproduced by the living principle of the mother. Hence, while in this state, they may be compared to plants, which owe the continuance of their vegetation to the soil in which they grow. As in the germi-

germinating vegetable, so likewise in the animal fœtus, vitality may for some time be preserved, even when separated from its parent.

VAN SWIETEN relates an instance of a murdered woman, from whom, by means of the Cæsarean operation, a living child was extracted, forty-eight hours after the mother's death. A number of instances of still-born, but resuscitated children, proves that their vitality may be long preserved in a latent state. "The generality of infants, considered as still-born," says OSIANDER, "are only apparently so: if, therefore, persons would persevere in their exertions to revive them, most of them "might be restored, though they should not, in all cases, continue alive." Resuscitation sometimes cannot be effected in less than one or two hours close application; nay, many of the apparently dead do not exhibit symptoms of returning life, till several hours after the accident, when all hopes of success had been relinquished.

Vitality is less tenacious in persons apparently drowned, especially if they have lain for some time under water.

Among

Among more than six hundred fortunate cases, announced by the Royal Humane Society of London, there is only one instance of successful resuscitation, effected on a man who had remained three quarters of an hour in the water; but during that space of time he had continued to float on the surface *.

In cases of strangulation, occasioned by a tight-drawn ligature, as in suspension by hanging, the remains of life seem to exist a still shorter time in this dangerous situation, where the blood-vessels have been very closely compressed. A physician, however, assured the great BACON, that he would engage to restore, by tepid baths and friction, every strangled subject which had not been suspended longer than half an hour, and whose neck had not been dislocated by a fall in cutting him down.

Persons struck by lightning are instantaneously destroyed, and putrefaction takes place with incredible celerity *.

According to the foregoing observations, the scale for the durability of organic life would be in the following proportion:

* KITE, on the resuscitation of persons apparently dead.
† See BRANDIS's Essay on Vitality. Hanover, 1795.

1. Apparently dead by cold.
2. Apparently still-born children.
3. Apparently drowned.
4. Strangled.
5. Struck by lightning.

Beside the operation of these causes, apparent death occasioned by swooning, apoplexy, hysterics, or torpor, may continue so long, that its exact limits cannot possibly be determined. Persons apparently dead, sometimes awake after an interval of seven days; as was the case with Lady RUSSELL.

In the female sex, the suspension of vital power from spasms, fainting fits, &c. originating from a hysterical, feeble constitution, are not rare; nor is it improbable that the state of apparent death may be of longer duration with them: nay, it may be looked upon as a periodical disorder, in which all susceptibility of irritation is extinguished. Particular attention ought to be paid to this circumstance, with respect to the resuscitative process applied to apparently drowned or suffocated women.

It is, however, really astonishing, that those cases of apparent death, by which the individual is most endangered, are generally treated with

with neglect. More happy, therefore, are those persons who suddenly die in their beds, as some days at least elapse before their interment. The apparently drowned, on the contrary, after a very superficial examination, are in a few hours consigned to their tomb.

From what has been said, the knowledge of a criterion, by which we might be able to ascertain whether a person be really dead, or not, is an object of the first importance. Now of all the signs of death, though putrefaction be the most infallible, yet, the symptoms of the commencement of putrescency, before a total dissolution of the organic parts has taken place, are so uncertain that, in many cases, if we were to rely upon them as infallible, we might be deceived as to the existence of latent vitality. The following critical inquiry into the indications of death, will prove the uncertainty of such symptoms, when taken singly; though it cannot be denied, that when their connexion and adventitious circumstances be duly attended to, they are worthy of attention.

Signs of Death.*

1. *Cessation of the pulse.*—When, in consequence of a deprivation of its irritability, the heart ceases to move, pulsation is no longer perceptible. It is, however, difficult, as METZGER observes, to distinguish it from that state in which the heart, from a want of energy, is unable to manifest its contractions, or pulsations.

2. *A cessation of breathing.*—We are not possessed of criteria, to ascertain whether respiration has really ceased. The placing of a feather or a looking glass before the mouth, is entirely useless; for a mirror may be deprived of its brightness by the evaporations of effluvia from a body, in the first stage of putrescence.

* On the signs of death, vid: Dissertation sur l'incertitude des signes de la mort, et l'abus des enterrements and embaumements precipités; par J. J. BRUCHIER, à Paris, 1749. WINSLOW. An mortis incerta signa minus incerta a chirurgicis quam ab aliis experimentis. Paris, 1740.—LOUIS. Lettres sur la certitude des signes de la mort, à Paris, 1782.—CAMERER de signis mortis diagnost. Tubing. 1785; also in FRANKÜ Opp. vol. viii. p. 107. As also BERENDS, METZGER, HUFELAND, STOLL, PLATZ, CREVE, ANSCHEL, and HIMLY.

3. *Loss of animal heat.*—The surface of the body may, to a certain degree, be cold, as is observable in cases of suspended animation, by frost; and yet internal warmth and vitality may not be extinguished. On the contrary, persons killed by apoplexy, will long retain their natural warmth.

4. *Rigidity of the body, and inflexibility of the limbs.*—It is not easy to distinguish, whether this inflexibility be owing to spasms, or a real torpor, the concomitant of death. The limbs of persons, killed by lightning, or dying of putrid diseases, have been found pliant even an hour after their dissolution.

5. *Relaxation of the lower jaw.*

6. *Inability of the eye-balls* to return to their sockets, when laterally moved by the pressure of the finger.

7. *Dimness, faintness, and sinking of the cornea.* Dr. CREVE has often remarked, that the cornea continued transparent and perfectly convex for three days together, particularly when the surrounding atmosphere was moderately cold.—The before-mentioned symptom of death, however, has always been considered the most infallible.

8. *Foam in the cavity of the mouth*, is rather to be considered as the last exertion of nature, than a sign of actual dissolution.

9. *Blue spots* of various sizes, and on different parts of the body, particularly on the back, where the skin has suffered most from pressure, are called death-spots, and are generally deemed certain signs of dissolution; but they often mislead the physician. Scorbutic are also, by young practitioners, frequently mistaken for death-spots.

These livid spots are likewise observable in putrid and other diseases, and are the consequence of long confinement to a sick bed.

10. *A cadaverous smell* is one of the most uncertain signs, as it has sometimes been observed in patients, and has continued even while they were in a state of convalescence. Dr. CREVE confirms this remark, by some very remarkable observations which he made on himself.

11. *Insensibility to stimulants.*—The most cruel experiments have been made on persons apparently dead; yet, even the application of a red-hot iron did not rouse them, till the period

period of apparent death had terminated. The same has been observable in cases of torpor.

All these, and other supposed symptoms of death, are far from being conclusive, and may take place in persons apparently dead, as in subjects really lifeless. One external and indubitable sign of certain death, is putrefaction.

Many circumstances, however, may occur, which will not permit us to wait for the manifestation of putrescence.

When epidemic diseases, particularly those of the putrid kind, extend their malignance with such rapidity that the number of dead bodies is daily increasing, people are often unable to retain them long in their habitations; and there are but few houses in Germany, for the reception of the dead. In such cases, nothing is more desirable, than a criterion to ascertain the real signs of commencing putrescence. Neither the cadaverous smell, nor the livid spots, are to be depended upon. In many cases, we are not certain of true putrefaction, till the fetid animal gas, emitted by the body, becomes dangerous to the attendants. It is possible, however, to ascertain death, without the appearance of

putres-

putrescency; by investigating the previous state of the subject, together with the peculiar circumstances which preceded its dissolution; constitution, age, and sex; the treatment after expiration; and the fruitless attempts at resuscitation. The corpse ought likewise to be examined, and its appearance compared with the before-mentioned signs of dissolution. It is farther observable, that in persons killed by lightning, and those who died of putrid diseases, the incontestible symptoms of putrefaction will make their appearance much sooner than in others.

As some time elapses, before the destruction of the organic parts becomes perceptible, the medical art is much indebted to Dr. CREVE, who first applied animal electricity for the discovery of real death*. It is now no longer a matter of doubt, or question, with rational physicians, that all vitality must have left a body, in which no animal electricity, or rather, no irritability of the muscular fibres can be produced; and that no vitality can exist where this most effectual test of muscular irritability

* See GREN's Journal of Natural Philosophy, vol. i. No. I.

disco-

discovers no action in the system. At the same time, it is doubtful whether susceptibility of all irritation, the metallic one not excepted, may not entirely forsake one part of the body, or be liable to a temporary suspension? Dr. CREVE asserts, that in many muscles he sometimes was unable to excite the smallest convulsion by animal electricity; he therefore recommends the successive application of it in different parts. If Galvanic experiments could be made with persons in a state of spasmodic torpor, much light might be thrown upon this subject.

Dr. CREVE's experiment is too remarkable not to be mentioned*; but I shall previously make a few observations on GALVANI's discovery of animal electricity; and refer the reader to the writings of VOLTA, VALLI, SCHMUCKER, PFAFF, HIMLY, and CREVE.

GALVANI, Professor of the University of Bologna, discovered by experiments made with different animals, that when any nerve of an animal recently killed, was covered with a metallic plate, as for instance, with very thin

* Vom Metallreize, einem neuen untrüglichen Prüfungsmittel des wahren Todes von C. C. CREVE, 1796.

plates

plates of tin, and the muscular flesh, in which the nerve terminates, was laid bare, violent convulsions of the muscles and motions of the limbs will take place, as soon as the denuded limb is covered with the metallic (armed) nerve, or brought in contact with it by any (metallic) body whatever. In cold-blooded animals, this phenomenon is often observable for more than two hours after they are killed; in those with warmer blood, on the contrary, it ceases in a quarter of hour after their death.

Dr. CREVE, in his experiments on animal electricity, or, as he called it, *metallic irritation*, which he proposed as a criterion of certain death, invented an instrument formed like a bow, both ends of which were furnished with two round plates. This apparatus is composed of two parts, made of different metals; one half of solid zinc, the other of pure silver; or gold and zinc; or lead, tin, and gold. It is, however, requisite, that the proportion of the first metal should be less than the other combined with it. Thus, the weight and size of that made of zinc ought to be less than the opposite one of gold. The plates are only screwed on the bow, the greatest part of

which

which consists of silver. If such an instrument cannot be procured, he recommends the substitution of a small piece of tin or lead, and a silver coin of moderate size. Any part of the body may be chosen for these experiments, but the most proper is the upper part of the arm. Care should be taken, that the skin be not gangrenous or unsound in that part where the incision is made.

In cases where the subject has been affected by intense cold, the limbs ought previously to be made flexible by the application of warmth. The before-mentioned experiment, therefore, ought to be resorted to only when long continued endeavours to restore animation have proved ineffectual.

The muscles are to be disencumbered of all fat, and likewise, as far as is practicable, of all cellular texture. The blood is to be washed away by a sponge soaked in water.

After this operation, the muscle should, in a slight degree, be extended, by stretching the arm. The muscular fibres ought to be clearly exposed, and the skin expanded, in order to keep the lips of the wound duly separated.

The

The instrument before described must now be held in the centre of the curvature, and both its flat plates brought into perfect contact with the bare muscular fibres. Attention must also be paid to the fibres themselves, which, if irritability remain, will, in the moment of contact, be contracted and twisted as if by cramps, or they will exhibit convulsive motions, all which cease when the instrument is removed, but recommence on repeating the same process. If all irritability be destroyed, no motion whatever will appear.

The author of this work has successively repeated these important experiments, both on men and animals; and though they were tried under different circumstances, and in various ways, yet the result always proved the same.

Another diagnostic criterion of apparent death, was supposed to be discovered in *electricity*. While the least portion of vitality continues in the muscles of the heart, they will certainly contract, when the electric fluid pervades them; but if, on giving a few moderate shocks, no motion be perceptible in the extremities of the person, the continuance

tinuance of other experiments is likely to prove unavailing.

Electricity, however, furnishes us with no infallible criterion; for in persons apparently dead, the most powerful electric fluid will sometimes only pervade the skin and fat, and consequently will not reach the nerves of the muscle, nor the muscular substance: hence, no excitation of irritability nor muscular motion will ensue. Besides, it would be dangerous, to give the heart such violent electrical shocks as would ascertain the existence of vitality; for the irritability of the muscular fibres might thus be destroyed. Some very considerable contractions of the heart will sometimes ensue, but they cannot be of long duration, nor will it be in our power to excite a repetition of such motions.

It is not improbable, that we may soon derive, from new and successful experiments in chemistry, an infallible criterion of certain death, or the means of discovering the earliest stage of putrefaction. The latter desideratum might be attained by a chemical test for distinguishing cadaverous gas from any

other animal effluvia; by pointing out a method to collect this gas; suppose by a tube applied to the mouth of the subject, without being necessitated to wait for the perceptible marks of putrescency, which commences in the internal parts, long before it is obvious from its external symptoms.

IV. *On apparent Vital Extinction, occasioned by sudden Accidents.*

The following observations, which I venture to communicate to the reader, are far from being perfect and conclusive; but from that inattention to symptoms, which is but too common during the resuscitative process, practical remarks are but rarely to be found in the *reports* of unfortunate accidents; and therefore I hope this deficiency will plead my excuse. Besides, my design in publishing them merely is, to rouse the more skilful physicians, that they may persevere in their observations, and occasionally collect the ingenious

genious remarks of others, on a subject which requires the greatest attention*.

I. *Drowned.*

External signs of apparent death by *drowning*.

1. Coldness; extreme paleness of the whole body; livid lips; the mouth, either open or firmly closed; the tongue blue, swelled and protruded; the cavity of the mouth covered with filth; the eye-lids closed, the eyes turned and the pupils dilated; the jaws contracted; the face swelled and blue; the abdomen inflated, and hard.—*Signs of returning animation:* convulsions of the muscles of the face or feet; motion of the eye-lids; a spasmodic shivering of the body.

II. *Suffocation by the Cord.*

External signs.—The appearance is somewhat similar to that of persons drowned; the face very much bloated, distorted, and of a

* I think it unnecessary to repeat the general and well-known signs of apparent death, and shall therefore collect only the most striking, external marks of the different kinds of apparent vital extinction. The same shall be observed with respect to the signs of *life*.

dark red hue, in consequence of the extravasation of the blood; the eyes are inflated and prominent, a bloody froth at the mouth; the vessels of the face and neck are distended; and in all cases deglutition is impeded.

III. *Animation suspended, from an intense degree of Cold.*

External signs.—Persons who have thus been deprived of life, will retain the position in which they were, when the fatal accident happened; they are commonly found leaning against a tree, or sitting; and manifest the highest degree of coldness; inflexibility of the limbs; the teeth are closed; froth issuing from the mouth; insensibility of irritation; partial mortifications in the extremities, which sometimes drop from the body.

IV. *Suffocation by Mephitic Vapours.*

External appearances.—Head, face and neck swelled; eyes propelled from their sockets; the tongue protruded, and inclined to one side of the mouth; insensibility; the appearance of a pro-

profound sleep; the jaws firmly closed; the face livid; lips of a dark blue colour; and the abdomen inflated.—*Signs of returning life:* foaming at the mouth; shivering of the whole body, particularly after being sprinkled with cold water.

V. *Lightning.*

External signs.—In general, no particular injury is observable. Red streaks, however, appear on different parts of the body; especially on the chest and arms, in which a burning sensation is experienced after recovery*.

VI. *Still-born Infants.*

External signs†.—a. *In cases of apoplexy,* occasioned by the accumulation of blood in the cavity of the head; by a privation of air; or

* A flash of lightning having struck a woman, her breasts immediately became marked with streaks and figures, similar to those which are seen in winter, on windows covered with congelations; or rather, as they appear upon an electrified pitch-cake, when colophony is scattered over it. The serpentine and zig-zag streaks were blood-red.

† See the excellent work of Dr. KNEBEL, on midwifery.

by impeded extension of the lungs. Its symptoms are, a red, swollen face, prominent eyes, large blue spots upon the skin; frequently a degree of warmth, and a pulsation of the arteries at the navel-string, are observable.

b. *In cases of syncope:* face pale and cheeks hollow; lips blue; limbs relaxed and flaccid.

Symptoms of returning vitality:—a slight motion of the under jaw; contraction of the muscles of the face; mucus, untinged with blood, issuing from the nose, during the introduction of air into the lungs.

Symptoms of death:—though on the whole uncertain,—there is no pulsation of the navel-string; a discharge of the meconium; flaccid limbs, especially when the infant is born with its head foremost, and the waters are of a greenish hue.

V. *General Principles, relative to the resuscitation of persons apparently dead.*

Resuscitation is accomplished, by exciting suppressed vitality; or by removing the obstacles which prevented the latent vital power from exert-

exerting its influence on the system. Our success frequently depends upon a proper notion of vitality and its modifications, as before mentioned; namely, irritability and susceptibility of irritation. During this process we ought anxiously to attend to the symptoms of returning animation, and proceed as circumstances may require. We accordingly promote—

1. *The susceptibility of irritation,* which is reproduced by removing the different obstacles. Thus we take the drowned out of the water, undress and dry them, cleanse their mouths from froth and filth, and place them in a proper position;—we cut the cord of those suspended, &c.

2. *The application of a proper method.*—The inanimate body should be placed in a temperature, where the latent vital power may again become active, or susceptible of irritation. Hence, life will often return without the application of any other stimulus. A gradual transition from apparent death to perfect life, is not to be effected by precipitately resorting to extremes, but by gently cherishing the vital power. Effectual assistance can be afforded only

only by slow degrees and an incessant attention to the signs of returning animation. Nothing is, therefore, more pernicious than a sudden transition to air of a different temperature. A person benumbed by cold, would inevitably expire, if immediately brought near a fire.

To restore the susceptibility of irritation, nothing more is required than to assist its gradual evolution. Hence, the good effects resulting from rest, and a cautious moderate proceeding, are obvious; nay, such measures are necessary for reviving the spirits, and restoring the strength of the subject.

Generally speaking, the want of success in many attempts to effect re-animation, must be attributed to a hasty and officious assistance. No time is left to Nature for her own exertions. All, it is imagined, must be effected by a violent compulsory treatment. The operators often forget, that they are treating an organized body; and that all the success they can expect from their applications, principally depends upon vital action, which, by violent treatment, is too often deprived of all its energy. During the whole of the

the process, persons apparently dead, should be regarded as if dangerously wounded.

It frequently happens that the first treatment of the apparently dead, renders the succeeding applications totally ineffectual. A person drowned, is either dragged out of the water by the legs, or dangerously lacerated by hooks employed on such occasions. Another, who has suffered by cold, is generally rubbed in a violent manner; and there have been instances, of the jaw-bones of the unhappy sufferer being fractured by this treatment.

The first treatment, in cases of suspended animation, should be directed to excite a susceptibility of stimuli; and next, for restoring susceptibility itself. The first part of the treatment is negative; the second positive, inasmuch as real means of resuscitation are employed, namely, those of air and warmth: their temperature ought to correspond exactly with that of the body. The person who has suffered by intense cold, is treated in the open air, or in a cold room; the drowned should be removed to a room which is moderately warm, placed in a tepid bath, &c. For those who have suffered by cold, the snow-bath, or

ice-

ice-cold water constitutes the first degree of warmth.

Before any susceptibility of irritation be manifest, no stimulants ought to be administered; for they would be inefficacious, because the body is not susceptible of them; nay, they would injure it, by forcibly propelling the blood to the heart, and thus destroying its irritability. Hence the detrimental consequences of violent friction, in the beginning of the process, must be evident.

2. *Restoration of irritability:* this is effected by a proper application of stimulants.

Stimuli can only be applied, when there remains a susceptibility of irritation. Symptoms of this, as well as the first indications of irritability, require the utmost attention; and as the former may often exist without manifesting itself by perceptible signs, our utmost endeavours to excite it, will in all cases be absolutely necessary. Many a person apparently dead by drowning, cold, or suffocation, has been restored to life without medical assistance, only by being exposed to a moderate warmth, and left to Nature alone. I am convinced, that in a high degree of asphyxia, such a pro-

a proceeding would not be sufficient, but in those cases resuscitation may, perhaps, be effected by the art of the physician, and a cautious application of stimuli.

The manifest criteria of susceptibility determine the degree and nature of those stimuli, by which returning vital action must be supported. There are, however, cases, in which, though susceptibility may really exist, no traces of it are perceptible; if, therefore, exciting means be tried for some time, if the drowned be moderately warmed, and still no signs of this susceptibility, such as warmth, contraction of the heart, &c. appear, yet the judicious application of stimulating means should not be neglected.

But, from the preceding observations, it ought not to be inferred, that the method of exciting susceptibility should always first be applied for a certain length of time, and stimulants afterwards administered, without continuing the former process. Such a proceeding would be erroneous, inasmuch as the method of exciting and supporting the susceptibility, for instance, the warming of the body, should be continued without intermission; while at the

the same time stimulants must be administered as circumstances may require. By this judicious application of stimuli, they will be of double advantage: by both exciting and promoting the susceptibility of irritation.

Advantages so essential, should induce us to be particularly careful in the choice and application of stimulants, and not to administer such as are too powerful, which would indeed excite irritability in a violent degree, but at the same time suppress the susceptibility of irritation, Thus powerful electrical shocks through the heart, excite violent motions of that organ; but as this stimulant is destructive of the feeble irritability remaining in the system, the pulsations will soon cease, nor can they again be excited. Hence, during the application of stimulants, great attention ought to be paid to the different degrees of irritability; and it is also deserving attention, that in the beginning of the process, when the susceptibility of irritation is but slight, violent stimulants are pernicious, as they tend to suppress the latent sparks of life.

The different degrees of susceptibility of irritation, are equal to the ability of bearing the

the application of stimulants. Hence, when the susceptibility of irritation is feeble, gentle stimulants only must be administered. Such stimuli, therefore, ought to be gradually applied; and when the first degree of susceptibility is excited by the operation of those of a milder nature, the more powerful may then be administered.

The constitution of the individual apparently dead is, however, a point which deserves great consideration; as irritable, weak, and strong habits, and such as are vigorous, but insensible of stimuli, require very different modes of treatment. The latter can be affected only by the stronger stimulants. Attention is also to be paid to the age of the subject, whether it be a child, a vigorous youth, a man, or a person advanced in years.

As this idea of the susceptibility of irritation can only be relative, it would be fruitless to establish rules, suitable to every case. These must therefore be determined by the judgment of the physician; a talent which neither HIPPOCRATES nor GALEN could ever impart by their writings.

When, by a proper treatment, the susceptibility of irritation has been evolved, and irritability excited, by a cautious application of stimulants, the indications of existing vitality become obvious. The patient slightly moves his eye-lids; the muscles of his face begin to recover their action; he vomits; and at length begins to respire. Our chief attention should now be directed to

3. *The Preservation of the Vital Power.*

This comprehends the treatment of the subject, as well during his recovery, as after he is perfectly restored to life.

1. *Treatment during recovery:*—On witnessing the joyful signs of returning life, we should cautiously avoid all tumultuous and eager conduct, and unremittingly attend to the feeble state of vitality. The principal points of this treatment are:

A moderate, but not too rapid, continuance of the remedies for exciting and preserving the susceptibility of irritation. Particular attention ought to be paid to the continuance of the first part of the resuscitative process, namely, the

the warming of the patient, the proper temperature of the air, &c.

2. *Repose*—It is necessary, particularly when signs of returning animation are manifest, to allow the patient time for repose, by desisting from the application of stimulants. Short pauses should be made, in order to observe the operation of the remedies employed, and aid the efforts of Nature. There is nothing which impedes the progress of vitality in a greater degree, than a long continued and precipitate manner of conducting the resuscitative process, or the successive administration of different remedies, without observing the various degrees of vital action, and the effect produced by restoratives.

2. *Treatment after the Patient has perfectly recovered.* At this period, also, the precautions before stated, should be kept in view. A hot regimen, the too liberal use of corroborants, particularly wine and brandy, excess in eating, taking cold, violent passions, neglect of blood-letting when necessary, or other evacuations, or the omission of proper corroborants, are sufficient to prove fatal to a person just restored to life.

Besides, quiet and undisturbed sleep is here of essential service.

VI. *General Survey of the Resuscitative Process.*

A. *Method of exciting the susceptibility of irritation, or the first treatment.*

1. *Negative method*, for the removal of whatever has been the cause of apparent death, or tends to impede the resuscitative process.

a. In this method are comprehended all the institutions for rescuing those apparently dead from danger; for instance, the discovery of the drowned, and precautions for securing them from farther injury*.

b. The removal of whatever might prove an obstacle to resuscitation. Persons who have been strangled, should be gently taken down,

* In Dr. BALDINGER's Medical Magazine, Vol. iii. No. 3, is contained the following curious anecdote: A student of a certain university being drowned, an unsuccessful search was made for the body. A man who was passing by, advised his young friends to procure a large loaf; to scoop out part of the crumb, and fill the cavity with quick-silver; he then directed them to throw this *quick-silver pye*, upon the current, and averred, that it would be stationary at the place where the drowned was lying. They followed his advice, and actually found the body.

and

and the cord cut without delay; and in all cases, the loosening of tight clothes, and particularly the cleansing of the mouth and nose, should not be deferred for a moment. The mucus is to be removed from the mouth and fauces as soon as possible; for otherwise the air cannot have access to the lungs, and respiration will never be restored. It is to be regretted, that we are not in possession of instruments adapted to this purpose; as, by such aid, the process of resuscitation might be considerably facilitated.

2. *Negative means* for restoring the susceptibility of irritation. Under this head, are chiefly included air and warmth.

Air. The quality of the air into which the body should be removed, both with regard to temperature and purity, is a matter of the first importance. The pernicious effect of overheated rooms, in such cases, is well known. The temperature of the surrounding atmosphere ought to correspond with that of the body, and may easily be discovered by a thermometer. Persons who have suffered from intense cold, should be treated in cold air; still-born children, on the contrary, require a degree

of warmth, such as they were accustomed to in the womb. Air saturated with carbonic acid gas, and sensibly vitiated by the breath of crowds, must necessarily have a pernicious effect on the lungs of those apparently dead. Our chief care, therefore, ought to be, to convey them into a purer atmosphere; for it is by no means to be considered as a matter of indifference, what kind of air *first* affects the lungs. The assemblage of curious people is likewise to be prevented, and the air of the apartment should be kept as pure as possible, by opening the windows. Steam of vinegar is a very good corrective of vitiated air. Fumigations with different sorts of powder, will occasion an agreeable odour, but they are apt to affect the brain. The evaporation of vinegar, by pouring it upon red-hot iron, or stones, is productive of carbonic acid gas, and consequently detrimental.

We should be in the possession of a superior remedy against apparent death, if we could, by a cheap process, fill the apartment which contains the subject, with oxygen gas. Its salutary effects have been sufficiently proved by the experiments of HUNTER and ACHARD. The latter revived

revived small animals, which had been exposed to the influence of several pernicious kinds of air till they appeared to be dead, by placing them in a vessel filled with pure air. The common atmospheric air was insufficient for their recovery, but oxygen gas proved very efficacious. VAN MARUM has discovered a mode of obtaining this gas, by a cheap and expeditious process.

It would, however, be of great efficacy, to conduct the vital, oxygenated gas, by a proper apparatus, from the vessel to the lungs, which ought, previously, to be freed from mucus. This method would, in many cases, be preferable to that of blowing into them oxygen gas, which is too stimulant, and may therefore prove injurious.

Warmth; or the external application of heat, in order to excite the susceptibility of stimuli.

External heat promotes the expansion of the internal natural warmth, and is applied in the same proportion as the latter.

Warmth is the first requisite for excitement of vitality: by it alone, without any other stimulant, persons apparently dead have been restored to life, of which, particularly with regard

gard to drowned subjects, very remarkable instances have occurred. I shall here only mention one. In the year 1790 a soldier plunged, quite naked, from a window of the military hospital at Strasburg, into the Rhine. In the afternoon he was missed, and on searching the river, was found, after he had lain about half an hour under water. He appeared completely lifeless, was laid in a warmed bed, with his head upright, the arms placed at both sides, and the legs stretched together; warm cloths were likewise applied to his body, particularly to the region of the stomach and his legs. In about seven or eight minutes, a slight motion of the upper eye-lids was manifest, and he soon afterwards opened his mouth, which before had been firmly closed, some froth issued from it, and the patient was now able to swallow a few spoonfuls of wine. After this, the pulse returned, and in a short time he could speak.

A chief cause of the want of success in the resuscitative process, is the neglect of warming the subject apparently drowned. The same observation applies to still-born children.

Warmth should be administered in proportion

tion to the temperature of the body, and therefore only by slow degrees. For those who have perished by cold, a low degree of warmth, somewhat exceeding that in which they became benumbed, is a sufficient stimulant. According to KITE, external warmth should exceed the temperature of the body only by a few degrees, and be gradually augmented, in proportion to the increase of natural warmth.

A too violent degree of warmth, especially when applied in the beginning of the resuscitative process, will destroy irritability.

There are many methods of producing warmth, some of which I shall here communicate. One good consequence of this diversity is, that we can adopt different plans, according to particular circumstances.

First degree of Warmth.

1. The ice-cold bath, for people who have suffered either from cold, or by being drowned in winter. It may, likewise, be used in cases of apparent death by suffocation from mephitic air, and it is applied by the Russians, with great success.

2. Cover-

2. Covering with snow. Experience has taught us, that the lives of persons overcome by intense cold, have been preserved for many days under snow. And this simple method has, likewise, proved effectual in cases of suffocation from pernicious vapours. In Russia, persons suffocated by the smoke of charcoal, are buried as soon as possible in the snow, and the whole body, particularly the region of the stomach and the temples, are rubbed with it, while cold water or milk is poured into the mouth. The friction must be continued till the bluish hue of the skin is changed into the natural colour. Those suffocated by coals, are generally found to be warmer immediately before, than they are at the moment of their recovery.

3. The earth-bath is not only useful for persons struck by lightning, but may also be beneficially applied in other cases of apparent death. Its efficacy is partly owing to the proportionate warmth, and partly to the invigorating vapours of the earth, which are very salutary in affections of the lungs. By the exhalations emitted from tilled earth, impeded respiration, nay, the most tormenting symptoms of pulmonary consumption, have often been alle-

alleviated*. Hence, a strong presumption arises, that this remedy may also produce the most beneficial effect on the lungs of those apparently dead.

a. *In cases of suffocation from mephitic air.* It is a common practice among miners, when one of their companions is suffocated by mephitic air, and drops down lifeless, to bury him in the ground to his neck, and at the same time sprinkle his face with cold water. This remedy might also be applied to persons suffocated by the vapours of charcoal.

b. *In cases of suspended animation from cold.* If, in very frosty weather, it were practicable to dig the ground, the earth-bath would afford an excellent and novel process for the resuscitation of those apparently destroyed by cold. There are, indeed, circumstances, which frequently render it practicable. The following anecdote on this subject deserves attention. A beggar arrived very late at night, and almost frozen to death, at a German village; and observing the school-house open, he resolved to

* Lord BACON attests the salutary effects experienced by consumptive persons following the plough, and inspiring the vapours arising from the new tilled glebe.

sleep

sleep there. The next morning, the school-boys found the poor man sitting motionless in the room, and hastened, affrighted, to inform the school-master of what they had seen. The villagers, supposing the beggar to be dead, interred him in the evening. During the night, the watchman heard a knocking in the grave, accompanied by lamentations; he gave information to the bailiff of the village, who declined to listen to his tale. Soon afterwards the watchman returned to the grave, and again heard a hollow noise, interrupted by sighs. He once more hastened to the magistrate, earnestly soliciting him to cause the grave to be opened; but the latter, being irresolute, delayed this measure till the next morning; when he applied to the sheriff, who lived at a distance from the village, in order to obtain the necessary directions. He was, however, obliged to wait some time before an interview took place. The more judicious sheriff severely censured the magistrate, for not having opened the grave on the information of the watchman, and desired him to return and cause it to be opened without delay. On his arrival, the grave was immediately opened; but, just Heaven! what a sight!

a sight! the poor wretched man, after having recovered life in the grave, had expired for want of air. In his anguish and desperation, he had torn the flesh from his arms. All the spectators were struck with horror at this dreadful scene.

4. The wrapping up in blankets, cloths, and straw. To persons benumbed with cold, the two first mentioned, however, should not in the beginning be applied in a hot state.

5. The warmth of solar heat.

Second degree of Warmth.

Means of warming the whole body.

1. The wrapping up in warm clothes, and beds artificially warmed.

2. *The warm bath,* which is peculiarly calculated to communicate an uniform warmth to the whole body. I have seen many cases in which this remedy alone effected resuscitation. The temperature of the water is to be determined by that of the body, and to be very gradually increased.

3. *The dry bath*; namely, covering the body with warm ashes, or clean sand, warmed over

the fire. In most of the directions published on this subject, it is advised to make this application; even after some hours, when all other means have proved ineffectual. This simple process is, however, more useful in the beginning, to excite a susceptibility of stimuli.

4. The warmth of the human body. Two persons place themselves in bed by the sides of the drowned, or one who has suffered by cold, and thus endeavour to communicate warmth.

5. The warmth of animals. Still-born children have sometimes been restored to life by placing them in the bellies of hogs or cattle recently killed. This remedy might be resorted to for re-animating drowned children; HERACLITUS cured himself of a dropsy, by submitting to be put into the warm belly of a recently killed bullock*. This is an excellent method of imparting warmth to the body; and much to be recommended for the recovery of persons apparently dead.

Means of imparting warmth to particular parts of the body. We should especially endeavour

* Baco de Vita et Morte, p. 369.

deavour to warm the back and the pit of the stomach.

1. Flat tiles wrapped up in warm cloths, are to be applied to different parts of the body.

2. A warming pan wrapped up in flannel, is to be moved slowly up and down along the spine.

3. A bladder filled with warm water, is put over the pit of the stomach.

4. Warmed cloths are placed on the same region.

5. Poultices; and cloths soaked in warm brandy or wine.

6. The crumb of loaves as they come from the oven, may likewise be placed on the pit of the stomach.

7. Small animals, recently killed, applied to the upper part of the abdomen.

Preservation of Warmth.

It is of particular consequence, to preserve the warmth of the body, and thus also the susceptibility of irritation. The warming of the body should be continued during the whole resuscitative process, and the poultices, and

fomentations, often renewed. A method which deserves to be greatly recommended, is to place the patient in a bed which has been previously warmed, and kept in this state by warming-pans filled with hot-water and wrapped up in flannel. Warmth is likewise preserved by gentle friction of the body.

Means of restoring the susceptibility of stimuli.

b. The proper use of stimulants, has been pointed out in the preceding chapter; but it cannot be too often repeated, that in the application of them, we ought to consider that state of irritation, of which the patient is susceptible.

As it has been proved, that when the vital power, though present, is in a latent state, stimulants may become totally ineffectual, we never can be certain, that a body is entirely lifeless. Even the application of red-hot iron may for some time be unable to excite irritability.

By proper attention to that susceptibility, we are also enabled to determine the degree of the stimulants to be applied; a matter of great consequence on such occasions. Sometimes, when signs of returning life have been observed,

served, the best hopes have been frustrated by improper treatment, especially by the application of too powerful stimulants.

In general, it may be considered as a rule, first to administer gentle stimulants, and gradually apply such as are more potent. In cases of apparent death, the *violence* of stimulants is of less consequence, than the manner of their action, compared with the susceptibility of the individual. Many constitutions are affected by very gentle stimulants, while others cannot be excited by those of the strongest kind. In hysterical affections of women, burnt feathers may, sometimes, produce a powerful effect. Regard should therefore be paid to the predominant inclinations of the patient. Thus, lovers of music have been roused by the power of harmony; others have been restored by shouting into their ears the name of a particular friend. In such cases, peculiarity of constitution, temperament, and mental disposition, require to be accurately investigated, and compared with the nature and state of the nervous system, and the particular irritability of different parts of the body. As it is known that the region of the pit of the stomach is ex-

quisitely sensible, we should particularly apply to that part, the means of warming and stimulating the system. The intestinal canal is likewise susceptible of a considerable degree of irritability.

Before I enumerate the different stimulants, I shall treat of the use of friction, which ought to be practised with great precaution. In the beginning of the resuscitative process, we should particularly avoid violent friction; because, by this operation, the blood will be determined to the heart and lungs, from all parts of the body, and the remaining spark of vitality may thus be easily extinguished. The consequences of friction, being of such importance, an inquiry into the cases, and the different degrees of its application, will not be deemed superfluous. Let us consider:

1. *The state of susceptibility of irritation.*—Above all things, the means of exciting this susceptibility ought to be carefully applied. During this process, particularly when signs of susceptibility are discoverable, we may proceed to friction, which, however, should at first be very moderate.

COLEMAN, by his experiments made with drowned animals, demonstrated the pernicious effects of improper friction. He justly observes, that as the right ventricle of the heart is naturally overcharged with blood, which would be increased by friction, it ought not to be attempted till the pulsation of the heart be perceptible.

2. *The particular state of persons apparently dead*, also deserves attention; and whether the susceptibility of irritation appear soon or late: in either case, friction will promote animation. Thus, in cases of apparent death by cold, it will be proper, soon after the application of snow, or the cold-bath, to proceed to friction, as the best promoter of internal warmth: in cases of drowning, however, it should be applied at a later period.

Friction may be usefully combined with other stimulants, and even supported by them: such are the shower-bath, electricity, &c. all of which, for the sake of greater accuracy, I shall divide into two classes.

a. *Gentle*

a. *Gentle Stimulants.*

1. *Odorous substances.*—Spirit of wine, vinegar, bruised garlick, or burnt feathers, applied to the nostrils, are very proper remedies, both in cases of *asphyxia*, and of still-born infants. I cannot avoid giving an admonition against the use of strong sternutatories, as for instance, spirit of sal ammoniac, hellebore, &c. The sense of smelling should not be too powerfully affected; because these stimuli are immediately communicated to the brain, and consequently will be attended with the greatest danger, in cases where there is an obvious determination of blood to the head, particularly in new-born infants, suffocated persons, and those attacked by sanguineous apoplexy.

2. Bathing the forehead and temples with spirit of wine, brandy, or vinegar.

3. *Stimulants applied to the tongue.* That organ should be first rubbed, and afterwards stimulated by a few drops of wine, or a little salt, remedies which, on account of their great efficacy, should never be neglected. STOLL relates, that several stimulants had been applied in

in vain, to restore a still-born child to life; but, when its tongue was rubbed, it began to cry, and recovered. Another observation confirms the efficacy of this method, in cases of drowning. A girl three years of age was taken, apparently dead, out of the water, and after being well wrapped in warm cloths, by which her susceptibility was excited, some salt was introduced into her mouth, in consequence of which she began to vomit. Afterwards the soles of her feet were rubbed with salt, till they became warm; she at length opened her eyes, and was completely restored. This resuscitative method, simple as it may appear, is much to be commended; for it affords an instance of the well-timed application of friction, which proves most efficacious, when the first symptoms of returning life appear.

4. Bruised garlick, or snuff blown into the nose. This remedy, when signs of vitality are perceptible, will produce the best effect, by exciting salutary contractions. As an elucidation of this, I refer to the case of a drowned child, related in the second section.

5. Injec-

5. Injections of moderately stimulating substances into the vagina, for instance, vinegar, or cold water, may be efficacious, in cases of a contracted uterus.

6. Cloths dipped in the coldest water, and applied to the genitals. The good effect of this remedy, in spitting of blood, induces us to hope, that it may prove equally useful in cases of apparent death.

7. Stimulating the intestines by strong clysters of brandy, &c.

8. Sprinkling of the face with cold water. In opposition to BROWN, I maintain cold to be a stimulant, with which the ancients* were well acquainted.

9. Whipping with nettles is an excellent remedy, but much depends upon the critical moment of its application. Its effects will be the more salutary, if applied when indications of susceptibility become apparent; when the

* So OVID sings of the fainting LAODAMIA, when she takes leave of her consort:

Lux quoque tecum, tenebris exanguis abortis
Succiduo dicor procubuisse genu
Vix socer Iphiclus, vixume grandævus Acastus:
Vix mater gelida moesta refiçit aqua.

heart

heart begins to contract, and the animal heat to diffuse itself through the body.

10. Friction of the soles of the feet, is not esteemed a very powerful remedy, but as a secondary aid, it should not be neglected. Rubbing of the feet with salt, is productive of a similar effect; the best application of which, is illustrated in the instance above-mentioned.

11. A great noise and shouting into the ears of the person apparently dead. There are many instances of resuscitation by this method, which, however, is to be tried only in cases almost hopeless; as its effects, in the progress of recovery, might be prejudicial.

12. A poultice made of ginger, and applied to the skin. This powerful stimulant is prepared by macerating ginger in burning spirit of wine.

Strong Stimulants.

Some of these may have the semblance of cruelty; but are certainly beneficial, as they tend to save life. What is a transient pain, when compared with its salutary effects! Besides, it is well known, that such stimulants are not painful to persons in a state of insensibility;

sibility; being felt only when the greatest danger is overcome, and at that moment, every sensation of pain is mitigated by the transport of being restored to life.

Sometimes violent stimulants are indispensably necessary, when the latent vital power must be instantaneously roused; and in such cases, even the most severe means should be employed. When weak stimulants, of every description have been successively tried, with little effect, recourse must be had to those which are more powerful. Of this nature are the following:

1. Burning with a red-hot iron. A woman, apparently dead, could not be recovered, till a red-hot iron was brought into contact with her neck.

2. Melted sealing wax, or pitch dropped on the skin.

3. Scarification.

4. The drawing of a tooth.

5. Instilling a few drops of a volatile spirit into the inner corner of the eye.

6. Stimulating the throat with a feather dipped in volatile alkali, may be efficacious with subjects whose humours are vitiated.

7. Errhines,

7. Errhines, such as, volatile spirits of hartshorn, sal ammoniac, &c. are beneficial to phlegmatic constitutions.

8. Several fluids, for instance, a solution of tartar emetic, or HUXHAM's antimonial wine, conveyed into the stomach by means of the tube invented by HUNTER. The flexible tubes described by COLEMAN, may likewise be used for this purpose. He recommends five or six ounces of brandy, rum, or any other cordial, or aromatic fluid, to be introduced into the stomach.

9. The shower-bath is one of the most efficacious stimulants, and ought to be used in all cases of suspended animation.

10. Electricity.—Whatever has been said concerning friction, may likewise be applied to the use of electricity. The electric fluid is particularly to be conducted through the heart; the shock, however, should not be violent; for such would irrecoverably destroy the latent spark of vitality.

Stimulants of the most violent kind.

These are administered with a view to excite, if possible, the inert vitality, after the

usual stimuli have been tried without success.

1. The shower-bath with boiling water. It is dropped on the upper part of the hands or feet, or on the left breast, by means of a tube of about an inch in diameter. BURNSTIEL restored a man to life who was palsied and in a state of insensibility, by pouring boiling water upon his feet.

2. Burning *moxa* on the pit of the stomach.

3. Injection of tartar emetic into the arteries.

4. Transfusion of blood. This operation deserves particular attention; and though successfully tried at first, it was afterwards neglected. Two veins are opened, and while the blood of any other animal is transfused by a small tube inserted in one orifice, the old blood is carried off by the other. It is probable, that by a judicious management of this operation, the sudden impression of new blood on the noblest organs of life, will seldom fail to produce an extraordinary change in the constitution of the patient. Hence, it might be successfully performed in different cases of apparent death.

Many

Many are the salutary stimulants in our possession; but how difficult is the choice even to the most skilful physician! The greater number of resuscitatives which a physician can command, the better; for cases may occur, when after several unsuccessful applications he would be obliged to relinquish the subject, unless he knew of a few domestic remedies, which might, on a particular occasion, prove the most proper and efficacious.

The greatest part of the rules for reviving persons apparently dead, are given in an empirical manner, without any regard to their application. To avoid this error, the proper remedies only shall be here enumerated.

Conditional means of relief; these are,

1. *Venesection.* The too general recourse to this remedy, in all cases of apparent death, is much to be regretted. Apoplexy was formerly supposed to arise only from plethora; hence, the first and principal remedy in cases of suspended life, was blood-letting. The physician, however, ought not only to know the indications and contra-indications of venesection, in general, but also the age, state of

the constitution, &c. of the patient, must determine him how to act. Thus a retention of the menses may be an accessary cause of apparent death from drowning, a remarkable instance of which, will be found in Section II.

2. *Bronchotomy*:—Physicians are divided in opinion, respecting the necessity of this operation; in many cases, however, it is the only method by which air can be conveyed into the lungs, in order to restore respiration, when the teeth are so firmly closed as to prevent the application of a pneumatic tube, provided we adopt the idea of COLEMAN, that the inspiration of air is indispensably necessary.

3. Inflation of the lungs. This operation seems, in general, to be prejudicial; and, as it is attended with great difficulty, it can scarcely ever be recommended to persons who are not of the faculty. If performed alone, without warming, moderate friction, &c. it will prove rather injurious to the subject; and without hesitation, I subscribe to what Professor VOGEL, of Rostock, wrote to me on this subject. "I, for my part," says he, "expect very little success from the introduction of air into

into the lungs; and I am of opinion, that by the general method of proceeding, little or no air will reach this organ, and even if it does, I never could perceive the least expiration of it, nor any motion of the chest."

Unless the tube can be introduced into the glottis, not even an expansion of the lungs will be produced, as the epiglottis prevents its entrance. Air which has already been breathed, is consequently unfit for respiration; while, on the other hand, the use of the bellows may prove dangerous, by the violence of their exertion on the lungs.

The common practice of continuing this operation too long, is also dangerous. I know a case of a person apparently drowned, in whom the signs of returning life were perceptible, but whose recovery was prevented by the abuse of this stimulant.

If any benefit can be expected from this remedy, it is by its stimulating effect, which has, sometimes, proved beneficial to still-born children. Professor OSIANDER is of opinion, that by this process the mucous matter which covers the lungs, is, in some degree, dis-

 pelled,

pelled, and a passage cleared for the admission of air.

4. *Emetics.* While no signs of perfect susceptibility of irritation are perceptible, emetics may prove very prejudicial; and even after resuscitation, they should be administered with great caution. On reflecting upon the nature of apparent death, which is a state of real asthenia, and upon the effects of an emetic, we may be fully convinced, that, in this case, the administration of such a remedy, will generally be attended with danger. The indications for the use of emetics, are a rattling in the throat, particularly a hiccough, during which there is no stagnation of mucus; an entire exemption from inflammatory symptoms. Cases in which emetics may be administered, are detailed in Section II. respecting the treatment of still-born infants.

5. *Tobacco Clysters.* This is a doubtful, nay, it generally proves a dangerous remedy; the stupifying property of tobacco suppresses vital action, and clysters of it are also injurious, by swelling the intestines, insomuch that the cavity of the abdomen can scarcely contain the tumid

tumid viscera, while the diaphragm is forced upwards, and the action of the lungs prevented. A decoction of tobacco is also improper, but particularly the blowing of tobacco smoke into the lungs. The application of tobacco clysters is particularly detrimental to persons apparently suffocated by the cord, or still-born children. In the second stage of the resuscitative process, when symptoms of returning life manifest themselves, such clysters might, perhaps, be used with safety*.

Many instances of the successful application of tobacco clysters; of violent friction, even in the beginning of the resuscitative process, and of emetics, successfully applied, may, perhaps, be opposed to what I have stated. These may be facts, indeed, but it is uncertain whether the recovery took place by virtue of such remedies, or during their application. Great is the power of the vital principle, which sometimes triumphs over all obstacles, even over the prescriptions of daring empirics; but can we ascribe to their medicines the restora-

* See Section II. art. Some Remarks on Drowned Persons.

tion

tion of a patient, whose constitution was strong enough not to sink under them? It is the same in cases of apparent vital extinction; especially as the patient is not affected by things, which, in a state of health, would certainly have proved fatal.

VII. *General Considerations respecting the Treatment of Persons Apparently Dead, or otherwise endangered.*

A. *Reflections on the preceding circumstances.*

a. *Remote circumstances:*—Season, sex, age, temper, state of health, diseases, state of the mind, passions, regimen.

b. *Proximate circumstances:*—Weather; time when the accident happened; duration of apparent death; time which elapsed before assistance was procured; nature of the accident.

B. *Consideration of present circumstances.*

a. External coincidences:—Place, time, weather, persons present, convenient remedies.

b. *State*

b. *State of the body:*—Wounds, contusions, fractures, ruptures; appearance of the face, whether blue, swelled, or hippocratic; eyelids shut or open, blood-shot or swelled; the eyes bright, turned, filled with mucous matter, covered with filth, cornea more or less opake, shrivelled, or collapsed; pupils dilated, of an equal size, sensible of the impression of light, froth at the mouth and nostrils, whether bloody or otherwise; the tongue swelled and dependent; the skin livid, and without elasticity; the anus open; the abdomen tense, inflated, or of a greenish hue; the limbs rigid, contracted, or flaccid; internal and external warmth, fever, heat, coldness, pulse, respiration.

C. *Circumstances attending resuscitation.*

a. *During the process:*—Signs of returning life; what they are, and after which operation they commenced.

b. *State after resuscitation:*—Pain, anxiety, sickness, stupefaction, giddiness, a burning sensation in the limbs, fever, spasms, palsy.

VIII. *Analysis of Particular Cases of Apparent Death.*

Drowning.

1. Season.

2. Weather.

3. Length of time the person has continued under the water.

4. The state of his mind when the accident happened; whether he was intoxicated, frightened, &c.

5. Constitution of the body.

6. Whether he fell into the water in a state of perspiration.

7. The height from which he fell.

8. Whether he fell with his head foremost.

9. Depth of the water.

10. Properties of the element; whether it was cold or warm, sea or river water.

11. The position of the person while in a state of submersion.

12. The clothes he wore.

13. Manner in which he was taken out; whether by the feet, and without receiving any injury.

14. Treat-

14. Treatment; whether he was inverted or rolled on a tub, or what other methods were tried for his recovery.

Suspension of Life by intense Cold.

1. Previous circumstances, causes, &c.

2. Length of time the person had been in a benumbed state.

3. Situation, whether under the snow, or exposed to the air.

4. The nature of his clothes.

5. Condition of the body; whether the limbs are in a gangrenous state.

6. Method of assistance, whether he was brought into a warm room or placed near the fire; or if any other improper means were applied.

Suffocation by the Cord.

1. Season of the year.

2. Whether the person had been strangled in the open air, or in a house.

3. How long he had been suspended.

4. State of his mind; diseases, and other antecedent causes.

5. Treat-

5. Treatment in taking him down; whether he fell to the ground?

6. Examination of the body; bruises, contusions, &c.

7. Resuscitative method.

Suffocation by Noxious Vapours.

1. Nature of the vapours; whether those of coals, moist wood, fermenting liquor, or sulphurous minerals.

2. Place where the accident happened; whether in a close room, cellar, mine, or pit; or during sleep, near a coal-fire, &c.

3. How long he had been suffocated.

4. State of the body.

5. Treatment.

6. Signs of returning life; whether, after being sprinkled with cold water, a shivering motion was observable.

Apparent Death by Lightning.

1. Place; whether in a house or in the open air, at the fire-side, or under a tree?

2. Nature

2. Nature of the thunder-storm; direction of the lightning; damage done by it to buildings.

3. Condition of the sufferer.

a. His state previous to the accident.

b. External injuries, such as burns, streaks, &c.

4. Method of recovery: whether the earth-bath was resorted to?

5. Complaints after resuscitation; a burning pain in the limbs, thirst, fever.

Still-born Infants.

1. State of the mother's health during her pregnancy, particularly, a short time before her delivery.

2. Condition of her body; formation of the pelvis.

3. Circumstances which attended parturition; whether easy, or difficult; a natural or artificial birth.

4. Conduct of the midwife.

5. In what manner was the child born? with the head, feet, or anus foremost?

6. Condition of the child: colour of the face and skin, flexibility or stiffness of the limbs.

7. State of the navel-string; its pulsation.

8. Operations of the midwife; her manner of cutting the navel-string; and whether she suffered it to bleed?

9. How long the child had continued in a state of asphyxia?

10. Whether any methods of recovery had been tried, and their nature?

11. Signs of returning animation.

Overlaid Children.

1. Contingent causes; whether the accident happened by the inattention of the mother or nurse?

2. State of the body; contusions; injuries of particular parts.

3. Manner of death; whether by pressure or suffocation?

4. Time which had elapsed since the accident happened.

5. Symptoms: convulsions, impeded respiration, apoplexy.

6. What

6. What method of resuscitation had been tried?

Apparent Death by a Fall or Contusion.

1. Efficient cause; nature of the fall; height whence the person fell; and instruments by which the sufferer was wounded.

2. Examination of the body, particularly wounds of the head, the hair being previously cut; injuries of other parts; contusions, dislocations, fractures.

3. State of respiration and the pulse.

4. Duration of the lifeless state.

5. Remedies, particularly, domestic medicines, such as arnica, &c.

SECTION SECOND.

THE theory concerning the subject of resuscitation having been detailed in the former Section, I shall now proceed to the practical part, and describe the various methods of assistance in *particular* cases of apparent death. For the sake of perspicuity, I shall adopt tables, by a reference to which, in sudden accidents, the remedies applicable to particular cases may easily be found. Such resuscitatives as cannot be administered indiscriminately, are marked with figures, as references to a subjoined list of the most essential remedies. The others have been analyzed in the theoretical part of this work; but as even the best description of the necessary apparatus for the resuscitative process, must be imperfect, I have merely enumerated them. To those who wish to become more intimately acquainted with the most perfect apparatus for this

this purpose, I recommend the following excellent publication: "*Geschichte and jetzige Einrichtung der Hamburgischen Rettungsanstalten für im Wasser verunglückte*," namely, "The History and present State of the Resuscitative Institution of Hamburgh:" by J. A. GÜNTHER, with plates, Hamb. 1794.

In order to render this work more perfect, I have also mentioned GORCY's bellows, though I am convinced, that they are almost unnecessary: for the principal attention of the practitioner should be directed to a speedy excitement of irritability.

I. *Resuscitative Apparatus.*

A. *General apparatus.*

1. *Instruments:* A lancet, bistoury, a syringe to cleanse the throat of mucus; blankets.
2. Sticking plaster.
3. Soft brushes for friction.
4. A quantity of brandy or wine.
5. A bottle of oil.
6. Vinegar.
7. Culinary salt.

8. Warm water for bathing.

9. Cold water.

10. A deep tub, for bathing the feet.

11. An oblong vessel, for bathing the whole body.

12. A quantity of aromatic plants.

13. Ginger, mustard, vesicatories.

B. *Particular instruments.*

1. HUNTER's thermometer.

2. Three or four small tubes, such as COLEMAN has recommended *.

3. GORCY's bellows †.

4. A portable electric machine.

5. Dr. RICHTER's instrument for opening the wind-pipe.

A particular chest, containing the most necessary instruments, and a sufficient quantity of medicines for internal and external use, ought to be in the possession of every medical man ‡.

* See COLEMAN's Treatise on Suspended Respiration, &c.

† See GREN's Journal der Physik, Vol. II. No. I. P. I. and also "Geschichte der Hamburg. Rettungsanstalten." p. 24.

‡ A full description of this medicine-chest is given by KITE, in his Essay on the Recovery of the Apparently Dead.

II. *Prac-*

II. *Practical Rules for the Treatment of Persons apparently dead, or endangered.*

1. Crowds should be guarded against, as five or six persons are sufficient to perform the process, and a few others may procure the necessary instruments.

2. The person endangered should not be brought into a warm or crowded room.

3. A free circulation of air must be obtained, by opening the windows of the room where the process is conducted.

4. A hasty application of resuscitatives is dangerous, and tends to extinguish the vital principle.

5. All resuscitative remedies, when too strong, and abundantly administered, are prejudicial.

6. Proper means of exciting susceptibility ought to be applied from the commencement, and continued throughout the whole process of resuscitation.

7. Stimulants should be administered only in proportion to the perceptible degree of susceptibility.

8. All

8. All resuscitatives are to be gradually applied, according to the temperature of the body.

9. A single remedy should never be considered as sufficient to restore animation, but a proper and successive application of several should be pursued.

10. Before the patient has recovered the power of deglutition, neither medicine nor nutriment ought to be administered. Emetics, in particular, might prove fatal at this period.

11. Clysters of tobacco, emetics, and sternutatories, ought to be used with great caution, or not at all; they are particularly dangerous at the commencement of the process.

12. All powerful odours are prejudicial, especially during the first indications of life.

13. The process should be continued from *four* to *six* hours; nor should the recovery of the patient be despaired of, till the most unequivocal signs of death have become evident.

III. *Particular Directions.*

Treatment at the commencement.

1. Violent concussions are prejudicial, though a moderate rolling motion has, sometimes, been efficacious.

2. Strong

2. Strong friction is also injurious at the commencement of the process.

3. Particular care is required to wrap the body in warm blankets or cloths, and warm it moderately, in cases where a higher temperature is salutary.

Continuation of the Treatment.

1. The process of warming, and the means of exciting susceptibility, must not be too soon discontinued; nor should the person apparently dead, be uncovered, but when indispensably necessary.

2. Stronger friction and stimulants are generally indicated:

a. By signs of susceptibility; such as returning warmth; throbbing of the heart, and spasmodic shivering of the limbs.

b. The method of exciting susceptibility of irritation having been continued for some time, it may be supposed actually to exist, and such stimulants are to be administered, as may tend to promote its developement.

4. Gentle stimulants ought to be first administered, and those of a stronger nature gradually and successively applied.

Treat-

Treatment of the Patient on the first Symptoms of returning Life.

1. A precipitate method to enforce resuscitation, ought to be guarded against, as well as the application of violent stimulants, such as strong odours, &c.

2. The before-mentioned method, particularly that of gentle friction, is to be moderately continued.

3. The gradual developement of the vital power should be carefully attended to, as the nature and degree of stimulants must be determined in consequence.

4. A careful continuance of the application of warmth to the patient, will be most efficacious at this period.

IV. *General Treatment of Persons in Danger.*

In order to enable the reader to comprehend, at one view, all resuscitatives, and the rules for their application, with respect to vital power, I shall give a short description of the treatment of persons endangered by fatal accidents.

First

First Treatment.

Diligent search for the body, and its removal to the open air; undressing, &c.

The subject should be placed in an erect position; the head somewhat elevated, and turned to the left side; the best place is a table in the middle of a room, so that the assistants may have easy access.

The person apparently dead, ought also to be removed in the above-mentioned posture, and the mouth and nose cleansed of froth or filth without delay, to facilitate the communication of air to the lungs. This may be effected by the finger, a feather dipped in oil, or by a syringe. The body is, at the same time, to be kept covered with warm blankets.

RECOVERY OF THE SUSCEPTIBILITY OF IRRITATION.

Warmth, applied according to the temperature of the body.

Persons, who have suffered by intense cold, should be covered with snow, or put into an ice-cold bath; on the contrary, the drowned, if the

the body has not been exposed to intense cold, are to be wrapped in warmed cloths or feather-beds, or placed in a tepid bath; in short, any method by which warmth can be communicated to the body, may, in such cases, be adopted. We should now attentively watch the signs of susceptibility, and examine whether any part of the body begins to grow red or warm; whether the motion of the heart be perceptible, &c. If such signs are observed, stimulants may be administered; but if not, the warming process is to be continued for some time, and succeeded by the application of stimuli. Less injury will be done by the omission of stimulants in the beginning of the process, than by neglecting the other means of exciting susceptibility.

Recovery of Irritability.

Stimulants.

During the continued application of the means of exciting the susceptibility of irritation, for instance, with persons who have suffered by cold, the cold-bath; with those apparently drowned, fomentations; and with such

as

as are struck by lightning, the earth-bath, &c. other stimulants may also be applied *at the same time.*

These are: sprinkling with cold water; friction, proper clysters, &c. During the application, the person apparently dead must be kept in the warm-bath, or uncovered as little as possible; because the process of warming ought by no means to be interrupted.

The signs of susceptibility, by which the degree of irritation may be ascertained, must be our guide in the application of stimulants.

These are to be administered successively, as the following examples will demonstrate: After the application of the shower-bath, namely, when cold water is dropped from a height upon the pit of the stomach, the subject must be immediately wiped dry, and the left side, in particular, as well as the limbs, chafed upwards. During this process, which may be repeated at intervals, the subject should remain in the warm-bath. This operation has proved very efficacious in exciting all the energy of vital power. On sprinkling with cold water, in successful cases, a contraction of the muscles of the face, and a shivering of

the whole body is perceptible; and on a repetition of this process, more certain symptoms of active vital power appear, such as opening the eyes, sneezing, &c. Other stimulants, clysters, the application of a poultice of ginger, and friction of the soles of the feet, are to be applied either before or during the intervals of the process, according as circumstances may require.

If the above-mentioned method should fail of success, stronger stimulants may be tried, such as scarification, the actual cautery, boiling water dropped on the left side, while other modes of excitement are continued.

Violent stimulants should be applied only for a short time, with frequent pauses, during which it should be examined, whether there appear any signs of re-animation.

Treatment of the Patient after the return of Life.

When the first symptoms of returning life appear, proper care must be taken not to suppress the vital power, by any violent mode of proceeding, such as increasing the stimulants,

lants, shouting in the ears of the patient, &c. The application of remedies may be suspended, but not entirely relinquished. Moderate friction is requisite, even when the signs of re-animation are no longer doubtful. The patient is to remain in the bath, or should be wrapped up in warm cloths; fomentations of aromatic plants are to be applied to the pit of the stomach, and a bladder filled with warm water to the left side; clysters of warm brandy are likewise to be continued. Whipping with nettles in this crisis, may also be of singular efficacy, in promoting the circulation of the blood; as well as moderate friction with brushes dipt in warm oil, and rubbing the soles of the feet with salt. A small quantity of wine, or a solution of salt dropped on the patient's tongue, will be effectual stimulants. By attention to the signs of returning susceptibility, the degree of vital power may be ascertained, and the treatment modified accordingly. Only by slow degrees, and with the greatest precaution, can the reviving patient be restored to perfect life. Violent stimulants, such as powerful electric shocks, strong odours, &c. are particularly injurious at this period.

When signs of returning life become progressively evident, especially the principal functions of the animal frame, such as respiration, pulsation of the heart, and vital warmth, whatever may impede the developement of animation is to be removed. The mouth is to be cleansed from mucus, to facilitate the admission of air to the lungs; symptoms of plethora are to be mitigated, by venesection in the upper part of the arm; but this operation requires the greatest precaution.

Treatment after Resuscitation.

The patient must be left undisturbed; the warmth of the bed ought to be supported, and as soon as he can swallow, a little wine, or tea with a few drops of vinegar, or warm beer, &c. ought to be administered.

The physician must also pay attention to concomitant symptoms, such as vomiting, diarrhœa, coughing, asthma, fever, convulsions, &c.

If the resuscitative process be continued without success, for five or six hours, the subject ought to remain for some time longer in the warm

warm bed or bath; or be covered with ashes or ground malt. There have been instances of persons apparently dead, who revived after all hope of their recovery had been relinquished. In such cases the resuscitative process had excited the susceptibility of irritation, but had been unable to restore irritability, the developement of which, was effected by nature.

V. *Recapitulation of the different Resuscitative Remedies.*

The following directions are calculated to facilitate the application of the foregoing rules, in particular cases of apparent death.

Suffocation in Water.

First Treatment.

1. The subject should be gently taken out of the water by the arms, to prevent the head and breast from being injured.

2. The body ought to be carefully carried into the nearest house, with the head somewhat raised; or the resuscitative process may be performed in the open air.

3. The upper part of the body must be supported in an erect position, with the head inclining towards the right side, and the whole body should be placed in such a manner, as to admit of free access.

4. The clothes are to be taken off without delay; and no violent shaking of the body should be attempted.

5. The mouth and nose are to be cleansed from mucus, by a feather dipped in oil.

Warmth.

1. The subject must be covered with blankets, or feather-beds, hay, straw, &c.

2. If it be a child, a person may lie beside it in the bed, to promote warmth.

3. A tepid bath should be applied, the warmth of which ought to be supported.

4. The warmth of the bath ought to be moderate in the beginning; and gradually increased to the 70th degree of FAHRENHEIT's thermometer.

5. Different parts of the body, particularly the pit of the stomach, ought to be warmed by the application of a bladder filled with tepid water, or by aromatic fomentations, or a warm-

a warming pan wrapped in flannel, and gently moved along the spine.

Stimulants.

1. Friction, applied gently at the beginning, and gradually increased, especially when the motion of the heart is perceptible. This operation is performed with warm flannel, or brushes dipped in oil.

2. Stimulating clysters of warm water and common salt; aromatic plants; or a strong solution of tartar emetic.

3. Clysters consisting of five or six ounces of brandy.

4. Sprinkling with cold water.

5. The cold shower-bath (No. VI.), or aspersion of the pit of the stomach, with a syringe.—N. B. After each application of the shower-bath, the body ought to be wiped dry, and the pit of the stomach gently chafed.

6. Electricity (No. X.)

7. Whipping with nettles.

Remedies to be applied on the Appearance of Life.

1. Moderate continuation of the resuscitative method before-mentioned.

2. Rest.

3. After the return of deglutition, tea with vinegar, may be administered.

4. Vomiting should be excited, by a decoction of chamomile, with honey of squills, or by the application of a feather dipped in oil.

5. The patient must be treated with as much caution as one dangerously wounded, or even as a lying-in-woman.

Resuscitatives, only to be applied in Cases of Extremity.

1. Introduction of air to the lungs (No. XI.)

2. Venesection (No. I.)

3. Vomiting.

4. The hot shower-bath.

N. B. Persons drowned in the winter season, should be treated in the beginning of the process, as if they had suffered by intense cold.

Appa-

Apparent Death by Cold.

N. B. External warmth must not be applied till the internal warmth of the body be excited; and even then, in regular proportion to the gradual increase of the latter.

First treatment.

1. The resuscitative process should be performed in the open air, or in a cold room.

2. The body should be cautiously carried, without delay, to the nearest house.

3. During removal, and the whole process, the body should be kept somewhat erect, with the head turned a little towards the right side.

4. The subject is to be carefully undressed.

N. B. Violent treatment ought to be guarded against, such as the immoderate friction and bending of the limbs, by which dislocations and fractures may be occasioned.

Means of exciting Internal Warmth.

1. The whole body, except the face, is to be closely covered with a layer of snow half a yard thick.

2. Appli-

2. Application of cold water mingled with ice.

3. Cloths dipped in cold water, and applied to the breast and head.

Stimulants.

1. Gentle friction (gradually increased) with cloths dipped in cold water, or with soft brushes.

2. The shower-bath (No. VI.) and friction should be, alternately, applied. After having continued this method for a considerable time, the body must be left undisturbed for a few minutes.

3. Clysters of cold water, with vinegar, or oil.

4. Injection of five or six ounces of brandy into the anus.

Remedies to be applied on the return of Life.

N. B. The application of warm fomentations may now be discontinued; and the resuscitative process pursued in a cold apartment.

1. Stronger

1. Stronger friction, cautiously performed.

2. The patient placed in a bed between two persons, in order to promote warmth.

3. Wine, vinegar, or oil, should be externally applied.

4. Emollient clysters.

5. When the patient is able to swallow, tea, with vinegar, or wine, should be administered.

Resuscitatives, to be applied only in desperate Cases.

1. Venesection.

2. The earth-bath (No. VIII.)

3. Introduction of air into the lungs (No. XI.)

4. Electricity (No. X.)

Suffocation by the Cord.

First treatment.

1. The suspended body must be gently taken down.

2. The cord immediately cut.

3. All

3. All pressure of the clothes, such as neckcloth, garters, girdle, stays, &c. removed.

4. The head supported in an erect posture, and turned towards the left side.

Resuscitatives.

1. Air should be blown on the face.

2. The face sprinkled with cold water, or vinegar and water.

3. The œsophagus stimulated with a feather dipped in oil.

4. Vinegar applied to the nostrils.

5. The region of the throat and heart gently pressed.—Caution against immoderate friction, especially in the beginning, and also against the application of violent stimulants, sternutatories, or (what is extremely detrimental) sulphureous vapours.

Means of Warming.

1. The subject is to be wrapped in warmed flannel, or placed between warm feather-beds.

2. Appli-

2. Application of a bladder, filled with tepid water, to the pit of the stomach.

3. Fomentation with cloths dipped in warm water.

4. Poultices of aromatic herbs.

5. The tepid bath.

Stimulants.

1. Moderate friction, particularly on the left side; with proper attention to the state of susceptibility.

2. The shower-bath combined with friction (No. VI. IX.)

3. Stimulant clysters of salt and oil.—The application of violent stimulants should be avoided, when a determination of blood towards the head and heart is perceptible.

Treatment on Apparent Resuscitation.

1. Blowing air on the patient's face, and sprinkling it with cold water, continued.

2. Clysters prepared with a strong solution of tartar emetic.

3. Fomentations of chamomile and wine applied to the contusions.

4. After recovering the power of deglutition, cold water with vinegar may be administered.

5. Gentle antiphlogistic purgatives.

Resuscitatives to be applied only in Cases of Extremity.

1. Venesection (No. I.)

2. Introduction of air into the lungs (No. XI.)

3. Bronchotomy (No. II.)

Suffocation by Mephitic Vapours.

Different kinds of vapours: of charcoal, metals, beer, vinegar or must, in a state of fermentation; flax, moist wood, turf, pit-coal; and those in unventilated apartments, caverns, and mines.

Symptoms. Giddiness, head-ach, lethargy, fainting, convulsions, torpor, asphyxia.

*First treatment**.

1. The windows and doors opened.

2. Immediate removal of the subject into the open air, or an aired room, the windows of which must remain open.

3. The body undressed, and all pressure immediately removed.

4. It should be supported in a leaning posture upon a chair.

Resuscitatives.

1. The subject should be covered with flannel, or blankets.

2. The face sprinkled with vinegar.

3. A bath prepared for the feet, or the whole body.

4. The face and pit of the stomach sprinkled with cold water, either by pouring it out of a glass, or squirting it by a syringe.

5. Friction with soft brushes, dipped in oil, must be applied every time the process of

* Of the necessary precautions to be used by persons who venture into pits, &c. which contain noxious air; see No. XVII, and of the purification of the air, see No. XVIII.

sprinkling is performed, after which the subject should be left undisturbed for some minutes.

6. Clysters of vinegar and water.

Remedies to be applied on the return of Life.

1. The use of the before-mentioned resuscitatives, such as vinegar applied to the nostrils; clysters, and gentle friction, are to be continued.

2. An inclination to vomit promoted by a feather dipped in oil.

3. When the patient is able to swallow, vinegar and water, or mint and balm tea, may be administered.

Resuscitatives to be applied only in particular Cases.

1. Introduction of air into the lungs (No. XI.)

2. Venesection (No. I.)

3. Bronchotomy (No. II.)

4. The earth-bath (No. VIII.)

Light-

Lightning.

First treatment.

1. Immediate removal of the body from the farther influence of the mephitic air of the apartment where the accident happened.

2 The doors and windows must be opened for the admission of fresh air.

3. The subject should be undressed, and all other pressure removed.

4. The posture of the body leaning, the head raised, and inclining a little to the right side.

5. Covering it with blankets or cloths.

Resuscitatives.

1. Sprinkling the face with cold water.

2. The earth-bath (No. VIII.)

Remark.—If the earth-bath is applied, it must be continued for several hours, or till certain signs of returning life appear. Stimulants are to be administered at the same time.

3. The shower-bath (No. VI.)

4. Cold poultices applied to the head.

5. Cloths dipped in wine or vinegar, to the pit of the stomach.

 6. Friction,

6. Friction, at first very moderate, and continued from the lower extremities upwards, especially towards the left side (No. IX.)

Remark.—Friction and sprinkling with cold water are to be alternately applied at the commencement of the process; the violent application of the former, however, is extremely improper, and even in the advanced stage, it requires precaution.

Remedies to be used on the return of Life.

1 A moderate continuation of the above-mentioned method.

2. Cloths dipped in wine, or warm vinegar, applied to the pit of the stomach.

3. Poultices applied to the contusions.

4. Clysters (No. III.)

5. After the recovery of deglutition, water mixed with wine, or balm tea, may be administered.

Resuscitatives to be resorted to only in particular Cases.

1. Venesection (No. I.)

2. Introduction of air into the lungs (No. XI.)

3. Electri-

3. Electricity (No. X.)

4. Blisters applied to the chest, if anxiety prevail.

Still-born Infants.

An examination, whether apoplexy or fainting was the cause of apparent death.

Remark.—Cutting the navel-string, and letting a little blood, should be resorted to only in a case of real apoplexy; and this operation requires the greatest caution.—See Section I. (VIII.)

First treatment.

1. Wrapping the infant in warm cloths or flannel.

2. Its mouth and nose should be cleansed by a soft piece of linen.

Resuscitatives.

1. A tepid bath of wine and water, preserved in a moderate degree of warmth.

2. Warm flannel applied to the body.

3. The subject may be placed in the warm body of an animal recently killed.

4. Cold

4. Cold water mixed with wine, slowly dropped from a considerable height on the pit of the stomach.

N. B. After every application of this process, the body should be wiped dry, and the left side gently rubbed with the hand; it is then to be covered with warmed cloths, and placed in the nurse's lap for a short time, after which, if no signs of life appear, the process must be repeated.

5. The tongue is to be stimulated by rubbing it with a little salt.

6. Clysters composed of oil, water, and salt.

Remedies, when signs of returning life appear.

1. Continuation of warm applications, and moderate friction.

2. The soles of the feet brushed and rubbed with salt.

3. After the recovery of deglutition, a little wine may be administered.

4. In case of a rattling in the throat, occasioned by mucus, a small quantity of HUXHAM's emetic wine, may be dropped into the mouth.

5. The

5. The child is to be gently placed beside its mother or nurse, to promote natural warmth.

Resuscitatives, to be applied only in particular Cases.

1. Introduction of air into the lungs (No. XI.); to promote the evacuation of mucus, and the admission of pure atmospheric air.

2. Electricity (No. X.) should be applied with the same caution as the shower-bath.

Children who have suffered by pressure in bed, through the Negligence of the Mother, or Nurse.

First treatment.

1. Brought into the open air.
2. Cloths or swathings, taken off.
3. Wrapped up in cloths or blankets.
4. The face sprinkled with cold water.

Resuscitatives.

1. The warm bath.

2. Cold water slowly dropped from a bottle upon the pit of the stomach.

3. Friction

3. Friction with the palm of the hand after each application of the water.

4. Rubbing the soles of the feet with brushes.

5. Friction with flannel, fumigated with juniper berries.

6. Poultices with warm wine applied to any contusions.

When Life begins to appear.

1. The application of poultices continued.

2. After the recovery of the power of deglutition, some wine or tea dropped into the mouth.

3. The warmth of the bed and quiet.

Remedies to be applied only in particular Cases.

1. Venesection, when symptoms of plethora are perceived, such as a full pulse, red face, and tumid blood-vessels.

2. Emetics, such as oxymel of squills, administered in small doses; or, in case of pituitous matter, rattling in the throat, &c. HUXHAM's emetic wine.

3. Anti-

3. Antispasmodics, as musk, chamomile tea, and tepid baths, often renewed.

4. Aperient medicines; namely, gentle laxatives, or clysters prepared of senna leaves, with salt.

Apparent Death from a Fall or Concussion.

1. Examination of the wound.

2. The head placed in an erect position.

3. Cloths dipped in cold water applied to the head.

4. The face sprinkled with cold water.

5. Tepid bath for the whole body.

6. Poultices of aromatic plants to the pit of the stomach.

7. Cold water slowly dropped from a height upon the same part.

8. Moderate friction gradually increased, in order to co-operate with the shower-bath.

N. B. Friction is to be employed with great caution, particularly in the beginning of the process.

Treatment after the first Signs of Resuscitation.

1. The subject should be placed in a warm bed.

2. Mode-

2. Moderately stimulating clysters applied, as directed in No. III.

3. After the recovery of the power of deglutition, some wine or vinegar with tea ought to be administered.

Resuscitatives to be resorted to only under certain Circumstances.

1. Venesection (No. I.)
2. Blisters applied to the crown of the head.
3. Electricity (No. X.)
4. Emetics are seldom, if ever, to be used.
5. Due attention should be paid to symptoms, such as vomiting, hemorrhages, convulsions, stupor, &c.

VI. *Survey of the Resuscitatives.*

To facilitate the use of this treatise, it will not be improper, to give the reader a general view of resuscitative remedies; the recapitulation of which may be useful. For the critical remarks respecting them, I refer the reader to the first Section.

Excite-

Excitement of susceptibility of Irritation.

1. Covering with snow.
2. Cold bath.
3. Earth-bath (No. VIII.)
4. Cloths dipped in cold water.
5. Wrapping up in warm cloths or beds.
6. Tepid baths, which may be rendered more stimulating, by mixing wine or brandy with the water (No. V.)
7. Dry bath: covering with warm ashes, in clean warm sand, or ground malt (No. VII.)
8. Application of the internal warmth of animals recently killed, to the pit of the stomach.
10. Application of the warm crumb of bread to the same part.
11. Cloths dipped in brandy or wine.

Application of warmth continued.

1. The subject should be placed in bed between two persons.
2. Bottles, filled with hot water, and wrapped in flannel, to support the warmth of the bed.
3. A bladder filled with warm water should be applied to the pit of the stomach.

4. A warming pan covered with flannel to be gently moved along the spine.

Means of restoring Irritability.

1. Friction with soft brushes, dipped in oil (No. IX.)
2. Stimulation of the tongue.
3. Powdered garlick blown up the nostrils.
4. Whipping with nettles.
5. Friction of the soles of the feet with brushes and salt.
6. Sprinkling with cold water, or the shower-bath (No. VI.)
7. Electricity (No. X.)
8. A poultice of ginger applied to the skin.
9. Stimulant injections, of brandy, &c. (No. IV.)
10. A loud shouting into the ears of the subject.

Stimulants for particular Cases.

1. Cold applied to the genitals.
2. Injections of moderately stimulating substances, such as vinegar and cold water, into the vagina.

3. Titil-

3. Titillation of the fauces with a feather dipped in volatile alkali.

Powerful Stimulants.

1. Application of the actual cautery to the nape of the neck.

2. Melted sealing wax, or pitch dropped on the skin.

3. Pricking the finger under the nail.

4. Volatile spirit dropped into the inner corner of the eye.

5. Sternutatories, spirit of hartshorn, or sal ammoniac.

6. Introduction of several fluids into the stomach, such as a solution of tartar emetic, or HUXHAM's emetic wine, &c. by means of Dr. HUNTER's tube.

7. Boiling water dropped upon the body.

Resuscitatives to be applied only under certain circumstances.

1. Venesection (No. I.)

2. Bronchotomy (No. II.)

3. Introduction of air into the lungs (No. XI.)

4. Emetics.
5. Tobacco-clysters.

VII. *Remarks on Resuscitation, and instances of successful Cases.*

Aquatic suffocation.

A greater number of persons apparently drowned have been restored to life without the use of stimulants, merely by the renovated susceptibility of irritation. I have collected thirty-six cases of persons apparently drowned, in Lausatia, from the year 1772 to the year 1792*, who were restored to life. Most of them were treated by uninformed people, and revived by friction and warming; two persons, however, were indebted for their lives to the continuation of the resuscitative process, for several hours. It is remarkable, that the greatest part of those re-animated were children; which, it seems, is not only to be ascribed to the greater danger of drowning to which they are exposed, but also to the longer continuance of vital power in the infant frame.

* See the author's treatise: Uber Gesundhutswohl, und Volksyorur.

A violent

A violent concussion of the body is detrimental, but a moderate motion of it seems to promote the excitement of vital power; this observation is particularly applicable to the case of children. The Royal *Humane* Society of London, therefore, recommends the following treatment: namely, that two assistants take hold of the arms and legs of the drowned, and shake the whole body for five or six minutes. This should be repeated at intervals during the first hour*. Several cases in which this treatment proved successful, have also come to my knowledge, one of which I shall communicate. A boy of about a year and a half old had lain upwards of a quarter of an hour in the water; and was found with his face downwards, and the whole body livid and swollen.

He was undressed, wiped dry, and wrapped in warm blankets; but the most particular part of the process was rolling the body upon a table, shaking it by the shoulders, and rubbing the feet. This having been continued for an hour, a convulsive motion was observed in the toes; on which a little snuff was blown

* See Report of the Royal Humane Society, for the years 1777 and 1780.

into the nostrils, which excited sneezing. The tongue was stimulated with strong vinegar; the throat irritated with a feather, and at length an injection was administered. The consequence was, that the child vomited a large quantity of water, began to breathe, and in an hour afterwards was completely restored to life. This instance deserves particular attention, on account of the order in which the stimulants were administered; for immediately on the first external appearance of life, the application of snuff to the nose, was succeeded by the irritation of the throat. No process could have been conducted with more propriety; as the spasm which it occasioned, contributed very much to the excitement of vital action. As such cases are better calculated to teach us the right uses of the different resuscitative remedies, than mere theoretical information, it will not be amiss to add another very instructive instance; and the result is worthy of the reader's attention, as a confirmation of my theory.

A woman upwards of 30 years of age, who had been delivered six weeks before, and was affected with epilepsy, fell, in consequence of a fit, from a height of seventy feet into the water;

water; where she remained a full quarter of an hour, before she was taken out. Mr. REDLICH, surgeon of Hamburgh, caused the body to be stripped, and friction with warm cloths to be continued for a considerable space of time, while at intervals a small quantity of spirituous liquor was dropped into her mouth. During this process a bed was continually warmed by hot bottles covered with flannel. When friction had been applied for a quarter of an hour, symptoms of life, such as convulsive motions, and a very weak pulse appeared. It was now thought proper to apply tobacco-injections; after which a violent hemorrhage of the uterus ensued, and the patient gradually revived. At length an *emetic* was administered, which operated successfully. In three hours from the time when she was taken out of the water, she recovered the entire use of her senses, afterwards fell into a quiet slumber, and awoke after some hours repose, without feeling the least sensation of pain.

In this case the stimulants were likewise used with great propriety; and the tobacco clyster was efficacious, as it promoted the hemorrhage. Hence we may also conceive the

propriety

propriety of venesection at the foot, in cases of aquatic suffocation, though, according to the opinion of some physicians, this operation is prejudicial.

Both the cases may serve to prove the simplicity and ease of the true resuscitative method, and how small a number of such means are requisite to restore the life of a fellow-creature. All, indeed, depends upon the proper time of their application.

It remains, however, to be remarked, that the treatment of persons apparently drowned must be different, according to the season of the year in which the accident happened, and the temperature of the water. In the former case, the resuscitative method is nearly similar to that for the revival of persons endangered by intense cold.

Accidents from severe Cold.

In no case, whatever, is the danger of committing homicide greater, than in the treatment of persons who have suffered by severe cold. Their death-like state may deceive our judgment; not only because such persons continue the longest apparently dead, but because the

the want of susceptibility of irritation is, in many cases, not distinguishable from real death. A man benumbed with cold burnt his feet, but continued insensible of the pain, nor did he feel this sensation till he warmed them at a fire: in this case, it is evident, that the susceptibility of irritation was destroyed, while vital power remained.

The following case of successful resuscitation is too remarkable to be omitted:

In the month of December 1783, a man was found lying in the snow, and was carried to the hospital of Carlsruhe, a few miles distant. The body was quite stiff by cold, pulsation had entirely ceased, the teeth were firmly closed, but some froth was observed at the mouth, which induced the physicians to hope for success from the application of resuscitative remedies. His clothes, particularly the gaiters, stockings, and shoes, which were frozen to the skin, being cut off, the swelled livid face and neck, except the mouth and nose, were covered with cloths, dipped in cold water; the body, genitals, arms, and legs were strongly rubbed and covered with snow by several persons alternately. This being continued for five hours,

hours, most parts of the body became red, and at length warm; the toes, however, continued of a dark blue colour, and stiff, as if covered with ice. Respiration soon afterwards was gradually restored, but the patient continued insensible, and at length a large quantity of mucus issued from his mouth. Cold sauer-kraut was then repeatedly applied to his feet, by which means they gradually recovered their natural flexibility. During this process, clysters with vinegar were applied, and the warmth of the room was gradually increased. At length the patient was able to swallow some tea prepared of elder-blossoms, and a few drops of *balsamus vitæ cum liquore mineralis anod.* On the following night he was so far recovered, as to eat a few spoonfuls of soup, and the next day he drank an infusion of aromatic herbs, with an intermixture of nitre and camphor. On the third day he was seized with a fever, attended with violent heat and blistering of the toes; and some days afterwards he complained of a tingling pain in his arms. From his negligence, perspiration was obstructed, in consequence of which, one of his arms became inflamed, and the other benumbed. Venesection

section was twice repeated, and the use of antiphlogistic draughts caused an abatement of the fever and inflammation; but notwithstanding the most careful chirurgical treatment, some of his toes fell off. The patient was sixty-two years of age, of a careless and obstinate disposition, in consequence of which his recovery was slow. He had been benighted, and went astray before he was overcome by the cold; and during his wandering, he had frequently waded through brooks, to which circumstance may be ascribed the loss of his toes.

Lightning.

A man who stood in a kitchen near an unfinished chimney, was struck by lightning, and considered as dead. The body had no visible marks of injury, except a few red streaks on the breast and right arm. Two minutes after the accident happened, he was carried into the open air. The pulse was strong and irregular: the whole body, except the face, was immediately covered with a layer of earth, six inches thick, and cold water poured upon the face. In eight minutes, he began to move his shoulders

shoulders and tongue; and, in twelve minutes, he was so far restored, as to be able to articulate some incoherent words. He was then removed from the earth-bath, put to bed, and rubbed with vinegar. A mixture of vinegar and water was likewise poured down his throat. An hour and a half after the accident, he had entirely recovered the use of his senses, but complained of excessive thirst, and a painful burning sensation in his right arm, and the fingers of both hands. The following night, he could not sleep, on account of intense pain: he rose the next morning; but, for many nights afterwards, he did not enjoy a quiet repose; and even after the expiration of half a year, the sensation of pain had not entirely forsaken him.

In this case, the application of the earth-bath is the most remarkable remedy: it is, however, to be observed, that the use of this excitement of resuscitation, like all the others, ought to be continued for several hours, till signs of returning life appear. I know an instance of a physician, who, having accidentally heard of the earth-bath, applied it, but only for a few minutes. Though, in this case, resuscitation

citation was not effected, yet, during the application, some warmth was perceptible in the subject.

The same phenomena which are produced by violent electric shocks, are observable in persons who have suffered by lightning, namely, shivering and heat of the extremities, anxiety, asthmatic complaints, and extreme sensibility of the electric atmosphere, on the approach of a thunder-storm. A man who had received a violent shock, from an electric battery, afterwards suffered by a similar sensation, lost his appetite and sleep for a long time, and was seized with giddiness and stupor. From experiments made with animals, electricity was analogically inferred to be a very powerful resuscitative, in cases of accidents by lightning. Animals were apparently killed by electricity, and afterwards restored to life, by a second shock through the head and heart.

Still-born Infants.

Of all kinds of apparent death, the resuscitation of still-born infants is most successful; for even the application of moderate warmth

and gentle friction, generally prove efficacious. Although there are many objections against the introduction of air, yet, in this kind of apparent death, it seems to be highly beneficial, by operating as a stimulant, which may promote expectoration, and thus admit the external air freely to the lungs. The breath of another person, however, is pernicious, as such air is rendered unfit for a second respiration. In such cases, indeed, we are not so much to consider the quality of the air, as the irritation which it produces by extending the lungs. Many cases have occurred to me, in which this operation, joined to a gentle pressure of the infant's chest, was successful. Probably a little wine introduced into the stomach of the child, would promote the good effects of this stimulant.

Another very powerful stimulant for the revival of still-born infants, is the sprinkling with water. Dr. NIEMEIER, has communicated an excellent method of performing this process*: "After having taken the lifeless child

* *Journal der Erfindungen*, &c. (Journ. of Inventions, Theories, &c. in Medicine and Natural Philosophy), No. IV. p. 101.

from

from the mother," says he, "and tied the navel-string, I sprinkle the body with brandy, though cold water mixed with vinegar is preferable, or even cold water alone, at the same time gently sprinkling and rubbing the pit of the stomach. If this prove ineffectual, I pour cold water from a considerable height, out of a tea-kettle, upon the left side. Immediately on this application, the body becomes contracted, as if electrified. I then cause the region of the heart to be gently rubbed with the palm of the hand; after which the child is wiped dry, covered with warm cloths, and suffered to rest, for some time, in the lap of its nurse. If, after some minutes, no other signs of life appear, I repeat the shower-bath and friction; and if these prove inefficacious, I try the same process a third time. After each repetition of the shower-bath, rest and warming are requisite. This is most conveniently effected, by placing the infant in the lap, and covering it with warm cloths; a tepid bath may, however, be applied with equal success."

The propriety of this process is confirmed by the following instance: In a case of asphyxia, all resuscitatives proved ineffectual; the

infant, indeed, shewed some slight symptoms of life, which disappeared during the application of the resuscitative method. While in this state, the physician let cold water fall in drops from a considerable height on the left breast. On the falling of each drop, the muscles of the child's face were violently contracted; and when, after a short pause, the operation was repeated, it opened its eyes; and with the third repetition, began to breathe freely, and to cry*.

Great attention, however, should be paid to the proper time for the application of this excellent remedy. In the beginning of the resuscitative treatment, it would, in most cases, be injurious; particularly when a weakness of the system is manifest. Powerful effects may, however, be expected to result from it, after the recovery of susceptibility, as in this case respiration will be promoted, and the latent vitality roused. But, previous to the application of this resuscitative, proper means should be prepared for the application of warmth to the infant's body. This is best effected by tepid baths; which, by relaxing the pores, as well

* Hufeland's Medical Journal, II. 311.

as

as by the pressure on the body, will tend to restore respiration, and promote the circulation of the blood.

During the whole process, we must be particularly careful to cleanse the mouth from mucus. If, therefore, debility, hoarseness, or interrupted respiration, be observed in the patient, we should immediately endeavour to promote vomiting, by tickling the throat with a feather dipt in oil, or by giving a few drops of HUXHAM's antimonial wine; a grain or two of ipecacuanha with tincture of rhubarb, or chamomile tea. As for the use of strong odours, we cannot be too circumspect. In one instance, where all the signs of returning life were perceptible, no sooner was spirit of sal ammoniac applied to the child's nostrils, than it expired in a moment. This instance evinces the injurious tendency of powerful stimulants on the first symptoms of returning life.

All still-born children should be considered as only apparently dead, and the resuscitative process ought never to be neglected. Sometimes two hours, or more, will elapse, before re-animation can be effected. An ingenious

man-midwife, says BRUHIER, was employed for several hours in the revival of an apparently still-born child, and as his endeavours proved unavailing, he considered the subject as really dead. Being, however, accidentally detained, he again turned his attention to the child; and by continuing the resuscitative method for some time, it was unexpectedly restored to life.

Apparent Death from a Fall, or Blow.

In treating those who have suffered by such accidents, the physician ought to consider the constitution, together with bilious or plethoric symptoms. Several persons, who had fallen from a considerable height, while they laboured under an epidemic bilious fever, which continued with the symptoms produced by the accident, were cured by the administration of emetics and resolvents. On opening the body of a patient, who had expired under the operation of the trepan, there was found an accumulation of bile. Perhaps in some cases of concussion of the brain, caused by a fall, an emetic might prove useful, even after venesection; at least, Nature seems

seems to point out the use of it, by thus alleviating the symptoms of the commotion of the brain in new-born children, produced by a compression of the head during labour. Altho' I am very sensible that this idea is hypothetical, yet it may not be unworthy of the attention and examination of the unprejudiced practitioner.

KITE first directed the public attention to the use of electricity, in cases of apparent death from a fall, by a remarkable instance, which, as it demonstrates the efficacy of this remedy, cannot be too often repeated. A girl three years of age, fell from a window, two stories high, upon the pavement; though she was considered as lifeless, Mr. SQUIRES, a natural philosopher, applied electricity. Almost twenty minutes elapsed, before the shocks produced any effect. At last, when some of the electric matter pervaded the breast, he observed a slight motion of the heart: the child soon after began to breathe and groan, with great difficulty; and, after some minutes, a vomiting ensued. For a few days, the patient remained in a state of stupefaction; but, in the course of a week, she was perfectly restored to health.

It is not improbable, that the artificial concussion produced by electricity, may counteract the effects of the fall; and perhaps a similar counter-irritation may also be effected by vomiting. Hence, also, it is not improper to apply such a heroic remedy as electricity, in cases of imminent danger, when the urgency of the occasion will not permit the gradual application of the usual stimulants. The success of empirics is to be ascribed merely to their immediate application of the most powerful remedies; though attended with very great danger. There are, however, cases of emergency, in which no choice is left to the practitioner.

SECTION THIRD.

On the Manner of saving Persons in extreme Danger.

BESIDES the state of apparent death, there are many other accidents which threaten existence; such as the bite of a mad dog, the swallowing of poison, or other noxious substances, and apoplexy. These may be included in the list of human misery, as well as the former; to which they may be compared, both with respect to their danger, and the speedy assistance they require.

I do not intend to expatiate on a subject with which every skilful physician is sufficiently acquainted; but I shall endeavour to facilitate the recollection of important symptoms and remedies, by the following retrospect.

I. *On*

I. *On the different Methods of treating Persons endangered by Accidents.*

1. *General Points.*

These are, with a few modifications, similar to those which have been discussed, in treating of apparent death, in the first Section.

2. *Particular Inquiries.*

Bite of a Mad Dog.

1. Whether the dog was really mad.
2. Examination of the wound—in what part of the body; nature of it; whether it was given through the clothes; or whether the mad dog had only licked the skin.
3. Appearance of the clothes.
4. Time when the accident happened.
5. Time elapsed since the accident.
6. Remedies administered.
7. Whether the wound remained open.
8. Symptoms attending it; such as fever, convulsions, tinglings in the wound, or even signs of hydrophobia.

9. State

9. State of the patient's mind—whether he was of a timorous, or courageous disposition.

Poisoning.

1. Nature of the poison—whether vegetable or mineral, sharp, corrosive, or narcotic. This may be discovered by

a. Examining the remainder of poisonous aliment.

b. By the account of the patient, and persons present.

c. By the symptoms *.

2. Quantity of the poison taken into the stomach.

3. By what means it was conveyed into the stomach; whether in food, drink, or medicine, &c.

4. Symptoms: vomiting, dysentery, convulsions, swelling of the face, abdomen, &c.

5. Time elapsed since the poison was taken.

6. Remedies already administered, and their operation.

7. Effects of the poison: palsy, colic, pain, &c.

* This superficial inquiry into the nature of the poison, can only be useful in cases of emergency: instructions for a more minute investigation, will be given in the sequel.

Apoplexy.

Apoplexy.

1. Age.

2. Sex.

3. Manner of living; food.

4. Time of the accident.

5. Preceding circumstances; whether after a repast, or a fit of passion, intoxication, being over-heated, or after a cold; from the effect of vapours, metastases, after cutaneous diseases, or debility occasioned by excessive evacuations, &c.

6. Antecedent symptoms: giddiness, headach, tingling of the ears, nervous complaints, defect of memory, relaxation of the muscles of the jaws.

7. Symptoms of apoplexy: plethora, cachectic, hysteric, and nervous complaints; spasms.

8. External signs: pulse, tongue, evacuations, perspiration, vomiting, stool, heat in the head, respiration, whether it be asthmatic, rattling, or attended with coughing.

9. Duration of the paroxysm.

10. Remedies used.

11. *Proximate causes*: plethora, suppressed hæmorrhages; such as bleeding at the nose, the

the catamenia, lochia, suppressed perspiration, obstruction of the viscera, &c.

II. *Tables of Accidents, and Remedies.*

Bite of a Mad Dog.

The virus of a mad dog is so very infectious, that a person only licked by the animal, may be attacked by hydrophobia. To guard against its consequences, we ought to treat the wound inflicted by unprovoked dogs, in the same manner as those of dogs really mad.

Characteristics of a Mad Dog.

He becomes surly and snappish; neither cares for his master, nor for food; refuses to drink; does not bark, but growls; attacks any thing that comes in his way; leaves his master's house, and rambles about with a drooping head: the tongue is of a blueish hue, and hangs out of the mouth; the eyes are red, bleared, glaring, and fixed; the mouth is filled with a viscid mucus; the ears and tail hang down; the hair is bristling, and erect; he seeks dark places; falls suddenly down, and leaps up again; and is shunned by every other dog.

Method of preventing Hydrophobia.

1. The wound should be washed with a warm ley of wood-ashes, a strong solution of salt in water, or vinegar; or, if none of these can be procured, with urine. This washing is, however, to be continued for a considerable time.

2. The wounded part should be cut out; or,

3. Seared with a red-hot iron, or gunpowder; or,

4. Corroded with lunar caustic, till it be covered with a thick scurf. The matter which issues from the wound during this operation, is to be wiped off with soft lint, or paper.

5. The suppuration of the wound is to be promoted for seven or eight weeks.

6. If, from improper treatment, a wound should heal too soon, it must be opened, and brought to suppuration.

Internal Remedies.

1. Deadly nightshade (Belladonna) No. XIII.

2. The oil-beetle, or oil-clock *(Meloë proscarabæus)*. Some practitioners recommend mercurial ointment (No. XIV.) to be rubbed into

into the wound. This may likewise be applied, when the patient has only been licked by the dog.

Cautions.

1. The patient bitten should be stripped; and those places in his clothes which are marked with the dog's teeth, should be cut out and burnt.

2. The sword, or any other instrument, with which the mad dog was killed, ought to be cleansed, by making it red-hot, or it should rather be buried deep under ground.

3. Cattle, or other animals, bitten by a mad dog, should, as soon as symptoms of madness appear, be killed, buried in a deep pit, and covered with quick-lime; but by no means thrown into water; their stalls, or cribs, should be burnt, and their chains purified by fire.

4. The body of the dog must also be buried deep in the ground, without touching it with the hands, and covered with stones, or lime.

5. Every thing contaminated by the virus, is to be cleansed immediately, or burnt: tables, or benches, are to be planed, and the plane afterwards destroyed.

Poisoning.

Inquiry into the nature of the poison; whether it was a poisonous plant, or arsenic, or sublimate of mercury; and how long it had remained in the stomach.

General Remedies.

1. When the poison has been recently taken, it may be evacuated by means of an emetic, or by tickling the patient's throat with a feather dipped in oil, and giving him as much milk and oil as he is able to swallow.

2. When it has been taken some hours, emetics would be injurious: in this case, lukewarm water, milk and oil, are to be administered in large quantities; and tepid bathing should be resorted to.

A. *Narcotic Poisons.*

Opium, thorn-apple, henbane, nightshade, hemlock, &c.

Symptoms: Delirium, vertigo, and a strong propensity to sleep.

Remedies: Emetics; twelve grains of white vitriol, for adults.

1. Mu-

1. Mucilaginous drink, sour whey, butter-milk ; but particularly vinegar, strong coffee, &c.
2. Clysters of vinegar.
3. Cold-bath.
4. Vesicatories applied to the head.

B. *Corrosive Poisons.*

Arsenic, preparations of mercury, antimony, copper, lead, quick-lime, aqua fortis.

Plants: Fox-glove, meadow-saffron, pasque-flower, anemone, different species of the crow-foot, mezereon, wolfs-bane, &c.

Symptoms: Violent pain, great anxiety, sickness, vomiting, griping, a burning pain in the throat.

Remedies: When the poison has been recently taken, besides emetics, all the following general remedies are to be used ; but if it has been for some time in the stomach, no emetics are to be administered.

The general remedies are: mucilage of oats and barley, meal-porridge, soap-water, fomentation of the abdomen with soap-water, or a solution of camphor.

C. *Narcotic and Corrosive Poisons.*

Deadly nightshade, hemlock, poisonous mushrooms, flesh of diseased animals.

Symptoms: Violent pain about the pit of the stomach, accompanied with a burning sensation, and a great inclination to sleep.

Remedies: The same as mentioned under the article, Narcotic Poisons.

Particular Cases of Poisoning.

By arsenic, orpiment, cobalt, &c.

Symptoms: Shuddering, anxiety, tremor, violent retching, vomiting, a burning sensation in the throat, fever, thirst, pain, suppression of urine, costiveness, a gnawing pain in the bowels, swelling of the face, torpor, stupefaction, and, ultimately, death.

Remedies.

1. Soap-water, prepared according to the prescription, No. XV.

2. Vomiting, by tickling the throat with a feather dipped in oil. All these remedies should be applied immediately after the poison has been taken.

3. To alleviate pains in the intestines, doubled cloths dipped in a solution made of soap in rain-

rain-water, ought to be applied to the abdomen.

4. Clysters of milk and oil.

5. Tepid bathing in diluted soap-water.

Alleviation of the progressive Symptoms.

1. Milk, with the addition of the eighth part of sweet cream, is administered to the patient, till he begins to recover; or,

2. Several quarts of water, saturated with hepatic gas (No. XVI.); to which the fourth part of sweet cream, or a solution of either gum tragacanth, or gum arabic, in the proportion of one to thirty of water, is added.

N. B. Clysters of milk and oil, and fomentations, to be continued at the same time.

Venesection is only to be conditionally resorted to.

Poisons by Preparations of Lead.

Symptoms: Colic pains, obstinate costiveness, palsy of the limbs, wasting of the whole body, and consumption.

Remedies immediately after the Accident.

1. Milk and oil is administered in large quantities, as an emetic; or,

2. Tick-

2. Tickling the throat with a feather dipped in oil.

Remedies to be employed some time after the Poison has been swallowed.

1. A mixture, of a drachm of borax, and two drachms of rhubarb, divided into two doses; one of which is to be taken in water, every hour, and chamomile tea drunk after it.

2. Clysters of milk, oil, and soap.

3. Gentle purgatives.

4. Friction of the abdomen with oil.

5. Poultices of bread boiled in milk, applied to the abdomen.

6. The warm bath.

7. Opium, with neutral salts.

EXAMINATION OF POISONS.

Arsenic.

1. When strewed upon live coals, it produces a white vapour, with a smell like that of garlic: this alone, however, is not a certain criterion.

2. A solution of arsenic is to be mixed with a saturated solution of ammoniacal copper: the pre-

precipitate is a yellowish powder, which, when strewed upon coals, emits the garlic smell.

3. If the quantity of arsenic be sufficient, the reduction to its metallic state may be effected by sublimation.

Corrosive Sublimate.

1. When strewed upon burning coals, it produces a white suffocating vapour, which, however, has no smell of garlic.

2. It forms a brownish precipitate in lime-water.

Verdigris.

1. Dissolve the suspected matter in muriatic acid, and add spirit of sal ammoniac.

2. The blade of a knife dipped into a fluid which contains verdigris, will be coated with copper in the space of twelve or fourteen hours.

Lead.

The test-liquor of HAHNEMANN (No. XVII.)

Swallowing of Hurtful Substances.

Shot, fruit-stones, beans, coins, broken glass, nails, pieces of bone, pins, needles, &c.

If the substances swallowed are blunt, or round, the following remedies are proper:

1. Emetics.

2. Thick porridge, mashed potatoes, sauer kraut, &c.

If pointed substances are swallowed:

1. Vinegar is given in a considerable quantity.

2. Oil, particularly that of almonds.

DANGER OF SUFFOCATION,

FROM SUBSTANCES SWALLOWED.

Remedies.

1. GENTLE percussion of the back and shoulders.

2. The steam of warm water, or milk, conveyed into the mouth.

3. Tickling of the throat with the finger, or a feather dipped in oil.

4. The patient is to drink plentifully of water-gruel, milk, or oil, particularly that of almonds.

5. Blunt bodies, which stick in the throat, may be pushed down with a spunge fastened to a piece of wire covered with leather: this apparatus should be moistened with oil before it is applied; or, a long piece of a wax taper, made flexible by warmth, and dipped in oil, may be substituted.

6. Pointed

6. Pointed substances, or such as may wound the throat, should be extracted by means of the fingers, or small forceps; or, a piece of strong iron wire bent at one end, and having a handle at the other, may be employed to extract the obstructing body. This instrument should be properly oiled, and the operator ought to fasten it to his hand, lest it fall into the person's throat.

N. B. The patient should drink the above-mentioned beverage before the operation is undertaken.

7. If he be afflicted with spasms, an emollient poultice of marshmallows and lintseed boiled in milk, should be placed round his neck.

In very dangerous Cases.

1. Venesection at the arm (No. I.)
2. Bronchotomy (No. II.)

Burns, or Scalds.

First Treatment. a. *When the whole Body is burnt.*

1. Cloths soaked in cold water, or milk, should be applied.

2. The

2. The patient should be put into a cold bath of water and milk.

b. *Burns in particular Parts.*

1. The burnt limb ought to be immersed in cold water ; or,

2. Anointed with ink, vinegar, and butter, or amber varnish.

3. Cataplasms of raw, scraped potatoes, are to be applied, and renewed as often as they become warm.

4. The blister should be opened by puncturing, and not by cutting it.

5. Ointment, made of equal parts of lime-water and sweet-oil, arquebusade, or Goulard water.

Apoplexy.

Antecedent Symptoms: Distortion of the face, the sensorial functions impaired, the tongue swelled, shivering, coldness.

First Treatment of Apoplexy in general.

1. Untying of all streight garments.
2. The body placed in an erect position.
3. The windows opened, to admit fresh air.
4. Vinegar held to the nostrils.

5. Cloths soaked in warm wine, and applied to the pit of the stomach.

A. *Sanguineous Apoplexy.*

Signs: Face red, or pale in aged persons; the temporal blood-vessels, and those of the neck, swollen; eyes prominent, head very warm, respiration not quite free, pulse generally full and strong, as in inflammatory diseases.

Remedies.

1. Venesection at the jugular vein, or the arm, on the side not paralytic; and from the foot, when hemorrhages have subsided. Regard is, however, to be paid to the age of the patient, or to his cachectic constitution.

2. Cupping glasses applied to the nape of the neck.

3. Cloths soaked in water, applied to the head.

4. Emollient clysters, with the addition of saltpetre, and tartar-emetic.

5. Tepid baths.

N. B. All violent stimulants, such as errhines and emetics, are to be avoided.

B. *Serous*

B. *Serous Apoplexy.*

Signs: Cachectic disposition, face pale and tumefied, limbs flaccid, respiration more laborious than in the former species of apoplexy.

Remedies.

1. Vesicatories, sinapisms, or plasters, made of powdered ginger and vinegar.

2. Stimulant clysters, with tartar-emetic, soap, or salt.

3. Purgatives.

4. Emetics, when there is an inclination to vomit: great caution is, however, necessary, with regard to this remedy: it ought never to be administered in a state of asphyxia.

5. Rubbing with cloths dipped in brandy, or spirit of wine and camphor; friction, whipping with nettles.

6. Vinous fomentations applied to the pit of the stomach.

C. *Nervous Apoplexy.*

Symptoms in hysteric or hypochondriacal subjects:—redness of the skin, strong pulsation of the arteries of the neck, spastic pulse, restlessness.

Remedies.

1. Application of the combined methods of treating the two foregoing species of apoplexy, with proper attention to the different symptoms.
2. Antispasmodics.
3. Friction (No. IX.)
4. Baths (No. V.)
5. Fomentations.

Remark. Some species of apoplexy, which can neither be called gastric, nor plethoric, require a compound treatment. Their different causes may be ascertained, by examining them in the manner above specified.

III. *Remarks on the prevention of Hydrophobia.*

When this dreadful disease has once made its appearance, it is scarcely in the power of medicine to afford any relief. As it would, however, be an act of cruelty to abandon such unfortunate patients to their fate, we ought to use every exertion to alleviate their misery.

No benefit can be expected from internal remedies alone; and the chief part of the treatment consists in external applications. If the virus

virus be really absorbed, it will be almost impossible to expel it. In such cases, the most celebrated specifics, even the oil-beetle, and belladonna, generally prove ineffectual. If no symptoms of hydrophobia appear, after the bite of a mad dog (though no recourse was had to medicine), it follows that the virus had not been absorbed by the lymphatics, and, consequently, that no infection was communicated; as sometimes happens in inoculation for the small-pox. Hence quacks, with their magical, sympathetic, and other nostrums, often pretend to have effected a complete cure. Much, therefore, depends on the degree of confidence evinced by the patient in the efficacy of medicines; as thus the deleterious effects of the bite are often prevented. Timid persons are always in greater danger. Nay, there are instances of persons, who, fancying that they have been bitten by a mad dog, were really seized with a chronic hydrophobia.

a. *External Remedies.*

In most cases, according to my excellent friend, Dr. LETTSOM, the cutting out of the

bitten part, is probably the only effectual remedy. As the wounds, however, are often too deep to be entirely extirpated, the application of caustics is requisite, to effect a complete removal of the virus; though even this method, unless applied within a few hours after the accident, will perhaps be insufficient to prevent canine madness.

External remedies should, in no instance, be neglected, in order to prevent the absorption of the virus. Caustics, by destroying the muscular substance, are the most efficacious. Scarification, cupping, and vesicatories, are useless, and only tend to enlarge the wound. Careful washing of the wounded part is particularly to be recommended.

b. *Internal Remedies.*

As these co-operate with the efforts of Nature, to expel the virus, they ought likewise to be resorted to.

1. Sudorifics and diuretics: belladonna, the oil-beetle, and antimonial preparations.

2. Antispasmodics: musk, ipecacuanha, valerian, opium, tepid baths, &c.

3. Tonics:

3. Tonics: bark, wine, baths, and serenity of mind.

The physician must be guided by particular circumstances, in the seasonable application of these remedies. Venesection and purgatives ought to be prescribed with great caution. In doubtful cases, I should prefer emetics to laxatives. No person bit by a dog really mad, is free from the danger of being attacked with hydrophobia; the symptoms of which sometimes appear after the expiration of a few days, but sometimes only after several months, or even a whole year. Meanwhile, the injured person thinks himself perfectly safe; is cheerful, and performs his business undisturbed by apprehensions: he has, perhaps, placed his confidence in ineffectual remedies, when suddenly the first symptoms of this horrible malady appear. This catastrophe sometimes takes place after a violent fit of passion, or in consequence of over-heating the body. In most cases, the disease manifests itself about the fortieth day after the bite.

The wound generally heals in a few days; but previous to the first symptoms of the malady, it becomes red and painful, swells, and some-

sometimes bursts. The patient complains of a painful sensation in the wound, extending towards the heart and head; he becomes dejected, anxious, and extremely irritable. These symptoms are soon succeeded by the dread of water, which particularly manifests itself, when the patient attempts to drink. In vain he makes an effort to bring the cup to his lips; and at length his abhorrence of every kind of liquid becomes so invincible, that, at the very sight of them, he is seized with horror and trembling. As soon as he has swallowed any liquor, the most violent convulsions ensue. He is so easily irritated, that, on the appearance of any new object, nay, even at the sound of the wind, he will start, and be seized with spasms. He suffers from the most intolerable thirst; and, on account of the violent spasms in the windpipe and throat, is often in danger of suffocation. At length, death, generally accompanied with convulsions, or extreme debility of the whole system, terminates his misery.

It is much to be wished, that the remedy so successfully administered by Dr. SIMS, may be confirmed by the experience of other practi-

tioners.

tioners. The case was as follows: A person bitten by a mad dog, was seized with hydrophobia and convulsions, and became so enraged, that he attempted to bite his own mother. Three or four ounces of oil were administered, by means of a tea-pot, lest he should see the fluid; and his whole body was rubbed with oil: these frictions, together with the application of clysters of mutton-broth, were repeated at intervals. At the expiration of eight days, all the symptoms of disease had gradually ceased; and the application of oil was continued for ten succeeding days. The slight inflammation about the wounded part, gradually disappeared. It is remarkable, that the patient, after his recovery, was quite ignorant of what had happened during his illness*.—We are not, however, informed whether any other remedies were administered at the same time, and whether it was the common oil of olives, or whether it was given warm, or cold.

The medical treatment of persons bitten by mad dogs, is thwarted by numerous obstacles;

* See Memoirs of the Medical Society of London, instituted in the year 1773, vol. iii. London, 1792.

as

as the generality of people are prompted by prejudice to use nostrums, rather than apply for medical advice. Besides, the patient seldom has sufficient fortitude to persevere in taking medicine; and as he feels no inconvenience immediately after the accident, he generally disregards it. Even physicians are not quite free from prejudices respecting this disease. For, unless there be visible marks of injury by an enraged animal, they are too apt to treat the case with indifference. There are, however, instances of hydrophobia, occasioned merely by being licked by a mad dog. Dr. HAHNEMANN mentions several cases, which came under his observation. Among these, is one of a boy, who was seized with the hydrophobia, of which he died, in consequence of his face being licked by a dog, that went mad after the accident. Hence it appears, that the treatment, in such cases, ought to be the same as if there was a wound. The part licked by the dog, should therefore be put, for several hours, in a strong ley, or covered with cloths soaked in it; and the internal remedies beforementioned, ought, at the same time, to be administered.

Canine madness may, likewise, be communicated by means of the instrument with which the animal was killed. A gentleman, after having killed a mad dog with his sword, thoughtlessly returned it into the scabbard. Eight years after this circumstance, having a quarrel with two gentlemen, he wounded them both with the same sword. The wounds were inconsiderable, and soon healed, as is frequently the case with those occasioned by the bite of a mad dog; but again opened, after the lapse of three years, when the unfortunate men were seized with hydrophobia, and died. This incident may serve as a caution respecting instruments which have been used in killing mad animals. It may also be proper to observe, that the lancet, with which the wound has been scarified, ought to be tempered afresh.

Table of the principal Poisonous Plants.

Wake-robin, cuckow-pint, lords and ladies *(Arum maculatum)*.

Deadly nightshade, dway-berries, deadly dwale *(Atropa belladonna)*.

Common henbane *(Hyoscyamus niger)*.

Bitter-

Bitter-sweet, woody, garden, or common nightshade *(Solanum dulcamara)*.

Squirting cucumber *(Momordica elaterium)*.

Herb-Paris, true-love, one-berry *(Paris quadrifolia)*.

Common wolfsbane, monks-hood *(Aconitum napellus)*.

Purple-flowered wolfsbane *(Aconitum cammarum)*.

Yellow wolfsbane *(Aconitum lycoctonum)*.

Common fox-glove *(Digitalis purpurea)*.

Hedge-hyssop *(Gratiola officinalis)*.

Crow-foot, water-crow-foot *(Ranunculus aquatilis)*.

Upright-meadow butter-flower, butter-cups *(Ranunc. acris)*.

Celery-leaved crow-foot, round-leaved water-crow-foot *(Ranunc. sceleratus)*.

Lesser spearwort *(Ranunc. flammula)*.

Common mezereon, or spurge-olive *(Daphne Mezereum)*.

Pasque-flower anemone *(Anemone pulsatilla)*.

Darnel *(Lolium temulentum)*.

Common laurel *(Prunus laurocerasus)*.

Common nightshade *(Solanum nigrum)*.

Hellebore *(Helleborus niger, viridis)*.

Common

Common wild parsnip *(Pastinaca sativa)*.
Common cyclamen *(Cyclamen Europæum)*.
Common hemlock, kex *(Conium maculatum)*.
Lesser hemlock, fools parsley, cicely *(Æthusa cynapium)*.
Common thorn-apple *(Datura stramonium)*.
Marsh-spurge *(Euphorbia palustris)*.
Cypress-spurge *(Euphorbia Cyparissias)*.
Water-cowbane, long-leaved water-hemlock *(Cicuta virosa)*.
Meadow-saffron *(Colchicum autumnale)*.

A Case of poisoning by Arsenic.

A man, seventy years of age, on searching in the dark for a medicine, unfortunately laid hold of a paper containing arsenic. Having put a spoonful of the poison in beer, he afterwards drank a moderate quantity of the mixture, and went to bed. In a few minutes, he felt a burning sensation in his tongue, throat, and stomach, accompanied by giddiness and stupefaction. He then drank a glass of beer, which produced vomiting and greater thirst, that induced him to drink a larger quantity of that liquor; this occasioned violent pains in his

bowels, and incessant diarrhœa. Next morning, he was found much debilitated; the face pale and distorted, the pulse scarcely perceptible, and his whole body covered with perspirable matter. The paper containing the remainder of the poison, which was still upon the table, together with the few words he was able to articulate, soon informed his friends of what had happened. Anxiety, and an intense pain in his bowels, attended the diarrhœa, which continued with unabated violence. Such was his condition, when Mr. FILIZ, of Luckau, a skilful surgeon, was called in, who prescribed the copious use of milk mixed with the yolks of eggs, and ten grains of *lac sulphuris* mixed with two grains of steel-powder *(limatura mart. op.)*, to be taken every two hours. He also frequently applied clysters of mucilage of lintseed oil, and salt of tartar. These remedies being continued for ten hours, the violent symptoms of looseness, anxiety, and pains in the bowels, began to abate. Mr. FILIZ then directed the yolks of eggs mixed with some borax, to be administered in large quantities, and that the patient's only nourishment should be groats and sago boiled in milk.

He

He recovered but slowly; and, for several weeks, the utmost debility, together with a considerable swelling of the feet, continued; which, however, were at length removed, by the internal use of willow-bark, and the application of rollers to the legs. At length, the patient was restored, though with the loss of his former vivacity; and his memory also was considerably impaired.

Obstruction of the Throat by foreign Substances.

Urgent danger often suggests to us the most effectual remedies. In a case where the gullet was obstructed, by the introduction of a foreign substance which threatened suffocation, the patient was ordered to swallow a piece of sponge fastened to a pack-thread. Thus, by pulling it gently upwards, the impediment was removed, and immediate relief obtained.—See *Journal de Medicine, Sept. Paris,* 1789.

On Apoplexy.

The general classification of apoplexy, and the method of cure, are deficient; for the modifications

difications of this disease can only be determined by the knowledge of their different causes. Besides, the diagnostic signs of what are called the serous and sanguineous species, are not accurately ascertained. A red face, prominent eyes, or a full pulse, are not always certain symptoms of a genuine sanguineous apoplexy; for, on opening the bodies of such as have died of this disease, an aqueous extravasation has been frequently found upon the surface, and even in the substance, of the brain. The contrary often takes place in cases of serous apoplexy; the death-like colour of the face suddenly changing to red. With aged people, we sometimes observe paleness of the face, though they be of a plethoric habit. I have, however, followed the common classification in the subjoined Table, in order to exhibit to the medical reader, that there is a diversity of this disease, which ought not to be wholly neglected. Many apoplectic cases require a complicated, and others a simple, treatment; according to the causes by which they are produced. Venesection indiscriminately adopted, in apoplectic cases, by the

lower

lower class of people, as well as empirics, is particularly detrimental. The physician cannot be too cautious in this respect; but, in a doubtful case of apoplexy, he may take away a few ounces of blood, and observe the effect.

TABLE

OF THE DIFFERENT OPERATIVE MEANS OF RESUSCITATION.

I. *Venesection.*

WITH regard to the place from which the blood is to be taken, the jugular veins are preferable; but, as it is not always practicable to open them, we prefer the temporal arteries. These are remarkably irritable; and, if any vitality exists in the body, they seldom fail to emit blood, when opened.

In cases less urgent, the *vena cephalica*, or the *vena mediana*, of the arm, or the *vena saphena parva* of the foot, may be opened. In general, it is best to let blood as near the heart as possible; since, as COLEMAN asserts, it is not improbable that the right ventricle may be surcharged with blood. The right jugular vein is the most convenient for the purpose of venesection.

The

The orifice is to be covered with sticking-plaster. If, after the incision, the blood does not flow, the part is to be rubbed for a considerable time, and moistened with a sponge.

II. *Bronchotomy.*

This operation requires the greatest care, and a very dexterous hand*. The proper place to make the incision, is between the annular and thyroid cartilages, or even in the substance of the latter.

III. *Clysters.*

1. *Emollient* clysters, of marshmallows, torch-weed, and linseed, to which oil of olives may be added; or, half a pint of milk with an equal quantity of gruel, or barley-water, adding a few spoonfuls of oil. Broth, with some butter, oil, lard, or warm milk, may likewise be used as a substitute.

2. *Purgative* clysters are made by adding to the former, tamarinds, Glauber's salts, or honey.

* De Fourcroy de nova laryngotomiæ methodo. Paris, 1779.

3. *Sti-*

3. *Stimulant* clysters are prepared by the addition of salt, soap, or a solution of tartar-emetic, from ten grains to a dram, according to circumstances.

IV. *Introduction of Liquids into the Stomach.*

The tube invented by COLEMAN, is most proper for this purpose.

V. *Baths.*

In order to give a due temperature to the bath, two parts of cold water are added to one of boiling water.

In general, however, the degree of warmth in the water, ought to correspond with the temperature of the body. In order to communicate a tonic and emollient quality to the bath, brandy, vinegar, or milk, may be added to the water; or a handful of bran, or emollient plants, boiled, tied up in a piece of thin canvas, and put into the bath.

VI. *Shower-Bath.*

Water is dropped from a vessel with a syphon, upon the region of the heart, to which a little

little wine may be added; and after each application, the patient is immediately to be wiped dry, and covered up with warm clothes.

In cases of suffocation by the vapour of coals, a syringe may be used, to squirt water against the pit of the stomach. After this operation, the body is to be wiped dry, well covered, and left undisturbed.

VII. *Bed of Ashes, or Sand-Bath.*

The body should be covered up to the head with warm wood-ashes, or sand. The ashes should be sifted, and warmed in large kettles, or pots. Next, they are strewed on a sheet, to the thickness of about two inches; on which the body is laid, quite naked, after having been previously wiped dry. Every part of it, except the face, should then be covered with ashes, in the manner before-mentioned. Thus, the person apparently dead is left for several hours; while gentle stimulants should also be resorted to.

Instead of ashes, warm sand, or husks of grapes, or, if these cannot be procured, warm horse-dung may be used for this purpose.

VIII. *Earth.*

VIII. *Earth-Bath.*

The person apparently dead is laid, quite naked, in a reclined posture, in a hole dug for the purpose, and all parts of the body, except the face, are loosely covered with earth, four inches thick. To ensure the good effects of the earth-bath, it is necessary that the subject should be left in it for several hours.

IX. *Friction.*

All substances used for rubbing the body, are to be previously warmed. Friction is best performed by means of brushes dipped in oil; and it ought to be commenced gently, and gradually increased: proper attention is also to be paid to the signs of susceptibility of irritation. Friction with salt is improper, as it causes the most violent pain to the subject, when restored to life.

X. *Electricity.*

This remedy should be applied by directing moderate shocks through the breast of the subject;

ject; and which may be effected by placing a positive conductor between the fourth and fifth ribs of the left side, and a negative one between the second and third ribs of the right side; or, by applying one of the conductors to the left side of the pit of the stomach, and the other to the nape of the neck; or the first to the sternum, and the second in an opposite direction, at the spine; so that the electric fluid may pervade the heart.

Electricity, however, requiring great circumspection, ought not to be resorted to, without sufficient reason. The electrical machine should be powerful, and the coated jar of a proportionate size. The thinner the glass of the jar, the better; as the electric spark will be more pointed and stimulant. Friction, during the application of electricity, should not be neglected; for, in this respect, the latter remedy resembles the shower-bath.

XI. *Introduction of Air into the Lungs.*

Air is conveyed into the lungs, either through the mouth, the nose, or an incision in the trachea.

In

In this operation, we use,

1. GORCY's bellows; with which, however, the operator ought to be well acquainted; or,

2. Common bellows. A quill, or any flexible tube, one end of which, covered with wet linen, or blotting-paper, is put into the nostril or mouth of the subject, and the other end fastened to the pipe of the bellows. During the operation, an assistant gently presses the prominent part of the trachea (Adam's apple), upwards; by which the access of the air to the lungs is facilitated. When the lungs are dilated with air, another person gently rubs the breast in an upward direction, particularly on the left side. This process is to be continued till a contraction of the heart is perceived. The tube should always reach the glottis, which may be effected by pulling the tongue forward. This method, however, is so difficult, that it can only be recommended to the skilful practitioner.

3. The blowing in of air by the mouth. Most physicians are of opinion, that this method of conveying air into the lungs, is injurious; but as it may tend to excite irritability,

Dr.

Dr. OSIANDER has recommended it in cases of infantine asphyxia.

XII. *The Oil-Beetle.*

The oil-beetle, or oil-clock, has been very strongly recommended by government, as a preservative against the fatal consequences of the bite of a mad dog; but has by no means proved a specific remedy. In some cases, it operates as a purgative; in others, as a sudorific, or diuretic; and, sometimes, it is attended with consequences distressing to the patient. Hence it appears, that its effects are as uncertain as those of the Spanish fly. If the oil-beetle be combined with other powerful medicines, it may, however, prove a good preservative against hydrophobia. Hence Dr. SELLE prescribes as follows:

℞. Scarab. maj. no. viij.
Theriac. androm. unc. ss.
Sal. volat. c.c. drachm. ij.
Camph. drachm. j.
Spir. minder. unc. viii.
Misc. det.

XIII. *The Root of the Belladonna, or deadly Nightshade.*

This vegetable has recently been recommended as a most powerful specific for the cure of hydrophobia; and it appears indeed to deserve that character. It ought to be administered in doses large enough to produce a transient dimness, and profuse perspiration. As it causes a burning sensation in the throat, the patient should drink plentifully of mucilaginous liquids, particularly water-gruel. He must, at the same time, continue in bed, to promote perspiration. Belladonna ought to be administered as soon as possible after the accident; and all the symptoms which appear during the use of it, should be carefully attended to. BUCHHOLZ asserts, that the administration of this remedy for nine days in succession, will secure the patient from all danger of hydrophobia: for my part, I should rather continue the whole process, and keep the wound open, at least for a fortnight.

The deadly nightshade ought to be gathered every year, in the month of June, washed clean, dryed in the open air, reduced to powder,

der, and preserved in a well-stopped glass vessel.

In order to proportion the doses of this medicine, according to the age of the patient, and the time of using it, I have subjoined the following Table:

Age.	In one hour.	In two hours.	In three hours.	Vehicle.
2 years,	1 gr.	1½ gr.	—	
3 ——	2 —	2½ —	3 gr.	
4 5	—	3 —	3½ —	
6 7	4 —	4½ —	5 —	Either in
10 11	4 —	5 —	5½ —	milk, or
12 13	4½ —	5 —	6 —	water-
14 16	5 —	6 —	6½ —	gruel.
17 50	6 —	10 —	12 —	
50 60	4 —	8 —	9 —	
60 70	5 —	6 —	7 —	

Women who suckle children, as well as weak persons in general, should take smaller doses, according to circumstances. At intervals, the use of this remedy should be discontinued for a day.

XIV. *Mercurial Ointment to be rubbed in, after the Bite of a Mad Dog.*

℞. Mercur. crud. unc. j.—teretur;
Thereb. drachm. ij.
Axungiæ ovis unc. viii.
M. F. Unguent.

A drachm of this ointment is to be rubbed in at a time, and continued till the eleventh day.

XV. *Soap-Water.*

One pound of soap should be dissolved in four pounds of pure water, by rubbing it on a grater, after which it is put into a pot that contains eight pints. Boiling water being poured upon the soap, the mass is stirred, allowed to boil for two minutes, and then stirred again. The patient, if an adult, may every third or fourth hour take a tea-cup full of this solution, lukewarm, and a piece of sugar after the draught, to overcome the nauseous taste.

XVI. *Water*

XVI. *Water saturated with Hepatic Gas.*

This preparation is celebrated for its salutary effects, in counteracting the poison of arsenic. According to Dr. HAHNEMANN, it is prepared in the following manner: take a bottle filled to its neck with two pounds of pure tepid water; to this add an ounce of powdered liver of sulphur, mixed with five drachms of purified cream of tartar. The bottle should then be closely stopped, and the ingredients shaken for ten minutes. After the coarser powder is precipitated, the fetid milky fluid is poured from its sediment into another bottle, containing three or four cups of sweet cream, two ounces of powdered senegal, or half an ounce of gum tragacanth. This bottle is also to be stopped, and shaken for a few minutes, till all the ingredients are dissolved; when the medicine is fit for use.

The liver of sulphur, for this purpose, may be procured by exposing equal parts of sulphur and quick-lime to a high degree of heat. In a wind furnace, the *hepar sulphuris* will be ready in the space of sixteen minutes; and,

in fifteen more, the water may be easily prepared; a method which, on account of its dispatch, is preferable to any other. Chalk may be substituted for quick-lime; in which case, however, the mixture will require to be heated a longer time.

XVII. HAHNEMANN's *Probatory Liquor.*

In order to prepare this valuable test for ascertaining adulterations of wine with lead, a liver of sulphur is first procured, by exposing an equal quantity of powdered oyster-shells and sulphur, for twelve minutes, to an intense heat. In this manner, the dry hepar is obtained in the form of a light grey powder, which may be preserved for a long time in a bottle closely stopped.

To discover whether wine contains any particles of lead, put two drachms of hepar and seven drachms of finely-powdered cream of tartar into a strong bottle which contains sixteen ounces of pure water. After closely stopping this vessel, shake the ingredients for ten minutes. When the sediment has subsided, and the liquor become clear, mix a

spoonful

spoonful of it with two or three ounces of suspected wine; and, if it contain any lead, a precipitation will take place, which will be of a deeper brown, in proportion to the quantity of that metal.

XVIII. *Precautions to be adopted in rescuing Persons from Subterraneous Places.*

The assistant of such unfortunate people, should first drink a little brandy, then put into his mouth a sponge soaked in vinegar; and, before he descends into the pit, cover himself with wet cloths. A double rope ought to be tied round his body, passed under his arms, and secured behind: he should also be furnished with another rope, for the purpose of giving signals.

XIX. *Manner of purifying the Air in damp Apartments.*

This may be effected by burning gun-powder in a room; by a straw fire kindled at its entrance; by pouring cold water over the floor; or placing on it a few bushels of lime recently slaked, and diluted with an additional quantity of

of water. If pits are to be purified, the mephitic vapours, or fluid, at the bottom, should be frequently stirred with proper hooks and poles. No person can, with safety, descend into a pit, when a burning candle, on being conveyed to the bottom, is suddenly extinguished.

THE END.

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THE

DOMESTIC ENCYCLOPÆDIA;

Or, a CONCISE ANALYSIS of such DISCOVERIES, INVENTIONS, and IMPROVEMENTS, as are more immediately applicable to the Purposes of Life: comprehending whatever deserves to be known, or may tend to promote NATIONAL PROSPERITY, in the various Branches of Rural and Domestic Economy: calculated for the Use of PRIVATE FAMILIES, but more especially for the Accommodation of those who are not inclined to purchase the more voluminous and expensive Works.

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TO THE PUBLIC.

AS the practical tendency of the work here announced, must be evident from the above, its peculiar nature scarcely requires farther explanation.

When we consider the natural condition of man, the object of all his pursuits becomes at once

once manifest and defined. To live with satisfaction to himself and others; to procure as many comforts of life as are consistent with his mental and bodily constitution; and to avert impending danger, or, in other words, to preserve himself from the injurious attacks of external agents, are nearly the whole of what relates to the practical part of human life. The present work being exclusively devoted to the departments of health and of general economy, no subject can therefore with propriety be introduced, which has an immediate reference to ethics or morals, to metaphysics, or the abstract and professional sciences.

In order to unite conciseness with general utility, the theoretical or speculative part of every invention, discovery, or improvement, will form but a small portion of the DOMESTIC ENCYCLOPÆDIA; because the *rationale*, or elementary principles, will only be inserted in those instances where the subject cannot be sufficiently understood without them. And as the alphabetical form possesses many advantages over the systematic division and sub-division of articles, it has, in the present case, been preferred, as more eligible for a popular work.

It will be easily conceived, that the subjects to be treated of in this collection must be numerous and important; inasmuch as the economical sciences are intimately connected with natural and experimental philosophy, including the knowledge of useful animals, plants, and minerals; chemistry, agriculture, gardening, hunting, the cultivation of trees, rearing of cattle, fishing, &c. To enable, however, the reader to judge of the method by which we intend to reduce subjects apparently intricate and abstruse,

to

to the level of ordinary capacities, the following heads will furnish an outline of the proposed Economical Dictionary.

1. A concise historical account of the subject under consideration, or the manner in which it is most advantageously produced, either by nature or art; for instance, fuel, candles, hats, shoes, wine, yarn, &c.

2. The most judicious and economical mode of applying every substance to useful purposes; such as new substitutes for bread, tea, coffee, soap, &c.

3. All the newly-discovered methods of defending the objects of domestic and rural economy from the effects of air, heat, and cold, the changes of climate, seasons, and other contingent causes; likewise the most effectual way of preserving particular substances, such as seeds, roots, plants, &c. from the depredations of insects, reptiles, and other animals.

4. An explanation of the general effects which every article of food and drink, as well as all external and contingent causes, produce on the health of the human body; together with the most approved rules and directions for its preservation.

5. As the list of human afflictions contains many and obstinate diseases, such as cancers, consumption, epilepsy, gout, palsy, white-swellings, &c. which have hitherto been, for the most part, considered as incurable, it is proposed to give a concise and faithful account of the latest and *most plausible* remedies, or methods of treatment, discovered for the cure of these complaints. No other diseases, therefore, but such as fall under that description, will be here introduced: we propose, however, to give pointed hints and directions,

rections, how to guard against the sudden attack of acute or dangerous maladies, and in what manner successfully to treat them in their commencement.

6. With respect to the nature and uses of plants, our plan will in general be confined within the limits of the indigenous, or native productions, whether obtained from trees, shrubs, or herbs; which, as articles of food, dress, luxury, or medicine, may conduce either to our necessities or pleasures.

7. Lastly, conceiving it our duty to contribute as much as possible to the detection of fraud, and prevention of mischief, we have endeavoured to obtain the most accurate information, not only respecting the most pernicious adulterations practised in the articles of bread, beer, wine, spirits, oil, tea, &c. but likewise of all the poisonous plants growing in the British isles;—a liberal communication of which, must prove peculiarly acceptable to every head of a family, as well as to private individuals.

CONDITIONS.

I. This Work will be handsomely printed on a new Type, cast purposely for it, and on a fine Demy Paper, in 8vo.

II. Each Number will contain Eight Sheets of Letter-press, and one or more appropriate Engravings, besides occasional Wood-cuts, illustrative of the different Subjects.

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