ELEMENTS

OF

MATERIA MEDICA.

PROLEGOMENA.

(*Definitions.*)

THERAPEUTICS (*therapeia, therapeutice, therapeutica,* from θεραπεύω, *I cure*) is that branch of medicine which has for its object the treatment of diseases. It is divided into *general* (*therapeia generalis*) and *special* (*therapeia specialis*).

Authors are not agreed as to the proper limits of Therapeutics. In the most extended sense of the word, and which I have adopted in the text, it embraces all the known means of cure, and consequently all surgical operations. Guersent,[1] however, excludes Amputations, Lithotomy, Tracheotomy, &c. from its domains, though he includes Bloodletting, Issues, Setons, Acupuncture, and all those operations which are useful in the treatment of diseases, by producing modifications of the vital properties.

Sprengel[2] applies the term *Iatreusologia* (from ἰατρεύω, *I cure*, and λόγος, *a discourse*) to general therapeutics.

ACOLOGY (*acologia,* from ἄκος, *a remedy,* and λόγος), or *iamatologia*[3] (from ἴαμα, *a remedy,* and λόγος), is that department of therapeutics devoted to the consideration of remedies.

Some authors[4] limit Acology to the consideration of surgical and mechanical remedies.

The term MATERIA MEDICA implies material substances employed in the treatment of disease; but, in a more extended sense, it signifies all remedial agents, of whatever kind. It is also used to designate that department of medicine devoted to the consideration of remedies or medicines.

REMEDIES (*remedia,* from *re,* and *medeor,* I heal; *auxilia medica*) are agents used in palliating or curing diseases.

They are of two kinds: those which operate through the agency of the mind; and those which act on the body directly.[5]

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[1] *Dictionnaire de Médecine*, t. xx. art. *Thérapeutique*, 1828.

[2] *Institutiones Medicæ*, t. i. p. 7.

[3] C. H. E. Bischoff, *Die Lehre von den chemischen Heilmitteln*, Bd. i. S. 22, Bonn, 1825.

[4] Sprengel, and C. H. E. Bischoff, *op. supra cit.*

[5] Strictly speaking, this division is, perhaps, inaccurate; since we know that changes in the condition of the brain produce corresponding alterations in the state of the mind; and it may be fairly inferred, that changes in the state of the mental faculties are necessarily associated with some mo-

The first may be denominated *psychical* or *mental* remedies; the second, *somatical* or *corporal*. The latter are subdivisible into *imponderable*, *hygienic*, *mechanical*, or *surgical*, and *pharmacological* agents.

PART I.—PSYCHICAL OR MENTAL REMEDIES.

(*Remedia psychica*).

Affections of the mind, by their influence over the corporal functions,[1] favour or oppose the action of morbific causes, and modify the progress of diseases. The methodical application of them as remedies constitutes the *psychical method of cure*.[2] Regarded as therapeutical agents, they are by no means unimportant, or to be neglected; though their employment is necessarily limited, on account of the difficulty experienced in producing, regulating, and controlling them.

They are of two kinds, *external* and *internal*.[3]

1. EXTERNAL AFFECTIONS OF THE MIND.

(*Sensations*).

Those mental affections which immediately result from the influence of agencies external to the mind, are denominated *sensations* or *external mental affections*. They arise either from influences external to the body (*external sensations*), or from organic causes existing within the body (*internal sensations*).

External sensations are frequently excited for therapeutical purposes. Their influence over disease is either direct or indirect. It is *direct* when the effect is the immediate result of impressions made on the sensitive nerves. In this case sensations usually act either as excitants or as soothing and tranquillizing agents. Thus, strong light and loud noises are excitants; while monotonous impressions on the auditory or optic nerves dispose to sleep. The influence is *indirect* when the effect arises from internal mental affections suggested by the sensations. Thus the remedial influence of music is indirect, because it is referable, not to the mere perception of sounds, but to the resulting emotions. In such cases, the effect being due to associated ideas or suggested feelings, is not uniform.

1. SMELL.—Those substances which are employed in medicine on account of their odour, are denominated Odoraments (*Odoramenta*). They are used for various purposes, of which the following are examples:—

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lecular alteration in the cerebral substance. If this be true, all remedies are somatical or corporal. But at present it is convenient to speak of *mental* as distinguished from *corporal* agents, just as we speak of *functional* as distinguished from *organic* diseases.

[1] For some pertinent observations on the powerful influence of mental impressions in deranging the functions of the body, see Dr. J. Johnson's *Essay on Indigestion*, 10th edit. 1840.

[2] J. C. Reil, *Rhapsodieen über die Anwendung der psychischen Kurmethode auf Geisteszerrüttungen*, 2d Ausg., Halle, 1818. Also, E. F. von Feuchtersleben, *Lehrbuch der ärztlichen Seelenkunde*, Wien, 1845.

[3] On this subject consult Dr. Thomas Brown's *Lectures on the Philosophy of the Human Mind*, vol. i. p. 341, 2d edit. 1824.

α. Strongly odorous vapours (as of ammonia and acetic acid) are used, both as preventives and remedies, for fainting, and attacks of hysteria and epilepsy.

β. Fragrant substances are employed both for the agreeable sensations they excite, and for the purpose of overpowering or disguising disagreeable odours. The *pot-pourri* or scent-jar, the *sachet* or scent- or sweet bag, the sweet coffer, perfumed oils, spirits, and waters, scented soaps, fumigating pastils, &c. are used for these purposes. Perfumes are to be distinguished from substances called disinfectants; the former disguise, while the latter destroy, noxious vapours, &c.

Odorous emanations from young and vigorous animals have been esteemed salutary;[1] and to them have been sometimes, though erroneously, ascribed the beneficial effects supposed to arise from a residence in stables[2]; as well as from the ancient practice[3] of putting young, vigorous, and healthy subjects to bed with the old and enfeebled.[4]

In considering the therapeutical influence of odours, the singular sensitiveness of some constitutions (the hysterical chiefly) to perfumes should not be forgotten. The inhabitants of Rome, especially the females, are remarkable for this peculiarity. In them, headache and numerous other nervous affections are readily produced by the agreeable odours of flowers and other perfumes.[5]

2. TASTE.—Sapid substances are frequently employed in medicine for affecting the sense of taste, as in the following instances:—

α. Pungent and acrid substances (as horseradish and ginger) are employed to excite the gustatory nerve in ageustia, or loss of taste.

β. Bitters, and the substances called *condiments*, heighten the appetite for food, for which we frequently use them in medicine. They probably act, in part at least, by their action on the nerve of taste.

γ. An important object in the art of prescribing is to disguise the unpleasant taste and smell of medicines by substances possessing a more agreeable flavour and odour.[6] The employment of gelatinous and membranous capsules to envelope medicines, has for its principal object the avoidance of the unpleasant taste of the substances swallowed.

δ. In some nervous cases, we endeavour to increase the faith of our patients in the powerful agency of the remedies employed, by augmenting the odorous and sapid qualities of the substances used.

3. HEARING.—Impressions made on this sense are useful as remedial agents, either by their direct effects, or indirectly by the internal affections of the mind which they give rise to.

α. Noises act as direct mental stimulants. They check sleep, and are sometimes useful by diverting the attention.[7]

β. Monotonous sounds (as the humming of bees, the ticking of a clock, the murmur of a rivulet, a dull discourse, &c.) soothe and dispose to sleep. In therapeutics we avail ourselves of this fact, and combat want of sleep by directing an attendant to read aloud and monotononsly to our patient.

γ. Silence disposes to sleep. In cases of vascular or nervous excitement of the brain, in fevers, and in many other cases where sleep is desired, silence should be enjoined. Under some circumstances, however, silence "may become a stimulus when sound ceases to be so. Thus, a miller being very ill, his mill was stopped, that he might not be dis-

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[1] H. Cloquet, *Osphrésiologie; ou Traité des Odeurs, du Sens et des Organes de l'Olfaction*, Paris, 1821.

[2] Beddoes, *Observations on the Medical and Domestic Management of the Consumptive*, &c., Lond. 1801.

[3] 1 *Kings*, chap. i. v. 1—4.

[4] *Anecdota Sydenhamiana*, p. 62, Lond. 1845. Copland, *Dict. of Pract. Medicine*, vol. i. p. 475, and vol. iii. p. 135.

[5] Sir James Clark, *The Sanative Influence of Climate*, p. 230, 3d edit., Lond. 1841. Orfila, in his *Traité de Toxicologie*, vol. ii. p. 543, Paris, 1843, has collected several cases of supposed poisoning by the emanations of odoriferous plants. In the case of Caspar Hauser (see Copland's *Dict.* vol. i. p. 474), the most remarkable and singular effects were produced by odours.

[6] For illustrative examples, see Paris's *Pharmacologia*, p. 443, 9th edit. 1843.

[7] "Quorundam discutiendæ tristes cogitationes; ad quod symphoniæ, et cymbala, strepitusque proficiunt" (Celsus, lib. iii. c. 18).

turbed with its noise; but this, so far from inducing sleep, prevented it altogether; and it did not take place till the mill was set a-going again."[1]

δ. Harmonious and melodious sounds influence the mind chiefly in an indirect manner, and excite a sensation of either pleasure or pain, according to the nature of the ideas they are associated with, or the feelings which they suggest (see *Music*).

4. VISION.—On this sense, as on hearing, remedial impressions act either directly or indirectly.

α. Strong light operates as a mental excitant, and checks sleep. In bright solar light we feel more active, cheerful, and happy; whereas obscurity and darkness give rise to a gloomy and depressed condition of mind: hence, insolation in the open air is employed as a mental stimulus in melancholy, lowness of spirits, and despondency.

β. Different coloured lights exercise different effects on the mind. Thus, certain tints are popularly called cheerful or lively, while others are termed sombre. Hence, in the treatment of insanity, the colour both of the patient's chamber, and of the works of art which surround it, is not undeserving of attention. Feuchtersleben suggests the use, in these cases, of coloured glass for windows and spectacles.

γ. Sleep is promoted by "the sight of any thing waving; as of a field of standing corn, or of the hand drawn up and down before the face by a mesmeriser, attracting attention much more than an object at rest."[2]

δ. Darkness, especially when accompanied with silence, has a calming and depressing influence, and disposes to sleep. Hence it is employed in cases of great vascular or mental excitement of the brain, and where we desire to produce sleep. In some instances it excites great terror.

ε. Fixing the eyes steadily on a single object, as a candle, or a hole in the wall, will sometimes induce sleep.

5. TOUCH.—Of the therapeutical uses made of this sense, the following are a few illustrations:—

α. Gentle friction[3] with the fingers on some part of the body disposes to sleep. Its soothing and lulling effects I have repeatedly experienced when suffering from severe headache. "I know a lady," says Dr. Elliotson,[4] "who often remains awake, in spite of every thing, till her husband very gently rubs her foot."

β. "A combination is still more effective: whence, experience has taught nurses to rock, and otherwise agitate infants, while they hum them to sleep."[5]

γ. Freedom from pain and from uneasiness of any kind favours sleep.

δ. In some soporose affections, as poisoning by opium, apoplexy, &c. remedies are resorted to which, by exciting the sensibility of the body, are calculated to rouse the patient, and prevent sleep. Various methods of causing pain have been devised: one of the oldest is *urtication*, or flagellation by a bunch of nettles (*Urtica dioica*). This practice is mentioned by Celsus.[6]

ε. Pectination, or combing the hair, disposes to sleep, and is often resorted to for this purpose.

ζ. Brushing is used to allay cutaneous irritation, and occasionally to provoke sleep.

η. Rubbing, and various other kinds of manipulation, are employed as soothing means. Dry rubbing is very serviceable in œdema of the limbs.

θ. Titillation has been suggested and used by Mr. Wardrop[7] as a remedy for paralysis (of sensation?). The mode adopted was to pass a feather lightly across the palm of the hand, three or four times daily, until laughter was occasioned.

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[1] Dr. Robert Macnish's *Philosophy of Sleep*, p. 32, Glasg. 1830.

[2] Dr. Elliotson's *Human Physiology*, p. 608, 5th edit. 1840.

[3] The friction above referred to should be very light and gentle. Strong or violent friction by the hand or horse-hair gloves is used for other purposes; as, for allaying itching and irritation of skin, and promoting cutaneous circulation. Dinneford's "*Patent improved Electrical Horse-hair Renovators*" are, for these purposes, a great improvement over the ordinary horse-hair gloves.—On the subject of friction as a remedial agent, the student may consult Celsus, lib. ii. c. 14.

[4] *Op. cit.* p. 609.

[5] *Ibid.*

[6] Lib. iii. c. 2.

[7] *Edinb. Med. and Surg. Journ.* vol. viii. p. 197.

Monotony.—It has been already stated that monotonous impressions on the organs of hearing, seeing, or feeling, are great provocatives of sleep. This is the principle of the "method of procuring sound and refreshing slumber at will" recommended by the late Mr. Gardner, who called himself the *hypnologist*. His method was for some time kept secret, and was first made public by Dr. Binns.[1] It is as follows:—

Let the patient "turn on his right side, place his head comfortably on the pillow, so that it exactly occupies the angle a line drawn from the head to the shoulder would form, and then, slightly closing the lips, take rather a full inspiration, breathing as much as he possibly can through the nostrils. This, however, is not absolutely necessary, as some persons breathe always through their mouths during sleep, and rest as sound as those who do not. Having taken a full inspiration, the lungs are then to be left to their own action; that is, the respiration is neither to be accelerated nor retarded too much; but a very full inspiration must be taken. The attention must now be fixed upon the action in which the patient is engaged. He must depict to himself that he sees the breath passing from his nostrils in a continuous stream, and the very instant he brings his mind to conceive this apart from all other ideas," he sleeps. "The instant the mind is brought to the contemplation of a single sensation, that instant the sensorium abdicates the throne, and the hypnotic faculty steeps it in oblivion."

2. INTERNAL AFFECTIONS OF THE MIND.

This division of mental affections includes the *feelings* and the *intellect*.

1. The Feelings.

Under the denomination of *feelings* or *affective faculties* are included what the phrenologists denominate the *propensities* and *sentiments*.

The therapeutical regulation of the feelings or passions is principally resorted to in nervous and mental disorders, and consists in the repression or encouragement of particular feelings according to the circumstances of each case. "One insane," observes Dr. Spurzheim,[2] "will behave well by veneration; another by fear; a third will be guided by love of approbation, often by attention paid to his self-esteem; many, by gentle manners and kindness; melancholic, anxious, and fearful patients, by the greatest mildness." The same author further observes: "Every object which may excite the deranged feelings must be removed. This is the case with religious insanity, in pride, in melancholy, and in any other feeling. How injudicious is it, therefore, to give books to persons insane from religion, or to let them hear sermons, which nourish their disorders; or to keep with melancholics a conversation on the subject of their despondency!"

Hope is a mildly stimulating or tonic passion, which may be beneficially employed in most cases, and which proves injurious in few, if any. Most patients receive, with satisfaction and benefit, assurances from their medical attendant of the prospect of recovery. Even in diseases of a mortal character, life may be sometimes prolonged by concealing from the sufferer the fatal nature of his malady.[3]

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[1] *The Anatomy of Sleep; or, the Art of procuring sound and refreshing Slumber at Will*, p. 436, 2d edit. 1845.

[2] *Observations on the Deranged Manifestations of the Mind, or Insanity*, Lond. 1817.

[3] For some judicious remarks, by Sir H. Halford, on the duty of the physician, in withholding from, or communicating to a patient, the probable issue of a disease displaying mortal symptoms, see *London Medical Gazette*, vol. vii. p. 602. I fully agree with the late learned President of the College of Physicians, that the first duty of the physician is, "to protract the life of his patient by all practicable means."

Faith in the beneficial agency of the remedies employed, and *confidence* in the skill of the medical attendant, are important adjuvants in the treatment of most diseases. To them both physician and empiric owe part of their success; and it is, therefore, the duty of the practitioner to encourage these feelings in his patient by every legitimate and honourable means.

The influence of the *imagination* on disease has long been known, and is a fruitful source of fallacy in therapeutics. Extraordinary cures have frequently been ascribed to inert and useless means, when, in fact, they were referable to the influence of the imagination.[1]

Fear is a depressing and debilitating passion, of whose power over disease the practitioner has sometimes availed himself. Thus Boerhaave prevented the recurrence of epileptic attacks (brought on by a person falling down in a fit in the sight of the hospital patients), by directing a red-hot iron to be applied to the person who should next be affected.[2]

Removal from home, or separation of the insane from their families and society, is an important agent in the treatment of lunatics, and the influence of which is referable chiefly to the feelings and passions. It is calculated to act beneficially, by withdrawing the patient from the influence of domestic circumstances calculated to add to, or at least to keep up, the morbid condition, and by presenting new objects to his view, which arrest his attention, and excite new trains of ideas.[3] "Persons insane by pride," observes Dr. Spurzheim, "are seldom cured in the bosom of their family, where they are accustomed to command." In this case removal is desirable; so also, in madness from misanthropy, jealousy, hatred, or malice, removal is absolutely necessary. There are cases, however, where separation is objectionable; as where the intellect is not much disordered, and the attachment of the patient to his relatives is very strong.

There can be no doubt that the injurious effects of *coercion* or *restraint*, formerly considered essential to the successful treatment of insanity, are chiefly referable to the injured feelings.[4]

The state of the *sexual feelings* frequently demands the attention of the physician. Marriage is sometimes recommended to remove the temptation to solitary vice; and, in epileptic and hypochondriacal cases, I have witnessed its beneficial effects. There are cases, however, where it may prove injurious, as in diseases of the heart.

2. THE INTELLECT.

Under this head are included both the *perceptive* and *reflective faculties*, which, as well as the feelings, may be frequently and advantageously influenced for therapeutical purposes.

The influence of *music* is referable to this head. It has been employed in the treatment of diseases (especially those of the mind) from very remote times.[5] The most ancient notice of its remedial use occurs in the Bible,[6] where the sacred historian tells us that David cured the melancholy of Saul by it. This happened more than a thousand years before Christ. The ancient Greeks also had recourse to music in medicine, though Hippocrates makes no mention of it. It would appear to be principally adapted for the relief of the melancholic form of insanity, but its beneficial effects are very transitory, and have been greatly exaggerated. Esquirol[7] tried it at Charenton in every way, and under

[1] See Dr. Haygarth's *Of the Imagination as a Cause and a Cure of Disorders of the Body, exemplified by fictitious Tractors and epidemical Convulsions*, in the *London Medical Review*, vol. iii. p. 28, 1800; also, Dr. Lind's *Treatise on the Scurvy*, p. 343 et seq. and p. 535, 3d ed. 1772.

[2] See Dr. Wm. Falconer's *Dissertation on the Influence of the Passions upon Disorders of the Body*, p. 100, 2d ed. Lond. 1791.

[3] On this subject consult Esquirol, *Des Malades Mentales*, t. ii. p. 743, Paris, 1838. Also, Prichard's *Treatise on Insanity*; and Dr. Conolly *On the Advantages and Disadvantages of Removal of the Patient from Home*, in the *Lancet* for April 25th, 1846.

[4] For an account of the *non-restraint* system pursued at Hanwell, see Dr. Conolly's Lectures in the *Lancet* of Nov. 1, 1845. In cases of great violence, seclusion in a padded room is substituted for bodily coercion.

[5] F. A. Steinbeck, *Diss. Inaug. de Musices atque Poësos*, Berol. 1826.

[6] 1 *Samuel*, xvi. 15—23.

[7] *Des Maladies Mentales*, t. ii. p. 538, Paris, 1838.

the most favourable circumstances, but with little success. "Sometimes," he reports, "it rendered the patients furious, often it appeared to divert them; but I cannot affirm that it contributed to their recovery. To the convalescent, however, it proved advantageous." A more recent writer (Dr. Conolly) also observes,[1] that "little regard is probably due to music as a remedial means, its effects being usually only temporary. Violent patients often become silent, and are then moved to weeping, when the piano is played to them." As, in the therapeutical employment of music in insanity, our object is to create agreeable emotions, by recalling the happy events of by-gone times, and by restoring old associations and trains of thought, particular attention should be paid to adapt the character of the music to the peculiarities of each case; for it is obvious that what may prove beneficial to one patient may be injurious to another.

Reasoning, with nervous, hypochondriacal, and insane patients, rarely proves serviceable. This arises chiefly, perhaps, from the circumstance that the malady in these cases is more frequently seated in the feelings than in the understanding; and wherever strong feelings are deranged, little effect is to be expected from reasoning. In many instances it is absolutely injurious, "by exciting irritation in the mind of the sufferer, who thinks his counsellors are either unfeeling or incredulous towards his complaints."[2]

PART II.—PHYSICAL BUT IMPONDERABLE REMEDIES.

(*Remedia physica.*)

In this Part we have to consider Light, Heat, Electricity, and Magnetism, as remedial agents.

1. LUX.—LIGHT.

(*Lumen.*)

PROPERTIES OF SOLAR LIGHT.—Solar light possesses several distinct properties or qualities: it illuminates bodies; it raises their temperature; it effects in them various chemical changes; and on some it confers the faculty of being self-luminous or phosphorescent.

To account for these properties, the *corpuscular hypothesis* assumes the existence of as many kinds of imponderable matter as there are classes of properties. Thus the illuminating quality is ascribed to an imponderable termed light, the calorific property to caloric, the chemical property to tithonicity,[3] and the phosphorogenic property to an imponderable which has not hitherto received a name.[4] But the *undulatory hypothesis* explains the phenomena by assuming the existence of one imponderable or ethereal medium, to the mechanical action of whose vibrations or undulations on the atoms of matter all these properties of solar light are ascribed; the differences in the effects of this action depending on differences in the frequency of the undulations. Of the undulations which excite the sensation of colour, the shortest and most frequent are assumed to produce the sensation of violet; while the longest and least frequent give rise to the sensation of red. The greatest chemical effects are supposed to result from undulations which are more frequent, but shorter, than those which give rise to the greatest calorific effects. Lastly, the phosphorescence is supposed to arise from the neutralisation of the two

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[1] *The Report of the Resident Physician of the Hanwell Lunatic Asylum, presented to the Court of Quarter Sessions for Middlesex, at the Middlesex Sessions*, 1840.

[2] *Change of Air, or the Pursuit of Health and Recreation, illustrating the beneficial influence of bodily exercise, change of scene, pure air, and temporary relaxation, in sickness and in health*, by James Johnson, M.D. 4th ed. 1838.

[3] *Tithonicity*, from Tithonus, a beautiful youth with whom Aurora fell in love! (Draper, *Lond. Edinb. and Dubl. Phil. Mag.* vol. xxi. 1842).

[4] Draper, *op. cit.* vol. xxv. 1844.

electricites which are separated from each other by the mechanical action of the undulations on the atoms of the phosphorescent body.[1]

PHYSIOLOGICAL EFFECTS.—In the organised world, light performs important functions, and acts as a vivifying or vital stimulus.[2] This physiological property may be a primary or secondary quality of light; that is, it may be an influence distinct in its nature from any of the physical properties already alluded to, or it may be a consequence of them.

Morning light is popularly believed to exercise a more beneficial influence on the nutrition of animals and plants, than afternoon light. If this notion be well founded, it lends support to the opinion that the physiological effects of light are connected with the chemical influence of this agent; for, in photographical experiments, it is usually found that the rays of the morning sun are more effective than those of the afternoon sun.

Light promotes the nutritive processes of vegetables, and is the cause of the green colour of plants. That curious phenomenon denominated the *sleep of plants* is supposed to be connected with the absence of light. A morbid condition, called *etiolation*, or *blanching*, is observed in vegetables which grow in obscure places.[3]

On animals light operates in a two-fold manner: it promotes their development and nutrition, and it acts as a specific stimulus to the eye, as the organ of vision.[4]

Privation of light disposes to inactivity and sleep. Edwards found that it retarded or prevented the hatching of the ova of frogs. The disease called *Anæmia* or *Hypæmia* in man, is analogous to the condition termed etiolation in vegetables; and, like the latter, is sometimes referable to deprivation of light,—combined, however, with other deleterious causes.[5]

Amaurosis (retinitis ?) occasionally results from the exposure of the eye to strong light. The effect of the sun-stroke (*coup de soleil*, or *ictus solaris*), in inducing inflammation of the brain, may be in part, perhaps, owing to the influence of the light of the solar rays.

USES.—In maladies characterised by imperfect nutrition and sanguification,—as scrofula, rickets, and anæmia,—and in weakly subjects with œdematous limbs, &c., free exposure to solar light is sometimes attended with very happy effects. Open and elevated situations probably owe part of their healthy

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[1] E. Becquerel *On the Constitution of the Solar Spectrum.* In Taylor's *Scientific Memoirs*, vol. iii. 1843.

[2] The phrase *vivifying* or *vital stimuli* is used to designate those external conditions necessary to the maintenance of life in organised beings; such as heat, air, water, and nutriment. They are to be distinguished from the *alterative* or *medicinal stimuli*, which, while they cause temporary excitement, ultimately exhaust (see Müller's *Elements of Physiology*, by Baly, vol. i. pp. 28 and 57).

[3] For details respecting the influence of light on vegetation, consult J. C. Ebermaier, *Versuch einer Geschichte des Lichtes*, Osnabrück, 1799; Landgrebe, *Ueber das Licht, vorzugsweise über die chemischen und physiologischen Wirkungen desselben*, p. 187, Marburg, 1834; R. Hunt, *Researches on Light*, Lond. 1844; Gardner (of America), *Lond. Edinb. and Dubl. Phil. Mag.* vol. xxiv. 1844. Also, De Candolle, *Physiologie végétale*, t. iii. p. 1069, Paris, 1832.—Stark, in his *Allgem. Pathol.* p. 211, Leipzig, 1838, gives a complete account of the literature of this subject.

[4] On the influence of light on animals, see J. C. Ebermaier, *op. supra cit.*; E. Horn, *Ueber die Wirkungen des Lichts auf den lebenden menschlichen Körper*, Königsberg, 1799; Landgrebe, *op. supra cit.* p. 370; and W. F. Edwards, *De l'Influence des Agens physiques sur la Vie*, p. 394, Paris, 1824.

[5] See the case of the workmen employed in a French coal-mine, detailed in the *Dictionnaire de Médecine*, art. *Anémie;* and M. Andral's *Treatise on Pathological Anatomy*, translated by Drs. Townsend and West, vol. i. p. 97.

qualities to their position with regard to it. The observations of Dr. Edwards on the influence of light in promoting the perfect development of animals, led him to conclude that, in climates where nudity is not incompatible with health, exposure of the whole surface of the body to light is favourable to the regular conformation of the body; and he has therefore suggested insolation in the open air as a means calculated to restore healthy conformation in scrofulous children whose deviations of form are not incurable.[1]

1. *Darkness.*

In all diseases of the eye attended with local vascular or nervous excitement, in inflammatory conditions of the brain, in fever, and in mental irritation, whether attended or not with vascular excitement, the stimulus of light proves injurious, and in such cases darkness of the chamber should be enjoined. After parturition, severe wounds, and surgical operations, and in all inflammatory conditions, exclusion of strong light contributes to the well-doing of the patient. Lastly, darkness is employed to promote sleep.[2] In most cases where obscurity is indicated, rest and quietude should be enjoined.

2. *Dioptric Instruments.*

When vision is imperfect from defect of focal distance, *i. e.* from some defect of the image-forming parts of the eye, the remedy consists in the use of dioptric or refracting instruments (*eye-glasses; spectacles*). In *myopia* (i. e. *short-* or *near-sightedness*), double concave lenses are usually employed, to counteract the over-refractive power of the humors; while, in *presbyopia* (*long-* or *far-sightedness*), convex lenses or magnifiers are generally used, to obviate the diminished refractive power of the humors of the eye.[3] These are generally double convex glasses; but, for couched eyes, plano-convex glasses are frequently employed, in order to give a larger field of vision.

Lenses for the above purposes are commonly made either of flint-glass or of Brazilian quartz.[4] The latter, called *pebble*, has the advantage of greater hardness, and it is not, therefore, so readily broken or scratched.[5] The diathermancy of quartz is about the same as that of mirror-glass.[6]

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[1] *Op. supra cit.* p. 401.

[2] See p. 4.

[3] In opticians' shops two *trial boxes*, or *frames of sight*, are kept; the one comprises the range of double convex, the other of the double concave lenses. These are used for trying myopic or presbyopic eyes.

[4] Quartz presents some remarkable optical phenomena. It possesses the property of double refraction in the direction of its axis. In this it differs from every other known uniaxial crystal. Moreover, when a plane-polarised ray is transmitted through a prism of quartz, the two pencils, into which the ray is divided, are, at their emergence, elliptically polarised (Airy, in *The Transactions of the Cambridge Philosophical Society*, vol. iv. 1833).

[5] Lenses made of amber are readily scratched, and soon lose their polish.

[6] Melloni, *Taylor's Scientific Memoirs*, vol. i. p. 1. The transcalency or diathermancy of several transparent solids is as follows:—

Of 100 rays of heat proceeding from the flame of an Argand lamp, there were transmitted by

	Rays transmitted.		*Rays transmitted.*
Rock salt	92	Mirror glass	62
Iceland spar	62	Alum	12
Quartz	62	Sulphate of copper (diaphanous)	0

In another series of experiments Melloni ascertained the relative diathermancy of flint-glass, mirror (plate) glass, and crown-glass, to be respectively 65, 62, and 49.

Occasionally lenses of other forms than those above enumerated are employed; but the only one deserving of special notice is the *periscopic* or *meniscus* (concavo-convex) lens, recommended by Dr. Wollaston,[1] for enlarging the field of vision.[2]

Double Convex Lenses, for Long-sightedness.		Convex Lenses, for Couched Eyes; or Cataract Glasses.		Double Concave Lenses, for Short-sightedness.	
Sights.	*Inches Focus.*	*Inches Focus.*		*Nos.*	*Inches Focus.*[3]
000	60 } Rarely used.	2 } For reading.		000	36 } Rarely used.
00	48 }	2¼ }		00	30 }
0	40 }	2½ }		0	24
First	36	2¾ }		1	20
Second	30	3 }		2	16
Third	24	3½ } For distant objects.		3	14
Fourth	20	3¾ }		4	12
Fifth	16	4 }		5	10
Sixth	14	4¼ }		6	9
Seventh	12	4½ }		7	8
Eighth	10	4¾ }		8	7½
Ninth	9			9	7
Tenth	8			10	6
Eleventh	7			11	4¾
Twelfth	6			12 to 20	4½
Thirteenth	5				

3. *Chromatic Instruments.*

In some affections of the eye (popularly known as *weakness of sight*), coloured glasses are employed, with occasional relief, to diminish the intensity of light. Those with a neutral or grey tint (or twilight tinge), recommended by Mr. Mayo,[4] prove the most agreeable to the eye.

White light is most fatiguing and hurtful to the eye.[5] The disease called snow-blindness, which sometimes results from the long contemplation of a country covered with snow, is probably retinitis.[6]

Both *red* and *yellow*[7] light are injurious to the eye. To the excess of the yellow and red rays in common artificial light, may be in part ascribed the baneful influence of this light in causing impaired vision. Two modes of preventing its ill effects have been suggested; viz. the addition, by reflection, of the blue rays that are deficient (as by the use of conical blue shades or reflectors around the flame); or the subtraction, by absorption, of the red or yellow rays that are in excess (as by passing the light through blue glass, or some other transparent medium of a blue tint).[8]

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[1] *Nicholson's Journal*, vols. vii. and viii.

[2] For further information respecting spectacles, consult Mackenzie's *Practical Treatise on Diseases of the Eye*, pp. 784 and 792, 3d edit. Lond. 1840; Kitchener's *Economy of the Eyes*, Part 1—Spectacles, 2d edit. Lond. 1826; and Cox's *Spectacle Secrets*, Lond. 1838.

[3] A concave glass of a given number of inches focus is considered to be equivalent to a convex glass of the same number of inches focus; because, when superposed, the refraction of the one exactly neutralises that of the other.

[4] *The Philosophy of Living*, Lond. 1838.

[5] The intense light caused by the ignition of charcoal and the combustion of metals effected by the voltaic battery constructed by Mr. Grove, has produced on myself, as well as on some friends, temporary blindness. The symptoms (which lasted two days in my case) were those of retinitis, with profuse lachrymation.

[6] Mackenzie, *op. supra cit.* p. 501.—Xenophon (*Anabasis*, lib. iv.) speaks of snow-blindness.

[7] Hence, amber lenses, as well as amber-coloured glass lenses, are objectionable.

[8] See Dr. James Hunter's work, *On the Influence of Artificial Light in causing impaired Vision*, Edinburgh, 1840.