

On the action, use, and value of oxygen in the treatment of various diseases otherwise incurable or very intractable / by S.B. Birch.

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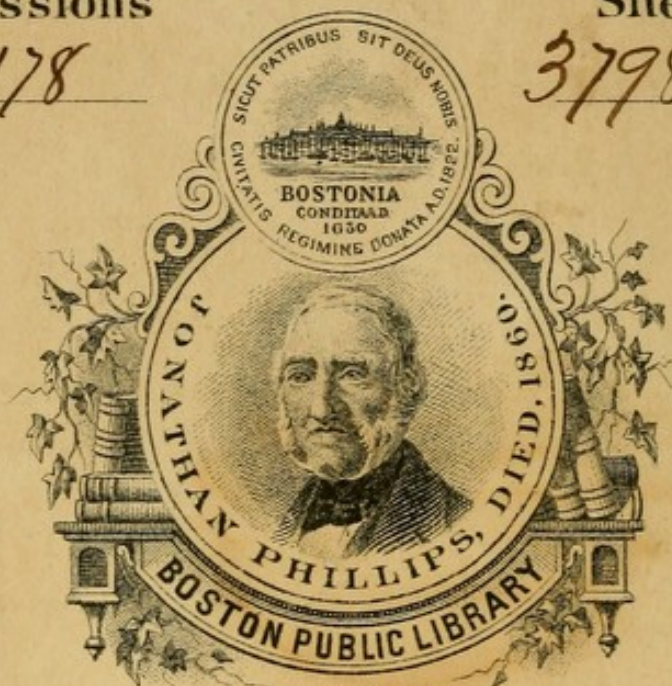
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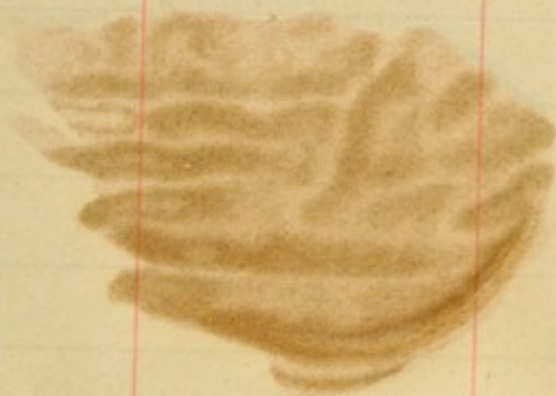
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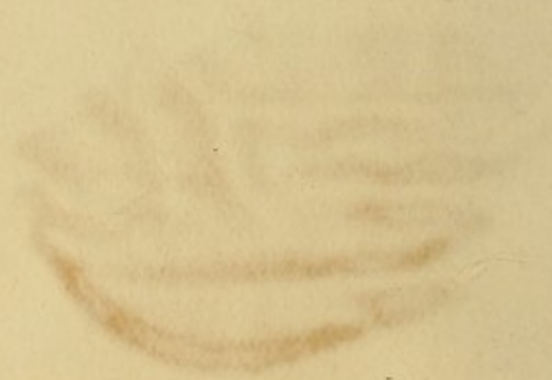
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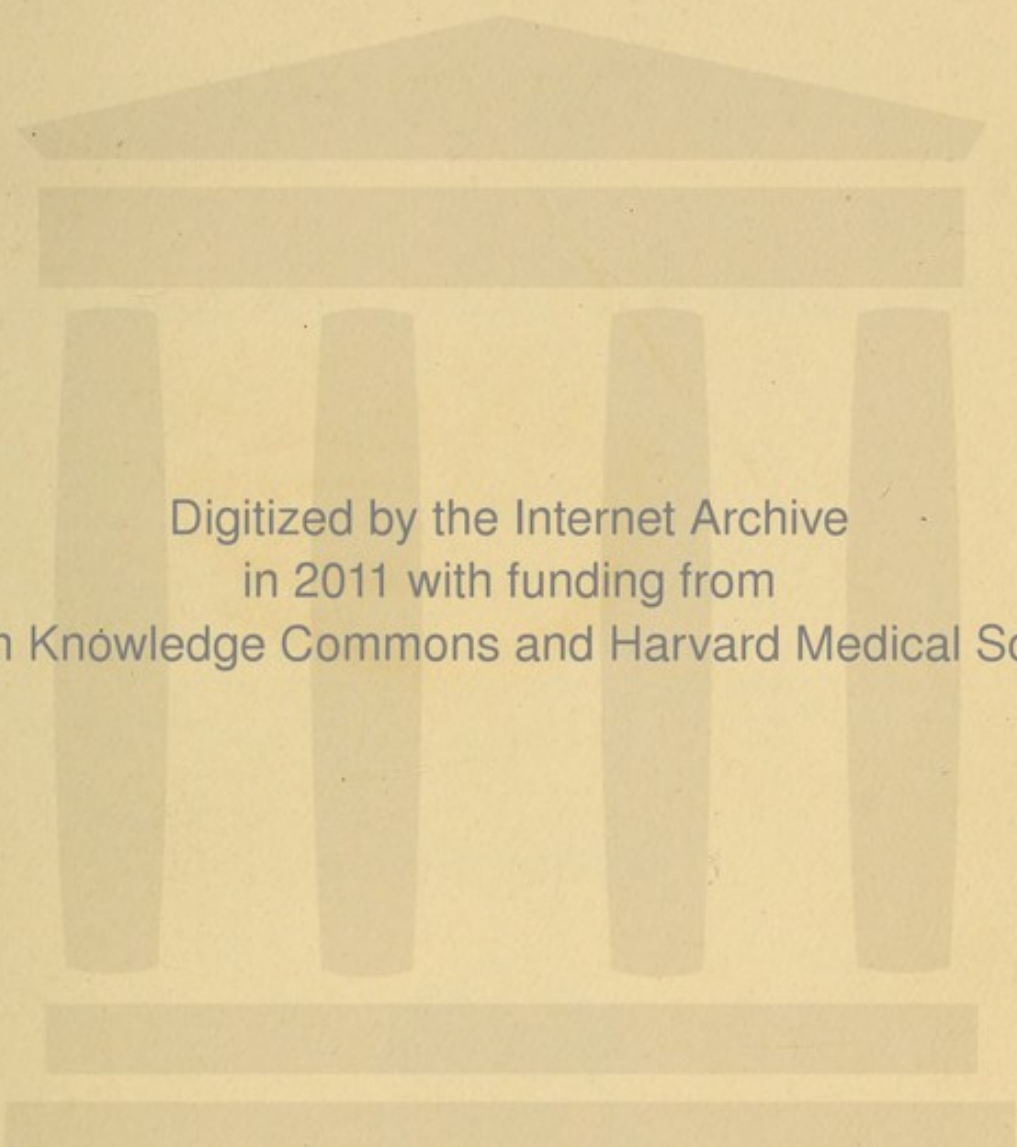
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ON THE
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IN THE TREATMENT OF
VARIOUS DISEASES

OTHERWISE INCURABLE OR VERY INTRACTABLE.

BY

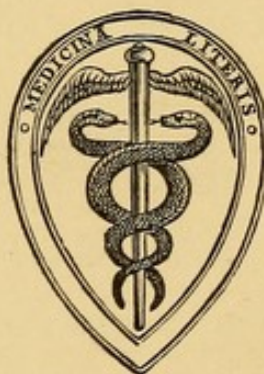
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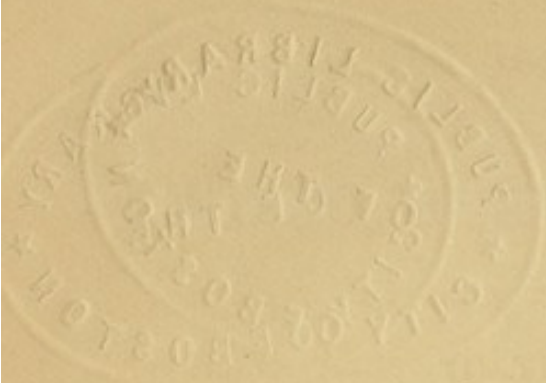
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PREFACE TO THE SECOND EDITION.

IT will be admitted that the steady advance of physiological and chemical science—since I ventured to reintroduce, in earnest and decided terms, the subject of these pages—has for all practical purposes confirmed the views which I formerly expressed, and the force of the clinical and other evidence which I then adduced, in opposition to the scientific world who had stamped it out as a pseudo-scientific plague.

Upon mature reflection it is gratifying to find little to modify except crudities of no practical moment. In this respect much, doubtless, remains open to fair criticism, by which I hope to profit in issuing any future edition ; while I may fairly claim justice and generosity on the part of former conscientious but mistaken opponents, who did not hesitate to couple my subject with “ bread-pills,” &c.

While the more important portions of the first edition are retained in their integrity, a moiety of this edition is almost a reprint from different numbers of the ‘ British Medical Journal.’ A few clinical selections are now added. Some of the

most remarkable of the older cases appeared in 'The Lancet' in 1857, and 'British Medical Journal' in 1859.

In the First Edition impartial justice to *any priority of opinion* was earnestly sought; and (with special reference to my views on the treatment of disease of the Lungs and Bronchi) these words were impressed:—"If I commit the fault of forgetting *prior* claims to merit, I shall be but too glad to rectify the omission in a future edition." In place of the justice thus rendered to others (although originally, as regards the therapeutic use of oxygen, there existed for me hardly anything worthy of the name of support), I have received significant injustice from certain self-interested supporters of oxygen who have followed me. This Second Edition is not prematurely offered, for the purpose of protecting myself against moral piracy and non-acknowledgment; while I have reason to hope that it may prove of scientific interest and *practical value* to at least some inquiring practitioners and students.

S. B. B.

61, HARLEY STREET,
CAVENDISH SQUARE, W.

PREFACE TO THE FIRST EDITION.

THE writer hopes that the following pages may be of some service by drawing professional attention to a much neglected, but highly important subject in Therapeutics.

If a mode of treatment, not generally adopted, prove eminently useful in the hands of any member of our Profession, he is bound to give the result of his experience for the benefit of all.

Any hypothesis, which the writer may entertain, is offered with all due respect to the opinions of the scientific who may differ with him; but the facts set forth as the result of his practical application of the treatment here advised are not presented thus deferentially. They afford quite sufficient evidence that oxygen may be employed as a valuable medicinal agent. Experimentally convinced of this truth, to advocate it becomes a duty which requires no apology.

September, 1857.

APPENDIX TO THE FIRST EDITION

It is a matter of fact that the following pages may be of some service to those who are interested in the history of the subject, but it is not intended to be a complete history of the subject. It is a matter of fact that the following pages may be of some service to those who are interested in the history of the subject, but it is not intended to be a complete history of the subject. It is a matter of fact that the following pages may be of some service to those who are interested in the history of the subject, but it is not intended to be a complete history of the subject.

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CHAPTER I.

INTRODUCTORY.

OXYGEN is well known as that constituent of the atmosphere which is essential to health and life. It is well known in its physiological relations. As a therapeutic agent, however, it is almost unknown to the vast majority of the profession; and, such being the case, I conceive it my duty as well as privilege no longer to withhold the results of my own experience.

We are constantly exhibiting remedies, not because science has *à priori* taught us their *modus operandi* on the animal economy, but because observed facts prove that they possess a certain specific action on it. Chemistry may ascertain for us the active principle of a medicine; it can go further, and show the proportion and arrangement of the elementary atoms of that active principle; but chemistry does not teach us why this active principle causes, arrests, or modifies peculiar actions in the living organism; the knowledge that it does so is all we have, and this is only acquired by ob-

servation of the fact. Hence a sufficient number of well-recognised facts, proving the utility of a remedy, must be considered sufficient reason for employing it, especially when it can be shown that it meets emergencies for which we cannot provide an equally effective substitute. I might rest my advocacy of oxygen as a therapeutic on facts alone; but we have, in using this agent, scientific light to aid us. Physiology teaches the nature of its action on the organism, and thus elevates it to a higher scale in medicine than the major part of our remedies.

There is not anything new in *suggesting*, though extreme difficulty in re-introducing, oxygen as a remedy. My professional brethren must nearly all be aware that towards the close of the last, and during the first part of the present century, it was used by Drs. Beddoes, Hill, Thornton, and several other physicians with signal success.*

Some of my respected medical brethren have joined issue with me upon the presumed too-rapidly-destructive metamorphosis of tissue when oxygen is employed in exhausting diseases. Others have met me with the strongly-expressed opinion that it "must be an injurious stimulant or excitant to the

* Upon reflection, I now omit Dr. Riadore's name. His reference to oxygen was of a most trivial character, but I desired to be strictly just, and carried that feeling somewhat too far in his case. [Second edition.]

vascular system ;” while in some instances I have heard of the remark, somewhat contemptuously made, “I suppose it is nothing more than taking a little extra fresh air, and can do neither good nor harm.” Others, again, conceive that the gas is merely a temporary stimulant, like alcohol—and that, the effects immediately passing off, the patients can have at least received no permanent benefit, even if no corresponding depression result. One great misgiving appears largely to prevail, viz. that the inhalation of an increased amount of oxygen must hazard pulmonary inflammation. A physician, eminent in the profession, gravely assured a patient who requested his opinion, that the Almighty had put the right proportion of oxygen into the air we breathe, *ergo* under no circumstances could it be desirable to increase it temporarily. Some content themselves with objecting, “Oh ! that is an old-fashioned thing—that has been tried in the hospitals, and always failed.” The most reasonable reply which I have heard, was from the lips of one of our most eminent physicians, who, when his opinion was required, said, “I have never given the subject my consideration ; I have never used oxygen in disease, nor seen it used, and therefore I decline to give any opinion on the subject.”

The most remarkable thing connected with these opinions obviously resides in their contrariety and their variety ; nor can I wonder at them, when I

recall to mind the words of the late Dr. Pereira, our great authority on *Materia Medica*, who, fortified I presume by the reported failures in some hospitals, ends his article on the therapeutic use of oxygen in these words: "On the whole, then, I believe oxygen to be almost useless as a remedy."

The above opinions, so characteristically opposed one to another, I will consider *seriatim* in as few words as possible:—

The "two rapid metamorphosis of tissue" appears *primá facie* very plausible; but numerous successful facts in my own experience have clearly proved to me, that in promoting and augmenting for a certain period daily the natural transformations of tissue, we *pro tanto* confer upon the system an increased power of reconstruction. The vital powers, which may have been long depressed by disease, unable to get the necessary lift-up to par, and consequently (incapable of renovation by any other available means) becoming weaker daily, will frequently under a judicious exhibition of this powerful remedy at once receive permanent invigoration. Once give the physical forces the urgently required temporary stimulus, then the almost stagnant circulation resumes its healthy motion, the torpid digestive and assimilative functions again become active, the congested organs are again capable of their work of secretion and excretion, and by a carefully managed daily dose, conjoined

where necessary with other judicious assistance, the constitution, after the lapse of a proper period according to the nature and long or short duration of the malady, becomes renewed, and not only is oxygen as a medicine no longer required, but health being restored, a continuance of it will become absolutely injurious. Indeed, subject to the condition that it be employed with a sufficient *practical* knowledge of its actions, and with due attention to dietetic regulations and other judicious measures, oxygen cannot be productive of too rapid and injurious metamorphosis. The idea of "living too fast," which has been suggested, must by no means be considered as applicable to the medicinal use of oxygen, inasmuch as analogous reasoning would then support the belief that an increased amount of fresh air and exercise must shorten life by promoting immensely the natural transformation and destruction of tissue. Yet do we not all know that health is thus invigorated, and hale old age almost ensured?

As to this remedy proving an injurious stimulant or excitant to the vascular system, I may say that the inexperienced might meet with such a result in certain constitutions; that formerly, before I had fully initiated myself in its application, I occasionally had little *contretemps*, but that with due caution no unpleasant sensation, except of a most evanescent character, need ever arise.

As to its doing neither good nor harm, because merely equivalent to a little more fresh air—I can readily understand how this should be, if the due absorption of the gas were not ensured; but that the absorption of a potent physiological agent like oxygen should be believed to have no effect *of any consequence* upon the system, could only arise from practical ignorance of the remedy, or from having probably observed no effects follow a few improperly-managed administrations. A fact well ascertained by all careful experimenters, that hyperarterialisation results from the prolonged confinement of animals in oxygen, incontestably proves its potency when inhaled in quantities beyond atmospheric proportion, and affords *per se* the strongest presumptive evidence of its value as a curative agent.

Far from being a merely temporary stimulant, it frequently is not felt as a stimulant or excitant at all. I usually find that sensibly beneficial effects, after inhaling it, last from an hour or two to twenty-four hours; and in one lady I recollect well that a single dose produced a feeling of vigour, and what she described as “an elongation of the nerves” for a week or ten days. It may be added, that other powerful medicines are admitted to possess more than a temporary effect. Why should this be denied to oxygen?

Even where the oxygen has been inhaled daily

for some months, I never met with one indication of inflammation or irritation of the lungs ; but on the contrary, I have had several striking cases of cure in chronic pulmonary congestion (which had been pronounced incurable), as well as in sub-acute inflammation.

Professional differences in opinion and neglect to give a trial must, I believe, have simply originated in a want of lengthened practical experience of oxygen as a therapeutic agent, and from overlooking its influence upon the vital dynamics. Vital air it was formerly denominated ; perhaps that term was by no means a bad one, for it certainly implied much more than chemical action alone. Oxygen is a remedy *sui generis* ; discrimination must be exercised, as to doses and mode of exhibition, in employing it in the treatment of different temperaments and diseased conditions. Under different circumstances in fact, oxygen will be found stimulant, sedative, exciting, depressing ; frequently no sensible effects are felt, yet gradually and almost imperceptibly a well-marked change for the better takes place in the patient's condition.

The therapeutic application of oxygen, and the prognosis to be formed as to the probabilities of success from its employment, must always be based upon the peculiar pathological state of each individual patient. Success from its employment, even when suitable cases have been selected, will

be found to depend upon judicious directions as to the mode of inhalation, and upon the care with which oxygen is made thoroughly to permeate the delicate membrane of the air-cells. Moreover, I believe we must not confine our views in every instance to the chemical combinations of oxygen in the pulmonary capillaries alone; for I have observed such well-marked and rapid effects upon the circulation in the extremities, in cases where, from poverty of blood, the gas could meet with very little oxydizable matter in the lungs, that I feel assured that oxygen, when properly managed, may be made to permeate the general tissues of the body, and so directly enter the systemic as well as the pulmonary capillaries. This need not surprise, for it is well known that few gases are so rapidly absorbed by the organism.

The use of oxygen will give some personal trouble, and cause loss of time to the practitioner, especially in his first essays; but I am sure few members of our profession would permit these considerations to influence them, were they really aware of its value both as a primary and auxiliary medicinal agent.

The foregoing portion of this introductory chapter was written more than ten years ago; and for the obvious reasons, elsewhere given, it has been thought desirable here to retain, without addition, words and ideas to which I then gave expression.

It remains for me now to add that when I ventured in the years 1856 and 1857, after some careful experience, to re-introduce the subject of oxygen gas as a therapeutic agent, and to urge its reception and establishment as one of our most valuable remedies in many intractable forms of disease, the more highly scientific portion of the profession, almost to a man, met my views with the most uncompromising hostility. Dr. Beddoes and Sir Humphrey Davy, as well as Dr. Cavallo, had tried and had failed; Drs. Hill and Thornton were either forgotten or ignored; in hospitals at home and abroad it had been tried and had failed; I was bringing forward "an exploded remedy dressed up in new colours," &c. Few, indeed, were the bright gleams of encouragement afforded. Among these, however, it is my pleasing duty to record Dr. Alexander's reference to me in his able work on *Gout and Rheumatism* (1858); Dr. Francis in the *Lancet* (1858); and, among periodicals, the one *hopeful* exception in my favour, the *British and Foreign Medico-Chirurgical Review* (1858). In 1859, my paper read before the British Medical Association at Liverpool, gave another impulse in the direction desired, and I had soon the pleasure of finding the subject attracting the attention of many practitioners both at home and abroad, and notably those two able experimentalists, Drs. Richardson and Demarquay. Great,

indeed, has been the change in professional opinion regarding the therapeutic use of oxygen within the last few years, when I can now feel that an apology for advocating it is no longer demanded.

CHAPTER II.

METHODS OF PREPARING AND ADMINISTERING
OXYGEN AS A THERAPEUTIC AGENT.

WITH the element of practical usefulness specially in view, it appears desirable, in the first place, to name the easiest and most economical methods by which oxygen can be promptly prepared and exhibited.

Although the use of chlorate of potash and peroxide of manganese is one of the best processes in an economical point of view, yet, for the busy practitioner, there is too much trouble in the management of apparatus for regulation of temperature, purification from chlorine, carbonic acid, &c. It appears to me that one of the best "rough and ready" processes which can be recommended is the one originated (I believe) by Keller, and latterly modified by Fleitmann. A saturated (not milky) solution of chloride of lime, with a very small quantity of freshly prepared peroxide of cobalt added, is to be subjected to a temperature of 176° ; and the gas in tolerable purity comes off freely to the extent

of 400 pints for each pound of the chloride. The protoxide can be added at the moment of use, quickly becoming peroxide. To extemporise an apparatus is obviously easy, and for administration a bladder can be readily attached, and some approach to accuracy thus attained in regulating the proportions of the oxygen and the atmospheric air.

Mr. Robbins (Robbins and Co., Oxford Street) taking advantage of this process of Fleitmann, has ingeniously managed to combine and retain in dry powder the oxide of cobalt with the chloride of lime, ready for immediate use by simply adding *boiling* (so directed) water to the compound. This affords two advantages: first, the good quality of the chloride is ensured; and secondly, the trouble of making the clear saturated solution is avoided; while, with the simple inhaler devised by Dr. Beigel, the practitioner can administer oxygen at a distance from his residence, in a case of urgency, without the trouble of bulky and heavy apparatus. *Primâ facie* it might be feared that sufficient chlorine, or at least hypochlorous acid, would be disengaged to affect seriously the value of this quick and ready method; but so small is the real amount, that I would merely guard against its employment:—1. In cases of very sensitive lungs; 2. Where the decided taste and smell might be seriously unpleasant to the patient; 3. Where prolonged use in chronic disease may be required.

Solution of peroxide of hydrogen affords an easy and excellent (though rather expensive) substitute for the preceding, whenever perfectly pure oxygen may be demanded for immediate but limited use. At a comparatively low temperature (say below 100°) the pure peroxide in it readily parts with one equivalent of pure oxygen. It is but just to add that Robbins and Co. have paid more than ordinary attention to its *careful* preparation, which is a matter of great moment.

Various other processes for obtaining oxygen gas with tolerable facility might be here adverted to, but most (if not all) of them present something objectionable in a medical point of view. As a matter of professional interest, I will refer *en passant* to two. Take two parts by weight of peroxide of barium, and one part of bichromate of potash; then to this mixed powder add either an equal weight of bisulphate of potash, with about seven or eight parts of water, or else diluted sulphuric acid. The other process, viz. decomposition of water by galvanic battery, is at present a fancy one, but may some day be no longer so regarded, when electrical agency can be employed with less expenditure of material and time.

Having named the most ready means for the administration of oxygen by inhalation in cases of emergency and for limited periods, I must next draw attention to an older and more approved

method which has several decided advantages, and through which I have mainly gained my own experience of the value of oxygen in disease. I refer to the apparatus and condensed gas in iron bottles invented by Mr. Barth, of Long Acre, London. With the disadvantages of the bottles being rather liable without care to get out of order, and difficulty of easy conveyance at a moment's notice—at least in the country—there are the following great advantages:—1. The condensed gas is absolutely pure and devoid of taste and smell; and the large quantity of 120 pints is guaranteed in each bottle. 2. The apparatus is adapted for the most accurate and instantaneous measurement of due proportions of the oxygen and atmospheric air (a very important consideration, as I shall afterwards show); it is an excellent spirometer; and with it we can regulate with precision the patient's pulmonary movements, by a simple motion of the hand varying at will the pressure upon the lungs and the depth of each inhalation. As yet, I believe, nothing has been suggested equal in value to this apparatus with condensed gas, where prolonged employment of oxygen is required. So far back as 1856, in a brief note published in the 'Lancet,' I called professional attention to this convenient and accurate method of managing inhalation, which (it may be here noted) I have found equally available for nitrous-oxide gas in certain cases.

Having reviewed the best methods of employing inhalations of oxygen, it remains to notice its introduction into the system by means of the stomach.

1. *Oxygenated water*, which has latterly been used a good deal in France by Ozanam and others, as well as in this country, is highly to be commended in many cases ; but I have very little reliance upon ordinary water charged with the gas. The only oxygenated water in which any confidence can be placed is that which was patented by Barth some years ago, and which has been somewhat overlauded in advertisement, notwithstanding its real merits. In preparing this water, all the atmospheric air is expelled by the conversion of the water into steam, pure oxygen gas then taking the place of the atmospheric air by being brought into contact with the steam under high pressure. Thus the water may be regarded as a saturated solution of oxygen ; and, even when all the effervescing superfluity has disappeared, the water still retains all the gas upon which its virtue depends. The worst point in connection with this water is, that it is flat to the taste like distilled water, and that it has hitherto been found impossible (without exciting low vegetable organisation) to give it a slight piquancy, even with a mineral acid, except at the time of drinking.

2. *Nitrous-oxide water* is somewhat more pleasant to the taste, but not so generally useful as pure

oxygenated water; although in some nervously depressed and hypochondriacal patients I would give it the preference. It was twenty or thirty years ago the subject of a patent (Searle's).

3. *Solution of peroxide of hydrogen* has been recommended by Dr. Richardson for internal use. I am compelled to say that I find it only exceptionally useful; and there is an additional drawback in its unpleasant flavour, to which patients much object. I will recur to the former point when speaking of the *modus operandi*.

4. *Ozonified oil*, discovered by Mr. Dugald Campbell, was introduced to the notice of the profession by the late Dr. Theophilus Thompson. Although it must not be regarded as a very general remedy, yet it has its limited sphere of usefulness, and ought not to have the stigma "rancid oil" attached to it. Where it does not agree with the stomach, in some cases of rapidly increasing tubercular vomicae and strumous ulceration generally, much benefit will occasionally be found from its use, other more approved remedial measures failing or demanding an auxiliary. For external use I have found it still more applicable; and in some few well-marked instances its superiority over other stimulating oils, as well as oils combined with ordinary stimuli, has scarcely admitted of question.

5. *Perchloric acid, chlorate of potash*, and the

permanganates, may be rightly regarded as media for the conveyance of oxygen into the stomach. The first, hitherto little used, appears to exert a powerfully tonic and purifying influence upon the blood and secretions in some sanguineous but cachectic subjects (*e.g.* in anthrax), but it requires considerable circumspection in selecting cases for its administration. The second is well known for its valuable febrifuge and purifying properties. Permanganate of potash, now so valued as a deodorising and disinfecting agent when brought in contact with putrefactive matters, can scarcely be recognised for internal use, owing to disagreeable taste and astringent quality when administered in sufficient strength; except it be in passive hæmorrhage from the stomach or bowels in cachectic subjects, or as a gargle in foul conditions of the mouth and throat. It is here specially named, because its transition into the stomach has been in some quarters rather earnestly advocated.

Lastly, *oxygenated bread* demands special notice, as a new and easy method of prescribing the gas, which seems calculated to prove a boon in medical practice. My attention was drawn to it by Mr. Welton, Grafton Street, within the last twelve months, and he has recently patented his ingenious process, with my fair encouragement, after some careful trials. The simple principle brought into practice, in oxygenating *baked bread*, is somewhat

allied to that which obtains in the manufacture of oxygenated water, viz., the substitution of pure oxygen for the greater part of the air ordinarily present in the bread. One point of difficulty appeared to me at first to present an insuperable barrier to the general employment of this bread, viz., the rapidity with which it became mouldy even in the tightly-closed "tins." This difficulty has been overcome. I find that good samples of the bread now keep sweet, and the occlusion of the oxygen remains perfect, for *fully* a fortnight or three weeks. A surprisingly small bit of this oxygenated bread proves its special value *in suitable cases*. Moreover, its relative effect on the appetite is singular. Thus, on the one hand (as might be expected) it stimulates the appetite where absent or capricious; while, on the other hand, it tends to produce such a feeling of epigastric fulness, when sufficient food has been swallowed, as to effectually suspend (if not satiate) some morbidly-craving appetites. These facts, as far as they have already been observed, appear full of significance as regards influence upon assimilation and nutrition. Even now I venture to believe that oxygenated bread, *in some cases*, will be found advantageously to supercede artificial pepsine, pancreatine, and even quinine, iron, and the mineral acids. Particularly favorable subjects, upon whom to try it, present themselves in delicate children with continually-

recurring ascarides, functional derangements of stomach and bowels, and mesenteric weakness. I have much pleasure in drawing the attention of the profession to it, and hope that it may be found to meet some difficulties in medical practice, especially where it may be a grave point to avoid the trouble of inhalation.

* * Lest my passing reference to protoxide of nitrogen in this chapter should be misapprehended, I may be permitted to observe that I did not intend to convey the slightest idea of its being an oxygenating agent when inhaled: indeed, Dr. Hermann's experiments would appear to be conclusive on this point; but (presuming them to be inconclusive) the primary stage of peculiar excitement by no means establishes the theory of a brief period of greatly-increased oxygenation of the blood, for even non-oxygenating agents (such as chloroform) have their longer or shorter periods of peculiar excitement, and oxygen-inhalation itself rarely evidences the most moderate degree of "laughing" properties. With regard to nitrous-oxide water, however, it seems more than probable that when taken into the stomach during digestion of food, its constituents may separate. Perhaps the water was scarcely worth notice as a remedy, but (since it has lately been again advocated, and is decidedly useful sometimes) I deemed it best not to omit it altogether.

No special reference has been made to the compressed-air bath (originally introduced from France); since the opinion seems to prevail that it is simply a *valuable* compressing agent. Certainly I should not advise it as a general method of trying oxygen as a therapeutic.

CHAPTER III.

ON THE MODUS OPERANDI AND DOSES OF OXYGEN.

It may, *in limine*, be taken for granted, that the old *dicta* of chemico-physiologists have within the last few years given way to the general admission that undiluted pure oxygen, as well as oxygen in large proportions to atmospheric air, can and does convey *even to the healthy* organism of man and animals a modified force or influence, varying according to individuality of human constitution or the class of animal experimented upon. The scientific gauntlet fabricated from the *later* experiments of Sir Humphrey Davy, with those of Allen and Pepys, more recently of Regnault and Reiset, and their representatives, has turned out but partially proved armour wherewith to fight the battle against the therapeutic value of oxygen exhibited beyond atmospheric proportions.

To endeavour to explain the *modus operandi* of oxygen gas as a therapeutic agent, is by no means the easy task which some recent supporters of and writers on the remedy would superficially assume. I refer to that convenient assumption, super-oxygenation of the blood, as the *direct* effect of its

administration, however small the percentage added to the air, and however brief the inhaling process. For my own part (now, as heretofore, admitting super-oxygenation to be a partial truth applicable to the treatment of some diseases and constitutions) I have for the last eleven years felt the force of scientific reasoning, and have acknowledged that we must go much more deeply than the shallow idea of super-oxygenation, or otherwise evade any attempt at explaining the *modus operandi* of the small ordinarily-curative doses—a most unsatisfactory alternative, in these days of advancing science. Placing oxygen simply on a par with medicines in general, we might certainly rest contented with a basis of *rational empiricism*; but, where the great life-supporting element is concerned, more accurate knowledge may be fairly anticipated sooner or later. Clinical experience may be ample; but, in the instance of a remedy like oxygen gas (demanding considerable experience in the selection of cases, unusual care in administration, and judgment in the use of co-operative remedies), clinical success depends too much upon the individual practitioner to be admitted without due caution as conclusive evidence.

In what follows, whenever the phrase “artificial oxygen” or “non-atmospheric oxygen” is used, it is intended to refer to oxygen gas chemically produced, and more or less diluted with air. The

words "atom," "ozonide," "antozonide," are simply used as convenient expressions, not involving support of exploded theories.

The *modus operandi* of oxygen gas, as a remedy in disease, involves three distinct considerations, in order to attain some approximation towards a correct apprehension of it :

1. The modified condition of the gas as compared with that in the air.

2. The constitutional predisposition, and the abnormal conditions incidentally existing in the organism of each patient.

3. Co-operative measures which may assist or interfere with the remedial influence of the gas.

1. To the mind of any one who may have had a very moderate experience of oxygen as a therapeutic agent in suitable cases, there can hardly remain a doubt of the difference in effect between small doses of oxygen artificially prepared and the oxygen ordinarily breathed as the principal life-supporting constituent of the air; for, although we meet with plenty of cases where tolerably large doses are demanded, and where, consequently, it may be fairly argued that the *extra quantity* may have been the sole cause of the immediate and more or less continuous effect, yet abundance of evidence will from time to time present itself to the eye of the clinical observer, of the absurdity of supposing materially increased oxygenation as the *direct* result

of (say) two to six pints of the gas mixed with twenty-five to ninety pints of atmospheric air, and inhaled once in twenty-four hours. Still, however, certain superficial writers on the subject, who have latterly come forward advocating oxygen-inhalation, will harp upon the old string of burning up the superfluous carbonaceous matters, &c.; whereas such conception could only be correct on the supposition that the patient were kept in a largely superoxygenated atmosphere for several hours daily; while the fact is overlooked, that, were the extra quantity to be regarded as the criterion of benefit to be derived, the patient could usually, by a very little increase of exercise or natural inflation of the lungs, obtain all the advantage that a few additional pints of non-atmospheric oxygen could afford. Assuming, then, that benefit can arise from non-atmospheric oxygen in comparatively trifling proportion to atmospheric, and inhaled during a very limited period daily, such benefit can scarcely be explained, except by a modified condition of the gas employed. To such modification I formerly applied the practically significant but scientifically rather loose term, "quasi-nascent," when the oxygen used was not actually nascent, yet for a time retained that special activity of its atoms to which I wished to draw attention as an essential point in its administration as a remedy in disease; while I added, that I had no confidence in oxygen which had been long

released from combination, unless it had been kept in a largely compressed state, in suitable bottles.

Although the modified conditions of oxygen are still but partially known, yet the researches of Schönbein, Brodie, Tait and Andrews, Meissner, Odling, Soret, Clausius, Daubeny, Richardson, &c., have collectively so far cleared the scientific view of the subject as to show that heat-carrying power and polarisation (with, perhaps, a varied arrangement) of the atoms of oxygen may be received as a satisfactory *general* hypothesis explanatory of the marked difference in action between oxygen artificially prepared and oxygen as it exists in the atmosphere.

As, in the manifestation of electrical force, it would appear that active oxygen is never generated otherwise than in company with an opposite principle. As, on the application of heat to water (evaporation induced), the positive and negative principles, ozone and antozone so-called, become developed, the former in the water, the latter in the vapour (Tobin); so, in employing heat in the artificial preparation of oxygen, ozone can be tested at the moment of liberation, but very slightly (and for a limited period only) in the reservoir after mere passage through the tubes of transit. Doubtless, the distinct polar conditions quickly give place to neutral oxygen; but it may be fairly surmised that this neutral oxygen will for a time remain in very

active condition for motion and combination ; and that this activity may be for a lengthened period preserved by condensing it, and may be further promoted by the expansion of the gas in the contact with air, which takes place just prior to its use. It may even be surmised, with some probability of truth, that the mere mixture of the gas with the air, by isolating and individualising its particles, may permit a freer therapeutic action than would otherwise obtain ; just as the phosphate of lime in animal charcoal isolates and individualises the carbon therein, and thus renders the carbon-particles active in more directions of force than they could possibly be, if they were closely posited.

Again, the recent chemical theories advanced to supersede the original electro-chemical theory of Berzelius—viz., those of Gerhardt, Laurent, &c.—accord to oxygen a di-atomicity, or (as Dr. Thudichum has recently suggested) duplicated dynamicity, which clearly points out a double plane of action, in which the gas may fairly be supposed to be capable of working out therapeutic results.

Dr. Richardson has ably impressed upon physiologists the fact that the agencies of heat and electricity have a very similar influence in rendering oxygen more active when freely exhibited to animals, and apparently infers the propriety (if not necessity) of the gas being warmed before inhalation in disease. He has also shown that oxygen

gas, rendered inert for respiratory purposes by being breathed repeatedly, can be again made active by the electrical current passed through it. But, it may be asked, Can its subjection to *heat* external to the body restore its activity? Certainly not, except possibly through the direct (concentrated) rays of the sun; no more, indeed, than the heat within the lungs can preserve its activity after a certain time. Hence a force must have been existent in the atoms of the oxygen, affecting its heat-carrying power, and removed by the process of respiration; and electricity, being a force whose chief characteristic is polarity, under the influence of *motion*, can effect in the atoms of oxygen what artificial heat cannot. Thus heat and electricity, though analogous in result in some respects, must possess different planes of action in modifying the polar condition of the oxygen-atom; and the admission of such distinction will be observed to bear considerable practical import in attempting to explain the relations of heat and oxygen, in a pathological point of view, under the second head of our subject.

To ensure, then, the requisite energy of oxygen in small quantity as a therapeutic agent, it should be either nascent or carefully subjected to the electrical current immediately before employment, or properly condensed, so as to be available for release, measurement, and administration, at a moment's

notice; and this being premised, leads us to the consideration of—

2. *Individual receptivity*, according to constitutional predisposition and pathological conditions. That the effect of oxygen gas upon a healthy person, or upon an animal, is a very imperfect analogue of its influence upon the subject of disease; and, further, that the amount of the gas administered does not necessarily represent the amount of benefit conferred; but that, on the contrary, a minimum dose will occasionally be found to afford a maximum of benefit surprising to the careful clinical observer,—are points of primary importance, which I may claim to have initiated. Not only are they important in a practical point of view, but in a suggestive capacity as regards *modus operandi*. Now, although the combination of the negative principle of the oxygen-atom with the polar principle of all other elementary atoms is, as a rule, clear and definite in inorganic, and approximately so in lower organic nature, yet, under the infinitely varied organic conditions of animal life, especially in man, we must have an equally infinite variation in the reception of the negative force associated with the oxygen-atom by the positive force associated with the blood-corpuscles. As physiologists, we can scarcely, if at all, meet with two persons who can be absolutely asserted not to differ in the smallest degree in con-

stitutional power of generating heat, musculo-nerve force, and blood-corpuscles, and consequently in the power of appropriating, for strength and vitality, the negative principle in the oxygen-atom. So great is the inherent vital power in some individuals—so quick and vigorous the assimilation of alimentary matters—that they can live in excellent health through their interior motility, assisted by a comparatively limited amount of food, air, and exercise. Contrast this with those who can scarcely “keep their blood in circulation ” and nutrition in tolerable activity for comfortable existence, without a large and regular supply of food, air, and exercise. It is true that each of these extremes and their intermediates, so long as they can and do maintain the *mens sana in corpore sano*, each receiving the requisite amount of atmospheric oxygen according to the natural demands of the organism—are often not very sensibly affected (some not at all) by the inhalation of large quantities of pure oxygen; although, notwithstanding, many even of these may be made to feel the influence of a small per-centage added to atmospheric air, and inhaled under carefully detailed directions. (Some few constitutions, it should be noted here, are very sensitive to the influence of the gas under any circumstances.) Let, however, the healthy equilibrium of the organic economy be lost in some diseases, and the invalid will often experience most

marked effects from what might have been a nullity in health. This contrast between different constitutions, and between health and disease, receives significant exemplification from a knowledge of the comparative effects upon animals; for Dr. Richardson has most ably demonstrated that the effects of oxygen upon them differ according to their activity of circulation and tendency to (so-called) inflammatory action, carnivorous animals being closely allied to birds in this respect, graminivorous representing the less inflammatory; while it has, of course, been long known by physiologists how little sensitive are the cold-blooded animals to the influence of oxygen.

If, then, it be granted as a principle, that there are at least to be found a small minority of persons in perfect health who can be made to feel, in greater or less degree, appreciable effects from inhaling oxygen gas; that comparative physiology strongly supports the correctness of such observations; and that pathology, through the medium of not a few careful observers, presents occasionally unquestionable evidence of *peculiar* rapidity and energy of action—is it not reasonable to assume a *modus operandi* in disease mainly based upon individual receptivity, through variations in the interior power of generating and equably diffusing heat and musculo-nerve force? Without this as our *point d'appui*, indeed, it appears to me impossible to admit or

form any rational idea of the frequently well-marked therapeutic action of a *very small* quantity of non-atmospheric oxygen, as contrasted with *any amount* of deep inflation of the lungs in ordinary atmospheric air, or "breathing mountain air"—words which have been so often sarcastically used by the prejudiced and ignorant, blindly assuming that neither can any difference exist in this instance between one organism and another, nor between oxygen from the laboratory and oxygen in the atmosphere.

Reference has been made to heat and electricity having a very similar influence in rendering oxygen more active when respired by animals. As a *physiological principle*, the fact is a very valuable one to be borne in mind; but any inference that it should be warmed before inhalation in disease appears by no means so satisfactory, for the question will at once arise to the sceptic, Does the effect, then, of a hot or warm atmosphere upon an invalid presumed to require the therapeutic use of oxygen, approximate towards the effect of a small per-centage of the gas added to atmospheric air, hot or cold? Certainly not. On the contrary, even a moderate (*à fortiori*, a very high) temperature will often be oppressive to the invalid; and, *without changing the temperature*, a small per-centage of oxygen will *at once* relieve the difficulty, thus excluding the idea of mere sensible heat or the

physical laws of expansion, contraction, and condensation of the air itself. Indeed, it is occasionally found very advantageous to admit, at due intervals, diluted oxygen into the lungs at a very much lower temperature than the surrounding air which the patient is breathing. This, in juxtaposition with the well-known effects of the compressed air-bath in certain cases, naturally leads to reflection upon the law of diffusion of gases at different densities and temperatures, as suggestive of the more complete inflation of the distant cells, and quicker entrance of oxygen into the blood. Doubtless oxygen, in passing from a gaseous to a solid state, must yield caloric; but it does not follow that it will yield more active caloric by being first warmed. Such an idea would appear to involve some confusion of thought respecting latent and sensible heat (so called); and it seems more than probable that the latent heat stored up in the oxygen-atom may be thus prematurely lost. Warming the gas may be, indeed, desirable in some few cases of low vital power and collapse, simply as a precaution against the effects of temporary sensation of cold upon the lungs and system in general; but, on the other hand, just as one constitution can utilise atmospheric oxygen under ordinary circumstances far more quickly than another, so does a marked contrast exist between different conditions of the organism in the appropriation of artificial

oxygen; the latent heat conveyed by the oxygen-atom being to a greater or less degree converted into energetic heat, and undergoing more or less rapid combination, exactly in proportion to the prior condition of the imponderable forces secreted within the body and conveyed by the nerves and blood-corpuscles. A febrile condition may exist; the quasi-febrile effects of a tropical heat may influence the oxygen without and the organism within; but such a condition, it need hardly be said, does not constitute increased vital power or more vigorous health, the reverse being too frequently illustrated in the unacclimatised European. It will be seen that these arguments directly point to the non-advisability of using warmed oxygen gas as a therapeutic in small proportions, since its low density would preclude it from giving out the same amount of energetic heat as gas at the ordinary temperature would do.

The effect of the electrical spark in renewing the vigour of oxygen previously respired suggests important reflection in viewing the *modus operandi* of oxygen. At a certain stage, after repeated respiration, all the imponderable force that the organism can abstract from the oxygen-atom appears to be exhausted, and more quickly by one condition of the organism than another; yet the gas can have its negative polarity restored. This affords a useful analogy to assist in forming a con-

ception of the difference between atmospheric and more active oxygen in its effects on organic polarity, and inversely the effect of the latter (in different constitutions and diseases) upon the former. The necessary co-operation on the part of the positive force associated with the blood-corpuscles appears to bear close relation to their more or less energetic polarisation, or capacity for immediate polarisation, under the influence of the negative force in the oxygen-atom; and this converts the latent heat of the oxygen-atom into active heat, *cæteris paribus*, with much greater rapidity in the case of oxygen just released from condensation or combination (when admittted into the lungs or stomach, and thus brought within its proper sphere of action), than occurs in the case of oxygen in ordinary conditions of settled expansion.

From foregoing remarks, the fallacy of oxygen being designated as always an exciting agent will be obvious. So far back as 1856 I earnestly impressed, in confutation of two directly conflicting opinions—1, that artificial oxygen is neither inert nor useless; 2, that it is not *per se* an excitor, but that it may be exciting or sedative, according to circumstances, its real effect being *restoration of equilibrium* in the organism when *fairly* used in *suitable* subjects. It seems to me remarkable how many physicians still persist in sweepingly con-

demning it as "too exciting" an agent (*e.g.*) in pulmonary disease.

The oft-repeated old experiments demonstrating on the surface of the body itself, in congested excoriations and ulcerations, the action of oxygen gas locally applied, must here be referred to *en passant* simply as completing the scientific chain of evidence towards a clear apprehension of the *modus operandi* of the gas when administered in disease. To Dr. Demarquay much credit is due for the confirmatory evidence rendered in this direction.

A *résumé* of conflicting physiological experiments, to which I formerly referred, would be superfluous here; for they have until recently tended to produce professional hostility towards, rather than support of, oxygen in its pathological relations.

3. The *co-operation* or *otherwise* of medicine must be regarded as of some moment in viewing the *modus operandi* of oxygen as a remedy in disease. Just as a close relationship exists between organic and inorganic polarity, so also must relative chemistry be kept in sight. Let us regard what is termed catalysis. Inorganic chemistry informs us that the presence of iodine, bromine, chlorine, and other of the more potent electro-negative series, will frequently cause or quicken oxidation by their presence, when the oxygen would otherwise be dormant or slow in action. Again, certain peroxides (already adverted to when speaking of the prepara-

tion of the gas for medicinal use), such as the peroxides of manganese, cobalt, cadmium, etc., by their simple contact in very small quantities with a salt containing oxygen, will cause that gas to be yielded with increased facility, and in much larger quantity, without themselves undergoing any permanent change. Now, far from these facts being adduced (which they have been) as evidence of the universal sufficiency of the oxygen in the atmosphere under any diseased condition whatever, and of the uselessness of artificially prepared oxygen as a remedy, it appears to me that they are capable of an inverse application. While admitting the frequent value of the foregoing electro-negative elements and their salts in promoting oxygenation within the organism, as well as in assisting oxygen gas therapeutically employed, I would suggest *pari passu* the probability of very small doses of more active oxygen, possessing a *quasi*-catalytic action in the lungs, or at least enabling ordinary atmospheric oxygen to be absorbed and combined, with increased energy as an immediate effect, and thus affording more or less continued benefit in lowered conditions of the animal economy, according to individual capability of sustaining the reaction induced.

With reference to co-operation or interference on the part of medicines, there is another interesting point to be named. It has been surmised that

narcotics (opium especially) may act through suspending or lessening oxygenation within the organism. Now I have at present a lady under my care who has received great relief from small doses of oxygen gas. She had been taking thirty grains of opium daily for two months before I saw her, as the only relief for extreme neuralgia associated with cancer of the womb; and although the quantity was soon greatly reduced, yet from three to eight grains daily were still needful, notwithstanding the assistance rendered from the gas. Far from oxygen inhalation being rendered inert, it invariably, and in a marked degree, assisted the action of the opium, when the latter had partially soothed. It may be added that I have never found that the moderate use of opium interfered much with oxygen, when both were suitable for the patient's condition and disease: although, on the other hand, several lamentable instances have come under my notice where irreparable mischief resulted from a single dose of opium injudiciously administered by the practitioner, under fear that critical discharges suddenly produced by the gas, and really affording the only chance of cure, were too weakening. In fact, any sedatives or narcotics may be advantageously used with oxygen, provided that they be not abused by being given in unsuitable cases and in too large doses. Of alcohol (that much abused gift to man)—a stimulant or narcotic,

according to dose—the same may be said. Supposing even that oxygenation may be rendered less active, or partially suspended, in the cerebro-spinal system, it still evidently remains influential over general nutrition and secretion in many cases, unless, indeed, injurious quantities of drugs or alcohol be administered.

In connection with this portion of the subject, I may here remark that a number of experiments upon rabbits with chloroform and oxygen, which I made eight years ago, led me to alter a mere idea which I had entertained and expressed two or three years previously; viz., that the use of oxygen would be advisable under accidental mischief from chloroform. In nearly every chloroform experiment I found that the prior or simultaneous or subsequent employment of gas tended rather to deepen the insensibility and further relax the tissues. In fine, it may be almost regarded as axiomatic, that *cæteris paribus* the artificial use of oxygen will tend to promote a sedative effect where sedatives are judiciously exhibited, and will tend to assist suitably administered stimulants.

The action of oxygen when administered internally by the stomach would seem to involve the two considerations, condition of gas and idiosyncrasy of each organism, equally with its exhibition by the lungs. In fact, extreme variation in effect are very frequently met with in the case of two at

least of the three which we will take as examples of the classes, neutral, ozonide, and antozonide; viz., superoxygenated water or bread, ozonified water or oil, and peroxide of hydrogen.

1. *Superoxygenated water*, being neutral, is less liable to disagree than either of the others, if carefully apportioned to the requirements of each constitution. The gas in this form appears to be rapidly absorbed by the mucous lining of the stomach; for rarely does any return by eructation, and seldom is flatus induced; the occasional symptom of flatulence being probably indirect, or flatus already existent excited into movement. In a few persons, I have known an invariable sensation of heat and determination to the brain within ten minutes after imbibing half a tumbler of the water. Very many experience a quiet exhilaration or feeling of general tone throughout the body. In cold weather (taking a subject rather below the average vital heat), it is apt to chill and depress: in hot weather, to cool and brace up; but, even in winter, its use is found very beneficial for persons confined many successive hours in over-heated, pure-air-excluding apartments, and especially as a remedy for the thirst and dry mouth following a stimulating late dinner. These facts need little comment, when taken in connection with foregoing observations on the *modus operandi* of artificial oxygen. *Oxygenated bread* (to which special attention was

directed at pp. 17, 18 is scarcely open to any of the preceding objections, if it be prescribed with proper caution. It must not, however, be regarded as a substitute for the water, each having its distinct sphere of action, the latter being *more generally* applicable as a hygienic agent, the former claiming a *special position* as a therapeutic. This bread should be taken at the commencement of a meal; and the ordinary "dose" required by an adult is from one ounce to one and a half ounces. For patients having very small appetites half an ounce will often be quite enough; but this point requires due arrangement on the part of the attending practitioner.

2. *Ozonised water or oil*, whose sphere of usefulness is very limited in comparison with the preceding, appears to have an action allied to perchloric acid and (in a more remote degree) to nitrohydrochloric acid and iodides. They demand almost as careful prescription for the stomach as ozone does for inhalation; and, if not cautiously adapted to the state of the stomach and lungs, will affect injuriously the latter as well as the former. The oil especially (and I am happy in being able partially to confirm the belief of the late Dr. Theophilus Thompson) is very useful, when tolerated by the stomach, in the vomicæ and glandular suppuration of strumous subjects—useful after the failure of cod-liver oil and other approved remedies. The

double action of this oil receives significance from (a) the irritating effect of ozone in large proportion *versus* its alterative, tonic, and absorbent effect when very small doses are used—when, in fact, the really valuable nature of the element does not undergo abuse by poisoning the system with it, as with the abuse of alcohol, &c. ; (b) the well-known usefulness of cod-liver oil and other oils in certain perverted conditions of nutrition.

3. *Peroxide of hydrogen*, representing the so-called antozonic compounds, appears to me, after repeated trials in a variety of cases, to be quite an exceptional remedy for administration by the stomach ; and, notwithstanding the facility with which it gives up its second atom of oxygen (quickly becoming neutral) when subjected to moderate heat out of the body, its therapeutic effect evidences considerable dissimilarity from that of oxygenated water. It is apt to disagree with the stomach ; sometimes it seems to have no action ; certainly, more definite rules are required for the selection of cases in which its superiority may be manifested. The association of a second atom of oxygen with the oxide of an electropositive element, apparently causing the assumption of a polar condition opposite to the polar state of the oxygen in unstable protoxides and chlorine-peroxides, presents as yet a knotty scientific point even in inorganic chemistry ; and since a great difference exists between the action of peroxide of hydrogen

and the opposite loosely combined compounds of oxygen, as well as oxygen in solution, the question arises (*a*) whether the loose atom in the peroxide of hydrogen becomes neutral, or undergoes some other special combination in contact with the contents of the stomach or after absorption through the mucous membrane ; or (*b*) whether it be, on one hand, inert under many conditions of the stomach and internal economy, and, on the other hand, slowly active, and thus irritating in some instances, useful in a few diseased states. Dr. Richardson's suggestion regarding its peculiar usefulness in some cases of diabetes may be favorably viewed. A special catalytic agency in reference to the abnormal production of sugar and its oxygen component may be suggested ; but, as to most other perversions of health, this peroxide affords little satisfaction compared with other well-approved methods of oxygen exhibition, and is besides very unpleasant to the taste of most patients ; *ergo*, the impression is arrived at, that we can do very well without it, except in bad cases of diabetes, where it should be fairly tried.

In prescribing oxygen gas in disease, there ought to be much more care than usually obtains, or is commonly deemed necessary. It would be obviously superfluous here to extend my remarks beyond inhalation, and the administration of oxygenated water or bread ; since the therapeutic employment of substances containing oxygen in a state of chemi-

cal combination is a part of our ordinary *materia medica*, and there is no fear (*e.g.*) that any hunter will lead the profession, like inexperienced hounds, "off the scent," by assertions regarding the fumes of perchloric acid and nitric acid conveying pure oxygen to the lungs by inhalation! As to inhalation, *undiluted* oxygen may be, and is, exceptionally useful; but, as a rule, it affords but little satisfaction even if it does no harm. In desperate cases, as a last resource, I have tried the undiluted, after the gradually less-and-less diluted gas had failed. For one or two minutes it seemed to revive the patient; but the transient reaction has generally been followed by an immediate return and even increase of depression. It is necessary that the atoms of oxygen should be distributed through some medium; and atmospheric air is naturally selected as the best and most convenient, though nitrogen would almost equally subserve, and in some cases a medium of hydrogen (very carefully managed) affords a special advantage. The precise method of inhalation is highly important. In bad cases the inhalations (for a time, at least, at the outset of treatment) ought to be carefully watched by the practitioner. According to the special condition of the lungs, heart, and brain, &c., or the patient's physical weakness or possible nervousness, so ought the depth and vigour of the inspirations, and duration of each sitting, to be regulated. The diluted

oxygen should be retained in the lungs for at least two seconds. A medium period is five to six seconds after an ordinary inspiration (say) from 70 to 200 cubic inches, according to pulmonary capacity. One minute's interval of ordinary respiration, at least, should elapse between each artificial inspiration; and in some cases—either sensitive to its effects, or soon fatigued through debility—from two to four minutes' interval, ought to take place. As a rule one well-managed half to three quarters of an hour's sitting in the twenty-four hours is much more beneficial than short and repeated sittings; but of course there are exceptions.

It is not desirable to inhale within an hour and a half after a good meal, for obvious physical reasons, but it merits special notice that the renowned French physiologist, M. Claude Bernard, referring to the resistance to the absorption of oxygen being greatest during the act of digestion, attributes it to the superabundance of the hepatic saccharoid principle (*hepatine*, Pavy) forcibly propelled into the blood at that period. Debilitated and anæmic subjects* should

* In such subjects oxygen will cause depression, pallor, and coldness, if a full percentage be added, and the inhalation be unduly continued; and since the assumption of superoxygenation (in its chemical sense) is here out of the question, it appears most reasonable to explain thus:—Carbonic acid being insufficiently formed and deficient in the blood, and the presence of *due proportions* of both gases being essential for the organic economy, the unconverted oxygen (which has entered the circulation) preponderates, and actually checks in place of assisting the molecular changes and movements.

never take oxygen after long fasting (except for a very few minutes, and when very much diluted); while the contrary applies to the plethoric and congested with plenty of reactive power, for *direct superoxygenation* may here be received as the correct idea of the treatment with free doses, whenever ordinary oxygen cannot through physical impediments be sufficiently obtained from the air—moreover, Bernard and others have shown that the blood of animals while fasting absorbs the maximum of oxygen. The time to be occupied in inhaling a given quantity demands quite as much vigilance and judgment on the part of the medical attendant as the prescription of a dose. During the sitting all excitement should be prohibited; but after its completion active movements for a few minutes in the room or a little exercise in the open air is advantageous. Chilliness and cold feet must be guarded against, as far as possible, during the inhalations.

In speaking of small doses, a range is implied of from two to twelve per cent. of the gas in a given amount of air. Large doses are signified by a *minimum* of twelve per cent. Nine to twelve pints of the pure gas, diluted with about seventy-five pints of air, may be stated as a fair medium dose; and the inhalation of this quantity should, *mutatis mutandis*, extend over a period of at least half an hour.

To conclude this portion of our subject with a slight summary. As atmospheric air is provided for us by Infinite Wisdom as the perfect respiratory medium physiologically considered; so physiological experiments point to its physiological relations, and materially assist towards a comprehensive view of artificially prepared oxygen as a curative agent. But, on the other hand, artificially prepared oxygen can only be thoroughly tested in its own plane; being a remedy demanded by perverted physiology, its true value can only be understood through pathology. Thus it can be clinically tested by its action through the lungs, stomach, and skin; but, in testing it, we must recognise practically—1, heat, polarisation, motive power, associated with the oxygen atom; 2, the same forces in the living organism; 3, the mutual relations of these forces, inorganic or organic, in connection with *individual constitution* and various perversions from the healthy standard, as well as under medicinal modification.

CHAPTER IV.

ON SEMEIOLOGICAL AND PATHOLOGICAL INDICATIONS AND CONTRA-INDICATIONS.

IN employing oxygen in different diseased conditions it appears necessary, then, to regard its action from two aspects: 1. The alterative and tonic influence which it can exert on the nervous system (apparently irrespective of immediate chemical action *per se*, in the ordinary acceptation of the term), when exhibited in very small doses, and for a very limited period daily. 2. The augmented activity of the normal chemical changes in the animal organism directly induced by bringing a largely increased proportion of the gas in contact with the pulmonary cells; the duration and frequency of the inhalation being, in this case, an important consideration.

So far as relates to the first suggestion, I have, as before stated, had ample opportunities of observing that oxygen can, in many susceptible temperaments, and in certain diseased conditions, exercise a peculiarly powerful influence, rarely met with in persons enjoying perfect health; and, by taking advantage of this peculiarity, many cases

will quickly undergo a change for the better, where the most enlightened and judicious treatment had previously failed to produce any beneficial effect. In such instances, the gas ought to be used with great caution ; for I have known unpleasant symptoms arise from what would usually be regarded as a ridiculously small percentage added to atmospheric air. Most of these examples have occurred in sensitive nervous systems—in individuals possessing a very susceptible nervous organization, or otherwise in those affected with lesions of the brain or spine, from disease or injuries. Fanciful imagination, hysteria, *et hoc genus omne*, may very naturally create misgivings in the minds of those who have not personally witnessed such phenomena. Willingly do I grant a liberal discount to the incredulous, while adding that several of the best exemplifications have presented themselves in men of powerful frames, ignorant of the increase or diminution of the doses that they were being subjected to, and not only devoid of all apprehension of the treatment, but in the highest degree surprised that “a little more pure air” could exert such a perceptible action on the system. The principal symptoms of a disagreeable character, here referred to as occasionally resulting from extremely small doses, are, a sense of constriction of forehead and temples ; a feeling of weight over the centre of the parietal bones, and in the occiput ; a rush of blood to the head ;

fulness, pain, or oppressive sensation, in the nape of the neck and base of the brain ; sudden faintness ; palpitation of the heart ; spasmodic contraction of affected parts, *e. g.*, reflex movements in extremities affected with paralysis of voluntary motion. Moreover, I have seen, on two or three occasions, a state of unnatural excitement of the entire nervous and vascular systems, which has continued for several successive days after one moderate dose. The chief symptoms of a disturbing character observed from pushing large doses of oxygen are, in thin anæmic persons, sudden or gradual disappearance of pulse, pallor of countenance, coldness, and partial collapse ; in the plethoric and sanguineous, the reverse—viz. too excited circulation ; full bounding pulse ; intense heat of head, face, and skin ; severe, oppressive headache. I have also known the frequent and long-continued exhibition of it, when not duly superintended, cause much emaciation.

For individuals, however, to be obnoxious to the extremes of the foregoing symptoms, is only occasional.

On the other hand, certain beneficial effects of oxygen may be mentioned as not unfrequently immediate and well marked, where due judgment has been exercised in selecting cases, and in directing the doses and duration of the inhalation. Such are, complete relief from excessive oppression of

the brain ; sight improved in defective vision consequent on venous congestion ; genial warmth, even to the ends of the toes and fingers, succeeding to extreme chilliness and collapsed condition ; sudden departure of great nervous depression ; permanent relief afforded to the uterus, ovaries, and spine, by sudden induction of long-suppressed catamenia, particularly at the change of life ; unexpected diarrhœa, of highly offensive character, with dark inspissated bile, in long-continued torpor of the liver and portal system ; cutaneous transpiration suddenly and freely produced. To guard against any possible misapprehension from dwelling upon these special and important points, it must be distinctly understood that, in very many cases, the beneficial alteration effected by oxygen takes place with no characteristic signs of action perceptible to the patient, or even to the practitioner, except general improvement in the constitution, such as may be observed in many debilitated frames undergoing a mild course of chalybeates. Speaking generally, there will be found, in suitable subjects for the treatment, improved appetite and powers of digestion and assimilation, a feeling of being much more “ up to the mark,” less lassitude, more ability to bear physical exertion, and (that to which ladies are pre-eminently partial, and some of the ruder sex not less so) a clearer, fairer, and softer skin.

As to conditions of the organism contra-indicating the employment of oxygen, or in which it ought to be exhibited with extreme caution—a few hints (as an addition to comments already made), sufficiently suggestive to the professional inquirer, will alone be needed. *Du reste*, each case must be considered on its own merits.

Although certain functional and organic diseases of the heart will be specially named as capable of cure or alleviation by means of oxygen, yet cardiac affections, when associated with much nervous and vascular excitement, will, as a rule, decidedly negative its use. With a constitutional predisposition to nervous hyperæsthesia, where the slightest causes derange the heart's action, in impulsive and sensitive temperaments, there seldom will be found much satisfaction from oxygen. This obtains especially in subjects who have been the victims of chronic functional derangements calculated to upset cerebro-spinal equilibrium, and to induce morbid sensitiveness. A grave distinction, however, should be drawn between rapid pulse thus almost constantly present, and that arising purely from the presence of disease. Diseases with increased fibrine in the blood, if accompanied by relative diminution of the other organic constituents and deterioration of the red corpuscles, will either at once contra-indicate oxygen, or, if for special reasons it be thought worthy of trial in very small

doses, a few days without some marked benefit will negative its further employment. It seems almost superfluous to guard the educated practitioner against the use of the gas in acute inflammatory attacks and aneurismal tumours. In all chronic cases of extreme debility, with spanæmic condition and lost power of digestion and assimilation, oxygen, if tried as a last resource, must be employed in very small doses ; large ones in such cases will tend to lower the vital powers, to increase the pre-existing coldness of skin and extremities, pallor, sallowness of countenance, and general lassitude, and a patient may not for many days recover from the effects of one large inhalation.

The deviations from health in which it will be found most beneficial are those where there has been no very considerable reduction of what may be called intrinsic vital power. Depression or oppression may be extreme ; the nervous and vascular systems may be incapable of receiving more than temporary tone or stimulation by means of ordinary tonics, stimulants, and attention to the best sanitary and dietetic rules ; death may be at the door ; but, as a rule, there must not be present that permanently lowered condition induced by long-continued, insidiously-undermining nervous debility (so well known to us all) which, having become almost a second nature, has incapacitated the system for "making life" beyond such amount

as is absolutely essential for the brief maintenance of Psyche in her terrestrial abode.

In some constitutions, with bluish or rubicund noses, congested conjunctivæ and scleroticæ, semistertorous breathing on the slightest exertion, hæmorrhoids, &c.—all vividly depicting to the mind the internal state of matters—each dose will sometimes cause a slow, laboured, full, but very compressible pulse, to become quicker, firmer, smaller. In others, with a small, weak, quick, and even irregular pulse (in the absence of much excitement with hyperæsthesia), the quick conversion into a slower, fuller, and firmer pulsation, is sometimes equally well marked.

The diseases *par excellence* in which the gas has afforded me the most gratification are those attended with either local or general venous congestion—a preponderance of the venous over the arterial, and torpidity of the capillary circulation. The good effects have been, as a rule, most decided in persons of a gouty or strumous habit, or otherwise in a state of general *malaise*, with great liability to colds and sluggish circulation, either constitutional or superinduced by an atonic and oppressed condition through over-feeding and other luxurious or indolent habits, so prevalent in these artificial days.

In plethoric habits, with chronic local or general congestion interfering with the functions of one or

more of the secretory organs, the commencement of the curative process has sometimes been ushered in by sudden and unexpected efforts of nature to throw out peccant matters—efforts for so long a period previously unattainable through the most judicious treatment, and so immediately following two or three large doses of the gas as to afford almost unquestionable evidence of true sequence. The assistance urgently demanded by the system has been given; Nature has thus had a starting-point, and a critical discharge has made its appearance. It has been my fortune to see this exemplified in cases of long-suppressed catamenia, in torpidity of hepatic functions with pent-up biliary secretion (as evidenced by sudden diarrhoea of most offensive character), and in gouty affections with much cerebral, nephritic, and other distress. In the last, I have known the urine, which had been for many weeks uniformly clear and limpid, become, to the horror of the patient, turbid, dense, and loaded with urates and phosphates.

I would venture particularly to draw attention to the ascendancy of oxygen over the cutaneous capillaries, not unfrequently evidenced from the commencement of its use in torpid and unhealthy conditions of the cutaneous function, and cachexia arising therefrom. The benefit afforded will occasionally demonstrate itself in profuse perspiration, when a dry harsh skin had been previously the

order of the day ; or a relaxed and moist state of the cutis, with constant chilliness and liability to colds, will give place to a warm, healthy, and comfortable state, to which the invalid had been long a stranger.

Its occasionally singular value in unmanageable boils and carbuncles is tolerably well represented in No. 2, Selected Cases, page 74. Even inveterate skin affections, the history of which points to a congenital origin, and incurable in the permanent sense of the word, may nevertheless receive much benefit from an occasional resort to this remedial agency.

Rapidly spreading ulceration, with sloughing (even of the worst description, see pp. 78, 119-20), as also slowly progressing senile gangrene (see p. 143-4), have been under my observation suspended quickly and cured under the influence of oxygen, where every other known means had failed, and the patients were apparently in a hopeless state. Not a few fatal cases of this class (as well as so-called pyæmia) might, I believe, be prevented, were oxygen administered at the right time and with sufficient care.

In Strumous and Scrofulous subjects (employing the two adjectives to designate, the one the constitutional disease, the other the external manifestation of it) oxygen has proved of great advantage as a remedy, even where all the usual anti-strumous

remedies had failed. It ought to be regarded as a *sine quâ non*, whenever glandular enlargements and ulcerations, and vascular congestions, internal or external, have been found unmanageable or incurable under ordinary treatment with the best hygienic regulations ; while (*e. g.*) pulmonary consumption in strumous subjects affords a special example of the positive necessity of oxygen, if such disease is to have a fair chance of cure.

In Cancerous Diseases, even where operative procedure with knife, caustics, absorbents, &c., had done their best or worst, and various constitutional agencies had been unavailingly associated with the view to the suspension and palliation of the disease, I have, on several occasions, had an opportunity of trying oxygen with far more satisfactory results, through the constitution, upon the local disease than has been attained by any other remedy ; while (no small advantage) the patients were saved from any further local treatment, calculated to increase irritation, debility, and suffering, without any removal of the real disease. Although it would be unjustifiable to speak positively of oxygen being destined to offer *the firm base-work* of successful treatment in cancer, since I have had no opportunity of trying it in the *earlier stages*, yet, from the extraordinary influence discovered in careful trial upon some of the most unfavorable subjects, it

may with propriety be urged that whenever the disease (in any of its varieties) begins unmistakably to demonstrate its existence, oxygen should be suggested as the prime remedy, other really essential measures taking the place of assistants not mischief-makers, and alcoholic beverages, above all things, being used to a *very* limited extent. A senior physician of perhaps the foremost London Hospital could (in the case of a near relative of his own) confirm me as to the unquestionable value of oxygen even in hopeless cancer, when properly prescribed, and aided and modified in its action. The lady in question had sunk into a miserable and feeble state after three severe and *fruitless* operations. For four years since the commencement of the new line of treatment (though the cure is not yet complete), she has been taking long walks and enjoying life much like other people, and friends have been struck by the remarkable change in personal appearance, as well as health and strength.

Inveterate Headaches, and *Chronic Neuralgia*, and other nerve-affections of the most persistent kind, will often succumb to oxygen, either alone or with *gentle* adjuncts suitably prescribed; in a few instances even *intense* long-continued suffering has yielded in a few days. Clinical Selections 7, 9, 10, 19, and 28, will be found to exemplify its value in this sphere of action. Success with oxygen will

be found most attainable when the sufferings are the result of functional derangements of stomach, liver, or womb and ovaries, with indigestion, perverted nutrition, and *local congestions*; and this equally applies to reflex nervous affections, such as *Epilepsy*, when thus resulting (see Selected Cases 1 and 8). *Diabetes*, as a result of derangement of nerve-function and nutrition, affords an example of a disease in some cases of which oxygen ought to be employed before the supervention of extreme symptoms (see No. 14). In speaking of nerve-affections, attention should be specially called to Clinical Selections 4, 9, 11, 16, and 18, as remarkable evidence of the value of oxygen in certain cases of local or general *Paralysis*, with antecedent weakness, irritability, and congestion of the brain, or spine, or both.

In Congestive Diseases of Female Life, especially at the primary and secondary periods of catamenial change, and persistent relaxation and weakness after child-birth, oxygen has (even in complicated cases) given me perhaps more therapeutic success than in any other direction; and Selected Cases 11, 12, 26, 27, 28, and 30, are referred to with unusual satisfaction.

Chronic Derangements of Liver and Spleen, with congestion of the portal and mesenteric veins and tendency to piles, will be found strikingly exem-

plified in different portions of Clinical Selections following. Many cases of this class, which prove either very troublesome or fatal, might be cured with the *timely and judicious* agency of oxygen. The following is worth recording here as an *extreme case*, in which the rapid effect of oxygen-inhalation excited wonder in my own mind. In 1856, Lieut. E—, æt. 30, of the Indian Army, named (on consulting me) that he had been unfit for duty for several years in consequence of abscess, &c., of the liver, resulting from repeated attacks of fever and dysentery. It had discharged itself externally on several occasions, and the opening had been for some months healed. No sooner did this take place than dysenteric diarrhœa recommenced, with hepatic and intestinal pain, only relieved by continual use of opiates. Having returned to England, he consulted some of the most eminent authorities; was advised to carry opium always in his pocket; became worse and more emaciated daily; felt scarcely able to stand upright; and, as a last resource, requested my opinion about oxygen in his case. After three doses (rather as an experiment than with the hope of doing any good) the sanguineo-mucous and watery evacuations gave place to perfectly black and then dark bilious ones—at first very profuse, then moderate in quantity. In the course of ten days he began to feel less weakness, slept better (not being disturbed at night), did

almost without opium, and even ventured to dine out. Some days afterwards he informed me that he had walked eight miles on the previous day, felt no worse for it, and thought himself quite equal to joining on the Continent a family of friends who had long been hoping to see him. Whether he completely recovered, notwithstanding his imprudence, I am unable to say ; but *verbum sapienti*.

In Atonic Diseases of the Heart oxygen is a remedy of high value, notwithstanding the obvious judgment and caution which some prior observations on contra-indications will show to be essential in the selection of suitable subjects. Fatty degeneration, relaxation of the muscular walls, dilatation, and passive congestion, are the abnormal conditions in which oxygen will usually be found to yield the most satisfactory results. I have been the means of saving several apparently hopeless cases, with death impending, where *all* stimuli had become useless or worse than useless. The novice in the use of oxygen should be guarded against the *continuance* of any trial which he may be induced to make, if the circulation *in* the pulmonary artery, or its main branches, remain persistently incompetent, whether from secondary congestion of cardiac or of pulmonary origin, or from possible emboli. Besides Clinical Selections No. 26, No. 29, and, in some degree, No. 24, which afford fair examples of the

direction where success may be met with, it may not be amiss here to glance at the following clinical curiosity, of which I have a vivid recollection, though it is not fully entered in my notes. Nearly a dozen years ago a lady (aged 48, resident at the west-end of London) came under my care with all the symptoms of fatty degeneration, dilatation, and passive congestion of the heart, in a puffy relaxed subject, possessing flabby muscles with much deposit of loose interstitial fat. She was kept alive for three years (under my frequent observation) by *a dose or two* of oxygen almost daily. On many occasions during this patient's treatment the heart's action, capable of only partial and temporary restoration from collapse by brandy and other stimulants, began instantly to revive under the influence of oxygen. She lived by exercising great care, avoiding much physical exertion, and inhaling almost daily, according to circumstances, from fifteen to forty pints of oxygen in thrice the quantity of atmospheric air (N.B., a good example of direct super-oxygenation). During the latter half of the three years healthy nutrition and power (cardiac and general) were regained step by step; and then was afforded a remarkable proof of *that singularity of action and peculiar development of potency under altered conditions of the animal economy* which it devolved upon me originally to urge in opposition to authority. The patient, after requiring such

large doses for so long a time, and feeling pleasure as well as surprising benefit therefrom, became quite intolerant of the full doses, undue cardiac excitement and uterine irritability following any dose beyond from two to four pints, and even the *minimum* quantity being borne with advantage only on alternate days. Thus was also offered some testimony of the groundless nature of the fear, often expressed, that oxygen (if used for any length of time) would lose its influence. It is worthy of note that this lady afterwards took oxygenated water with much advantage, and that she was ultimately cured.

Chronic Bronchitis and Congestion of the Lungs are, it is almost needless to affirm, pathological conditions peculiarly indicative of the use of oxygen by inhalation, ordinary means failing to cure. Many a valuable life, on the very point of being extinguished through bronchitis or congestion of the lungs, might (D. V.) be saved by properly detailed management with oxygen, all other means proving futile. Sometimes I have been inclined to wonder why life has been permitted to *slip away* without even a trial of oxygen; not unfrequently my opinion has been requested when too late, even where twenty-four or forty-eight hours earlier would probably have sufficed to save the patient. Imperfect apparatus and inexperienced as well as careless administration have doubtless tended to keep up a

misgiving and prejudice formerly based upon pseudo-scientific grounds; and further, much mischief has *latterly* been superadded by individuals *professing* the highest opinion of oxygen and *really evading* the necessary trouble, &c., by employing *for the most part* other inhalations, and (even when trying oxygen) bringing it into discredit by so-called easy and cheap methods—methods, in truth, worthless in the majority of difficult cases.

In *Asthma* there will be found a fair per-centage of cases in which oxygen can cure or greatly relieve. As a rule, the subjects most benefited are those in which we can trace no congenital or hereditary predisposition, and where the affection owes much of its origin to chronic bronchitis or partial congestions and indurations of the pulmonary parenchyma.*

Pulmonary Consumption has been here allotted the caudal position among the pathological indications for the proper use of oxygen, as a matter of convenience; since it appears incumbent upon me (for reasons which may be gathered in the second preface and in the concluding chapter) to repeat *in extenso* the opinions which I ventured emphatically, and I trust fairly, to commit to writing in 1856-7.

* For bronchitis, pulmonary congestion, and asthma, see Clinical Selections 20, 21, 24, 25, as well as some other complicated cases.

N.B.—*In Gouty Subjects*, suffering from any of the foregoing forms of congestive disease, oxygen is a remedy of great value; and it may be further noted that oxygenated water is sometimes *peculiarly* beneficial in such subjects.

—The ill success attending the ordinary treatment of this disease (in each and all of its admitted modifications), and the consequently fearful mortality, are so clearly acknowledged that no apology is needed from me in suggesting the essential cause of this fatality, *viz.* the *negative error of overlooking and entirely neglecting*, or the positive error of opposing, the scientific use of that great element, oxygen, in the management of advanced but not hopeless stages—and the *too frequent oversight in securing* healthy pulmonary expansion (*i. e.* the due absorption of atmospheric oxygen), when advising general prophylactic measures in subjects evincing a consumptive tendency.*

Consumption, like most other forms of disease,

* In connection with *general* management on sound physiological principles, I here condense in a note (and quote some of) the observations written by me in 1856-7, giving high credit (1) to the late Dr. Ramadge, as a "prime mover in the right direction," and as having "strenuously urged that great principle in the correct and successful treatment of this affection, *preservation and restoration (where lost) of the healthy expansion of the pulmonary air-cells*;" (2) to Dr. Edward Smith, whose "acute and laborious investigations" had led him to an "approval of a line of practice analogous to that recommended by Dr. Ramadge;" (3), to Dr. Balbirnie, as the only writer (*at that time*, as far as I am aware), "who decidedly coincides with me in opinion."

While naming the respective views of Drs. Ramadge and E. Smith, I now take the opportunity of rectifying an unintentional omission, *viz.* a valuable little treatise published by Dr. H. MacCormac in 1856. It should be noted, however, that none of the three advanced as friends to the position which I ventured then to occupy in force, as regards judicious and discriminating employment of non-atmospheric oxygen.

must not be regarded as a *simple* morbid state, but as a concurrent series of morbid states, each having only a share in the production of phenomena which characterise the whole. There are predisposing, there are exciting causes, and there are the abnormal actions resulting from those causes where vitality lowered retains no longer the requisite control over ordinary chemical affinity. Thus, temperament, hereditary constitution, or any causes giving rise to general debility, sedentary in-door occupations, want of proper exercise, bad habits of any kind, may constitute the first links in the chain. Functional derangements of the digestive and assimilating organs follow, from the outset frequently accompanied by a neglect of healthy chest-expansion (*ergo* too little oxygen, with, of course, correspondingly slow exit of impure air). These derangements continuing, unhealthy and deficient nutritive products are afforded to the system, the various organs become incapable of executing their due amount of work; the blood loses its supply of proper materials; general feelings of discomfort, depression, and languor ensue; and the invalid will not or cannot be at the trouble of taking a sufficient daily number of healthy deep inspirations. The chest contracts, and (even if occasionally from pre-existent conditions, such as chronic congestion or solidification, or scattered emphysema, there be not much appearance of contraction externally) the

air-cells become inactive and collapsed, and from this time the want of proper oxygen becomes the great exciting cause of disease. The products of digestion—the incipient cell-formations in the blood, in their course through the capillary vessels of the lungs, cannot receive the normal vitalising changes, nor can the blood-corpuscles get a sufficiency of oxygen to convey to the systemic circulation; the stomach, the liver, and other organs soon lose their tone; the blood becomes impoverished; destructive metamorphosis and equivalent reconstruction of tissue progress too slowly; the vital powers can no longer control the tendency to chemical decompositions. Then the fermenting theory of Liebig (which has received further suggestions lately from Dr. Gardner) will come in to explain the more rapidly increasing disorganisation. The collapsed inactive air-cells become the natural *nidus* of tubercular deposit (consisting, as most eminent pathologists agree, of the imperfectly organised plastic material, broken-down epithelium, and other *débris* which disappear by absorption and expiration in healthy respiration), mixed with particles of decomposed fibro-albuminoid matter—thus the continually-forming epithelial cells are unre-moved; constantly renewed deposits of disintegrated granular, fatty, and calcareous matters take place; softening and purulent infiltration pro-

gress; and the hapless patient soon sinks into the grave.*

Assuming the admission of the foregoing premises, earnest attention is now directed to the great error through which the mortality from this disease is so alarming. This error has originated from the *effects* being practically mistaken for the *cause*. Because emaciation is the dreaded symptom, and of course is known to take place as a necessary consequence of diminished hydro-carbonaceous (respiratory) material in the blood; *ergo*, even the oxygen in the atmosphere is tacitly admitted to be too great for the system, and "consuming the tissues too fast" is the direct cause of the disease! According to this partially true but one-sided idea, atmospheric oxygen, the *sine quá non* of life, is the great poison! But is not our very existence each moment dependent upon a due proportion of this element? Do we not know that continual destruction of the corporeal fabric must unceasingly progress to maintain the movements of the machinery? Have we not plain evidence that oxygen, the most powerful electro-negative element in

* With reference to certain difficulties raised by some pathologists, the views of Van der Kolk and Addison do not appear vitiated by the fact of tubercle being deposited where there is no *epithelium*; for modified tubercle from cell-imperfection and deposit (with the ordinary accompaniment of low plastic material, &c.) may obviously become seated in various tissues of the body, the imperfectly organised or deteriorated epithelial cell being simply one example.

nature, the supreme supporter of combustion, is the providential means whereby all and every the other elements are enabled to preserve the mutual relations whereby organic life is retained? Hence, how utterly hopeless must be the state of any unfortunate patient whose organism shall have so far degenerated as no longer to tolerate even its necessary *minimum* of atmospheric oxygen without increased emaciation—unless indeed (assuming the possibility) the paralysed functions of assimilation and nutrition be still capable of restoration by *artificial* oxygen conveying an influence similar to that of atmospheric air, but more powerful and suitable for the temporary emergency.

Based upon sound physiological principles of treatment (with oxygen as an associate) *properly detailed and carried out according to the peculiarities of each case*—the cure of pulmonary consumption in the earlier stage (when not complicated with serious *mental* causation) ought to constitute the rule, not the exception; whether there be an hereditary or acquired predisposition to it, and whatever may be the pathological variety under consideration; but, in forming our prognosis, the extent and duration of *prior* undermining and insidious causation, in connection with nutrition and “vital dynamics,” demand cautious reflection. Even in the middle stage *great success* can be attained, presuming unprejudiced opinions, careful

judgment in *directing* and *carrying out* details, and (on the patient's part) cheerful co-operation. In the last stage the prognosis can be but one degree removed from that which would obtain under any mode of treatment; yet occasional success may even here be found (presuming but partial disorganisation of the lungs), if the pulse can be reduced in frequency, and the assimilating powers remain still capable of reaction. In all bad cases the last two present *the salient points* whereby to judge, and may be taken as affirmative or negative evidence of the possibility of cure. If oxygen, fairly employed in every minute detail *per se* and in association, cannot within a reasonable period begin to restore the normal balance between cardiac movement and number of respirations, bring down rapid pulse, and suspend loss of weight—it can but possibly palliate symptoms and prolong life a little; it can then, as a *curative* agent, perform no more than ordinary remedies; although, when the only chance for life, it may fairly have a trial as a palliative.

In the treatment of pulmonary consumption with *non-atmospheric* oxygen, the erroneous (because partial) notion of super-oxygenation must be dismissed from the mind. Admitting as a paradox that the patient—who may be the subject of consultation in an advanced stage—on the one hand cannot tolerate even the little atmospheric oxygen

which the lowered vitality can utilise, and on the other hand cannot retain life without an increased supply; the scientific principle presented for our contemplation is, how we can make such temporary impressions with *artificially-prepared* (*i. e.* dynamically superior) oxygen as shall invigorate the imponderable forces in the animal economy, give an impetus to assimilation and nutrition, and augment (as well as render safe and available) the absorption of atmospheric oxygen. Very different is this (with a free acknowledgment of similarity in action) from taking "more mountain air," or "sea air" which I have known to be adopted with a perseverance deserving better success, in some instances, where well-directed oxygen, with suitable physical and dietetic management, has quickly checked the progressive disease. And here I would protest against (what I will venture to call) a scientific error very prevalent, viz., to attribute the well-ascertained exemption from, as well as marked improvement in pulmonary consumption to the diminished *quantity* of oxygen in more rarified air; whereas, assuming that idea of the oxygen being mainly concerned, the correct explanation should be (see Chap. iii on *modus operandi*) the modified condition (quality) of the oxygen in rarified air at considerable altitudes.

Cases 22 and 23 have been selected as fair examples of successful treatment of pulmonary con-

sumption, in well-marked and advanced stages, occurring in two different classes of constitution. While I have avoided bringing forward even a single representative of the many cases with serious premonitory symptoms, in which perverted nutrition has been arrested and health has been restored,—I feel impelled in this place to illustrate preceding remarks upon the value of oxygen by the following most interesting case which (though ultimately fatal from adverse circumstances) I have always believed ought to have been completely cured. Miss A. D., aged 22 (ten years ago), in the last stage of pulmonary consumption of two years' standing, with respirations from thirty to forty per minute, pulse 120 to 135, profuse purulent expectoration and night-sweats, and every few days (for the previous two months) considerable hæmorrhage with alarmingly-increased prostration—found instant *relief* to the urgent dyspnœa after the first dose of oxygen, which likewise produced a pleasant warmth and removed the “feeling of sinking” within the chest. During the following night hæmorrhage again took place, but the blood was more coagulated, and the chest was much relieved by it. No further hæmorrhagic attack occurred for three weeks. For five months I treated this young lady carefully, myself administering every dose of oxygen for the first six weeks. Vomices from time to time opened suddenly, discharged their contents, and then apparently con-

tracted and cicatrised. Improvement was very slow, but *steadily progressive*, as long as she remained in my hands. Her friends then removed her to the country, former professional advisers assuring them that she *never could recover*. She went on well (I afterwards learnt) for a few weeks, then retrograded gradually, and died six months afterwards; as I had plainly predicted would be the issue, if such a case were prematurely deprived of the full and fair advantages of treatment.

It merits special remark that the treatment in one week restored her appetite and removed her craving for liquids; her weight (only 5st. 5lbs., while her height was 5 feet $5\frac{1}{4}$ inches) underwent no increase for four months and a half, but then in a single fortnight improved to the extent of $2\frac{1}{2}$ lbs., and she could at length walk several miles daily with pleasure and advantage.

CLINICAL SELECTIONS,

ILLUSTRATIVE OF THE CURATIVE POWER OF NON-ATMOSPHERIC OXYGEN, AFTER THE FAILURE OF OTHER REMEDIAL TREATMENT.

CLINICAL SELECTION (No. 1).

EPILEPSY.

Mr. W. R. R., æt. 41, unmarried, consulted me May 26, 1856—temperament bilio-nervous, habits regular; in consequence of his unfortunate malady, has been compelled throughout life to exercise the greatest caution as to diet, &c.

He became epileptic at seven years of age, from the sudden explosion of a cracker close to his ear, but the fits were mild and not very frequent until he attained his fifteenth year, when he received a serious fright at school; since which period he has suffered from paroxysms, more or less severe, every fortnight or three weeks; he has been thus rendered incapable of following any regular occupation, and always feeling better when taking plenty of outdoor exercise in the country, has latterly resided on

a farm in Devonshire, amusing himself with any little farming pursuits he found suitable.

He cannot bear much cold, but he is compelled to sleep with the window open every night ; he frequently experiences much oppression on the vertex of the head, especially when anything has chanced to disagree with his stomach ; and before his attacks, the whole of the right half of the body feels very cold and chilly.

His face is thin and sallow, his eyes sunken with deep dark areolæ around the eyelids, tongue pale and slightly furred, appetite moderate, liver rather torpid, pulse small and feeble, and there is a tendency to piles and to constipation. He is irritable and soon excited with passion, especially just before his attacks. He says that he has tried every mode of treatment which appeared to offer the most remote chance of cure.

Under these circumstances, although the prognosis could not but be unfavorable, I determined to give a fair trial to a judicious and carefully-watched course of oxygen. The effects were most remarkable, exceeding my most sanguine expectations ; for, from the commencement to the termination of the treatment (a period of three months) he suffered no paroxysm whatever ; his general health gradually became stronger, his eyes fuller and brighter, his mental powers increased, and at length he entirely lost his former extreme irritability and became

cheerful and happy. More than a year afterwards I had the satisfaction of hearing a favorable account of this patient, who had experienced no return of the epileptic attacks.

CLINICAL SELECTION (No. 2).

INTRACTABLE BOILS OF CARBUNCULAR CHARACTER.

A. B., a policeman, æt. 36, having been nearly three months under skilful medical treatment for this painful and distressing malady, was at length advised that medicine could do no more for him, and that he must get immediately into the country to try what change of air could effect. He was at this time covered with twenty or thirty large boils (or rather carbuncles), and his health was much undermined from acute suffering. Being accidentally heard of, he was offered gratuitous treatment under oxygen. Thankfully accepting the offer, he at once commenced a daily inhalation, and so rapid was his progress that in from ten days to a fortnight the eruptions had entirely disappeared, and the unhealthy constitutional condition was so completely overcome as to render the cure permanent. Not one dose of any other medicine was employed.

CLINICAL SELECTION (No. 3).

STRUMOUS DISEASE (MESENTERIC).

Miss A. B., æt. five years, with fair transparent skin and flaxen hair, had never been very strong, but at length became much debilitated; abdomen hard and much enlarged, breath very foetid, face wan, bowels irregular, with small frequent offensive evacuations. Hectic fever with other urgent symptoms supervening, it was advised as a last resource, and determined upon at great inconvenience to her parents, to send her for residence to the seaside. At this critical period the use of oxygen was suggested, and it was determined at once to give it a trial, in the hope that it might prove more beneficial, and save the expense of the journey. Under the influence of this powerful remedy, conjoined with general careful management and well-regulated diet, the child gradually began to improve, and in a few months was quite restored to health. She afterwards gradually improved in constitutional strength, (in this second edition, it may be added) and is now a fine healthy young lady, though of delicate and sensitive organisation.

CLINICAL SELECTION (No. 4).

CHRONIC CONGESTION OF LIVER AND BRAIN, WITH
PARTIAL PARALYSIS.

Colonel R., æt. 61, residing near Malvern, came up to town in July, 1856, and placed himself under my care.—Constitution naturally very strong—habits always regular; but he formerly saw much service in tropical climates, and underwent severe hardships which would have (as he has been often told) “killed most men.” As the result, he has been for many years subject to liver derangement, for the relief of which hydropathic treatment has been of great advantage to him. Latterly, however, his health deteriorated so much that his friends became seriously alarmed about him, and induced him to consult me.

He now informs me that for some months he has been unable, and indeed has been forbidden by his medical attendants, to perform his former customary ablutions with cold water, owing to the “rush of blood towards his head,” with vertigo, whenever he attempts to raise his arm to his head; that he is very sensitive to the effects of cold weather, and his memory has lately failed so much, that he feels great difficulty in remembering anything.

His countenance presents a bluish congested appearance; the coats of the eyes, especially the conjunctivæ, are much injected; the tongue looks relaxed and foul, and is covered with a thick yellowish-white fur; the pulse is slow, laboured, and subject to frequent intermissions; head feels dull and heavy; there is aching pain in the right shoulder and between the scapulæ; considerable uneasiness is experienced in the hypochondria, especially the right; the liver is a good deal enlarged, the colon much distended with flatus, the bowels rather sluggish, and the urine loaded with lithates. There is also partial paralysis of one side, several fingers being useless and drawn in tightly by the flexor muscles.

Under these unfavorable circumstances I recommended him at once to try a course of oxygen gas. A carefully-regulated dose was inhaled twice a day, and the effects closely observed. Improvement immediately commenced, and in four or five days he lost the greater part of his oppressive headache, while he expressed himself as finding his memory wonderfully better in so short a time. The treatment was steadily continued for between a fortnight and three weeks, and although his natural energy, when he felt himself so much benefited, led him after the first few days to do much more than I quite approved of, yet he rapidly progressed, and left London in a good state of health. Soon after

the commencement of the inhalations I had permitted him to perform his cold ablutions daily, and this he did without difficulty.

The only adjunct measures that I adopted were an occasional *very* gentle laxative, and strict attention to diet.

Experience has proved to me the fact of no therapeutic being equal to oxygen in the treatment and cure of many cases of this nature; in a number of threatened attacks which I have treated, oxygen has rapidly restored the subjects of them to perfect health, where previously, *malgré* the most judicious general care and medical treatment, the symptoms were becoming daily more urgent and alarming. Moreover, even in chronic long-existing paralysis (hemiplegia as well as paraplegia), in the absence of any extensive disorganisation softening and loss of nervous substance, I have met with gratifying results.

CLINICAL SELECTION (No. 5).

DANGEROUS RAPIDLY-SPREADING ULCERATION OF LEG, ETC., IN A SYPHILITIC SUBJECT.

Mr. S. B., æt. 33, unmarried, of temperate habits, of nervo-sanguineous constitution, had been the subject of secondary syphilis for seven years, and had undergone a variety of fruitless treatment.

Amongst other measures, he had, under the best advice, been the subject of several courses of mercury, iodide of potassium, sarsaparilla, nitric acid, and all the most approved means usually employed in treating such cases. Finding himself rather worse than better, and coming to the sad conclusion that his constitution had become terribly shattered, quite as much from the mercurial treatment as from the original disease, he resolved, by the advice of a friend, to place himself at a hydro-pathic establishment. Here he underwent such extremely severe treatment, that he was compelled, after some weeks, to give it up, owing to increased general weakness and exhaustion of his nervous system, with tendency to ulceration of the legs. He now consulted several eminent practitioners; had iodide of potassium, cinchona, &c., as well as the most generous diet, port wine, and stout, prescribed for him, and was advised, as the only hope of cure, to take a *long sea voyage* to a warmer climate. He had made up his mind to follow this advice, when one of his legs became suddenly so seriously ulcerated, and his whole system so debilitated, that he determined to place himself under my care, in consequence of learning the extraordinary curative agency of oxygen in cases of ulcerated legs and general debility.

June 29th, 1856.—This unfortunate gentleman consulted me. I found him extremely weak and

anæmic; his former powerful and muscular frame completely relaxed and attenuated. The skin throughout the body was quite blanched, and so transparent, as to show deeply beneath the surface much dark congestion, with scattered spots of purpura. Some caries of one superior maxillary bone existed; he suffered much from irritation of the brain, with eyes suffused and intolerant of light, and chronic iritis; pulse from 100 to 110, very small and almost imperceptible; tongue white and fissured; and although the weather was tolerably warm, his vital powers were so low as to render almost impossible the generation of a sufficiency of animal heat to keep him alive—the extremities being cold and clammy. In fact, universal prostration and torpidity of function prevailed. In addition, he had a suspicious, short, hacking cough (which had existed for some months) with profuse night perspirations, but no well-marked *physical* signs of tubercular deposit. Upon examination of his legs, a very large ulcer was seen on one calf, a small one on the other. The larger one, he informed me, commenced in a *little spot* about a fortnight previously, and had for some days been spreading very rapidly, causing much severe pain and constitutional irritation. It now presents the peculiar appearance of a sloughing mercurio-syphilitic ulcer, exactly circular, about two inches in depth, considerably excavated; the whole circumference, for

the distance of an inch and a half or two inches from the edges, is hard, red, and extremely sensitive. There is a discharge of dirty-looking sloughy matter, and acrid sanious fluid. In spite of the vigorous and judicious measures advised by an eminent London surgeon, who had been consulted a few days previously, the sloughing ulceration is rapidly extending, and in the prostrate condition of the sufferer the case appears by no means hopeful.

Here an opportunity offered of severely testing the power of oxygen; and knowing what this therapeutic agent could effect in analogous non-syphilitic ulcers, and in cases of extreme debility and languid circulation, I at once determined energetically to bring it into action.

My patient was ordered to preserve the horizontal position, and to foment, poultice, &c. The same afternoon I administered a large dose of the gas, which had the effect of making him feel more comfortable. The next morning, the ulcer still alarmingly progressing, I carefully superintended the administration of the largest quantity that could be borne (20 pints in 100 of atmospheric air), and ordered a moderate inhalation in the evening. From that time it spread no further, and by daily watching my patient during the succeeding fortnight, I had the satisfaction to witness the separation of the dead portions, the perfect cleansing

of the whole surface (the muscle being left exposed for some distance and its movements being seen at the bottom of the cavity), and the gradual filling-up of the excavation with granulations ; while at the same time the appetite returned, and the capillary circulation, with the entire nervous system, began to regain tone. Small doses (one grain) of iodide of potassium were now ordered three times a day ; nutritious but moderate diet with porter ; cod-liver oil was rubbed into the chest twice a day ; and tepid daily sponging of the whole body was enjoined. In five weeks he was able to walk about, and in seven weeks entire healing of the large and deep excavation, resulting from the ulceration, had taken place, permitting him without difficulty to walk several miles. He now left town, taking with him a supply of oxygen to be continued in small doses, being directed likewise to continue his iodide of potassium and cod-liver oil, and to communicate with me by letter once a week. Three weeks afterwards, having walked rather too much, and having otherwise irritated and injured the place on the other leg, where the small point of ulceration had apparently healed under the influence of the oxygen without sloughing, he thought it advisable to return to London. I found a deep ulcer ($2\frac{1}{2}$ inches in diameter) much inflamed from irritation—rubbing of the trousers against it, and neglect ; moreover, he had caught a severe cold, and his cough, which had

never left him, with profuse perspirations at night, disturbed him much. He was feeble and extremely sensitive to cold, although the weather was warm. I gave him strict directions as to quiet for his leg; largely increased his quantity of oxygen, at each inhalation night and morning, and continued his other constitutional treatment, as above mentioned, for the specific diseases. He again progressed most satisfactorily, and was soon enjoying his favorite pedestrian exercise.

Steadily continuing his treatment, he, towards the middle of September, had entirely lost his consumptive cough; had fully regained his nervous tone; had recovered his flesh, and suffered no longer from cold and languid circulation; the dirty congested appearance beneath the cuticle had quite disappeared, the jaw seemed quite sound (a small piece had exfoliated), and the general cerebral irritation with iritis had for several weeks ceased to evidence itself.

About the end of October this gentleman (an ardent disciple of Nimrod) wrote to ask whether he might follow the hounds again. With a caution I acceded to his request, and I have since learned that he rode hard throughout the hunting season without any return of his former protracted disease.

It is especially worthy of remark, with this interesting case in retrospect, that there exists no remedy at all comparable with oxygen, as (in

common *parlance*) a “purifier of the blood.” My own experience particularly points to its well-marked and energetic action upon the general capillary circulation and upon the skin; in suitable cases it powerfully promotes the healthy secretions of the latter, and assists it in throwing off morbid and poisonous matter, and, unlike all other medicines, while performing this duty, it produces no weakening or other untoward effects, but, on the contrary, simultaneously acts as a general tonic to the entire constitution. It will be observed that I ordered, as an *essential* adjunct to treatment, tepid sponging of the whole body; the poisonous *débris* cast off with the aid of the gas, and accumulating on the skin, obviously necessitating such sponging or the use of the tepid bath. It also merits a passing notice how quickly the oxygen (carefully given) demonstrated its power as a therapeutic agent, in cutting short and arresting the progress of *rapidly spreading* ulceration.

CLINICAL SELECTION (No. 6).

DISEASE OF CERVICAL VERTEBRÆ, AND ADJACENT TISSUES.

The Rev. T. A. W— (M.A. Dublin, formerly for four years educated for the medical profession, but compelled from ill-health to give it up), a curate

residing in Essex, wrote to me October 25, 1856, in the following terms:—"Is the oxygen treatment applicable to a disease of the cervical vertebræ, attended with slight curvature and considerable swelling and hardness of the parts, with occasionally much pain? The swelling is confined to the right side, but there is considerable pain, and a *burning* sensation felt on the *left side*. Upwards of three months I *have been* confined to bed, and under the direction of Sir ——, have applied a succession of blisters and taken the bichloride of mercury until the gums were affected, and, since that, several quarts of cod-liver oil, besides a good deal of quinine and iron, but as yet with little alleviation of the complaint." He then proceeded to ask whether it would "be necessary to go up to London, which would be with much difficulty and no little risk accomplished;" and then added, "An *immediate* reply will oblige. It may be as well to state there is constant pain, more or less felt, which prevents sitting erect for more than a few minutes at a time, with numbness of the fingers of both hands, particularly the right, and occasionally slight pains in the arms. The pain in the right side seems sometimes to be more deep seated than at other times, as though it were sticking into the spinal marrow. Quite nauseated with the drug system, I have no longer MUCH FAITH in its therapeutic efficacy."

My reply to this was, that a judicious and carefully regulated course of oxygen might be of great advantage to him, and my experience led me to entertain no inconsiderable hopes that a cure might be effected. If he were not able personally to consult me in London, my advice would be that his ordinary medical attendants should carefully watch and follow out the treatment in communication with me by letter.

Three weeks afterwards this gentleman introduced himself at my consulting-room, and stated that he had determined to run every hazard in order to have a personal interview with me. I found his general condition much as he had described it in his letter; there was extensive tumefaction, hardness and thickening of the cervical vertebræ (periosteum?) and of all the adjoining and superincumbent tissues, from the base of the brain to the seventh vertebra; considerable and severe pain upon pressure and upon slightest motion; neck perfectly fixed and stiff, and the head turned towards the left side; tongue foul; pulse quick and irritable; much numbness of the extremities, but as yet no paralysis of motion. Altogether he felt in a helpless miserable state, and had been compelled to resign his curacy without the most remote hope of ever again being capable of such duty, or even of partial recovery.

Careful and minute directions were given as to

diet and other adjunct means, and oxygen inhalation was at once commenced, the patient being closely observed during the administration of his daily dose. Belladonna fomentations were prescribed as a frequent local application. The result was, that in a few weeks he improved so much as to be permitted a considerable amount of *walking* exercise, the spine being unable, of course, to bear the shaking of any vehicle; at the same time the general constitutional irritation and pain gradually subsided, and the swelling much diminished.

At Christmas he went into the country amongst his friends, having recommenced cod-liver oil, which I had previously ordered to be temporarily suspended. In ten days he returned, and although some stomach and hepatic derangement gave indications of his having indulged in the good things of the season more than accorded with my strictly enjoined dietetic rules, yet the neck was still progressing favorably.

Between the 18th and 26th January, 1857, the weather being wet and damp, and prudence not having been altogether considered, he had a severe cold with general rheumatic pains, urine loaded with lithates; took a mixture of pot. bicarb., &c., and suspended the oxygen for a few days; yet, notwithstanding this severe attack, no material return of his former symptoms took place.

March 7.—My patient called. I had not seen him for three weeks, during which, for the first time since the commencement of the course, oxygen had been completely discontinued. He had feared retrogression, but had been agreeably disappointed. I was much gratified to find him overflowing with spirits in consequence of his having nearly recovered the natural mobility of the neck, and being (as he said) “up to anything.” In fact, he was again fit for his clerical duties; tumefaction and induration had almost disappeared; no pain whatever remained, and no concussion, even in an omnibus, had caused unpleasant sensation. A perfect cure was effected.

I heard again from this patient in June; he stated he had been obliged to travel from place to place on urgent concerns of a family nature, and believes that “the marvellous benefit derived from the oxygen, under the Divine blessing,” had alone enabled him “to accomplish the onerous duties” which had devolved on him.

In comparatively few cases of chronic deep-seated disease is much advantage to be found from severe counter-irritation, such as setons, issues, successive blisters, &c., the augmented constitutional irritation from their presence frequently adding to the debility, and more than neutralizing any benefit to be anticipated. Oxygen gas merits a primary position as a remedy in such diseases (including

diseased joints), especially in those characterised by the scrofulous diathesis.

CLINICAL SELECTION (No. 7).

CHRONIC NERVO-CONGESTIVE HEADACHE.

Mr. G—, æt. 50, a merchant engaged in the West Indian trade, of nervo-bilious temperament, very regular habits, consulted me June 9, 1856. He stated that he had suffered very severely for some years from frequent headaches, which were invariably produced by every noise and excitement; had formerly resided for a considerable period in the West Indies (Jamaica, I believe), and had then experienced occasional attacks of hepatic derangement, for which a good deal of mercury had been at different times administered; but he had escaped intermittent and yellow fever. Notwithstanding the utmost care in diet and general hygienic rule, which this gentleman had long been in the habit of practising, these cephalalgic attacks were becoming more frequent and distressing from slight causes, and of longer duration; but he especially suffered when business occasionally necessitated a journey to London, for during the whole time of his usual sojourn in town, he never felt himself free from pain.

A friend having recommended him to consult me as to the chance of oxygen affording benefit in

his case, he determined to take that course immediately upon his arrival in London. I found him suffering from the usual chain of symptoms attending torpor and general derangement of liver, stomach, and spleen; he was much depressed, and his face presented a sallow, worn appearance, with yellow conjunctivæ; head symptoms very bad.

Feeling assured that a judicious use of oxygen would quickly evince beneficial effects, I advised him at once to give it a trial. The first dose that I administered completely removed the pain, and made him "feel quite a different man;" and with one dose daily, to his surprise, he kept light and well with excellent appetite during the few days that he was in London. Upon leaving for his residence in Wiltshire, he took a supply of the gas for ten days, and I lost sight of him. Six months afterwards I heard, as the effect of this very short course of treatment, that there had been no return whatever of the headaches, and that he was in the enjoyment of perfectly good health.

The characteristic nervo-congestive headaches, of which the above was so severe an instance, are well known by our profession as being frequently very intractable. In most of such cases oxygen ought invariably to have a *fair trial*, where all ordinary means have previously failed. The writer himself was formerly very subject to this description of cephalalgia, and has had ample experience in his

own person of the beneficial effects of the gas. He well remembers likewise a physician, a personal friend, who had come to town from Yorkshire to give evidence in a trial, calling with a most severe nervo-congestive headache from over-work—mental and bodily. This attack had been so persistent for a day or two, and was becoming so much worse, that he felt quite upset and hardly knew how he should be able to give his evidence. Two or three doses of oxygen (the first removing the headache) put him quite right, and he was able to return to his large practice in capital health, not having felt at all well before his journey.

CLINICAL SELECTION (No. 8).

EXTREME CEREBRO-SPINAL DEBILITY, WITH EPILEPSY.

Mr. John M—, æt. 27, consulted me in the early part of 1856. History as follows:—Up to the age of 21, had enjoyed good health, but then began to be troubled with pain in the loins and back, with frequent and distressing discharges *per urethram*. Ordinary medical treatment failing to afford the slightest alleviation to these symptoms, he was persuaded to try “those villanous Morison’s Pills,” as he indignantly called them; continued taking them for eighteen months, became still more “thin and weak,” and at length “frequently

brought away large pieces of skin from the bowels." Epileptic fits of a severe character now occurred, with exacerbations of most of his previous symptoms. During the following few years a succession of medical practitioners were tried. Weakness increasing, the seaside was advised and tried for some time, but he returned "rather worse than better."

At this period he called on me. He presented an appearance of extreme debility, face pallid, with hollow cheeks, whole body anæmic and much attenuated; he complained of constant pain in the back and hypochondria; his head-attacks were so severe as almost to incapacitate him from any work at his trade (pianoforte manufacturing). Pulse very feeble, almost imperceptible; extremities always cold.

With strict regulations as to nutritious concentrated diet and other general measures he was placed under a course of oxygen inhalation. Within a few days (as he expressed himself), he felt as he had "not done for years before," as though he had "suddenly received a new supply of health and strength." Altogether he continued the treatment for six weeks, and notwithstanding that I had some trouble with his digestive and assimilating organs, he felt himself at the end of that time fully equal to his occupation. *All* his distressing symptoms had disappeared, and he had almost regained his pristine vigour of mind and body. I have lately

heard that his health was quite restored, there having been no relapse.

CLINICAL SELECTION (No. 9).

CHRONIC INDIGESTION, HYPOCHONDRIASIS, ETC.,
GREAT EXCITEMENT AND IRRITABILITY OF BRAIN.

Mr. W. L. K—, a schoolmaster, æt. 47 (year 1856), of regular habits and religious character, of nervo-bilious excitable temperament, has never been very strong, but always energetic and active in mind and body; was married at 32, now a widower. Has from childhood been the subject of incontinence of urine, with great weakness of the muscular coat of the bladder. About two years ago, after a slight fall and subsequent chill from travelling in wet clothes, began frequently to pass much blood from his bladder. Since that time has suffered from extreme nervousness, frequent inability to sleep at night from morbid fear of being alone or of dying suddenly, with other hypochondriacal symptoms of an unpleasant character. About twelve months ago, finding himself scarcely equal to his occupation, he was induced to consult me, by a clergyman who felt much interest in him and feared that his increasing debility and general ill-health would soon oblige him to resign the care of the school. He now presented an

anxious, care-worn aspect, *mouth slightly drawn down on one side*, eyes lachrymose with yellow and congested conjunctivæ; he complained of much pressive cephalalgia especially in the occiput and nape of the neck; much uneasiness and some pain upon pressure in the right hypochondrium and in the epigastrium, as well as in the hypogastric region; frequent passage of blood in the urine; constant aching pain in the loins; constipated bowels with much flatulence, and extreme depression and weakness, mental and bodily, alternating with fits of morbid excitement. Percussion evidenced considerable gaseous distension of the transverse colon; no appetite, but much thirst was present.

My poor patient's time in town being very limited, and the chances of rapid relief by means of oxygen appearing fair, I commenced at once and carefully watched the effects of the treatment throughout. The first day he inhaled fifteen pints, until it produced slightly unpleasant head-symptoms; this was followed, in the course of ten minutes, by a feeling of cheerfulness and general vigour of mind and body to which he had long been a stranger. Next day he appeared at the time appointed looking wonderfully improved in appearance, and informed me that he had felt "such an appetite," and "such a flow of spirits," ever since the previous day, that he could hardly realise the "astonishing effects." At the end of three weeks (his stipulated leave of

absence) he left town completely restored in general health ; all his distressing pains and other symptoms had disappeared ; his countenance and the whole skin presented a perfectly healthy aspect, clear and of normal colour ; and his mind had fully regained its natural tone and equilibrium.

It may be worthy of remark that the salient points of this case were a number of local venous congestions, consequent upon torpor in the general and capillary circulation, the result of long-continued loss of healthy tone and balance of the cerebro-spinal nervous system. Chronic congestion of the liver and portal system, of the kidneys, and of the brain, were very prominent symptoms ; while stomach and hepatic derangement with consequent mal-assimilation was daily adding to the mischief. In such cases, even of very long standing and when pronounced hopeless, I have seldom found oxygen to fail, when fairly and properly employed.

CLINICAL SELECTION (No. 10).

SEVERE PERIODICAL HEADACHE.

Mrs. W—, æt. 46, nervo-sanguineous constitution, had been subject from five years of age to frequent attacks of severe pain in the head, and excitement or irritability invariably produced one. Origin, in childhood, unknown. The catamenia

appeared at seventeen years of age, and then the cephalalgic attacks became regularly periodical. Marriage was recommended as the only chance of relief, and for the two years following the head was much better, but subsequently the neuralgic attacks became as severe as before. Has four children, the youngest three years old. Ever since the birth of the first child the catamenia have been, as a rule, of a more healthy character, lasting about a day and a half. Medical treatment of every kind, irrespective of expense, has been tried without avail; twice she has even been subjected to severe and hardly justifiable courses of mercurials. Unable to obtain more than temporary relief from orthodox practitioners, she has since tried homœopathy, &c., with no more favorable result.

August 7, 1856.—The following are this lady's present symptoms: neuralgic headache occurring monthly, of continued duration, from two days preceding to two days after the cessation of the catamenia, of so extremely acute a character as to oblige her during the whole time to preserve the horizontal position in a darkened room. No pain in the uterine or ovarian regions, but some in the loins, with copious rather offensive leucorrhœa; pulse 85, irritable and wiry, with strong pulsation in the carotids; digestion pretty good, but liver sluggish; countenance tolerably healthy. Hoping that oxygen might prove useful, even if incapable of curing such

a long-standing case, I administered carefully (for I saw clearly that only very small doses would be tolerated), 160 cubic inches of the gas diluted with twelve times the amount of atmospheric air. The inhalation of this small quantity caused a sense of fulness in the occiput, which sensation, however, presently passed off, and my patient then expressed herself as feeling more lively, and with less weight about the head. The second dose, on the following day, had the effect of bringing on the period, without any headache, a week before the ordinary time, and it continued rather longer than usual. My patient took a daily dose for about a week, and then *all* her unpleasant symptoms having disappeared and the periodical headache not having shown itself, she ceased taking the gas, contrary to advice. Three weeks afterwards she again called, fearing a return of her complaint at the approaching period. For a week she had an inhalation on alternate days, none of her former sufferings re-appeared, and she felt perfectly well. The process was repeated at the succeeding catamenial period as a prophylactic. I learnt several months afterwards, that the distressing affliction of this lady had completely succumbed to the treatment.

CLINICAL SELECTION (No. 11).

ORGANS OF SENSE PARALYSED, GENERAL PARALYSIS
THREATENING.

A married lady, æt. 51, residing in Cheltenham, was persuaded to visit London for the purpose of placing herself under my care. For some years she had experienced great mental anxiety with general derangement of health. During the previous winter and spring her debility much increased; constipation, which for fifteen years had necessitated the frequent use of aperients, gave place to a rather relaxed uncomfortable state of the bowels with very troublesome flatulence; formerly robust, she became much attenuated, for the digestive and other organs were so weak, that the system could only appropriate a very small quantity of the food taken. A very annoying eruption of a leprous character about the ears and temples had troubled her for several years. A few months since she had caught a bad cold, which owing to the debilitated state of her vital powers remained unsubdued, and degenerated into severe chronic bronchitis. Her eyesight became very dim, hearing much impaired, the senses of taste and smell entirely lost; there was a constant feeling of chilliness and feverishness even in the warmest apartment; and although formerly an

excellent walker, she became unable to take the slightest exercise without great fatigue and pain in the back, the lower extremities almost refusing to support the weight of the body. She felt, in her own language, as if all her senses were going, and that she could not last long. The catamenia, formerly of natural character, ceased last year.

May 12th, 1856.—This lady could just walk up to my consulting-room. Her countenance presented an anxious appearance; she could not read even very large print; with great difficulty could she be made to hear the questions put to her; she had no sense of taste or smell whatever, even when substances of the most powerfully bitter and odorous nature were applied to the respective organs of those senses; the head felt oppressed with a constant weight and tension; the back of the neck was very stiff and painful when moved; the face was drawn to one side, and upon being requested to show her tongue she involuntarily protruded it towards the right side. She experienced much weakness and pain in the loins and iliac regions (ovarian congestion); complained of always being chilly and cold; and moreover she suffered from constantly recurring paroxysms of distressing spasmodic cough, accompanied with copious mucous discharge from the bronchi. Abundant evidence was afforded that she was in

the very jaws, of what might have been under the circumstances, a fatal attack of paralysis.

A strong dose of oxygen was immediately administered, and I had the surprise and satisfaction of finding that in ten minutes all the oppression about the head had left her; suddenly she exclaimed, "Why, I can hear everything you say, perfectly." In a few minutes more she felt so much invigorated that she walked round the room quite astonished at her rapid acquisition of strength. In half an hour after she entered the room, just as she was taking leave, she abruptly turned to a book on the table and almost screamed "I declare I can see every word." To which I rejoined, "Only the large print, I suppose." "Oh, no! I can read the very small print," and taking up the book she proved that she could. Subsequently I was informed that in the course of the following night the catamenia again made their appearance after many months' cessation, and that the pain in the back and loins was quite relieved.

For four days, inhaling daily, my patient gradually progressed in strength; but I was not quite satisfied with one point, viz. the persistent chilliness. The oxygen was then pushed further. The first very large dose had at once the desired effect of creating a full genial warmth throughout the system, which continued for the whole day; but there being in the evening some slight return of

coldness and shaking, a second dose similar in strength was taken—after this the natural warmth was permanently re-established. Oxygen was continued daily in smaller doses for a period of six weeks. In three weeks after the first inhalation the senses of taste and smell were completely restored; in one month the severe cough had quite disappeared; and before the termination of the six weeks' treatment my patient was able to walk many miles without the slightest inconvenience. She then left London, merely complaining of some remains of the old eruption upon the ears and temples. *En passant*, I ought not to omit one or two other points of this interesting case. The complexion, which for some time had been muddy-yellowish and much wrinkled, soon assumed so fair and pink an appearance as to elicit various congratulatory remarks from her friends. From the very commencement of the inhalation, the troublesome flatulent distension of the bowels disappeared, and the evacuations regained their healthy appearance.

CLINICAL SELECTION (No. 12).

AMENORRHŒA, WITH SEVERE GENERAL SYMPTOMS.

Miss J. W—, æt. 18, residing in Tyburnia, accompanied by her mother, consulted me March 23rd,

1857. Bilio-nervous temperament; good health until fourteen years of age, since which period she has never been well, and latterly has suffered increasingly from ill-health.

Pulse 80, very weak; face of a leaden colour, and puffed; eyes hollow and dull, with want of action in the iris, and surrounded by dark areolæ; tongue furred, with red tip; some pain in the epigastrium upon pressure, and always after eating; ascending and transverse portions of colon much distended; once in two or three months has suffered from dysmenorrhœa with very slight appearance, but for several months has had complete amenorrhœa. She feels listless, and is easily fatigued; the extremities are always cold, and she frequently experiences much uneasiness in the spine.

As I had met with cases of a nature by no means dissimilar to this young lady's, in which oxygen had been advantageous, I at once strongly recommended its employment. In about a week or ten days the catamenia appeared, for the first time of a natural character, and without pain; the course of the gas (no other medicine) lasted but little over a fortnight, and then my patient, from a belief that she was completely put aright, discontinued it. I feared that the very short period of treatment would prove anything but satisfactory, but was gratified to find, two months later, that

she felt herself in perfect health, having had no recurrence of her former symptoms.

CLINICAL SELECTION (No. 13).

EXTREME CEREBRO-SPINAL DEBILITY, WITH PROFUSE SPERMATORRHŒA.

J. T—s, æt. 26, servant of a well-known M.P., requested my advice, May 5, 1857. Married for five years, but no family. Countenance sallow; pulse extremely weak, fluttering, and with a somewhat prolonged intermission succeeding every six or eight beats; skin moist, cold, and clammy; great spinal weakness and involuntary discharges *per urethram* nightly, with considerable uneasiness in the occiput and nape of the neck (sensori-motor ganglia), which appears often to extend to the eyes; frequent vertigo and headache; bowels very obstinate, with painful and distressing straining.

Opposed to these positive are the following important negative indications. No physical or general signs of either cardiac or pulmonary affection; can get through a tolerable amount of work, although he very soon feels himself knocked up, and is often obliged to rest himself; no stomach or hepatic derangement, tongue being perfectly clean, and the appetite good.

Before marriage I find that *se mori malo assue-*

verat—the origin, I doubt not, of his ill health. Notwithstanding marriage, however, his health and strength has gradually undergone considerable deterioration. He has without avail, or with slight temporary benefit, tried every mode of treatment that appeared to promise a hope of restoration; and the poor fellow's spirits are evidently extremely depressed in consequence; states that he was induced to come to me from knowing that his master's brother had received so much benefit from my advice.

As I had met with considerable success in two previous cases, something similar in character, although without symptoms of such extreme severity, I felt myself justified in recommending a course of oxygen gas. Encouraging him as much as possible, and ordering his spine to be rubbed with oil for half an hour every night, I likewise ordered 12 pints of the gas, diluted with eight times the amount of atmospheric air, to be inhaled daily, at one sitting, two hours after a meal. I saw him six days afterwards, and to my surprise he told me that the treatment had had an extraordinarily beneficial effect, that he felt himself "quite a different man," and that he really could now get through his work with pleasure. His symptoms, generally, I found mitigated, but the pulse was still extremely weak and intermittent; his face, however, had lost all its anxiety and depression.

He continued taking his gas daily, and visiting me once every five or six days, until the 30th, when my-note book says that he had experienced no troublesome symptoms whatever during the preceding week; that he had been subjected to a good deal of hard work, which previously would have quite knocked him up; and that nevertheless he now felt himself unusually well. The pulse had, I found, lost its intermittent character, the skin felt natural, the bowels had become regular, although still attended with some straining and mucus. Hitherto I had disallowed opening medicine, which he had from necessity acquired the habit of taking, but I now recommended a small dose of sulphur every other night, and hyd. bichl. gr. $\frac{1}{16}$ with cinchona once a day.

My patient still continued seeing me once a week, until July 3rd, when he felt himself to be and appeared so perfectly well and strong, that he needed no further treatment, and it was therefore by my advice discontinued.

CLINICAL SELECTION (No. 14).

Eleven years ago Captain M—, long a sufferer from diabetes mellitus, consulted me as to the probability of oxygen proving serviceable in his case. He told me that he had consulted and been for a lengthened period under the care of some of the

most eminent physicians in London and Paris ; that he was becoming gradually weaker and thinner ; and that forced residence abroad had been the only available means to prevent a rapid progress of the disease, which always became seriously aggravated whenever he remained in England. I advised a trial. In a few days, the harsh, dry, feverish condition of skin, so common in this affection, was removed ; and the thirst, as well as dryness of mouth and fauces, were much less distressing. The treatment was continued scarcely three weeks, during which the most marked advantage was derived from it—great improvement in the general health, increase in weight and strength, and great diminution in quantity of urine. Unfortunately, I could not get any samples of the fluid. This gentleman expressed himself as highly gratified, and then started for France. I have latterly observed his name several times in the public journals, but have had no opportunity of knowing his subsequent history.

CLINICAL SELECTION (No. 15).

A gentleman's coachman came to me, labouring under extreme debility, with constant liability to profuse—alternately hot and cold—perspirations after the slightest exertion ; yet compelled, from cutaneous relaxation, distressing chilliness, and icy-

cold extremities, to wrap up in a thick great coat in warm weather. He said that he had for twelve months tried several of the principal London hospitals, but without the slightest benefit. He appeared to have no *special* malady, except dyspeptic symptoms and imperfect assimilation. The first dose of oxygen acted almost like a charm, and made him thoroughly and comfortably warm from head to foot, without perspiration. The next day, I found that it had been no transient effect. He took a dose daily for one week, and then, feeling himself quite well and up to his work, and not needing his extra clothing, ceased attendance. Unfortunately, I forgot to take his name and residence. Out of gratitude (being a gratuitous patient), he ought to have called again.

CLINICAL SELECTION (No. 16).

Mr. S—, a well-known Yorkshire gentleman of family and fortune, placed himself under my care in 1856. He was sixty-two years of age; had suffered for several years from paraplegia of the lower extremities, from the loins downwards. In spite of treatment of every possible kind, the gradual diminution of motion and sensation continued. Under my advice he determined to try a lengthened course of oxygen, in small doses. From the first, there was evidenced some gradual im-

provement, more decided for the first two months, scarcely perceptible afterwards ; yet so firm of purpose and so patient was this gentleman, and so strongly did experience impress him with a feeling of hopelessness regarding his case, if this failed, that he steadily persisted with extremely small doses (depending solely upon it) for two years, at the termination of which he had the satisfaction of finding himself perfectly well.

CLINICAL SELECTION (No. 17).

Nearly twelve years ago, Miss T—, æt. 64 (formerly a patient of the late Dr. Thornton), suffering from extreme nervous depression, mental and physical, inhaled oxygen three times under my immediate direction. The result was peculiar and interesting. The first inhalation (six pints of oxygen in eighty of atmospheric air) raised the pulse in frequency, then caused it to become gradually slower and fuller. Towards the end of the administration the pulse again became quicker, and assumed a hard wiry character, the forehead at the same time feeling very slightly constricted. This last sensation passed away in two minutes. Next day, this lady came for her second sitting, being much gratified with the agreeable feelings experienced ever since her inhalation of the day previously. She said she felt “two or three inches taller, and as though the nerves were elon-

gated." This day the effects were nearly allied to those manifested before, but with the addition of a "curious fluttering" about the heart. For two days she did not appear. On the third day, she again visited me, and stated that she had felt so unnaturally excited during the whole day after the last dose, that she thought it advisable to discontinue for a day or two. The unnatural (though not disagreeable) excitement had left, but she still felt "taller, and nerves elongated." Wishing further to satisfy myself, I now administered three pints in about fifty of atmospheric air. No immediate result of special moment followed, and I arranged for another visit in a few days. A week elapsed before my patient again called, and she then informed me that she dare not at present take any more oxygen. Violent palpitation of the heart, with great excitement of the circulation, had supervened a few hours after taking the last dose, and had continued more or less for several days. She had only just recovered from this condition, after resorting to certain sedative measures which I had taken the precaution to recommend in case of absolute necessity. However, she was quite cured. Now, this lady, it should be borne in mind, was entirely prepossessed in favour of the gas, and had no anticipation whatever of such unpleasant consequences. The first two doses had influenced her most beneficially; and the same gas had produced no such

effects upon her sister, who had for ten days previously been inhaling daily with great advantage. Moreover, she had no tendency to cardiac affection, no functional derangement of uterus, and had comfortably transited the change of life. In fact, a small dose every third day would have been the proper plan in this case; but at that time I was comparatively inexperienced in the use of oxygen as a curative agent.

CLINICAL SELECTION (No. 18).

This case occurred in the person of a brother physician in London. He has kindly permitted me to use his name. Dr. C. T. Thompson, of Sussex Gardens, was seriously affected with partial amaurosis, which had resisted the best directed treatment, and had at length rendered him unable to employ the sense of vision for the most ordinary purposes; in fact, professionally, he was becoming almost *hors de combat*. He could only see the largest type in print, and could not read a very few successive lines of that without the greatest difficulty. Fearing total loss of vision from the progressive nature of this serious affection, which had even appeared to advance more rapidly in proportion to his improvement in general health under ordinary treatment, he was induced to request my advice as to the possibility of oxygen being serviceable. The exciting

cause was clearly traced to extreme congestion and torpid action in the medulla oblongata, base of brain, and parts adjoining, implicating especially the origin of the optic nerves. To predisposing causes it is needless to refer. I acquiesced in, and indeed urged, the propriety of immediately resorting to oxygen, but, for special reasons, advised an extremely cautious use of it—the maximum dose to be six pints in eighty pints of atmospheric air. This maximum dose was tolerated very well for the first few days, and a decided improvement in vision, in head symptoms, and in feeling of strength, at once manifested itself. About ten days or a fortnight, however, after the first dose, this gentleman called upon me, and stated that he had been obliged to reduce the amount of his daily inhalation to the *minimum* which I had suggested, viz. two pints of the gas; yet he had still, a few hours after inhaling, experienced so much uneasiness of head, tremor, lassitude, and exhaustion, as to compel him to omit his inhalation the day before. He added, that to-day he decidedly felt better for the omission, and almost feared any further trial of the treatment, notwithstanding the steady improvement in vision. I explained that I had met with various eccentricities in the action of oxygen on susceptible individuals, earnestly encouraged him to proceed, but recommended a diminution in quantity, and an inhalation only on alternate days. When next I saw him he

informed me that this plan had proved successful, adding, as an example of the benefit he felt, that he had just read without difficulty a long letter—a feat which he had been unable to accomplish for months.

I saw my former patient, after an interval of some months. He stated that, although vision was anything but perfect, he had found no retrogression from the *statu quo* following *first* improvement, which had been of a permanent character. Occasionally he takes, for two or three successive days, a minute quantity of the gas. This is borne very well, but he cannot persevere longer without producing unpleasant symptoms, which will then arise from even one pint to seventy of atmospheric air. I much regret that the advantage of longer personal attendance was not permitted.

CLINICAL SELECTION (No. 19).

GOUTY NEURALGIA OF TWENTY YEARS' STANDING.

Mr. T. C—, æt. 70, a member of an old county family in Norfolk, consulted me Aug. 21st, 1858, regarding frequently recurring gastrodynia, of very intense character, which had necessitated the frequent use of large opiates (the only means of partial relief) for twenty years. This neuralgia had latterly become more and more frequent (almost

daily, lasting for some hours), and he had become reduced almost to a skeleton, in spite of the most eminent orthodox (as well as "homœopathic") treatment. His history and general symptoms prove *Gout* to be the origin of his sufferings, and I diagnosed the solar plexus to be the exciting cause of the attacks, independently of errors in diet or any faulty condition of bowels, which had been most carefully guarded against for many years before I saw him.

Having received my advice, viz., oxygen, one lengthened inhalation daily, and free inunction with olive oil over the entire abdomen and back, the old gentleman disappeared until Oct. 6th, when he reported that he had experienced *no pain whatever* for the three weeks following the commencement of my treatment; that he then went to Buxton and used the waters, and had had a *slight* return (as he believed) from the weakening effect of the waters; but this had passed off. He expressed himself as highly gratified with the singularly quick and unexpected benefit; received from me a few further directions about the oxygen, and a prescription for small doses of the hypophosphite of iron; and I did not see him again.

CLINICAL SELECTIONS (No. 20).

CHRONIC BRONCHITIS, HEPATIC AND PULMONARY
CONGESTION, WITH SEVERE ATTACKS OF HUMID
ASTHMA.

Major W— had resided a good deal in hot climates, and had been liable for some years to hepatic derangement and to bronchial attacks. Recurrences of these attacks at length took place so frequently, as seldom to allow him an intermission of more than a week or two. On consulting me, he stated likewise that for some time he had been subject every afternoon or evening, and not unfrequently at other periods, to severe paroxysms of cough and wheezing, which always continued until he managed to bring up a large quantity of mucus. Hydropathic had been the only treatment from which much *temporary* benefit had been experienced.

The purple appearance of the face, the amount of blue venous ramifications on the nose and cheeks, the yellow conjunctivæ, the full labouring pulse, the presence of hæmorrhoids, all evidence general congestion, specially localised in and affecting the functions of the liver and lungs.

An intention to leave England for France in a fortnight being expressed, I was asked whether

oxygen would be likely to do *any* good in that short time. To this I replied, that undoubtedly it would do much, but I feared that I could not give any hope of *a cure* under six weeks or two months. With this understanding, and with a recommendation to continue the occasional use of his wet compress (for the preservation of regularity of bowels), he underwent a steady course of the gas for the fortnight, with such a complete relief to all his symptoms, and such a pleasing change in his unprepossessing complexion, that he spontaneously determined to incur some extra expense and alter his previous arrangements, rather than forego the advantage of another week's treatment.

At the termination of three weeks' course, this gentleman expressed himself enthusiastically as feeling perfectly well, and I found that the congestive and other distressing symptoms had quite disappeared. It may not be amiss to add that oxygen was the only medicinal agent employed by me in this case.

CLINICAL SELECTION (No. 21).

February 7th, 1857.—Mr. C. R. S—, æt. 41, height about 5 feet 11 inches, residing near Watford, consulted me.

History of Case.—Stomach and liver have been

apt to get frequently deranged ever since he had an accident when a boy, injuring his head and spine ; yet he is naturally a man of full chest and considerable physical power. Was tolerably well in health until, four years ago, he went to Australia, where he became a flourishing hotel-keeper, and naturally indulged with his customers in more alcoholic beverage than was suitable, though "never" to the extent of intoxication. Became subject to colds from profuse perspirations and subsequent chills. Had a succession of serious illnesses, and at length was pronounced to have incurable disease of the lungs and liver by several of the most eminent medical practitioners in Melbourne. Wishing to be buried at his native place, and yet hoping something from a sea-voyage, he "came home to die." Was not benefited by the voyage, but managed to reach home, where during four months he was under able medical attendance, and had, in addition, the aid of three eminent London physicians, who concurred in opinion as to the hopeless nature of the case. Became worse and worse, suffering extreme distress from spasmodic cough, difficulty in breathing, and inability to sleep, until scarcely any temporary palliation could be afforded. At this stage he happened to hear of my name in connection with the successful use of oxygen, and (unable to get even an hour's quiet in bed) took the desperate resolve of having

himself wrapped in blankets and brought to London, to consult me.

Salient symptoms.—Pulse very feeble, and intermittent; urgent dyspnoea; incessant cough, very distressing and spasmodic, with expectoration of dirty-looking and fetid ropy mucus, mixed with pus; cannot sleep at night *in any position* for more than two or three minutes at a time, even with the aid of sedatives; right side of chest motionless, with no respiratory murmur beyond the large bronchial, and on percussion feeling almost like a stone from apex to base of the lung; the left side of chest also much duller than natural, with humid rhonchi and puerile respiration in the upper half of that lung, while the respiratory murmur is lost in the lower half. There likewise exists considerable enlargement and projection of the liver, the anterior inferior margin reaching four inches below its normal position. With muddy-yellowish and congested countenance superadded, he presents a picture of thorough prostration and anxiety—in fact, death seems imminent.

No time was to be lost, and I gave directions to procure immediately one of Barth's apparatus with condensed oxygen.

From the very first dose of oxygen considerable relief was experienced, and in two days there was a palpable diminution of the congestion in the *left* lung, while respiration became *pari passu* less

hurried, and a *little* sound sleep was obtained, notwithstanding the distressing cough, which admitted but very short intervals of rest.

February 12th (copied from my notes).—Pulse, for the first time, had almost lost its intermittent character—firmer and only 70 immediately after the inhalation, instead of a variation of from 110 to 120, when not intermitting. Full inspiratory capability, only 60 cubic inches on the 7th, has now increased to 120 cubic inches.

13th.—Improving pulse, respiration, and congestion of face. Has expectorated large quantity of offensive mucus. After inhalation, pulse firmer, 75, slightly intermittent. Upper third of *right* lung rather less dull on percussion. Can lay down much better at night, although still obliged to preserve the semi-recumbent position during rest.

16th.—Passed a very bad night with harassing cough and profuse expectoration. Pulse very feeble, and intermittent; skin cold and clammy. The effect of this day's inhalations was surprisingly quick and well-marked; he had two sittings, and on each occasion all distressing symptoms (except cough in a minor degree) disappeared for two or three hours; the oxygen gave a glow to the whole capillary circulation, with hot skin and perspiration.

24th.—Percussion and auscultation indicate less

congestion; inspiratory murmur now heard here and there over upper half of right lung; lower half of left lung less dull; smell of breath excessively offensive, even pervading the entire room. Was ordered to use, frequently, inhalation of vapour of hot water charged with chlorine, to continue strong opiate fomentations to the chest.

28th.—Had passed “an awful night,” constant spasmodic cough, and no sleep whatever; produced at least two pints of expectorated matters which had nearly choked him, consisting of dirty-brown pus and mucus mixed with dark gangrenous shreds and lumps of pulmonary parenchyma. Feels exceedingly weak and low, and yet is, to some extent, relieved since the copious horrible discharge. Without the free use of chlorine, it would be impossible to restrain the nausea and sickness caused to the poor fellow by the fetor, or to stay in the room with him for more than a few minutes. Oxygen inhalation, continued night and morning, is evidently the only thing which keeps him alive.

Various fluctuations — some days slightly improving, and again apparently at the point of death — until March 16th, when my notes say “has had a terrible night; extremely depressed; quick intermittent and hardly perceptible pulse; cold clammy sweat on face and forehead; describes something as having *suddenly broken or given way*, causing him nearly to faint with pain and prostration, im-

mediately followed by the violent issue from the chest and mouth of a large quantity of fetid black discharge (mixed with blood) similar to that previously expectorated.

March 17th, 8 a.m.—Very bad night; retching, coughing, with the almost continual fetid expectoration from the sloughing cavity. 9 p.m. Feels much better, expectoration less copious and disgusting, and cough at longer intervals. The diminution of stone-like dulness on percussion, and of the tumefaction in right hypochondrium, is very decided.

21st.—Right side of chest sounds more clear throughout, except from apex to base for about the breadth of three inches to the right of sternum, where the stone-like dulness still exists. Respiration can be heard at the very inferior portion of lung with cavernous rhonchus, &c.

From this date, slow but steady improvement obtained, and it would be superfluous to give further details of progress week by week and month by month. Suffice it to say, that he returned to the country after being about two months in town, during six weeks of which he had been hovering between life and death; that he came up to town to see me from time to time during eighteen months, and ultimately quite recovered; and that he has now for many years been a strong and active man.

CLINICAL SELECTION (No. 22).

Miss F. P—, æt. 21, of sanguineo-nervous constitution, significantly beautiful pink and white complexion, had for three years suffered from delicate health, with very sensitive lungs, and liability to colds—no connection with the catamenia, which have always been correct. Twelve months before I saw her, one or two special authorities on pulmonary consumption had passed a *very* unfavorable prognosis, and recommended that either she should not winter in England, or should be carefully guarded against leaving the house except under the most favorable circumstances of weather.

Early in December, 1860, the mother of this young lady returned with her daughter to town from Brighton, and (anxious to know whether the great inconvenience of wintering abroad could be avoided with safety) consulted me about the use of oxygen. There were then present—constant short cough with frequent expectoration, hectic flush, frequently recurring febrile irritation, hot and very red tongue, and irritation of the stomach and bowels. Upon examination of the chest, there was found to exist considerable loss of symmetry between the two sides of the chest, the right being generally flattened and presenting some concavity beneath the clavicle to the extent of four and a half

inches from above downward. Auscultation, percussion, and microscopical examination of the expectoration confirmed the diagnosis as regards tubercular consolidation and central cavity. The remaining portion of the lung gave evidence of general congestion and loss of mobility, with jerking inspiration and *the peculiar "click."* The left side of chest and lung demanded no special notice, with the exception of compensatory respiration.

Now, this was one of those numerous cases where change of climate is ordinarily pressed as a necessity, but rarely does any permanent good, though it does often postpone the fatal day. My opinion was against the necessity for leaving England; while the propriety of prompt and active treatment was urged in order to save life. Oxygen inhalation was commenced without loss of time; cod-liver oil, which always created nausea, was discarded, and cream substituted as soon as the stomach could tolerate it; dietetic and hygienic rules were carefully adapted to the peculiarities of the case, and due attention paid to depraved secretions. From the very first dose of oxygen a diminution in the sensations of irritation and weakness of the chest could be felt by the patient; within a month marked improvement evidenced itself, both in the lung and general health; and, at the termination of four or five months' steady treatment, conjointly with carefully directed oxygen by inhalation once

daily, the flattening and concavity had given way to almost perfect symmetry, and the remaining dullness beneath the clavicle was so slight, that I ceased the use of the gas, but kept an eye occasionally on my patient. The following winter, after (what I might even then *almost* call) her cure, there was still some pain and sensitiveness to the impression of damp and cold air, but otherwise with a little extra prudence she enjoyed herself like others. Two years after the commencement of the oxygen she was quite well, married, and has ever since enjoyed good health.

In this case, it is worthy of remark, that very small doses of oxygen were employed throughout the course, never on one occasion exceeding six pints, and frequently not more than four, at one sitting.

CLINICAL SELECTION (No. 23).

Mr. Josiah K—, æt. 32, had not enjoyed good health for several years, and during the last six months, notwithstanding the greatest care in soliciting and carrying out medical advice, his general health had gradually failed, cough and expectoration occasionally charged with blood increasing, until eminent opinion had significantly prescribed the necessity for giving up his daily occupation as railway clerk altogether, and confining himself to the house except when weather was mild and genial.

Consulted me January 15, 1862.—Salient symptoms now present. Dulness on percussion, greatly diminished mobility, and complete loss of respiratory murmur over the whole of the right lung, except in the subclavian region, where humid crackling rhonchi, tubular breathing, jerking inspiration, and pectoriloquy were present. No pleural effusion. On the left side—general puerile respiration, no special dulness on percussion, occasional dry creaking râle in the submammary region, some pain beneath the scapula. Over the upper third of the right lung, the chest was considerably flattened, otherwise the two sides were symmetrical. Cough very troublesome night and day (but not spasmodic), with muco-purulent expectoration frequently tinged with blood. Heart's sound rather harsh, its action irritable and variable; pulse 95 to 115; never had rheumatic fever. Tongue red and glazed anteriorly, thickly coated with dirty fur posteriorly; secretions in general very depraved. Added to other symptomatology was much mental anxiety regarding his young family entirely unprovided for, since his health *for some years* had been such as to preclude life-insurance.

Without going into copious details of management, it may be gathered that this apparently almost hopeless case cost me much anxiety for about twelve months, the state of the stomach and bowels adding much to the distress from time to

time. Oxygen inhalation was not absolutely continuous, but was intermittingly employed with singularly marked benefit. The upper third of the right lung, full of small cavities and extensively disorganised, as it was, at the commencement of treatment—soon broke up into a large cavity which afterwards gradually contracted, causing considerable depression of the corresponding portion of the walls of the chest; this, however, *ultimately* recovered its form under carefully regulated chest-expansion. During the intervals that oxygen inhalation was suspended, and when stomach and bowels permitted, small doses of ozonised oil were found very useful in this case. After the few weeks at the outset of treatment, this patient was enabled partially to resume his duties as clerk, the railway company kindly permitting him a good deal of liberty for the year of constant treatment. He is now quite well.

CLINICAL SELECTION (No. 24).

CHRONIC BRONCHITIS, PULMONARY CONGESTION, &c.

Mr. C. B. H—, of Portsmouth, æt. 31, consulted me March 14th, 1865.

Informs me that for several years he has been subject to severe attacks of bronchitis and pneumonia, which gradually culminated in his present

condition. Has undergone a variety of treatment, and recently has been becoming still worse under the hands of a notorious advertising charlatan. For some time past the distressing symptoms have become complicated with cardiac weakness and irritability, and congestion of the pulmonary artery; and for several hours every night (with attacks sometimes continuous, sometimes intermitting) he has been compelled to sit up in bed, gasping for breath, until partially relieved by smoking, or inhaling steam charged with *datura tatula* or *stramonium*, such means being followed by copious expectoration and a period of relief (as in common *asthma*, a word which I carefully avoid in this case).

Principal symptoms now present. Hurried and laboured respiration, with loud wheezing and sudden physical prostration upon making very slight exertions, as carrying a chair across the room, or any continuous walking however slow, or even retaining the sitting position so as to *feel tired*; face and lips dark and congested; pulse flickering, and scarcely appreciable to touch of finger, and varying in frequency every few minutes; the semi-recumbent position throughout the night essential for the purpose of procuring even a moderate amount of uneasy sleep. This patient being constitutionally calm and self-possessed, I ventured (notwithstanding the dyspnoea) at once carefully to test the inspiratory capacity, and found that he

could barely accomplish more than fifty cubic inches with his best safely-performed effort. Auscultation and percussion give evidence of congestion throughout both lungs, with diminished respiratory murmur, a few slight patches of emphysema here and there, rhonchi varying in character in different portions of the lungs ; no evidence of heart-disease, but *extreme* feebleness in action, and great congestion of the large pulmonary vessels. There is much giddiness of the head, feeling of dull pain and weakness posteriorly, with tottering gait and legs suddenly giving way ; *liver, stomach, bowels, and digestion quite right*, excepting so far as partaking of the general prostration.

As may be readily surmised, this case cost me some trouble and anxiety, more especially since cardiac apnœa itself had become a primary point in uncertain prognosis, the cardiac feebleness having *followed* the gradual loss of nerve-power in the medulla oblongata and cerebellum. (The brain had been severely tasked with long business-hours and night-work, added to which was an unusually small development of the occiput and upper cervical region.)

It would be tedious to detail the various careful measures which were necessary to ward off proximate death. Suffice it to say, that oxygen inhalation was unquestionably the *sine quâ non* through which life was saved ; its effects were immediate

and well marked; and although, prior to the completion of cure, the oxygen was stopped and other remedial measures resorted to, yet it may be safely asserted that without the preliminary employment of the gas, all other treatment would have been fruitless. I had the patient under watchful eye for between two and three months, and occasionally saw him afterwards for twelve months. He has since enjoyed fair average health.

CLINICAL SELECTION (No. 25).

ASTHMA, WITH CHRONIC BRONCHITIS.

September 6th, 1864.—Miss M. J—, of Belfast, æt. 62, came under my notice. Has been for many years a sufferer from recurring attacks of bronchitis, usually associated with derangement of the stomach and liver. For the last two or three years symptoms have assumed an asthmatic character, and have gradually increased in severity, notwithstanding carefully carried out professional advice. She has been for twelve months unable to sleep at night in the recumbent position, and early every morning has a severe attack of asthma, with intestinal flatulence, very troublesome cough and dyspnœa, lasting an hour or more, and terminating in copious expectoration. Appetite is variable, usually bad: tongue covered with white fur; bowels somewhat

irregular ; no organic disease of heart to be traced ; so sensitive that very slight atmospheric changes give her fresh colds, unless she be highly cautious ; naturally possessing much physical and mental activity, she has become very feeble, and has also lost much of her mental energy.

Oxygen inhalation (4 pints in 48 of atmospheric air) promptly afforded *some* relief, and rendered life more tolerable. This went on until November 18th, when the report is—Morning spasm almost gone, though still an accumulation of mucus during sleep, which demands some moderate coughing to get rid of ; appetite and secretions improved ; can now sleep in the horizontal position without fear, and there is much less shortness of breath when going up-stairs, &c. For nearly twelve months longer (during which time I did not once see this lady, who wrote and reported occasionally) improvement slowly but surely advanced, until she informed me that she had no remains of her bronchial affection or spasmodic attacks (except occasionally a little accumulation of mucus, with slight shortness of breath, which soon passes off) ; that she had an excellent appetite, could walk and mount stairs just as formerly, and regarded herself as quite well.

Attention is invited to one special point of interest in this case. While the other pulmonary and bronchial cases, which I have selected by way

of illustration, required very close watching, and perhaps extended experience of the use of oxygen for their successful cure ; this one offers an instance in which oxygen did its work almost *per se*, although progressive recovery was necessarily slow, uncertain, and at times discouraging through excessive sensitiveness and liability to colds. Further, this had proved itself a decided case of long-standing hopeless disease, under every careful management, in a very prudent and sensible subject, though a Celt.

CASE (No. 26).

FATTY DEGENERATION OF THE HEART, WITH PASSIVE
CONGESTION OF THAT ORGAN, AS WELL AS LIVER,
SPLEEN, AND WOMB.

Mrs. M—, a lady residing in Berkshire, æt. 62, placed herself under my care, July 16th, 1864, with the following history, and urgently dangerous symptoms.

Has for many years, especially since “change of life,” been subject to frequent attacks of palpitation of the heart, “bilious attacks with piles,” as well as winter coughs and occasional attacks of severe bronchitis. She presents a puffy, congested, apoplectic appearance, with intermuscular and general deposit of loose fat, the more marked from the possession of a short neck and rotund figure. The

heart's action is extremely weak and irregular, with occasional brief intervals of irritative reaction, pulse intermitting every three or four beats, and very compressible; appetite bad; tongue flabby, and thickly coated; no cough of any moment, no present or recent cold which would temporarily exacerbate symptoms; severe headaches frequent; sudden giddiness and liability to fall down, without immediate assistance, when standing or quietly walking, even in the house, and inability to make the slightest exertion calculated to excite the heart's action, without these symptoms, and difficulty of breathing (cardiac dyspnoea).

As a special point, the normal extent of cardiac dulness on percussion indicates a moiety of increase equally diffused; and systole and diastole are scarcely appreciable to the ear. There also exist much flatulent distension of the intestinal canal, especially the transverse colon, some irregularity of bowels, and hæmorrhoids which are frequently troublesome; and these symptoms, conjoined with a naturally-excitabile nervous and vascular system, have for some time past caused severe spasmodic attacks of irritability, followed by urgently dangerous depression of the heart's action after meals, or upon laying down at night. For some weeks these attacks have been nightly, sometimes continuing more or less throughout the night, and the urgency of the symptoms have induced her to come to

London and place herself under my immediate care, at the earnest advice of an old patient of mine.

I at once commenced with oxygen inhalation, both fatty degeneration and congestion with relaxation of the heart being pathological conditions indicative of its use. At the same time I prohibited the *free* use of stimuli and sedatives (which had previously been advised from time to time for the purpose of palliation and obviating the tendency to death), permitting for internal use only an occasional teaspoonful of brandy or gin, with chloric ether and aconite in very small doses at night, an occasional dinner-pill, and a sedative embrocation externally.

The oxygen *from the first dose began to* evidence marked effects in improvement of *all* the distressing symptoms—the sensation of relief causing the patient to contrast the singular difference between the primarily exciting and secondarily depressing feelings which she had always experienced when stimuli were pressed upon her as a necessity—and the soothing yet quietly exhilarating influence of the oxygen, followed by no secondary depression.

The case being one so urgent, and of long standing, had many ups and downs during a four months' course of careful watching, with frequent variations of treatment, external as well as internal, oxygen affording *THE point d'appui*. Twice during treatment I had considerable difficulty in restoring

the heart's action (collapsed condition), in each instance a little indigestion and flatulence being sufficiently exciting cause of imminent danger to life. During the twelve months following I had a few letters from this lady, and found that the benefit had proved permanent.

CLINICAL SELECTION (No. 27).

LONG-CONTINUED DERANGEMENT OF THE WOMB AND OVARIES—IMMINENT APOPLEXY.

Mrs. H. B. G—, æt. 57, placed herself under my care, October 28th, 1858. States that ten years ago she had inflammation and fissure of the neck of the womb, with very offensive discharge, for which she was treated successfully (*so far as the local affection*) by one of our most noted specialists. Notwithstanding this, she has not enjoyed "one single day's feeling of real comfort and health" during the ten years, and has been almost continually under medical treatment, having given lengthened trials to many eminent physicians, both in this country and abroad. Not the least annoying circumstance connected with her case is, that (being stout and sanguineous) most of her friends have long considered her merely nervous, although she is naturally of cheerful, hopeful, self-reliant, energetic disposition, and fond of active exercise. She has

striven to the best of her ability against the gradually increasing physical weakness and lassitude.

At this date (October, 1858) this lady has all the symptoms of venous hyperæmia with considerably enlarged liver and spleen, internal piles, congestion of brain and spine. She suddenly fails in strength when attempting to walk, and drops without support; cannot now attempt any walking exercise, which she much misses; has constant bearing down of the womb; tongue glazed and fissured, very red anteriorly, thickly furred posteriorly; pulse very slow, and so weak as to be felt with difficulty, unless she makes an effort to walk across the room; tendency to constipation.

I at once resorted to oxygen, and stopped all stimuli (which under professional advice she had been taking), except very dilute wine and water. The very first dose of oxygen gas (12 pints in 80 of atmospheric air) conferred an immediate sense of relief from oppression, such as had not been experienced for years, and next day I found her quite a different person, that which her friends had chosen to consider "nervousness" having disappeared. She took one carefully watched daily dose (occasionally two) for two months, during which all her principal derangements of constitution gradually succumbed to careful but simple management, with the valuable aid of oxygen. She then

left town with my acquiescence ; I continued occasionally to see her at long intervals ; and six months afterwards she was perfectly well in health and spirits, and able again to enjoy her long walks, &c.

This presents an example of a class of female diseases originating or associated with "change of life," in which, with proper auxiliary management, oxygen has (in my hands) given, perhaps, more satisfaction than in any other diseased conditions, except chronic bronchitis and congestion of lungs. It is obvious that years of suffering under local as well as general treatment might have been spared to this lady had oxygen been employed earlier. It is also worthy of notice how symptoms of imminent apoplexy and danger to life were *at once* averted, and how rapidly presumed "nervousness" vanished under suitable remedial agency.

CLINICAL SELECTION (No. 28).

Countess of —, æt. 46, had been deteriorating in general health, and frequently suffering from severe headaches for a year or two, and for some months had become much worse from intensification and increasing frequency of her headaches, *malgré* the highest professional advice which London could produce, with changes of treatment and several changes of physicians. Homœopathy (after ortho-

dox failures) had been tried for some months ; and again, orthodox medicine had been fairly tested. Unable to obtain relief, and becoming daily more prostrate and unfit for society, she happened to speak on the subject to a late eminent statesman, who advised her to consult me about oxygen.

July 12, 1858.—I found, on my first visit, that for two months her attacks had become more and more intense, every third or fourth day completely disabling her for twenty-four hours, and leaving her during the interval before the next attack very feeble and depressed ; and (as she remarked) no sooner did she begin to feel herself recovering from the effects of one than another came. These attacks were evidently of neuralgic character, and for a few weeks they had been followed by a lengthened semi-comatose state from the extreme severity of the paroxysms, rendering her thus scarcely equal to any society even for one day during the intervals. No special disease organic or functional existed, but there was a spanæmic condition with lowered nutrition, lax tissues, weak digestion, sluggish bowels, sensation of “bearing down,” &c.

Understanding that her ladyship was not under the immediate care of any family medical attendant, and being requested to take the sole management of the case, I signified a decided approval of a carefully directed trial of oxygen. Indeed, it was a case which might be considered peculiarly

promising with the aid of the gas. From the first dose an appreciable (though slight for a few days) feeling of general benefit commenced; there was not a single recurrence of her paroxysms of *intense* suffering, merely common headaches now and then reminding her of the past, and even these disappearing as a rule *immediately* under the influence of a dose of oxygen.

For all practical purposes of life and movement in society a cure may be said to have been effected in a few weeks, although for some months my services were occasionally called for to rectify deranged nutrition, and one or other temporarily peccant organ, the results of the excessive strain to which the entire animal economy had been subjected.

Besides illustrating the quickly-attained success through oxygen, I will venture to make this case subservient to a condemnation of the indiscriminate use of quinine and iron so prevalent. I am satisfied that in this, as in many chronic diseases which come before me, much mischief and but little good has been done by them. In the course of *secondary* treatment I substituted for them with advantage (in small doses, once a day, for a few successive days occasionally) Liq. Pot. Ars. and Belladonna. The use of aperients also had added to the concomitant evil of torpid bowels by further weakening them, and from the outset (having been compelled

to stop all prior treatment) I had a somewhat difficult task in arranging associate treatment with the oxygen.

In *this* case, full doses of the gas were demanded; smaller quantities were negative. The doses were for the most part 12 pints of oxygen in thrice the amount of atmospheric air once daily, and occasionally a second dose of half that quantity. Now and then I had to prescribe less for a few days, in consequence of the pulse becoming lowered (not excited, be it remarked) by a prolongation of the influence of the oxygen.

CLINICAL SELECTION (No. 29).

VALVULAR DISEASE OF HEART, &c.

The following case will be found interesting as testimony of the occasional value of oxygen in incurable valvular disease of the heart.

Mrs. ——— (the wife of a solicitor) was advised by an old patient of mine to consult me (not at all with the idea of oxygen) in January, 1862. Her husband informed me that the last eminent physician, under whose care she had been, had frightened her very much by speaking of the diseased mitral valves; that he had been very anxious about her state for some months, as she was evidently failing more and more, and it had become of daily occur-

rence for her to turn faint and giddy, and almost to fall, when making any sudden movement from a sitting or horizontal position, or crossing the room. After a guarded conference with this lady, I determined to try a course of oxygen ; for the slightly bluish lips and vascular network in a naturally clear pink face, the congested conjunctivæ, sudden flushings from slight movements, tongue paralysed on one side, conjointly with the history and other general symptoms, clearly pointed to inefficiency in the cardiac, pulmonary, and cerebral circulation.

I need scarcely say that extreme care was necessary during the first week's daily inhalation ; after this, improvement was steady and progressive ; the heart's action became firmer, instead of a long intermission every two or three beats, the intervals only occurred, as a rule, every ten to twelve beats ; the systole, *with bellows' murmur*, as well as diastole (all not only indistinct, but inaudible at first), became appreciable ; the pulse, instead of being hardly perceptible to touch, could be felt with ease, though still feeble and slow ; the face regained a healthy hue ; the tongue could be protruded in a straight line ; and before the termination of two months from the commencement of treatment, so fairly was the equilibrium of the heart's action and the general circulation restored, that oxygen with auxiliary management was no longer necessary.

In this case it is noteworthy that from 4 to 6 pints

of oxygen in 50 of atmospheric air at each sitting was the *maximum* that could be tolerated ; any attempts to exceed this quantity soon afforded evidence of mischievous effect upon the head and heart's action.

During the last five years this lady has *always* consulted me when temporarily affected with any little ailments—such as colds, indigestion, &c.—which invariably disorder the heart's action, but she has been even six months at a time without requiring medical aid, and has had no serious attacks such as formerly were frequent. She has not thus far needed oxygen again ; and enjoys life and society, apparently like other people, by *strict* attention to my rules enjoined for her heart disease without herself being directly aware of the fact. Even the valves themselves appear to have undergone some gradual improvement.

CASE (No. 30).

CHRONIC CONGESTION, RELAXATION, AND IRRITABILITY OF THE WOMB, WITH EXTREME SPINAL WEAKNESS.

The subject of the present case, Mrs. M. R. J—, æt. 32, requested my professional services for the first time in 1862. I had some time previously been consulted about the healths of two delicate children born in India.

The history of this lady's case is unfortunately

a too common one. She married early, and had a rapid family during the seven years following; afterwards no increase for some years, during which she suffered much from (so-called) inflammation, congestion, and irritability of the womb, for which leeches and caustics were from time to time applied to the os uteri; had plentiful supplies of quinine and iron in India; and subsequently in England had a "twelvemonth's course off and on" of the same dear twins of fashion, as well as mineral acids, with a repetition of speculum-practice, galvanism, &c. No good result following, but decidedly the reverse, with steadily increasing weakness of back and spine, she had avoided all but the most simple remedies for some time before she sought my advice.

I found extreme weakness and irritability of the entire spine, especially the lumbar region—even a moderate carriage drive causing a lengthened attack of aching pain; tendency to piles; congestion and relaxation of the uterus with frequent leucorrhœa; and at the monthly periods (as might be expected from the quasi-spongy condition) undue losses slowly but surely undermining a naturally good constitution.

I enjoined, to be carefully carried out, a system of alternate rest and exercise, with elastic supports, and carriage to be specially padded; for tonic I depended upon a course of oxygen for a few suc-

cessive weeks, this being repeated on two occasions during the succeeding twelve months; and for *occasional* assistance to the relaxed and congested and frequently irritable womb as circumstances required—Ac. Sulph. dil., Bellad., Sec. Cornutum—with lotions from time to time containing morphia, glycerine, and astringents.

The result was in every way satisfactory. Twelve months afterwards she became pregnant, enjoyed unusually good health and spirits during the gravid period, and had a most satisfactory accouchement.

As of high practical importance, I have here and elsewhere briefly referred to auxiliary remedies, which (with oxygen as the *leading* curative agent) demand special care both in kind and in frequency of administration. As a rule, I do not give any one medicine for many successive days without suspension, for medicines may on the one hand interfere with the benefit anticipated from oxygen, and on the other hand oxygen may modify the action of medicines. The oxygen in this case on each occasion never exceeded 6 pints diluted with about 50 pints of atmospheric air; and the immediate benefit of each inhalation was well marked even with 4 pints. Larger doses first gave a short impetus, and then began to depress, showing the necessity of careful watching. Speculum, leeches, quinine, iron, *et hoc genus omne*, have long been discarded; and the uterus and accessories

now preserve their integrity as well as can possibly be expected in a subject long under such severe trial to health and strength.

CLINICAL SELECTION (No. 31).

THREATENED SENILE GANGRENE.

Until I recently took a retrospect of an old note-book, I had forgotten the following interesting example of a particular class of disease.

Mr. G. B—, æt. 62, for many years a sufferer from rheumatic gout and incurable spinal disease, showed a tendency to break up altogether in June, 1856. For some months previously, troublesome slow ulceration had attacked successively the roots of all the toe-nails, which had then turned black and fallen off, leaving dark surfaces indisposed to heal, with slight grumous discharge. For three weeks this morbid action had slowly increased, and had assumed the characteristics of commencing senile gangrene, with large, nearly black, purpuric patches upon the feet, ankles, and legs. No ordinary means appearing to have any influence in checking its progress, the patient (a relative of my own) came to town, and placed himself under my care. Being at that time comparatively a novice in the use of oxygen, I was much gratified and surprised with the result of a trial in this case; for without

any particular change of diet, no medicine, simply his two glasses of good old port wine daily, the extending morbid process was suspended, and began appreciably to give place to healthy action within one week. This change in the right direction steadily continued, and in the course of four or five weeks I had the pleasure of seeing that all traces of the disease had disappeared, new and healthy toe-nails having also begun to grow. The patient then left town, and for eleven years (now aged 73, while I am writing) has had no return of the foregoing symptoms.

In France during the last few years it is said that success has been obtained in some cases of gangrene through oxygen gas locally applied to the cutaneous surface. In this case inhalation performed its part in favour of the local disease through the beneficial alteration effected in the entire constitution, and (whatever may be the merits of oxygen applied externally) I will venture to put on record my opinion that inhalation is much the most reliable, and should always be associated with any external use of the gas which may be sometimes desirable.

CONCLUDING CHAPTER.

IN analysing the foregoing clinical illustrations of the peculiar value of oxygen in various forms of intractable (and even otherwise incurable) disease, several points of practical interest arise. 1. The inquiring mind will recur to prior observations* on the *modus operandi* of oxygen in its partially understood and comparatively new relation as a curative agent; and such contemplation will easily lead towards a solution of former chemico-physiological difficulties; for the advance of science (especially the relation of imponderable force to matter) appears now to render it no difficult task for any professionally-qualified or even any well-informed person to appreciate the contra-distinguishing characteristics of oxygen (*a*) in the atmosphere, and (*b*) artificially prepared. 2. It will be observed that (as I very strongly impressed eleven or twelve years ago) the amount of benefit is by no means in direct proportion to the amount of oxygen taken; and this point not only will receive elucidation by

* Chap. III, as well as the Introductory Chapter.

recalling foregoing observations, but itself gives significance to the important position which carefully-prescribed small doses ought to occupy in the treatment of some forms of notoriously-fatal disease, *e.g.*, incipient consumption. 3. It will be noticed that some of the selected cases* are of complicated character, several organs being almost equally involved, rendering it impossible to adhere to any dogmatic nomenclature. Most practitioners of the present day having discarded the routine treatment of the name of a disease (arbitrarily given to a few links in the chain of morbid actions with the laudable intention of conveying the totality by a simple expression), I merely glance at the fact in order to explain why it has been deemed best to avoid placing the "Clinical Selections" under a few formal heads according to some salient localisation of disease. 4. From the "clinical selections" are carefully excluded all those which (though perhaps depending upon oxygen for chance of life) had other careful measures so combined as either fairly to be open to doubt regarding the *primary* influence of the oxygen in effecting the cure, or where the oxygen was simply entitled to the position of a useful assistant. Thus many tempting cases have been omitted, and indisputable evidence alone admitted, my earnest endeavour having been to avoid any

* To avoid tedious reading, the *salient points* alone are given in many of the cases, and unnecessary details of symptoms are omitted.

possible charge of *post hoc, ergo propter hoc*; while nevertheless it must be urged that *the cure by oxygen in serious and dangerous cases* frequently depends upon the judgment with which collateral measures (hygienic, dietetic, medicinal) may be employed as auxiliaries, by the physician, during the progress and often daily variations of a disease.

Supplementary to the various bodily derangements which I have named as essentially demanding the timely and judicious use of oxygen, when assuming dangerous or otherwise uncontrollable symptoms—it is right just to notify a few other pathological conditions in which physiological principles more or less indicate oxygen, and in each of which I have had some, although less, personal experience. Such are secondary congestive conditions arising with urgency in *some* cases of fever and toxicohæmia, *e.g.*, in scarlatina—puerperal fever—uræmia—diphtheritis (if not dying from the mechanical impediment of “false membrane”)—cholera* *after primary reaction*—pythogenic fever among the well-nourished classes of the community—*prolonged congestion* from chloroform and other anæsthetics. Lastly (as something refreshing because *really new* from any clinical observer who has followed myself) Dr. Halford’s suggestion, founded

* Experience was afforded me so far back as the great cholera outbreak in 1849, when I had the superintendence of the Manchester Cholera Hospital.

upon his ingenious hypothesis on the action of snake-poison, merits passing notice.

In recording my views of oxygen as a powerful, really scientific, and agreeable curative agent *when properly exhibited in suitable cases*—as capable of far more extensive range in its application to the rational treatment of chronic disease than perhaps any other remedy—as pre-eminently Nature's own therapeutic, affording assistance in her own way without opposing the intentions of her ever-present *vis medicatrix*—as occasionally *the* remedy, and then the only one worthy of the name, in certain contingencies where life must be (and frequently is) sacrificed by neglecting a fair trial of it—as entitled to the position of a *curative* (either alone, or as an adjunct to *other careful and judicious* treatment) in a variety of intractable diseases otherwise incurable or tacitly acknowledged to be so by any other known means—I must request the indulgence of the reader, so far as relates to some unavoidable egotism—unavoidable while occupying (as I did at first) an almost isolated position, surrounded by open but generous foes, and subsequently (my position being proved tenable) having to neutralise, before the general body of the profession, the self-interested non-acknowledgment of certain individuals unable to resist the force of truth. It has ever been my own anxious wish justly to give credit where credit was due; and hence, when writing in 1856-7, I

earnestly impressed that I was *re-introducing* what had been (through grievous error) pronounced, *ex cathedrâ*, a worthless remedy. Thus to re-introduce was surely an infinitely more difficult task than advising an entire novelty, for Giant Prejudice had first to be expelled from his strong citadel.

It may with safety be predicted that, sooner or later, non-atmospheric oxygen will be universally admitted as one of the most valued of our remedial agents.

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B.P.L. Bindery,
APR 11 1893

