

Further observations on the internal use of the hydro-cyanic (prussic) acid : in pulmonary complaints; chronic catarrhs; spasmodic coughs; asthma; hooping-cough; and some other diseases. With full directions for the preparation and administration of that medicine / by A.B. Granville.

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FURTHER OBSERVATIONS
ON
THE INTERNAL USE
OF THE
HYDRO-CYANIC (PRUSSIC) ACID,
IN PULMONARY COMPLAINTS;
CHRONIC CATARRHS; SPASMODIC COUGHS; ASTHMA;
HOOPING-COUGH;
AND SOME OTHER DISEASES.

WITH
FULL DIRECTIONS FOR THE PREPARATION AND
ADMINISTRATION OF THAT MEDICINE.

BY
A. B. GRANVILLE, M. D. F. R. S. F. L. S. M. R. I.
PHYSICIAN IN ORDINARY TO HIS ROYAL HIGHNESS THE
DUKE OF CLARENCE; LICENCIATE OF THE ROYAL COLLEGE
OF PHYSICIANS OF LONDON; AND PHYSICIAN-ACCOUCHEUR
TO THE WESTMINSTER GENERAL DISPENSARY.

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1819.

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THE
ROYAL
SOCIETY
OF
EDINBURGH
IN
THE
MUSEUM
OF
NATURAL
HISTORY
OF
EDINBURGH

ROYAL SOCIETY OF EDINBURGH

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TO THE
PRESIDENT AND FELLOWS
OF THE
ROYAL COLLEGE OF PHYSICIANS
OF
LONDON,
WITH FEELINGS OF ESTEEM AND HIGH
CONSIDERATION,
FROM
THE AUTHOR.

Saville Row, 1st. March, 1819.

TO THE

PRESIDENT AND FELLOWS

ROYAL COLLEGE OF PHYSICIANS

LONDON.

WITH TESTIMONIALS OF ESTEEM AND HIGH
CONSIDERATION.

THE AUTHOR

WILLIAM BAKER, M.D.

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FURTHER OBSERVATIONS, &c.

THE very valuable paper of Dr. Magendie on the use of prussic acid in certain diseases of the chest, which I translated and inserted in the Journal of the Royal Institution,* with some preliminary observations, has succeeded in exciting, amongst medical men, that degree of interest, which if properly satisfied, must finally lead to the adoption of a more successful treatment in cases of pulmonary complaints. Having been the first to call the attention of the Profession in this country to this important subject, I stand in a manner pledged to them for further information. With this, I am happy to say, my experience for the last twelve months, has supplied me to a degree surpassing even my most sanguine expectations ; and as I have it also in my power to

* Vide No. VIII. of the Journal of Science, 1817.

add the result of the practice of some other Medical Gentlemen who have, at my suggestion, employed the prussic acid, and who kindly furnished me with their observations, I cannot longer hesitate in laying the whole of the accumulated evidence in favour of the acid before the public in general. This will serve at the same time as an answer to the numerous applications which I am daily receiving from medical practitioners, for more ample information on the subject; and for directions how to procure and administer the acid, in the various diseases for which it has been recommended.

With a view of making whoever may chance to peruse this paper acquainted with the complete history of this recent addition to our *Materia Medica*, it will not be inexpedient to give some account of the discovery, and chemical nature of the prussic acid; the experiments which have been made with it; and the analogy which led to its administration as a medicine. If to these facts be added a minute enumeration of its effects on the human body, and a detailed statement of those cases in which it has been used, both successfully and unsuccessfully; the public will have been put

in possession of every circumstance connected with the subject of this valuable remedy.*

1. *Chemical History of the Hydro-cyanic, or Prussic Acid.*

The name of *Prussic Acid* was given by Guyton de Morveau† to a particular substance, supposed to be the colouring principle of *Prussian blue*. Every one knows that the Prussian blue is a pigment of a fine dark blue colour, discovered by Diesbach, of Berlin, more than a hundred years ago, by the accidental mixture of a solution of green vitriol (sulphate of iron,) with an alkali highly impregnated with animal matter. The precise process of preparing this substance as a colour, was published in the *Philosophical Transactions* for 1724, and may be thus briefly stated. Dried bullock's blood and good pearl ash are calcined together in a crucible, and the contents afterwards boiled in a certain quantity of

* I have had, once before, occasion to direct the public attention to the use of prussic acid, in a paper written for that purpose, and inserted in vol. IV. of the *Medical Repository* for 1815.

† See the *Biographical Account* of the late Baron de Morveau, by Dr. Granville, printed in the *Journal* of the Royal Institution.

water, and the liquor filtered; a solution of green sulphate of iron is next added, when a bluish-green deposit is formed, which by the further addition of muriatic acid, is instantly changed from a bluish-green to a deep blue. This is the Prussian blue, or in other words, “a combination of iron with a particular substance contained in the blood,” and separated from it, in the first instance, by the potash. It is this substance, thus furnished by the blood, which has been called *Prussic Acid* by Morveau, but the real nature of which was not properly ascertained, until in 1815, M. Gay Lussac of the Royal Institute of France, published a most admirable memoir on the subject, which, to use Sir H. Davy’s expressions, is replete with the most elaborate and ingenious researches.*

The Swedish chemist, Scheele, was the first who succeeded in separating the particular acid in question from the Prussian blue, so as to enable him to study its nature and properties. Several other chemists followed him; but his process of obtaining the Prussic Acid

* RECHERCHES SUR L’ACIDE PRUSSIQUE, présentées à l’Institut, le 18 Septembre, 1815, par M. Gay Lussac. *Extrait des Annales de Chimie, Août, 1815.*

was considered the best, until Gay Lussac shewed that the acid, so prepared, was far from being pure ; and proposed another method, by which he obtained an acid, endowed with such active and energetic properties, as to rank it amongst the most virulent poisons. This method being unfit for the preparation of the Prussic Acid to be employed as a medicine, need not be mentioned in this place. It will be sufficient to give the formula employed by Vauquelin, and recently adopted by the faculty of medicine at Paris, in their Pharmacopoeia.* The prussic acid prepared according to Vauquelin's directions, or to those of Scheele, is a safe and valuable medicine in the hands of a cautious practitioner. The formula will be found in another part of this paper.

Having obtained the pure Prussic Acid from the Prussian blue, it was to be expected that an acute chemist, like Gay Lussac, would not be long in discovering its real nature. This has indeed been the case ; and we now know that it consists of a particular gaseous and highly

* Codex Medicamentarius, sive Pharmacopœia Gallica, jussu Regis optimi editus a Facultate Medica Parisiensi, anno 1818.

inflammable combination of carbone and azote, acidified by the addition of hydrogene.

To the former of these combinations, Gay Lussac has given the name of *cyanogene* (producing blue); and to the combination of cyanogene with hydrogene, that is, to the acid formerly called *prussic*, he applies the distinctive appellation of *hydro-cyanic*. By an accurate analysis, he found the *cyanogene* to be composed of

Carbone	44.39, or 46.19	} in every 100 parts,
Azote	51.71, or 53.81	

and the *hydro-cyanic* acid to consist of these same proportions of carbone and azote, with the addition of 3.90 of hydrogene.

2. *Method of procuring the Hydro-cyanic Acid for Medical purposes.*

It has already been stated, that the acid in its purest state, as obtained by Gay Lussac, cannot be employed as a medicine. The processes which have hitherto been recommended for the preparation of the acid in a diluted state for medical purposes, are those of Scheele, improved by La Planche, and of Vauquelin. I shall therefore detail them both with mi-

nuteness, as it is of the utmost importance to be very precise, as well as cautious, in the manipulation of this powerful agent.

Scheele's Process.

To two ounces of Prussian blue, mixed with one ounce of red precipitate of mercury, six ounces of water are added, and the whole boiled for some minutes with constant agitation, when the blue colour entirely disappears, and the mass becomes of a yellowish grey; it is then filtered, and the mass on the filter washed with a little hot water, which is added to the filtered liquor. Pour this upon one ounce and a half of clean iron-filings, and add three drachms of strong sulphuric acid. Shake the mixture well, and after allowing it to subside, pour off the liquor, put it into a retort, and distil the fourth part of it over into a well luted receiver, which will afterwards be found to contain the aqueous prussic acid, with an admixture of a little sulphuric acid, to be got rid of by means of barytic water. The improvement suggested by La Planche consists in limiting the first distillation to $\frac{1}{6}$ of the whole, and in rectifying the liquid thus obtained, by means of a gentle fire, over $\frac{1}{200}$ of

carbonate of lime, drawing off, afterwards, $\frac{3}{4}$ only of the whole by a second distillation. By this method the acid is obtained at an uniform degree of concentration.

Vauquelin's Process.

Into a solution consisting of two ounces of cyanuret of mercury and sixteen ounces of water, pass as much sulphuretted-hydrogene gas as will serve to decompose the salt, leaving an excess of the gas. Filter the liquor to separate the sulphuret of mercury formed, and treat the filtered liquor with an excess of subcarbonate of lead. Shake the bottle until the excess of sulphuretted-hydrogene be absorbed. Filter once more, and the remaining liquor will be diluted hydro-cyanic acid, of a proper strength for medical purposes.*

The prussic or hydro-cyanic acid is not found

* See at the end of this paper the Latin formula, taken from the Pharmacopœia of the Faculty of Medicine of Paris, 1818.†

† Mr. Garden, chemist, of Oxford-street, is the only person, to my knowledge, who has prepared the *medicinal prussic acid*, according to both the above methods; each of which is perfectly good for the purpose of practice: and I have satisfied myself, by ocular demonstration, that every precaution was taken to ensure the accurate result of the operations.

ready formed in the blood. This fluid does, indeed, contain the principles of the acid in question, but they require the presence of an alkali, to influence that peculiar attraction and combination of their molecules, which constitutes what has been called prussic acid. It is a fact, that when we wash the residue of animal matter in water, no prussic acid is found, unless alkalies be present at the same time ; but on treating animal matter by heat, ammonia is formed, the presence of which is sufficient to promote the subsequent formation of prussic acid.

This acid is also observed in the vegetable kingdom, though in small quantities. The smell of those substances, in which it is found, fully indicate its presence. This is the case with the bitter almonds, the kernels of apricots, cherries, and several plumbs, the peach flower, peach and nectarine leaves, the leaves of the lauro-cerasus, &c. We are indebted to Messrs. Vauquelin and Schrader for this discovery.

3. *Physical Properties of the Prussic Acid.*

When prepared by the decomposition of muriatic acid and the cyanuret of mercury,* according to Gay Lussac's method, the prussic or hydrocyanic acid has the following distinguishing properties :

First, it is a colourless liquid, with a strong smell of bitter almonds, and a peculiar pungent bitter taste.

Second, it is volatilized at 20° of the centigrade thermometer, boils at 26° , and at 15 below 0° it becomes concrete, and crystallizes in needles like nitrate of ammonia. Its extreme volatility is such, that when a drop of it is exposed to the air, on the end of a glass rod, it is rapidly crystallized.

Third, its specific gravity is 0.707 : when in a concrete state it is only 0.600 : while that of its vapour is 0.947.

4. *Physiological Experiments made with the pure Hydro-cyanic Acid.*

It is only by means of physiological experiments, that we can ever hope to increase

* Formerly called *prussiate* of mercury, until Gay Lussac proved that the cyanogene alone is combined, in this instance, with the metal, and not the hydro-cyanic acid.

the number of those substances, which medical men may afterwards use, with safety and advantage, in the treatment of diseases. From the moment of its discovery, it was ascertained that the prussic acid was deleterious to the human frame, and was consequently ranked amongst poisons. This opinion was confirmed by the experiments of Coullon, Emmert, Robert, Orfila, and more particularly by those of Magendie and Brugnatelli.* It has been shown by these chemists, that this acid, when administered to warm blooded animals, in its concentrated state, or in the form of vapour, destroys their sensibility, and the contractility of the voluntary muscles; but such a statement ought not to have deterred the physician from any inquiry, which might have led him to ascertain whether a substance possessed of such active properties, might not be safely introduced into the practice of medicine; for it must not be forgotten, that many of our most energetic remedies, are drawn from the class of vegetable and mineral poisons. Thus opium, henbane, hemlock, digitalis, arsenic, corrosive sublimate, &c., are daily used by the

* Read the *Giornale di Fisica*, published every two months, at the University of Pavia.

practitioner, with great advantage, though they are known to be poisonous in other respects. In fact, almost every article in the Pharmacopoeia may be considered as baneful, instead of being beneficial to the human frame, if the precautions respecting their dose and intensity be overlooked or neglected. The same reasoning holds good with regard to the acid, which forms the subject of the present paper. It is not because Dr. Magendie or Orfila tell us that dogs have been killed by the application or ingestion of the *prussic acid* in its most concentrated state, that we are to abandon all ideas of using it as a medicine. Who would refuse to prescribe the arsenical solution of Fowler in agues of long standing, and in some obstinate cutaneous disorders, because arsenic, even in small doses, has been employed to kill rats? Coullon, indeed, proved sometime since, that the prussic acid, like digitalis, hemlock, &c. may be poisonous, and yet perfectly admissible into the *Materia Medica*; for he brought himself to take eighty drops daily, without experiencing any bad effects.*

* See Coullon's Inaugural Dissertation on the prussic acid, defended, the 20th of August, 1808. To those who feel

The experiments that have been made upon animals, with a view of ascertaining the real poisonous effects of the hydro-cyanic acid of Gay Lussac, are various, and many of them curious ; but a detail of them in this place would be useless, as they have been published in several works, with which every medical man ought be acquainted ; to these facts, and to the statements which I have inserted in the Journal of the Royal Institution, I must refer my readers ; but with this observation, that the acid employed in these experiments, during which animals, greatly inferior to man in strength and constitution, were destroyed, is as unlike the acid now used in medicine, as the syrup of Poppies is unlike the extract of Opium ; yet both these latter substances are given as medicines ; whereas, with regard to the prussic acid, the weakest preparation only has been adopted.

It will not, however, be superfluous in this place to repeat, that in preparing the hydro-cyanic acid of Gay Lussac, the utmost caution

anxious of knowing more than I have here thought proper to detail with respect to the physiological action of the prussic acid, M. Coullon's paper will be a source of great information, as it contains a vast number of very interesting facts. The same gentleman has since made some experiments with the Cyanogene upon animals.

is necessary ; as it is impossible to breathe its vapours without feeling the most dangerous effects. Dr. Magendie states, that owing to some neglect on his part, while preparing the acid for the purpose of experiments upon animals, he suffered the most excruciating pains in the chest, accompanied by feelings of oppression, which lasted some hours.

But even the strongest hydro-cyanic acid of Gay Lussac, though dangerous in the preparation, soon ceases to be so, as it is impossible to preserve it in its state of purity more than a few hours.* It is spontaneously decomposed at the ordinary temperature of the atmosphere, and then loses all its obnoxious qualities. In this process, carbone is precipitated, the liquid becomes brown, and if evaporation be suffered to go on, the whole disappears under the form of volatile ammonia and hydro-cyanate of ammonia, leaving behind a considerable quantity of black carbonaceous matter.

* Gay Lussac says, “ En conservant cet acide dans des vases bien fermés, même sans qu’il ait le contact de l’air, il se décompose quelquefois en moins d’une heure.” Op. citat.

5. *Analogy which led to the use of the Medicinal Hydro-cyanic Acid (or Prussic Acid,) as a Medicine.*

It can now no longer be a matter of doubt that the prussic acid, however in itself poisonous, may, when properly diluted with water, be used as a medicine with safety and advantage.

This assertion, which three years ago had little more than mere analogy and supposition for its support, has since been proved, by extensive practice, to be true to its fullest extent.

In studying the phænomena of poisoning by the prussic acid, Dr. Magendie observed that animals on which it had been made to act, and in which no trace of sensibility or muscular contractility could be found after its application, would often continue to breathe for several hours freely, while the circulation of the blood remained apparently unaltered. It might indeed be said, continues the same author, that these animals were dead with regard to their external functions, yet still enjoyed life through their nutritive faculties.*

* See Dr. Magendie's paper on the use of prussic acid, in the Journal of the Royal Institution, already alluded to.

This property of extinguishing the general sensibility, without any ostensible injury to the respiration and circulation, the two principal functions of life, naturally led to a belief that the hydrocyanic or prussic acid, might be advantageously used in cases of excessive sensibility and irritation ; particularly when these two morbid states are likely to affect, as they often do, either the respiratory organs, or the circulation generally.

Thus, in all cases of spasmodic coughs, asthma, hooping cough, &c. the acid has been administered with constant good effects ; for in all such cases, there is a vicious augmentation of sensibility, more generally known under the name of irritability. But as the prussic acid is said to exert considerable influence over the arterial system, and little or none over the venous circulation, it might likewise be inferred, that in cases of inflammation, the acid might be employed with the most beneficial results. This kind of analogical reasoning induced Professor Borda, more than seven years ago, to give the hydrocyanic acid of Scheele, in cases of high pulmonary and other inflammations, in doses of four drops, twice a day, when the violence of the disease was quickly subdued, without

having any recourse to bleeding.* This, in a subject already exhausted by age, depletion, and a spare diet, must be considered as an incalculable advantage; for in all such cases there is a point at which the phlebotomist is obliged to stop, or the patient might expire under the lancet, before the desired effects of copious bleeding, in checking a chronic habit of inflammation, are perceived.

The partial success which some physicians have obtained in the various disorders they have treated with the Prussic Acid, evidently shews that it may be used without danger; for no one case has yet been recorded, in which the acid in question (when properly administered) has proved either fatal or injurious; whilst of the digitalis alone, (to say nothing of other active and poisonous medicines) several instances of its highly baneful effects on the animal system are found in medical works and journals; notwithstanding which, the digitalis is daily prescribed by physicians even to the most delicate subjects. A very few grains of tartar emetic dissolved in water, and a still smaller quantity of corrosive sublimate, will each destroy life;

* Consult Brugnatelli's "Elementi di Chimica applicata alla Farmacia," article "Acido Ossiprussico." 1814.

yet we are daily in the habit of administering both; the former, as a most useful evacuant, and the latter as a valuable specific. The charges, therefore, that have been brought forward against the Prussic Acid, because it belongs to the class of poisonous substances, must necessarily fall to the ground, when not a single instance of mischief produced by it can be quoted. Another charge, much better founded, against the Prussic Acid is, that it has failed in producing any good effect in some of the complaints in which it has been exhibited; but this would only go to prove, that the want of success in those cases is to be attributed to a want of sufficient knowledge, in the person employing it, of its mode of action on the animal economy; and without this knowledge, it is impossible to make a right use of any remedy whatever.

6. *Effects of the Prussic Acid on the Human System, and enumeration of the Diseases in which it has proved beneficial.*

The Prussic Acid is eminently sedative, more so even than opium; but its specific mode of action is somewhat different, both as to its

progress and effect, from that of the latter substance. The Prussic Acid, when administered to a patient exhausted by disease, and by the means employed to cure it, appears to exert an immediate influence upon the nervous system ; it gradually diminishes all irritability, checks a too rapid circulation, and calms many of the symptoms of fever. If a dry cough be present, it promotes expectoration in the first instance, and subsequently stops the cough itself. The spirits, before exalted, soon feel the quieting impression of the acid ; they become subdued ; the speech, the countenance, even the expression of the eyes, assume a character of unusual meekness ; there is a relief from pain and actual suffering ; the patient feels it, and is grateful : sleep comes on undisturbed, respiration is soft, and the pulse more quiet than at other periods of the complaint, having lost the thumping beat of irritation. In some few cases these sedative effects are so much more considerable, that the patient expresses that he feels himself as if only *half alive*. On those occasions there is an *apparent* entire prostration of strength, great lowness of spirits, and unwillingness to move, speak, or take food ; life seems suspended, yet the head and mind remain clear and

intelligent ; there is a total absence of pain ; neither does the patient complain of any symptom of local or general irritation ; the heat of the skin is natural, and the pulse, in the midst of this dead suspense, continues its course steadily and quietly. This state of things lasts from twelve to twenty-four hours, when it ceases ; and every organ is gradually restored to its former elasticity.

But it should be borne in mind that such instances of great depression produced by the acid, are extremely rare, and indeed seldom occur where tonics, or a proper quantity of nourishment can be given to the patient, at the same time he is taking the acid. There is scarcely a remedy which does not more or less present some anomalies in its effects, dependant on the particular idiosyncrasy of the patient. In some few cases the Prussic Acid disagrees with the stomach, and then it neither can, nor ought to be persisted in : it also occasions giddiness in some individuals, in which case it is necessary, either to discontinue it, or diminish the dose, and associate it with slight stimulants. Opium, Henbane, &c., have often, in this respect, exhibited the same occasional deviations from their usual mode of action.

But the Prussic Acid has never yet been found to produce the head-ach, and heaviness occasioned by Laudanum; the fluttering and palpitations brought on by Hemlock; nor the parched mouth, and irritability of the throat, arising from the action of Digitalis. The Prussic Acid moreover, acts gently on the bowels, in the first instance, and when after some days they seem to fall into a torpid state, the mildest medicines, and those in smaller quantities than usual, suffice to produce the desired effect, when combined with the acid.

The effect which the Prussic Acid produces, in almost every kind of cough, particularly if of a spasmodic nature, is highly satisfactory; and, it is more quickly obtained, than from any other application. In hectic fevers it affords ease, lowers the pulse, diminishes the number of paroxysms, works a favorable change in the action of the lungs, and their circulation; while the morbid heat of the skin, and the circular flushes of the cheeks, gradually disappear. The night sweats are also soon suspended. My practice in this respect is further more confirmed by that of Dr. Scudamore, the intelligent author of an excellent treatise on gout

and rheumatism ; who, on having read the paper on Prussic Acid, which I inserted in the Journal of the Royal Institution, took every opportunity of giving a fair trial to that medicine : and he has been successful in many cases, which he has been kind enough to communicate to me for publication. In the treatment of confirmed consumption, the Prussic Acid, even at the approach of death, is the most advantageous palliative that can be employed ; greatly superior, indeed, to any hitherto adopted ; and in a case of this kind, (that of the son of a wealthy tradesman,) in which it was administered, during some days previous to his dissolution, the grateful acknowledgements of the unhappy sufferer proved, how much more easy the last days of his disease had been rendered, by the action of this powerful sedative.

Asthmatic complaints have been greatly relieved by the use of this acid ; particularly the suffocating catarrh, (*catarrhus suffocativus*.) In this disease breathing appears almost suppressed or overcome, and the sound of the voice or cough is hoarse, accompanied with a hissing noise, and attended by much panting ; the pulse is small, irregular, rapid, and often not easily distinguishable ; there is

an oppression at the chest, and sometimes pain under the sternum, shooting through to the back. All these symptoms have yielded to the Prussic Acid, while the paroxysms of the disease have been shortened, and rendered fewer in number.

From analogy alone I should expect the most beneficial effects from the Prussic Acid, in cases of spasms of the stomach and diaphragm; and more particularly in cases of locked jaw, *tic-douloureux*, and, perhaps hydrophobia. But I have had no experience of its utility in such affections.

There is a sort of dry, convulsive, spasmodic cough, which may be called *sympathetic*, because due entirely to the morbid state, not of the lungs themselves, but of distant parts, such as the liver, stomach, spleen, pancreas, mesentery, womb, intestines, &c.; the pulse is frequent, and so small, as to be with difficulty discovered. There is a pain and dragging in some parts of the abdomen, with a sense of constriction about the region of the diaphragm, as if it were closely encircled by a girdle; the cough is worse at night, and the expectoration more copious on waking in the morning; the face is pale, the skin dry, the pulse small and

quiet. In this species of cough I have successfully employed the Prussic Acid, in doses of from eight to ten drops, in several ounces of liquid, taken by spoonfulls every three or four hours. The cough in two or three days diminishes considerably; so does the expectoration, which from being thick becomes limpid, light, and purely mucous. The patient sleeps some hours without having recourse to any other narcotic; and finally experiences a degree of relief, which is always proportionate to the state of the part affected.

The next complaint of respiration, in which the Prussic Acid has been given with great advantage, is the whooping-cough. It may be stated, without presumption, that no case of whooping-cough need be suffered to proceed longer than eight or ten days, if the Prussic Acid be timely and cautiously administered; and it is singular, that children bear the action of this sedative medicine, in small doses, better than adults.

Inflammation of the lungs, whether idiopathic, or produced by violence or hurts, will sometimes leave behind it, a disposition in those organs to become inflamed, at different periods, and on the slightest cause. The patient cannot lie

on his side ; the body is supported with pillows ; he complains of a distressing degree of heat in the back and loins ; and of pain in the muscles of the legs, arms and shoulders. The voice is either stridulous or hoarse, and he expresses a feeling of considerable oppression at the chest ; still he can fill this cavity without much pain or effort. A cough supervenes, which is sometimes dry and distressing ; and at other times, a thin mucous expectoration follows. If this state of things last long, a decided continued fever, with two daily exacerbations, occurs and preys upon the patient, who becomes emaciated, throwing off at length a purulent expectoration, more or less abundant, which proceeds either from a diseased secreting surface, or a small abscess in the lungs. If the patient gets through this attack, there is a chance of his having it again at some future period. The former abscess heals, and another is formed, producing exactly the same phænomena. The pulse, during the attack, is quick, full, hard, and jarring. Blood must be drawn, and often ; when it is found to be firmly coagulated, and covered with the inflammatory crust, and not unusually cupped. If the patient be quite exhausted from the effects of the disease, and

the system of depletion adopted to relieve it, as well as from many other adventitious circumstances, bleeding cannot be repeated often enough to do good ; nay, there will even come a time when it may do harm, although the pulse may still seem to indicate the want of it. At such a juncture the Prussic Acid will be found productive of the most advantageous effects ; the pulse will be lowered, and totally changed as to character ; the incessant cough relieved, and ultimately stopt altogether. The process of secretion in the pulmonary abscess, is suspended ; a thinish expectoration, consisting of pure mucus, relieves the distressing and alarming symptoms of a dry cough ; until the cough itself and the expectoration entirely cease. Sleep, which had before vanished, now returns, and the respiration during sleep, is calm, soft and regular. The morning and evening paroxysms of fever do not last so long, and occur at uncertain intervals and hours, until they at length disappear altogether ; and if the acid be persevered in, the morbid habit of the lungs is effectually corrected. It is during the most alarming part of such a pulmonary complaint, that the sedative power of the Prussic Acid is most conspicuous, and astonishes the persons

who have witnessed the disease, and the application of the remedy.

Sedatives being generally given in acute pain, I was led insensibly to think that the Prussic Acid might be employed with some advantage, in removing those distressing and acute pains which either attend or follow abortions. I have therefore tried it in a case of this kind, where every other sedative had been tried in vain; nay, with evident bad effect. My success was beyond my expectations—the pain vanished in about six hours after the first exhibition of the Prussic Acid; and, what is more curious, the flooding, which had proved untractable, stopt at the same time. This latter circumstance led Mr. Thomson, of Sloane Street, a gentleman of long and successful practice, and well known in the medical and literary world, to try the Prussic Acid in a case of spitting of blood, of long standing: on the fifth day the spitting of blood had disappeared, and never again occurred.

Dr. Magendie, in speaking of those symptoms which overpower the miserable consumptive patient, states, that he had always found that the use of Prussic Acid, given in

small but repeated doses, diminished the frequency of the cough, moderated and rendered more easy the expectoration, and, lastly, procured the patient some sleep at night, without any colliquative sweats. "Those who are accustomed to follow the progress of consumption, and witness the sufferings, without number, by which individuals attacked by this terrible malady are overpowered, will easily appreciate the real benefit of this success*."

Signor Manzoni, one of the clinical Professors at the University of Padua, has had frequent occasions to administer the Prussic Acid in complaints of the lungs, and never failed to obtain the same beneficial results.

Upon the whole we are warranted in concluding that the Prussic Acid, given in small doses, mixed with a certain quantity of fluid, may be advantageously employed as a palliative remedy in consumption, with a view of calming the cough, facilitating the expectoration, and procuring sleep—and that as such, it stands the first among the substances usually employed for similar pur-

* See the 8th Number of the Journal of Science and the Arts, p. 353.

poses; as it does not seem to incommode the patient as is done by the opiates.

In the course of the practice of Drs. Magendie and Manzoni, on the Continent; and that of Dr. Scudamore, Mr. A. T. Thomson, and my own, in this country, no *bad effect* has ever been observed to result from the action of the Prussic Acid given, as hereafter will be mentioned; but it must at the same time be acknowledged, that great care is requisite on the part of the medical person who gives it—that it requires to be watched; and that in fact such attention and vigilance are necessary in its administration, as can only be duly appreciated by a practitioner fully aware of every effect it may produce on the patient.

7. *Select Cases, in which the Prussic Acid has been employed.*

CONSUMPTION.

CASE I.—Mr. P——, residing in Bridge Street, Blackfriars', called upon me, about twelve months ago, in consequence of having read the paper on Prussic Acid, published in the Journal of the Institution. He expressed a wish that I should see his younger brother, who was lying at home, weak, emaciated,

almost incapable of moving, and suffering, from some disease in the chest, in the treatment of which, every remedy employed had proved unsuccessful. On visiting him the next day, I found he had passed a very restless night, with an incessant cough, and copious expectoration. A distressing sensation of heat had pervaded during the first part of the night; until, exhausted by the continued cough, he sank towards morning, into a kind of doze, which, far from refreshing him, added a greater oppression to his chest and head, and increased his extreme debility, being always accompanied by profuse and chilly perspiration. He had continued in this state for nearly nine months. The effects of these symptoms were evident on his countenance, and his whole system presented a sight of the greatest distress. I recommended the Prussic Acid, in doses of six drops, every four and twenty hours, to be increased a drop every two days. The success of this treatment became visible on the second night after he began to use the Acid. He slept several hours, coughed but seldom, and the perspiration ceased. The beneficial effects of this change were soon perceived in

the corresponding amelioration of every other symptom—in the return of strength, and a desire for food, instead of a constant nausea, with occasional vomiting, from which he had been suffering before. He went on taking the acid for several days, with the same success; and when at last he discontinued it, his disease, though not cured, was so far palliated, as to render life tolerably comfortable. In this case the expectoration was decidedly purulent.

CASE II.—A gentleman from Staffordshire requested my advice on the subject of his daughter's complaint, which the medical attendants had declared to be a phthisis pulmonalis. A description of all her symptoms was forwarded at the same time, in confirmation of that opinion. Nothing could be more discouraging: yet, as her night sufferings were described as most distressing, I thought that the acid might, at least, give her some relief, ease the pain and cough, and promote sleep. She was therefore directed to take eight drops of the Prussic Acid in four and twenty hours, diluted as usual. At first it seemed to disagree with the stomach;

but on combining a small quantity of bark and mucilage of Acacia with it, she was enabled to continue its use for eight days, at the end of which her cough and pain in the chest had vanished, and sound refreshing sleep returned. The very great prostration of strength present in this case, before the acid was employed, was the cause of its producing, after the second day, such a depression and lowness that threw her family into some alarm. This, however, was only temporary; and from the moment she began to recover from her state of languor, the improvement in every symptom of her disorder became daily more evident. She had been threatened with imminent dissolution but a few weeks before she took the Acid; and she is now by my advice, on her way to Malaga, in much better health. Her disorder is not cured, but subdued. Where there is a disorganization of the lungs no cure can be expected; but life may be prolonged, and rendered comparatively comfortable.

If the Prussic Acid be given during the first stage of pulmonary consumption, even where a constitutional tendency to this

dreadful malady exists, and before any tubercle is formed, a perfect recovery may be expected.

CASE III.—Miss D——, the sister of an English physician residing abroad, aged 30, tall, narrow chested, and thin, applied to Dr. Magendie, whilst labouring under every symptom of incipient consumption, for which she had been sent to the Continent by her physicians in London. The Prussic Acid was administered in doses of eight drops, and continued for two months. Her cough and expectoration vanished, the fever left her, and she gradually gained a considerable embonpoint. I saw her in Paris last summer, perfectly well, and received from herself the history of her case.

CASE IV. and V.—A young man and a young woman, not related, two morning gratis patients of Dr. Scudamore, consulted him, with appearances of urgent phthisical symptoms, such as harassing cough, wasting of flesh, very quick pulse, night perspiration, loss of strength, puriform expectoration, and the peculiar form of hooked nail wanting the circular shape. He gave to both the

D

Prussic Acid, up to the dose of 10 drops, and had the satisfaction to witness the best effects from the medicine. The patients improved in all respects, and at their last visit thought themselves sufficiently well to omit the medicine. After an interval of eight months, one of them, the young woman, returned to the Doctor, to thank him for the permanency of her cure.

Professor Manzoni* has, amongst many others, the following well defined case, in which the Prussic Acid was given with the fullest effect.

CASE VI.—Vir ætat. XL. cum affectu pulmonali, in insigni incremento, constituto, ad medicum accedit. Conquerebatur de tussi continua cum materiæ copiosæ rejectione. Alba erat, quæ per os rejicitur, quandoque livida, quandoque viridiuscula, et aquæ injecta, fundum petebat. Pulsus celer et parvus; noctes, propter tussim, habebat inquietas; somnus interruptus erat, et ipse difflebat sudoribus copiosis. Ex levi motu, virium imbecillitas, et spirandi difficultas superveniebant; nec poterat in utramque aurem

* De præcipuis Acidi Prussici, et aquæ cohobatæ lauro-cerasi medicis facultatibus, clinicis observationibus comprobatis, specimen. Patav. 1818. 8vo.

incumbere. Corporis constitutio, antea optima, fit gracilior; et partes carneæ molles erant et flaccidæ. Acutissimo pectoris dolore laborabat, et incidebant horrores frequentes. Post vomitorium, Acidum Borussicum in decoctione malvæ præscripsi; et sumebatur quotidie ad minim: decem. Primò tussis, deinde febris, quinque spatio dierum, minuuntur, cessantque omnino sudores. Dolor in pectore evanescit, et respiratio faciliior occurrit; et Acido Borussico, quotidie sumpto, post paucas hebdomadas, sanus, floridus, vegetus, et pinguis factus est.*

When consumption, however, is so far advanced, that there is a decided disorganization of the lungs, the Prussic Acid does not, of course, produce more than palliative effects, and those of short duration only—and it hardly seems to check the progress of the disease. Much alleviation of the sufferings of the patient at such a time, may, however, be expected. This is admirably illustrated by the two following cases favored me, with several others, by my friend Dr. Scudamore,

* I quote from memory, as Dr. Manzoni's book, of which a single copy had been sent to Paris, where I perused it last summer, has never yet reached this country.

whom I had occasion to mention before in the course of this paper.

CASE VI.—“To a lady aged 50, who had, for some weeks previously to my seeing her, been gradually wasting with hectic fever, incessant cough, and occasional hæmoptysis, I gave the Prussic Acid, beginning with eight drops, as the total quantity for the twenty-four hours, and increasing the dose, usually, at the rate of one drop per diem, up to twenty-four drops. The following was the exact form of the mixture.

R Acid. Prussici min. viij.

Mist. amygdal. f. ℥ iv.

Decoct. Cortic. cinchonæ cordifol.

Aquæ menthæ virid. āā f. ℥ ij.

Syr. tolutani f. ℥ ij. F. Mistura, cujus capiat partem quartam 6^{ta} quaque horâ.

At first the effects seemed very promising. There was a speedy and general improvement. The appetite, which had been lost, returned; the cough subsided; there was some abatement of the expectoration, which was manifestly puriform; the hectic fever and attendant perspiration abated, the sleep improved, the spirits of the patient were

elated, and she became sanguine in her hope of recovery. I did not, however, allow myself to indulge in such flattering feelings; there was too much evidence of advanced diseased organization of the lungs to warrant any expectation of cure; and this was proved by the fatal termination of this case in about two months. After a month the Prussic Acid began to disagree; sometimes vomiting; at other times diarrhœa occurring; the former effect apparently produced by the medicine, and the latter evidently increased on the different occasions of renewing the Acid."

CASE VII.—“ I next employed the Acid with a gentleman aged 45, who had for many months been languishing with symptoms of Phthisis. I never witnessed a more harassing cough. At first he was *charmed* with the effects of the medicine; but I did not see any real improvement. When the dose for the twenty-four hours was raised to sixteen drops, his stomach would no longer retain the medicine; and it was to no purpose that I attempted once more, to repeat the use of the Acid in a

still more simple vehicle. With this patient I also made trial of the tar vapour, as recommended by Sir A. Crichton. I could not, however, perceive any good effects from its use ; and this unfortunate gentleman, as a last resource, adopted the expedient I suggested of changing climate, and went to Nice, whence I have since received no tidings of him."

The gentleman through whose kindness I have obtained these two Cases, will allow me to remark, that no good reason is given for attributing the sickness, which is said to have occurred in both, to the Prussic Acid, after it had been used for some time. I do not deny that sickness at the stomach has been occasionally produced by the Prussic Acid, and this at a very early period of its administration ; but in cases of advanced, confirmed tubercular phthisis, vomiting and diarrhœa are *necessary* symptoms of the disease, and will both occur even where no medicine whatever is given. The gentleman, whom I mentioned in my first case, could scarcely speak to me, for more than ten minutes, without bringing on vomiting. When the Prussic Acid produces nausea, or even vomiting (and it is the same

with regard to dizziness, which it will induce in some individuals), those symptoms take place on the very first or second day of the exhibition of the medicine, and in such cases it is advisable to abandon it immediately, for there is no chance of its ever agreeing with the patient. Of about one hundred cases of the exhibition of this medicine, to which my personal experience, and that of two or three other physicians extend, five or six occurred, in which the Acid produced sickness at the stomach on the first day it was taken; and in no other was any nausea excited, after it had apparently agreed with the stomach for the first week. This peculiar effect of the Prussic Acid on the stomach of some few individuals, seems to depend upon a specific idiosyncrasy, or upon some anomalous property of the Acid, and not on the quantity in which it is administered.

As to the effects which the acid produces on the bowels, I shall merely repeat in this place, that during the first days of its exhibition it is gently aperient, and that when a longer use of the acid has rendered the bowels insensible to its action, a combination

of the mildest purgatives will suffice to promote the necessary evacuation.

HECTIC AND SYMPATHETIC COUGH.

CASE VIII.—Charlotte Pearce applied to the Westminster General Dispensary, for relief from an incessant and very distressing cough, with which she had been affected for upwards of two years. She had been ill for some time with a chronic liver complaint ; and by a careful external examination, this organ appeared, in fact, to be in a tuberculated state, and adhering partially to the side. After having suffered from a violent cough during more than a year, occasional symptoms of hectic fever, with two daily exacerbations, came on, attended with flushings and perspirations at night. On getting rather better of these, the cough alone remained, (always with the pain in the region of the liver) accompanied by an unequal sort of expectoration, for it was sometimes abundant, and occasionally scanty. When the latter occurred, it was thick and almost concrete ; while on the contrary it was thin, frothy, and mucous, if the former pre-

vailed. With all these symptoms there was loss of appetite, wasting of flesh, and consequent debility. The Acid was begun, under my direction, in doses of eight drops; and the cough was so far influenced by it, that on the night of the second day she slept for six hours uninterruptedly, without once coughing, an occurrence to which she had been a total stranger for nearly ten months. Her appetite had completely returned, by the time she had taken about 100 drops of the Acid; and after six weeks, although her side is still, and must always be, more or less painful, yet, her lungs seem to be less influenced by the morbid state of the liver: she coughs but seldom, and then in a manner by no means distressing.

CASE IX.—Mrs. Goodby, aged 40, residing in Marshall-street, Golden-square, requested my attendance, through my friend Mr. C. Hutchison, of Spring Gardens, late principal Surgeon of the Royal Naval Hospital at Deal. She had lately miscarried, and had the misfortune of losing her husband at the same time. Her moral as well as physical system was unhinged. She lay in bed from weakness,

after a considerable loss of blood, had constant fever, cough, anorexia, and suffered from want of sleep. Her constitution seemed inclined to the developement of phthisis; she and her friends indeed considered her as consumptive. My opinion, however, being somewhat different, and finding that after recovering from the debility produced by the miscarriage, the patient assumed a more favourable appearance, I determined on treating the cough as a sympathetic one, arising from an extensive ulcer in the right leg, of a bad character, and surrounded by occasional and wide-spreading erysipelatous inflammation, for which she had claimed the skilful aid of Mr. Hutchison. I accordingly gave her the Prussic Acid in the usual way, and watched the progress of the disorder. The cough was considerably diminished after the second day. She became more comfortable in every way, and left her bed in what may be called tolerable health. Still her leg continues sore, and occasionally inflamed, and when that is the case, the cough becomes more troublesome, either at night, or early in the morning; but, on these occasions, a dose of the Acid is sure of producing the pleasing effect of almost instantly checking it.

CASE X.—Sarah Buck, aged 24, residing in Ogle-street, has suffered from a diseased ovary in the left side, ever since her last confinement. For upwards of ten months she has had a continued pain in the left hypochondrium, with soreness extending occasionally across the abdomen. She wasted gradually under it, and had a constant fever. Cough of a very distressing kind came on soon afterwards, and the pulse indicated a sympathetic consumption. The means I took to remedy the original disease, which was accompanied by all its usual symptoms, not necessary to be detailed, seemed, at first, to diminish it essentially; but the cough was by no means abated in proportion; I therefore resolved to combine the Prussic Acid with the medicines she had already taken with so much advantage. She began it on the 15th of January, and this day, 12th of February, she has returned me her thanks for having released her from all the sufferings, which her cough occasioned. During the whole time of its administration, little or no expectoration was present, yet no oppression at the chest was produced from the want of it.

The sympathy exercised by a diseased

ovarium on the lungs is by no means singular. In the above case, there is a possibility of the original disease being entirely removed ; still it is curious to observe, that although it yet continues in existence, its baneful influence on the lungs is kept completely in check by the powerful agency of the Prussic Acid.

I must now again introduce Dr. Scudamore to my readers. In transmitting to me the two following cases, he says, " I have now the more pleasing task of relating two successful instances in which I employed this new and powerful agent."

CASE X.—" A young woman, aged 20, tall, of slight make, rather subject to a winter cough, was ill with typhus fever in the month of August, 1818. The most alarming appearance was the indication of sub-acute inflammation of the brain, when debility at the 19th day of the fever was itself very threatening. The symptoms in question were, considerable appearance of red vessels in the tunica conjunctiva, a glassy look of the cornea, and a wild expression of countenance, active delirium at intervals, and a very frequent pulse, marked by a degree of wiry hardness.

Blood was taken from the arm twice, at first to the amount of six ounces, the next time, and at the end of 24 hours, of five ounces. Leeches to the temples, cold lotion to the head, and other usual means of treatment, which is not to my present immediate purpose to describe, were employed with eventual success; danger, however, marking every step of the slow progress which was made. When a month had elapsed, from the time of the original attack, and the first symptoms of convalescence from the fever were dawning, a cough, which had been hitherto only occasional and slight, became troublesome, and in a few days to the degree of being incessant, and now attended with regular paroxysms of hectic fever, twice in the 24 hours, the succeeding perspirations being profuse. It was in vain that the most studied means of relief, according to the ordinary rules of treatment, were employed against the cough and hectic fever, which threatened to hurry the poor exhausted patient very quickly to the grave. I then prescribed the Prussic Acid to the amount of eight drops for the 24 hours, in a mixture, according the former formula. Towards the procuring of any composure from

the cough, opiates had been necessary in repeated doses each night, but were given only with partial success; but after two days use of the Acid, the narcotic was scarcely resorted to, and when four days had elapsed, it was entirely laid aside. The medicine was gradually increased in dose one drop per diem, up to 24 drops, and it uniformly agreed. An occasional aperient was necessary. By degrees the pulse abated from its frequency of 120; the expectoration, which had been copious and puriform, lessened, and at the end of about three weeks ceased; the hectic fever (which had been marked by rigor, hot skin, flushed cheeks, and profuse perspiration, in the usual order of succession,) also, at the end of a week, or at the most ten days, took its leave; and in short, at the period of three weeks, all had been accomplished by the medicine which we could desire, and the several functions were so far restored to health, that she took for a short time longer simply a cascarilla mixture, with a nourishing plan of diet, and after another week, went into the country, in order to establish her convalescence. In this object she perfectly succeeded, and continues well; she being now restored

to her former embonpoint, strength, and spirits."

CASE XI.—"A young gentleman aged 10, of slight make, and appearing delicate in constitution, was attacked with fever, which at first took on a regular continued form, and afterwards assumed the remittent type in some degree. This disease was very tedious, and the symptoms were remarkably variable. At first the brain was apparently threatened with mischief; the expression of the countenance was unnatural, the head was painful, and very hot to the touch, and there was occasional delirium. The pulse ranged from 100 to 126; there was great prostration of strength; the tongue was dry and crusted. The head was, after a week, effectually relieved by the treatment employed; and next, the respiration, which hitherto had been rather oppressed, became very alarmingly quickened, and a cough, which before was only trivial, became constant and urgent. The action of the pulse increased; seven ounces of blood were taken from the arm, which was rather cupped, and just beginning to have the buffy coat. This gave some

relief. A blister was applied to the left side, which he sometimes described as being a little painful. In two days after the inflammatory action of the lungs was again increased, and the breathing was very frequent; but the child was so pale and emaciated, the pulse was weak, and so much debility appeared, that cupping on the chest was preferred to general bleeding, and seven ounces were taken away with manifest advantage. Still the amendment was only of short duration, and now a certain state of hectic arose, but not in so regular a form as in the last related case. There was an occasional sense of coldness, followed by some heat of the skin, and slight flushing of the cheeks; and twice in the twenty-four hours the perspirations were excessively profuse. We could not procure any expectoration for examination, so little was there of secretion. A second blister was applied, from which no evident benefit was obtained. At this juncture, when the condition of the lungs threatened either to furnish symptoms which would require further depletory treatment, although that would be forbidden by the debility, which was become highly alarming; or to exhaust the little patient by

irritative fever, and a rapid circulation, it was resolved to administer the Prussic Acid. It was began in the total dose, for the twenty-four hours, of four drops, joined with the other ingredients, as formerly described. Subsidiary means of management were used, as spunging the body twice a day with tepid vinegar and water;—the blistered surface was dressed for a few days with savine cerate: Asses' milk freely taken, and one custard, in the day, with a little bread, formed the diet. The temperature of the apartment was carefully regulated. The dose of the acid was gradually increased to eight drops for the twenty-four hours, and it did not once offend the stomach. On the third morning of its use, a sudden faintness and frightful debility, with a complete dilatation of the pupils of the eyes, took place, and made us pause as to the continuance of the medicine; but these symptoms disappearing after three or four hours, we resolved upon an attachment to our remedy, which already appeared to have acted very decidedly in abating the cough, in causing comfortable sleep, in reducing the pulse; and, with these changes, the perspirations were materially lessened.

The bowels required an occasional aperient. The urine, both in this, and, as I should have noticed, also in the former Case, was distinguished by an extraordinary deposition of mucus. In the girl's case, it occasionally assumed a puriform appearance, and was once rather bloody. In the youth, blood was passed once, and on several examinations I found the urine slightly albuminous.

When the medicine had been taken a fortnight, we again lessened the dose, and, after a few days more, entirely discontinued it; then using only a light bitter, with an occasional dose of blue pill, rhubarb and sulphate of pot-ash. At this time he is only convalescent, but yet very favourably so, when reference is made to the urgency and tediousness of the acute form of the disease. The lungs have been wholly free from inconvenience for the last fortnight.*

In the last Case, Mr. Clarke, of Saville Row, attended with Dr. Scudamore; and he has acknowledged to me and several friends, that when the Prussic Acid was proposed, he willingly acceded to its adop-

* Since writing the above, I learn that the child is completely and permanently recovered.

tion, although without any personal experience on the subject, from a conviction that there remained no other resource for the young sufferer. He bears testimony to the excellent effects of the medicine in this instance.

ASTHMA, SPASMODIC AND DRY COUGH,
HOOPING COUGH.

Nothing is more distressing to witness than what is called an attack of asthma; the patient, when seized with it, starts up in bed, calls aloud for the windows and doors to be open, has all the curtains undrawn, and seeks for air with a panting breast and gaping mouth. The lower jaw is forced as far downward as possible, in hopes of a greater inspiration. After some time, cough of the most harrassing kind comes on, expectoration occasionally follows, and the patient sinks quite exhausted on his pillow, without much prospect of rest. Such is the terrible affection, I next thought it possible to alleviate, by means of the Prussic Acid. Those among my readers who are professional men, will readily see the analogy which brought me to such a determination, and they will be satisfied to find that success proved the expe-

diency of the measure. Hitherto I have had but one opportunity of this kind, in which I have employed the Prussic Acid.

CASE XIII.—Mr. K——, an elderly gentleman, nearly related to the author, has been suffering from asthma for upwards of six years. On the approach of every winter, his complaint assumes an alarming type, the breathing becomes exceedingly difficult, and is further oppressed by the smallest exertion, or by cold air and foggy weather. The attacks come on at uncertain periods, and during the intervals which elapse between them, a short, dry, snappish, and incessant cough, unattended by any expectoration, render him uncomfortable by day, and sleepless by night. His appetite diminishes gradually on such occasions, and nothing but the slightest food can be taken into the stomach without producing the worst symptoms. The secretions and excretions are very irregular, the latter often suspended. There is a tendency to œdematous swelling of the legs, with chilliness; the pulse is quiet in the morning, at which time the patient is generally better; but it becomes hurried towards noon, and is decidedly feverish and irregular

in the evening. There is at times such an anxiety and distress in breathing, as to shock the beholder at the convulsive swellings into which the muscles of the face are thrown during the efforts of respiration. This state of exquisite irritability—this inexpressible anguish, and all the sufferings it produces, were removed by the free but cautious exhibition of the diluted Hydrocyanic Acid. Mr. K—— now coughs but seldom, sleeps well at night, becomes more inured to the change of weather, can easily bear exercise, and ascends a staircase without being forced to stop, or without any oppression at the chest. His own expressions are these:—"I feel more comfortable, and in better health, than I have felt this long while." No depressing effects were produced in this case by the acid; and he is so fond of having recourse to it, whenever a slight attack of cough returns, that I have been obliged to caution him against the immoderate and unnecessary use of the medicine.

No complaint presents itself oftener to the attention of the medical profession in this country, than what is simply called a cough,

without any specific and determined disease. Almost every body suffers from cough at some time or other; especially during the winter season; and, indeed, it is so generally prevalent at certain periods, as to become a common topic of conversation when two friends meet, or a patient is visited by a physician. An indisposition in itself so slight, may not, in the opinion of many, require, or deserve, any medical treatment; but when it is considered that a simple cough, if long suffered to exist unchecked by any remedy, will become a most harassing companion to the patient, and often assume a more serious aspect, it will readily be granted that any measure, better adapted than those hitherto employed, to stop it in its incipient state, ought to be hailed as a real benefit.

Such a measure, I feel no hesitation in asserting, is to be found in the use of the Prussic Acid, properly applied to the different species of the complaint to be cured; such as the dry and the spasmodic cough, the stomach cough, the nervous cough, &c. One or two cases will serve to illustrate this part of the subject of the present paper.

CASE XIV.—Miss H—, healthy and strong, was occasionally affected by colds, which, after two or three days, were attended by cough, with little expectoration. On taking precautionary measures, Miss H— was sure of soon freeing herself from her catarrh, but not so with regard to the cough, a symptom which continued to distress her for many weeks. To prevent this, she had recourse to every sort of medicine which experience usually suggests, as most likely to be successful. The benefit, however, which she derived from them, was trivial and uncertain: the emulsions, the expectorants, the soothing draughts, the oxymels, and various preparations of ipecacuana, were all tried without permanent success. Having witnessed the good effects of the Prussic Acid in a case of sympathetic cough, related in this paper,* she, of her own accord, proposed to me the taking of that medicine for her troublesome complaint, to which I readily assented. I prescribed the acid, in an appropriate vehicle, in such doses that from five to eight drops were taken in thirty hours. Its use was not required for any longer period

* See Case IX. page 41.

than a week ; for, at the end of that time, the cough gradually diminished, and ultimately disappeared ; nor has it returned since.

I have had numerous opportunities, at the Westminster General Dispensary, of exhibiting this medicine in similar cases of cough, some of which were of a bad character, and I have succeeded in all of them, to the utmost completion of the patient's, and my own wishes. I shall only relate the following.

CASE XV.—Sarah Roberts, living in Great Earle Street, is pregnant of her 8th child, and about five months gone. From the moment of her quickening, a most harassing cough, of the spasmodic kind, came on, for which she desired my advice. She seemed to me to be so much distressed by this symptom, as I considered it, of nervous irritability, brought on by the peculiar nature of her situation, that after the usual verbal assurances that the complaint was, in fact, no complaint at all—that it was owing entirely to her being in the family-way, and that she would get well as soon as confined (all which assurances had neither the effect of healing her mind nor

quieting her cough;) I determined upon cautiously administering the Prussic Acid to relieve her. I begun with very few drops, and watched its effect. The mixture in which I gave it produced the happiest results, and on my seeing her again some time after, she expressed herself quite free from cough, and in excellent health. No bad consequence could result, and none therefore occurred, with regard to the particular situation in which she was placed.

The next cases to which I shall allude are those of my own children, who about two months ago were attacked by a cough of an alarming kind; and so incessant, hard, and distressing, as to lead a particular friend of mine who happened to hear one of them cough, to believe that he was labouring under the whooping-cough. The eldest, a girl, was the first who shewed any symptoms of this complaint. She had been out in the evening, and returned home with a bad cold, followed by cough, particularly at night. Two days afterwards, while pursuing the usual mode of treatment with her, I had the regret to find that the third, a stout healthy boy, was simi-

larly affected, By the evening of the next day the second was also attacked in the same manner; and a fourth, yet at the breast, was not long in shewing similar symptoms of the complaint. I should have called this a species of influenza; but that the only symptom of importance remaining behind, after curing the catarrh, was the cough. This, indeed, was most violent, disturbed their rest at night, and rendered them very uncomfortable by day. Sometimes the violence of the cough was such as to bring on vomiting, tears flowed from the eyes, the face became flushed with blood, and they complained of pain in the head. There was nothing wanted to constitute their complaint, as a real hooping-cough, but that peculiar catching and stridulous inspiration, which so eminently characterises a paroxysm of the latter disease. There was, however, no fever present, except perhaps at night, when they had been lying awake by continual coughing, for some hours. I am very fond of giving nature a fair trial in the complaints of children, and therefore I did but little to relieve them for a few days, particularly as there was nothing alarming in their indisposition. When, however, I found, that the cough,

instead of diminishing, increased, and that the tendency of the blood to the head, during the numerous paroxysms of it, was likely to produce mischief, I resolved to endeavour to put a stop to the complaint. My perfect reliance on the properties of the Prussic, or medicinal Hydro-cyanic Acid, in cases of this kind, induced me, of course, to try it in this instance; and I soon had reason to be delighted at the good effect it produced. In about a week, from their commencing its use, the cough had entirely disappeared, and they have kept wholly free from it ever since.

From such a cough as the one just described, to the regular hooping-cough of children, the passage is but short; the same remedy, should therefore be employed against it. This analogy has enabled me to use the acid in five or six cases of the disease in question with the same success which attended this remedy in every other instance. One case only remains yet stubborn, and apparently insensible to the action of the Acid, although the paroxysms are fewer in number; but it should also be observed that the subject is a poor, weak, and emaciated child, who had

recovered from the natural small pox and the scarlet fever only a few weeks before. It would be needless to give a detailed account of the cases I here allude to ; suffice it to say, that the success of the treatment in five out of the six children affected by the hooping cough, induce me to believe, that if the Acid be timely and properly used in that disease, its duration will be shorter and less distressing than under any other treatment.

8. *Mode of Prescribing the Prussic Acid.*

In prescribing the Prussic or Medicinal Hydro-cyanic Acid, care should be taken not to associate it with substances which are known to decompose it, or which are decomposed by its action. In this respect the medicinal Hydrocyanic Acid is not singular ; for it is a matter of the first importance never to lose sight of the chemical affinities of every medicine we prescribe.

The Hydro-cyanic Acid is soluble in water, and is not decomposed by any of the vegetable substances. It may therefore be given in vegetable infusions, and syrups may be added if necessary.

It decomposes most of the salts usually

employed in medicine, particularly those of antimony and soda, and cannot therefore be used in combination with them either before or after its injection into the stomach.

It should be recollected that at a high temperature the Hydro-cyanic Acid is decomposed; hence the simple combinations of this Acid, and the various bases called Hydro-cyanates, cease to be such, if they be dried at a high degree of heat, so as to deprive them of all the water present, without which the Acid cannot exist.

The Hydro-cyanic Acid combines with the alkalies and earths, but its affinity to them is inconsiderable; for, as the Acid is so liable to decomposition, the constitution of the triple compounds it forms is easily subverted.

Magnesia is dissolved, but in small quantities, by the Hydro-cyanic Acid, and again soon precipitated. With ammonia, it forms a peculiar salt, which might be used with advantage as a medicine. In cases where the Prussic Acid has been given in too great a dose, the ammonia has been suggested as the best means of neutralizing it; but on this subject I have two observations to

make. The first, that the Acid is so rapidly absorbed, when once taken, that little expectation can be formed of the ammonia finding it in the stomach ; and the second, that when ammonia has been used *immediately* after taking the Acid, in order to diminish its highly sedative power, the addition of the alkali did not seem to correct the effects of the former medicine.

The Prussic Acid cannot be administered in combination with any of the Sulphurets, which it has the property of decomposing.

The affinity of the Prussic Acid for the alkalis is so weak, that even carbonic acid displaces it from those combinations. Hence the Prussic Acid may be given in conjunction with the carbonate of potash ; forming one of the most successful modes of prescribing it in spasmodic and hooping coughs.

With tonics it may be associated with real advantage. The watery and filtered infusion of bark, calumbo, cascarilla, and even sarsaparilla, quickened by a few drops of alcohol, will be found to answer best the intended purpose. In incipient pulmonary complaints a strong decoction of the Lichen Islandicus will prove a useful addition to the Acid.

The following are the Formulæ under which I have prescribed it in the various complaints I have treated with the Acid.

1. IN INCIPIENT CONSUMPTIONS.

R Decocti Lichenis f℥ viij.

Acidi Hydro-cyanici more Vauquelin. ppti min. viij.

Syrupi rosæ f℥ ss.

M. bibitur ad fluidunciam dimidiam omni bihorio
vel.

R Misturæ amygdalarum f℥ viij.

Acidi Hydro-cyanici juxtà Vauquelin. ppti. min. x.

Syrupi tolutani f℥ ss.

M. Cochleare unum maximum sumendum est tertia q̄q̄e hora.

2. IN SPASMODIC COUGHS, HOOPING COUGH, AND ASTHMA.

R Potassæ subcarbonatis gr. xv.

Cocci cacti gr. viij.

Acidi Hydro-cyanici more Vauquelin. ppti. min. x.

Aquæ stillatæ f℥ vj.*

Solve. M. INFANTIBUS, per parva cochlearia, mistura, dum
urget tussis, propinatur.

ADULTIS, vero, cochleare unum maximum, ter vel
quater de die, exhibetur.

vel

R. Infusi corticis Aurantiorum f℥v.

Acidi Hydrocyanici juxtà Vauquelin ppti. min. viij.

Syrupi de Absinthiiis f℥j.

M. Modus sumendi par est, et ut prædixi.

* It is indispensibly necessary to use no other than distilled water in all prescriptions, having the Prussic Acid as one of their ingredients; or decomposition of the Salts, contained in common water, and of the Acid itself, will take place.

3. IN CHRONIC COUGHS WITH DEBILITY.

℞. Decocti cinchonæ lancifoliæ f℥ij.

Acidi Hydrocyanici min. ij.

Spiritus Juniperi compositi f℥ss.

F. haustus ter quotidie sumendus.

Excipiendæ sunt preparationes, cum Acido Hydrocyanico, lagunculis vitreis, crystallino obturaculo, munitis.

But the practical physician may change, at pleasure, the formula for the exhibition of the Acid, combining it with any other article of the Materia Medica which he may think indicated by the case under treatment, taking care not to associate it with any incompatible substance.

The following is the Formula inserted in the French Pharmacopœia, for the preparation of the Hydrocyanic Acid, according to Vauquelin's method.

*Ratio alia expeditior simpliciorque ad parandum
Acidum Hydrocyanicum a D. Vauquelin proposita.*

℞ Cyanureti Hydragyri . 100

Aquæ stillatæ . . . 800

Solvatur, levi calore, Cyanuretum, et per liquorem ita transmittatur Acidum Hydrosulfuricum, ut tantillum superet quod saturando sufficit. Coletur liquor, ut liberetur Sulfureto

Mercurii quod præceptum actum est. Liquori colato inest Acidum Hydrocyanicum cui admixtum est non nihil Acidi Hydrosulfurici. Hoc autem ipsum facile auferetur, admixto plumbi sub-carbonate, ita ut hujus pulveris quantitas superet quod sufficit ad sorbendum Acidum Hydrosulfuricum. Liquor et pulvis unà identidem exagitentur, ac demùm percolentur. Habebitur tunc Acidum Hydrocyanicum aquâ solutum, et alienis omnino liberum, eâque densitate quâ Scheelianum ipsum.

Having now concluded all I had to say with regard to the effect of the Medicinal Hydrocyanic Acid, in the treatment of certain diseases, I feel considerable satisfaction in being able to add, to the already voluminous evidence in favour of this active medicine, a letter, on the same subject, with which I have been favoured by Mr. A. T. Thomson, of Sloane Street, the author of the London Dispensatory, whom I have had occasion already to mention in the course of this Essay. I have preferred letting him speak for himself on a matter of such importance, that, in reporting any case he might have communicated to me, there should not be even the shadow of a possibility of my being hurried away by what some of my readers will perhaps call a partiality for a favourite remedy.

91, Sloane Street, 20th February, 1819.

MY DEAR SIR,

Agreeably to your request, I subjoin the results of my experience, relative to the medicinal properties of the Prussic Acid. I intended to have added some physiological experiments made with it upon quadrupeds; but I find, since I commenced them, that they involve an inquiry which expands as I proceed, and consequently that they cannot be completed in time for insertion in your proposed publication.

Although, my attention was turned to the consideration of the mode in which the Prussic Acid acts on the animal œconomy, so early as the year 1815, by the paper of M. Robert, which was published in the *Annales de Chimie*, (Octobre 1814,) and which I translated for the *London Medical Repository*; yet, I did not exhibit it as a medicine until after I had heard from you, whilst you were in Paris, in 1817, informing me of the Memoir of M. Majendie, a translation of which you afterwards published in the *Journal of Science and the Arts*. Since that period, I have prescribed the Acid in a great number

of instances, with variable success; but, the benefit it has produced is amply sufficient to authorize me to add my testimony in favour of its value, as an important addition to the list of direct sedatives.

The Prussic Acid, when taken into the stomach, produces its action on the circulating system, evidently through the medium of the nerves, the energy of which it considerably lessens, and even altogether destroys when the dose is sufficiently strong. In no case have I remarked that any excitement precedes its sedative effect, a circumstance which distinguishes it from every other substance belonging to the class of narcotics. The opinion of Orfila* and some others, that it is rapidly absorbed and transmitted through the current of the circulation, and that its fatal effect, when given in a concentrated form, is more or less rapid in proportion to the activity of the circulation, is rendered questionable by the instantaneous manner in which it produces death, when exhibited undiluted in large

* *Vide Traité des Poisons, Tome seconde, première Partie.*
p. 186.

doses: nor is the idea of its absorption better supported by the fact, that no Prussic Acid can be detected by tests in the stomach of the animal destroyed by it. The truth is, that the proper tests for free Prussic Acid are yet scarcely known; for I have proved by experiment, that the sulphate of iron, which detects its presence in a state of composition, or as prussiate of potash, produces no blue precipitate when added to free Prussic Acid; nor is this induced even by the addition of *Liquor Potassæ* to the mixture.*

Whatever may be the correct solution of this question, the influence of the Acid, even when it is largely diluted, in diminishing the irritability of the nervous system, is undeniable; and the information afforded by M. Magendie's experience, relative to this fact, led me to accede to your recommendation to try it as a remedy.

The diseases in which I have chiefly exhibited the Prussic Acid, have been catarrhal

* The only method of detecting free Prussic Acid is to add to the fluid supposed to contain it, some spirit of wine and *Liquor Potassæ*; and then, either a solution of sulphate of iron containing in a few drops of muriatic acid, or some of the muriated tincture of iron. T.

affections, accompanied with cough; and chronic coughs; and in one instance of hæmorrhage I imagined it proved beneficial; but, as I have had no other opportunity of proving the correctness of my observations of its utility in hæmorrhage, little reliance can be placed upon conclusions drawn from a solitary instance.

In catarrhal affections, my experience of its success has been considerable, owing to the prevalence of an epidemic of that character at present in this neighbourhood. The complaint makes its attack with rigors, followed by febrile excitement, sneezing, hoarseness, and dry, hard cough coming on in paroxysms, which increase in frequency at night, and prevent sleep. The tongue is furred, the bowels are confined, and the expectoration extremely difficult. In very few of these cases have I had occasion to use the lancet, since I employed the Prussic Acid, although the state of pulse in many of them would have fairly authorized it, had I not known the powerful influence of that medicine over the circulating system. My general practice has been, after purging, to commence the use of the Acid, largely diluted

with distilled water or simple almond emulsion, in doses proportionate to the age and strength of the patient, increasing the quantity two or three minims, on the whole portion taken in twenty-four hours, each day, until the cough be subdued. In adult cases the dose I have given at first has been two minims, in a table spoonful of the vehicle, repeated every second or third hour during the day; while, the following formula has been prescribed for infants between four months and a year old.

℞ Acidi Prussici, min. ij.
 Aquæ Distillatæ, fʒjx.
 Syr. Tolutani, fʒj. Misce ut ft. Mistura, cochl.
 min. ij. 3^{tlis} horis sumenda.

The greatest amount to which I have ever carried the Acid, has been twenty-four minims in the day to an adult, and six minims to an infant.

In these catarrhal affections, the first obvious effect of the Acid is the procuring sleep at night, and the lengthening the intervals of the paroxysms of coughing. On the following day the pulse is found less frequent and softer; and, by degrees, the violence of the paroxysm of coughing is much

abated. I have not remarked that it promotes expectoration, but it decidedly renders the cough softer, and less distressing, without it; while the bowels are in general gently affected, so that, except in very few instances, I have seen no necessity for repeating the purgative. In debilitated and old patients, the languor which sometimes follows the use of the Acid is very considerable, but it is easily removed by small doses of stimulants; and, when the cough is sufficiently subdued, by the ammoniated tincture of iron, exhibited in brandy and water.

I send you the detail of one case only of the catarrhal epidemic, to which I have alluded, the practice being very nearly the same in all;* but I have subjoined a few other cases, to shew its effect in some other complaints, which have generally been regarded of very difficult management.

CASE I.—Mr. S——, a gentleman attached to the Board of Controul, about thirty-seven years of age, of a plethoric habit and high

* I have prescribed it in twenty cases of this epidemic catarrh. In children, however, who have been very severely attacked, I have found bleeding and brisk purging to be necessary previous to the use of the Acid. T.

florid complexion, applied to me, on account of a severe cough, (the epidemic catarrh above mentioned,) under which he had been labouring for some weeks. For several nights he had obtained scarcely any sleep, owing to the increased frequency of the paroxysms of coughing, which had also produced considerable soreness of the fauces. There was no pain in the chest, but he was extremely hoarse; and the breathing was rather short, and attended with wheezing. He had been taking gruel, honey, paregoric, and several other domestic remedies, without any benefit.

After opening the bowels, he commenced the use of the Prussic Acid in doses of two minims, in twelve fluid drachms of water, repeated every second hour. The first night after taking the Acid, he had some comfortable rest, the cough abated both in frequency and violence, the expectoration became more easy, the pulse softer and more steady, and in three days all the symptoms subsided.

In this case the patient did not confine himself to his house, nor alter the nature of his diet. He took no wine, because he had

properly discontinued it, as well as the use of all fermented liquors, from the commencement of the complaint.

CASE II.—Miss G—, aged 40, of a dark but sanguine complexion, a cheerful disposition and irritable temperament, was attacked, upwards of two years ago. with that peculiar affection of the lining membrane of the trachea, which, in its last and ulcerative stage, has not inaptly been denominated *Phthisis trachealis*. She had been treated, during the early period of her disease on strictly anti-phlogistic principles, under my superintendence, with the occasional advice of Dr. Baillie; but so little benefit had resulted, that she lost all confidence in medicine, and scarcely any remedies had been employed for the last twelvemonth, except when the symptoms became unusually urgent. The diagnostic characters of the complaint were hard cough, the sensation of dryness of the throat, an occasional dread of suffocation, and inflammation without swelling of the fauces. These symptoms, which were accompanied also with fever and great nervous irritability, never altogether subsided, although they abated at

intervals, which were of some considerable duration in summer. On slight exposures to cold, they always returned with encreasing violence; she was therefore confined to the house during the whole of the last and the present winter; and, on my recommendation, as the attacks were gradually becoming more frequent as well as more severe, she was seriously contemplating the probability of going abroad, in order to try the effects of a temporary residence in a warm climate: this alternative, however, she wished if possible to avoid.

Having the opportunity of very frequently seeing Miss G—, and watching attentively the progress of her complaint, I was led to believe that, although the symptoms depended in a great degree on the inflamed state of the trachea, yet, that much also was to be attributed to the peculiarly irritable state of the nervous system. I was confirmed in this opinion from the state of the pulse, which was small, quick, and irregular, and varying according to the state of the mind. There was also palpitation of the heart: and the little sleep she obtained was disturbed and imperfect. Under these circum-

stances, I judged the case to be a proper one for the use of the Prussic Acid, and therefore resolved to try it the first occasion that offered.

On the 26th of January I visited Miss G—, and found her labouring under one of her attacks. She attributed it to cold, but could form no idea, to use her own language, of the way in which she had caught it, as she had not only not been out of doors, but had for many days refrained from going through the house further than was necessary to pass from her own room to the dining room, which was well warmed before mid-day, the time at which she then left her bed room. The cough was unusually hard, much resembling that of croup, and very frequent; the sensation of suffocation and, as she expressed it, of something sticking in the windpipe, was extremely distressing; the skin was not hot nor dry; but the pulse was small, quick, and intermitting; and the fauces, on looking into the mouth, were inflamed, and streaked with red lines, as if the larger vessels had been strongly injected: yet, neither the amygdalæ nor the uvula were swelled. On inquiry I found she had that morning opened

her bowels with a dose of castor oil. Such being the state of the case, I told her I wished her to try the effect of a new medicine ; and having obtained her promise that the doses should be very regularly taken, the following mixture was prescribed :

R. Acidi Prussici, min xij.
Aquæ Rosæ, f℥ss.
Syrupi Papaveris, f℥iij.

Fiat Mistura, cujus sumatur cochleare amplum unum secunda quâque horâ.

On repeating my visit next day, I found my patient very much relieved ; she had passed a more comfortable night than she had experienced for many months, and that morning rose without any cough, or sensation of dryness and uneasiness in the throat ; the pulse was more regular, less quick, and rather fuller.

The use of the medicine was continued for four days, increasing the quantity of the acid in the mixture two drops each day. On the fourth day a slight degree of nausea was experienced ; and as the more urgent symptoms of the complaint had altogether disappeared, she was desired to discontinue the medicine. Up to this day, February the 26th, no relapse has been experienced, and so free has Miss G— been from any of her former

feelings, that she regards the improvement as almost miraculous, and her cure as complete. I am not however so sanguine ; and consider the disease as still unsubdued, and requiring a regulated temperature and great caution, although I cannot but anticipate the probability, that the powers of the constitution will be able to restore, in time, the healthy state of the diseased membrane, if the occasional use of the acid can keep the morbid irritability sufficiently under control.

CASE III.—Lieut. Colonel F—— had been afflicted every winter, for several years past, with a spasmodic cough, which had resisted every means that had been tried for its relief ; and, therefore, this season he allowed it to take its course, having recourse to a little purgative only occasionally at bed time. As I was lately however in attendance upon his family, his wife persuaded him to allow me to prescribe for him ; and conceiving it to be a case likely to be benefited by the Prussic Acid, it was given to him in doses of two minims in a fluid ounce of almond mixture, and repeated every two hours. After having taken it for three days, and when the dose was encreased to four minims, his cough

abated in frequency and violence, he obtained sleep, and otherwise experienced such decided benefit, that, as he was about to return to his regiment in Ireland, I was requested to give him the prescription. This of course was useless, as the acid is not yet an article of the *materia medica* of any of the British Pharmacopœias ; but a small phial was given to him, with directions how to use it ; under the requisite cautions.

CASE IV.—T. R——, Esq. of a slender form, and gouty diathesis, had long been afflicted with dyspepsia, attended with a peculiar hot sensation of the tongue, which was supposed to depend on acidity of the stomach. The remedies he had employed, and the regimen to which he had confined himself, for some time past, had materially improved the power of the digestive organs ; so much so, that he had declined the further use of medicines, and considered his health as good as it could be expected to be, in an individual beyond the middle age of life. Notwithstanding this improvement, however, the heat of tongue still remained ; when he was attacked with the epidemic catarrhal

cough, already mentioned. He took the acid, in doses of two minims repeated every second hour, and with the cough, the heat of the tongue also rapidly abated and altogether left him in less than four days. I have not heard that the latter symptom has returned.

As the state of the stomach affects the tongue by sympathy, perhaps the unexpected effect of the Acid in this instance, may be ascribed to its reducing the morbid irritability of the secreting surface of the stomach, thereby enabling the juices of the organ to be more slowly secreted and of a more healthy character. We know that opium and some other narcotics produce temporary relief in cardialgia, arising from acidity; but after their first effect is over, the morbid irritability of the organ not only returns but is augmented: if, therefore, Prussic Acid produces a more permanent and equally beneficial effect, its importance, as an adjunct to tonics in the treatment of dyspeptic affections, must be obvious.

Such, my dear Sir, are the results of my experience in the employment of the Prussic Acid as a sedative. When it has produced

nausea, or when a sudden prostration of strength has followed its use, I have discontinued it; and would not prescribe it again to the same individual. I can readily conceive that it may prove hurtful in some idiosyncracies of habit; such, for example, as occasioning urticaria in those individuals who are liable to that species of eruption after eating bitter almonds, but as many of our best remedies are apt to affect peculiar constitutions in a similar manner, no argument against the employment of the Prussic Acid can be founded on such an effect. The Acid is undoubtedly a remedy of great power; and, when its use is directed by science and good sense, it cannot fail of proving a most important addition to the *Materia Medica*.

Believe me, My Dear Sir,

Your's most truly,

ANTHONY TODD THOMSON.

CONCLUSION.

From all that has been said in this Essay, the Author thinks he is warranted in asserting:

1st. That there are two varieties of hydro-cyanic Acid.

a. The H. Acid of Gay-Lussac.

b. The Medicinal Hydro-cyanic Acid.

2d. That the former is a virulent poison; but cannot be kept more than a few hours, without being decomposed, and then it loses all its obnoxious properties.

3d. That the second variety, or what may be called the Medicinal Hydro-cyanic Acid is a safe and highly useful preparation.

4th. That the Medicinal Hydro-cyanic Acid can be employed as the best palliative in cases of confirmed tubercular consumption.

5th. That it checks the progress of pulmonary consumption, when in its incipient state.

6th. That in all cases of asthma, chronic catarrhs, and coughs of long standing, it has proved more beneficial than any other medicine.

7th. That in dry and spasmodic coughs, and more especially in hooping-cough, the Medicinal Hydro-cyanic Acid has been used with constant and complete success.

8th. And finally, that there is every reason to believe that the Prussic Acid may, as a powerful sedative, be employed where all other narcotics cannot; and that as such it might be applied to the relief of high spasmodic action—excessive irritability—and acute pain—with decided advantage.

Saville-row, 1st. March, 1819.