eggs should be freely administered; they are coagulated, and, by involving the albumen, diminish its acrimony on the tissue of the stomach. The expulsion of this coagulum and the creosote, is then to be effected by vomiting, by means of direct emetics. The inflammatory symptoms require to be managed like cases of ordinary gastritis.

LECTURES

ON

MATERIA MEDICA AND THERAPEUTICS,

NOW IN COURSE OF DELIVERY

AT THE

WINDMILL-STREET SCHOOL OF MEDICINE

BY

GEORGE G. SIGMOND, M.D.

LECTURE XXV.

PRUSSIC ACID.—*Researches into the nature of colouring materials. Discovery of Prussian blue. Its preparation. Different theories of its nature. Efforts made to extend our knowledge of its properties. Scheele's discovery of prussic acid. The purest obtained first by Gay Lussac. Obtainable also from several plants and fruit trees. Its characters. Its dilution for administration. Formulae for preparing the dilute. Error concerning it in the new Pharmacopœia. Its characters and effects. Formation of prussic acid in the human body. Poisonous effects of unsound cheese, sausages, &c., dependant on prussic acid. The name hydrocyanic acid. Objections to this change. Poison of this acid, of the oil of almonds, and of laurel-water. Peach-nut oil.*

GENTLEMEN:—I am about to lay before you the history of the discovery of one of the most extraordinary bodies with which we are acquainted, the prussic, or, as it has been very uselessly called, hydrocyanic acid. That the lover of science should dwell with particular earnestness, and with an ardour almost amounting to enthusiasm, upon the first dawn of one of those accidental discoveries which have gradually led the way to a knowledge of some most wonderful phenomena, can not surprise you. We observe the biographer become so wrapt in the life and character of the individual he delineates, that he traces the most minute anecdotes of his infancy, and relates them with earnestness, and with a conviction that they interest the reader as much as they have previously interested him. The historian, too, does not content himself with a detail of the glories which are attendant upon the prosperity of the nation whose

annals he illustrates, but he investigates its origin, he strenuously asserts the greatness of its youthful days, and boasts its descent from a very long line of heroes. Most of the marvels which chemistry has exhibited to us have been the result of accidental discovery, but it does not the less detract from the greatness which we ascribe to her labours. Her votaries have investigated the objects which these accidents have placed before them, have examined their powers, have supplied the means by which they are obtained, and have gained from them further engines in the prosecution of their magnificent inquiries. It would scarcely have been imagined that one of the simplest acts of neighbourly kindness should gradually have led to the knowledge of a substance whose very odour poisons the circumambient air, so that the lungs can respire no more, the brain be instantaneously stupified, and the heart, the great centre of life, be, in one swift second, for ever paralysed.

About the commencement of the last century great inquiries into various of the arts which adorn life were simultaneously commenced in various parts of Europe, amongst others the knowledge of imparting colour to porcelain; of dying; of staining; and of calico-printing; this led to various experimental researches, and to the observation of any colouring matter that accident might furnish. That this study, which at first sight appears to be insignificant, is of no small consequence to society, you may deduce from the perusal of a very interesting work by a member of our profession, Dr. BANCROFT, on the philosophy of permanent colours, and when such men as CHAPTAL, MACQUER, REAUMER, occupied themselves intensely in promoting and examining every thing connected with it, we may fairly rank it as most important. DIESBACH, a chemist living in the City of Berlin, wished to obtain from an infusion, or decoction, of cochineal, in which it was combined with a portion of green vitriol, the green copperas of commerce, the sulphate of iron of the chemist, its colouring matter; he accordingly sent to his neighbour DIPPEL to lend him some alkali for that purpose, which was accordingly sent to him. On adding this alkali to the solution, great was his astonishment on finding that one of the most beautiful blues was the result. DIPPEL immediately reflected that the alkali had repeatedly served him for distilling and rectifying animal oils, and that of course it had become impregnated with animal matter; he tried various experiments, and found that it was to the presence of the sulphate of iron the solution owed its colour when the alkali, united to animal matter, was added to it. DIESBACH availed himself of this knowledge; the new colour was made, and sold over the Continent under the name of Prussian blue.

In the memoirs of the Academy of Berlin was the announcement made of the discovery, but the means of producing it were kept a secret. This concealment, however, did not prevent chemists from ascertaining the truth, and Dr. WOODWARD had the satisfaction of describing, in the year 1724, in the "Philosophical Transactions," a process for preparing this blue, which had excited the most intense interest. It was from dried bullocks' blood, calcined with potash in a crucible, that the preparation was formed, these were boiled in water, and the liquor filtered, a solution of sulphate of iron was next added, when a blueish green was deposited, which, by the further addition of hydrochloric acid, was instantly changed from a blueish green to a deep blue. The appellation of "lixivium of blood" was given to the liquor obtained from the alkali treated with the bullocks' blood, afterwards dissolved in water, and thus prepared to precipitate the iron in the blue state. A cheaper way of obtaining this animal blue was soon discovered, in which the horns, hoofs, hides, tendons, and other refuse parts of animals were employed; this was the result of BROWN's observations, for he found that flesh gave to the alkali this property as well as blood; in the following year GEOFFROY advanced another step, for he pointed out, from experiment, that oil, wool, hartshorn, sponge, and even a vegetable thyme, calcined with an alkali, had the same action upon sulphate of iron. They endeavoured to explain the new formation by stating, that there was a bituminous principle in the iron which was developed by the blood, and fixed by the alkali. This theory was succeeded by one of MENON, given in the "Memoires des Savans Etrangers;" he thought that blue was the natural colour of iron, and that the blood purified the metal and insulated its colouring matter. In 1752, MACQUER gained another step; he found that alkalies would decompose the Prussian blue, that they separated the iron from the principle with which it was combined in it, and which he supposed to be phlogiston. In consequence, the prussiate of potash, the ferro-cyanide of potassium of the present Pharmacopœia, was called the phlogisticated alkali. Chemists were all satisfied with this explanation; they felt they knew very little about the theory, but were very wisely prosecuting their researches to discover what bodies were capable, as they termed it, of phlogisticating the alkali, or, in fact, of being substituted for the animal matters that were first used. WEISMAN discovered this property in the empyreumatic oils, MODEL in soot, CARTHEUSER in the ashes of several vegetables, JACOBI in the carbon obtained from the vine, SPIELMAN in the bitumens, and GOETTLING in the fungus.

In the year 1775 another important fact was established by BERGMAN in his disser-

tation upon the elective attractions; he stated that the colouring matter of the Prussian blue was a distinct acid, and that it had, like other acid bodies, its own particular attraction; and SAGE announced that this animal acid, as he called it, united with the alkalies to form distinct neutral salts, that with potash, having octoædral crystals, that with soda, rhomboids, or hexagonal laminæ. DELIUS and SCOPOLI, DENNEUX and PARMENTIER, and FONTANA and LANDRIANI, all assisted in forwarding our knowledge of the nature of the Prussian blue, but it was reserved for one of those laborious and indefatigable men who cultivate science for her own sake, who desert her neither in riches nor in poverty, and who, when they become surrounded by the pleasures of the world, forget not the beauteous vision that beckoned them on the path of glory, but still worship and adore her;—it remained for one who fell a victim to his ardour, to the good and amiable SCHEELÉ, by a series of careful experiments, not only to obtain the acid separate, but also to ascertain its constituent principles. Alas! in the midst of these inquiries he was suddenly taken from amongst us, and his death is attributed to the effects of this deleterious acid; but "grateful science still adores his holy shade." His discoveries were printed in the "Trimestres" of the Academy of Stockholm, in December, 1782, and January, 1783; from these we learn the compounds of which the prussic, or hydrocyanic acid is formed; of the properties of this acid, which, before him, no one had succeeded in insulating, we ascertain its intimate nature, both by its decomposition and by its formation in a direct way with materials less complicated than animal substances.

In the year 1787, BERTHOLET communicated to the Academy of Sciences his experiments which led him to believe that the prussic acid was a combination of three simple combustible bodies, hydrogen, carbon, and azote, and he concluded that, as it had no oxygen, it had no acidifying principle. In 1790, FOURCROY pointed out a new fact; whilst treating the serum of coagulated blood with nitric acid he was struck with the smell of prussic acid, he collected the vapour, and found it to be real pure prussic acid.

All these various inquiries only were directed to the consideration of Prussian blue as a pigment. As yet no medical inferences were drawn from it, but soon its wonderful effects upon life became known; a deeper interest began to invest the subject, and many most distinguished chemists aided by their labours to arrive at our present state of knowledge; amongst these GAY LUSSAC, SCHAUB, of Cassel, SCHRADER, of Berlin, BUCHOLZ, of Weimar, ROLOFF, of Magdeburg, BERZELIUS, whose name belongs to the world, and, amongst our own countrymen,

TURNER, PORETT, and EVERITT have been faithful and zealous labourers in the field. Of these we owe most to GAY LUSSAC, for by him the purity of prussic acid was first established.

The acid is not only obtained from animal substances by laborious and complicated chemical processes, but it resides in several plants, or at least it can be educed from them. In the natural family of the rosaceæ exists a great number of plants which have a deadly principle residing in their leaves and their kernel, and which, when subjected to distillation, yield a fluid which gives a blue precipitate, upon the addition of a saturated solution of iron in carbonic acid.

Some of the species belonging to the almond tribe destroy cattle which feed upon them, as the *cerasus capricida*, which takes its name from its poisoning the goats in Nepaul. The bitter almond, the cherry laurel, bird cherry, the peach, the mountain ash, the cotoneaster microphylla, the *cerasus virginiana*,—all of them yield up a distilled fluid, which is marked by a very peculiar powerful odour, which, though it does not bear a similarity to that of hydrocyanic acid, has been compared to it. VOGEL, of Munich, obtained hydrocyanate of potash by subjecting the essential oil of bitter almonds to distillation from caustic potash. A volatile oil having the smell of the original oil, but which no longer contained hydrocyanic acid, was distilled over; and this, from a single drop killing a sparrow, he thought to be as poisonous as the acid. This, however, has not been confirmed by the experiments of STANGE, of GOPPERT, of ROBQUET, and BOUTRON CHALARD, who think that the acid could not have been entirely removed if the poisonous activity was thus exhibited. Pure and concentrated hydrocyanic acid is a limpid fluid, like water; it evaporates rapidly when exposed to the air; if a drop be suspended at the end of a glass rod, a portion of it is immediately congealed by the cold, which is the result of the evaporation of the rest. It may, according to Dr. URE, be detected by the sulphate of iron, when mixed with ten thousand parts of water, and the sulphate of copper produces a slight milkiness in water, containing only a twenty thousandth part.

It is volatilized at 68° of Fahrenheit, boils at 78°, and at 5° it becomes concrete and crystallizes in needles, like nitrate of ammonia. It is decomposed by a high temperature, or by the action of light, when carbonic acid, volatile oil, and carburetted hydrogen gas are given out, a carbonaceous matter remaining behind. When brought near to any body in a state of combustion, it instantly burns with a blue flame. GAY LUSSAC observes, that in preserving the acid in jars, well closed, even without any contact of air, it sometimes decomposes in less

than an hour. The pure acid cannot be administered internally, and, in fact, from its speedy decomposition, it could not be depended on for uniformity of strength. Various preparations of hydrocyanic acid have been brought before the scientific world, but that of GAY LUSSAC is of the greatest purity. He placed the bichloride of mercury in a retort, to which he adapted a tube about two feet in length, and about half an inch in diameter; pieces of marble were put into one-third of this tube, nearest the retort, and two-thirds of chloride of calcium in the other two-thirds. On the bichloride of mercury about two-thirds of its weight of concentrated hydrochloric acid were poured, and a gentle heat was then applied. The marble prevented any undecomposed hydrochloric acid from passing, and the chloride of calcium, all moisture. The chlorine of the hydrochloric acid thus combines with the mercury of the bichloride, and formed bichloride, which remains on the retort. The cyanogen of the bichloride combines with the hydrogen of the hydrochloric acid, and these form hydrocyanic acid; it is vaporised, and afterwards condensed in the receiver.

The *acidum hydrocyanicum dilutum* of the Pharmacopœia may be obtained either from the ferro-cyanide of potassium, or from the cyanide of silver, and the formulæ are,—Take two ounces of ferro-cyanide of potassium, an ounce and a half of sulphuric acid, and a pint and a half of distilled water; the acid is to be added to four fluid ounces of the water; when this is cooled and put into a glass retort, the ferro-cyanide of potassium is to be added, first dissolved in half a pint of water; eight fluid ounces of the water are to be poured into a cooled receiver, then the retort being fitted on, six fluid ounces of acid are to be allowed to pass into this water distilled with a gentle heat in a sand bath; lastly, six more fluid ounces are to be added, or so much that 12.7 grains of nitrate of silver, dissolved in distilled water, may be just saturated by 100 grains of this acid. The second formula observes that hydrocyanic acid may also be prepared, when it is more immediately wanted, from 48.5 grains of cyanide of silver, added to a fluid ounce of distilled water, mixed with 39.5 of hydrochloric acid; shake all these in a well-stopped phial; then, after some short time, pour off the clear liquor into another vessel; protect this from the access of light, and keep it for use.

The latter of these preparations owes its origin to Mr. EVERITT, Professor of Chemistry at the *Middlesex Hospital*, who is as distinguished for the clearness of his views, as he is for the happy mode he has of communicating them to others. In a review of some of the prominent novelties of the new edition of the London Pharmacopœia, with

specimens of "*the great care, pains, and industry*," with which the old edition has been "*revised, corrected, and reformed*," which appeared in *THE LANCET* a short time since, he pointed out a curious misprint. The "proportion of cyanide of silver nine grains, and dilute hydrocyanic acid nine minims for an ounce of water," ought to be 48.5 grains of the cyanide, and 39.5 grains of the strong hydrochloric acid, to produce an acid of the defined strength, 2 percent. You will find the duodecimo edition incorrect, and it has led Dr. SPILLAN into the mistake of "the dilute" hydrochloric acid. Both Mr. PHILLIPS and Dr. COLLIER have avoided this error. You will see in the translation by Mr. PHILLIPS some most important observations upon the processes, and upon the properties of this acid. In Dr. REID's "*Chemistry*," you will find a view of the chemical changes which occur in the first of these processes, and in the "*London and Edinburgh Philosophical Magazine*" for February, 1835, you will see the opinions entertained by Mr. EVERITT, and the experiments performed by him. The remarks of the *Pharmacopœia* tell us that dilute hydrocyanic acid is colourless, and goes off into vapour by heat, which exhales a peculiar odour. It reddens litmus, the colour is slight, is evanescent; is not coloured by the addition of hydrosulphuric acid; on the addition of a solution of nitrate of silver, one hundred grains of this acid precipitate ten grains of cyanide of silver, which are easily soluble in boiling nitric acid. It must be mixed with some other acid, if, upon adding iodo-cyanide of potassium and mercury, it becomes red. "In one hundred grains of this diluted hydrocyanic acid there are contained two grains of real hydrocyanic acid, and to this standard, in whatever manner it may be distilled, we wish that it be reduced." If the litmus paper be strongly and permanently reddened, the presence of some other acid is indicated; if any metallic salt were present, hydrosulphuric acid would discolour it. If hydrochloric acid were present, nitrate of silver would throw down the chloride of silver which is insoluble in the nitric acid; any acid mixed with the hydrocyanic would decompose the iodo-cyanide of potassium and mercury, and form red biniodide of mercury.

Among the startling facts which science has disclosed to us, is one so extraordinary, that we should feel it a duty to doubt it, notwithstanding the highest testimonies of its truth, if actual experiment did not prove it, that the proximate principles of the poison of prussic acid actually are present in our bodies, and may, under some circumstances, be developed. This very poison, a small quantity of which, pure and concentrated, killed Professor SCHARINGER, at Vienna, when diffused upon his naked arm, may be said to exist within us, and circulate in our

frames. It can not only be obtained from us with the greatest facility after death, but is formed in certain diseases of the fluids of the body. The blue stain which is imparted to linen from blood in a state of decomposition, owes its colour to this deadly poison. We have detailed to us, by the illustrious Professor of Chemistry, FOURCROY, a very interesting proof of the development of this acid, under peculiar circumstances:—

A female, who was about thirty years of age, was thrown into a state of deep melancholy and nervous despondency, in consequence of great grief, which had for some time been protracted. The principal seat of her bodily suffering was the epigastric region; she became extremely emaciated; hectic fever supervened; there was a livid paleness of the skin. Every symptom announced the general depression of animal power, and a total change in the circulating fluid, or what he terms a decomposition of the blood. After a few days she was seized with convulsive trembling and fainting, which were followed by discharges of drops of blood from the edge of the eyelids, the nostrils, and the ears: the linen with which the blood was wiped was marked with spots of a beautiful blue. FOURCROY was himself the witness of the case, and that the blood contained true prussiate of iron. Monsieur COULLON detected it, by its proper tests, in the menstrual secretion of a young lady who was in delicate health; and Dr. WILLIAM BATT, of Genoa, had under his care a little girl, of seven years of age, who, after much suffering, deposited in the urine a singular sediment, which was collected, and given to MOJON, the Professor of Chemistry, for his examination. He accordingly carefully analyzed it, and discovered it to be a true prussiate of iron, which, indeed, it closely resembled in colour. Of the great importance of further observation on this subject I need scarcely dwell.

Since the observations were made on the presence of the acid in various diseases, many loose opinions have been started, and the dark marks which occur in fever, petechiæ, discolourations of various kinds, have been attributed to it. For the toxicologist, it is necessary to ascertain the truth of such opinions, lest various changes produced upon the human body by disease should be ascribed to the effects of the administration of this poison. Of the circumstances under which it may be developed when the elements that form it exist, we have much to learn; we know that a series of changes are constantly occurring in all the objects of nature; that at every instant of time every particle of matter is entering into new combinations, and that sometimes, from the most innocent materials, spring forth the most noxious poisons. An instance of the formation of prussic acid in the course of the decay of unsound cheese is quoted, as

having been ascertained by Dr. WITTLING, and detailed in one of the French Journals. The poisonous property of cheese in this state has, from the attention paid to the subject, by SERTURNER and HUNFELD, been ascribed to two animal acids, which they consider analogous to the caseic and sebatic acid.

In Germany very great attention has been drawn to the deleterious qualities of decaying cheese, of bacon, and of sausages, which have been the cause of death, with symptoms of a most extraordinary nature. In this country this subject has undergone very little investigation, from the want of a proper medical police, yet instances are not at all uncommon of poisoning from food, taken in a state of decomposition; and, certainly, cholera has been more than once produced by it. The nature of the immediate principle of destruction it is most difficult to ascertain. During the stages of putrefaction the changes that go forward are so uncertain in their duration, the principles evolved are so fugacious, and the rapidity with which particles separate from each other, so instantaneously places compounds in fresh combination, as to render the attention of the chemist almost useless. They baffle his inquiries, and they produce an apparent difference in the labours of the most distinguished cultivators of the science: in an instant one animal acid gives forth such a proportion of its element as to be converted into an acid unobserved before; besides which, all the processes of that decomposition by which Nature removes from before us objects which would be destructive, even from the vapours they exhale, are variously performed, according to the heat, to the moisture, and to the locality of the situation in which they occur.

These difficulties have presented themselves to such a degree, that although it has been long suspected that in some stage of animal, nay, probably of vegetable decomposition, it is the prussic acid which is the cause of destruction, it has not yet been satisfactorily detected.

The vegeto-animal matter of the spurred rye, the *secale cornutum*, and which when made into bread is so essentially destructive to man, a poison producing the most wasting gangrene of the limbs, contains a very large proportion of hydrocyanic or prussic acid. ROBERT published at Berlin, in 1828, "*Dissertatio de secale cornuto ejusque vi, in corpus humanum, salubri et noxia*," and confirms the fact by analysis, made by himself, with great diligence. VAUQUELIN, PETTENKOFFER, and WINKLER, have also subjected the ergot to chemical investigation; they have not come to any determined result but that this vegeto-animal substance is exceedingly prone to putrefaction. The acids that have been obtained from decayed cheese and sausages have been found most

destructive of life. The one approaching to casein, obtained from the cheese, killed a cat in eight minutes, given in the quantity of a drachm and a half, whilst the same quantity of the acid, which was called sebatic, obtained from the sausage, had the same effect in three hours. Dr. CHRISTISON, when observing that the poisonous cheese has been hitherto only met with in some parts of Germany, says that he had some information communicated to him, not long ago, by Dr. SWANWICK, of Macclesfield, which led him to think that a parallel poison is occasionally met with in Cheshire, among the small hill farms, where the limited extent of the dairies obliges the farmer to keep the curd for several days before a sufficient quantity is accumulated for the larger cheeses. That putrefaction renders meat noxious we cannot doubt, and from the facility with which hydrocyanic acid may be procured from it, we may fairly deduce that its latent elements exist in this flesh, and that it may, during a moment of the changes, be fully developed. The facility with which it may be deduced, when its component parts exist, may be illustrated by the fact, that the bitter almond will give up its portion to form the acid, when heat and moisture are ready to develop it; thus, when we commence masticating the almond, the saliva gives its hydrogen, and the animal heat lending its aid, we ourselves convert, in our mouths, the innocent fruit into a deleterious poison. I remember on one occasion, at a meeting of the *Medico-Botanical Society*, that Mr. EVERITT, the Professor of Chemistry, fully illustrated this fact, and proved the presence of the hydrocyanic acid, evolved by mastication of the bitter almond, after a very able lecture upon the principles which the labours of the French chemists have proved to exist in the almond, and to which I may hereafter have occasion to refer, although they more immediately belong to the province of the chemist.

The change of name from *prussic acid* to *hydrocyanic acid* I have characterised as useless, but I agree with the observations of the Editor of the "*Medico-Chirurgical Review*," that it is even reprehensible. In a note to the analytical review of Dr. ELLIOTSON's cases, illustrative of the efficacy of hydrocyanic or prussic acid, he says,— "The disposition which there exists to obscure the science of medicine, by the invention of high-sounding names, cannot be too severely reprehended. Even the chemists, whose predilection for hard words is notorious, saw enough of technicality in the title prussic to be satisfied. Why, then, should the sons of *ÆSCULAPIUS* feel so desirous of a change? Is it (which is the only excuse) that they fancied they had found another term more descriptive of the thing signified? If so, grievously, we apprehend, have they erred in judgment." The term hydrocyanic

acid is derived from cyanogen, or generator of blue, because the experiments of GAY LUSSAC rendered it probable that the carbon and azote exist in combination, to form a distinct compound, which is necessary for the formation of Prussian blue. If this compound had been the cause of the blueness of all objects in creation, this name might have been correct, but nothing can more immediately recal the circumstances attendant upon the discovery of this acid than the appellation prussic acid. It was familiar, too, to the public under such a title, to whom it becomes of the deepest importance to know how it is designated, if even it be administered only as a medicine; but as it might be the source of fearful destruction, it is still more requisite that they distinctly know and understand the language which is used.

The poisonous properties of prussic acid were soon observed after its discovery, and more particularly when it was obtained from various vegetable substances; and it was soon understood to what the oil of bitter almonds and the laurel-water owed their noxious influence. It was remembered that as early as the days of DIOSCORIDES, the oil of the bitter almonds had been employed to poison wolves. BOHM, a German chemist, ascertained the actual presence of the acid, and the process pursued by Mr. HENNEL, of Apothecaries' Hall, to detect it, clearly demonstrates the fact.

The essential oil of bitter almonds is obtained after the expression of the fixed oil; the process pursued is to place a hundred weight of the cake which remains after the oil has been forced by pressure out of the almond into the still, with about four hundred gallons of water; this quantity is required to prevent the formation of a collection of mucilaginous dregs, from which the volatile oil will not pass, and which sometimes, if made to boil, rises up into the head and worm of the still. The quantity of oil varies very much, a hundred weight of the cake sometimes giving one ounce, at others two ounces and a half, by weight, of the volatile oil, which seems to be composed of hydrocyanic acid, united with volatile oil. Mr. HENNEL proved this fact, by digesting red oxide of mercury in it, and he thus procured cyanuret of mercury, from which the pure hydrocyanic, or prussic acid, was obtained, by its distillation with hydrochloric acid. In the "*Annales de Chimie*," the sixteenth volume, are to be found M. ROBERT's examination of the oil of almonds, and he states, in a note, that he believes the oil of the cherry laurel is identical with that of bitter almonds. Numerous are the examples of death produced by laurel-water. FODERE tells us, that whilst attending his studies at Turin, in 1784, the chamber-maid and man-servant of a noble family of that town, stole, for the purpose of regaling them-

selves, from their master, a bottle of distilled laurel-water, which they took for an excellent cordial, which was kept locked up for the sake of preserving it: fearful of being surprised, they hastily swallowed, one after the other, several mouthfuls of it, but they paid, in a short time, the penalty of their dishonesty, for they expired almost instantaneously in convulsions. The dead bodies having been carried to the University, they were examined; the stomach was found slightly inflamed, and the rest in a sound state.

In the "*Philosophical Transactions*," in the year 1731, is the narrative of a woman who, after making a quantity of laurel-water, gave a bottle of it to MARTHA BOYCE, her servant, who carried it to ANN BOYCE, her mother, as an excellent cordial. This latter person made it a present to F. EATON, a shopkeeper, who gave two ounces of it to regale MARY WHALEY, who only drank two-thirds of it, and went away. EATON drank the rest. MARY WHALEY went into a shop and complained of a violent pain in the stomach; she was carried home, and from that moment lost the use of her speech, and died in an hour and a half, without vomiting, convulsions, evacuations, or any external change. BOYCE, the mother, when informed of this, would not believe it, and to prove that it was an excellent cordial, poured out into a glass three spoonfuls, which she drank, and a few minutes after swallowed two more, so much was she persuaded of its virtue, but she died in a very short time after, without making the least complaint, and without convulsions. EATON, who had taken but little of it, escaped death, by an emetic. FONTANA made an oil by distilling the leaves of the laurel in vessels of glass, without the addition of water; and two, three, and four drops administered to rabbits, tortoises, pigeons, and frogs, killed them very speedily.

Various are the details of the action of the bitter almond on the animal economy, made by GERARD, ORFILA, VICAT, DEYEUX, which prove the deleterious effects they produce. DUHAMEL tells us, in the "*Traité des Arbres et Arbustes de la France*," that he was almost suffocated by the strong smell of bitter almonds, which was evolved on opening the body of a dog poisoned by these means. The experiments of Sir BENJAMIN BRODIE upon the essential oil are particularly interesting; whilst engaged in them, he dipped the blunt end of a probe into the essential oil, and applied it to his tongue, meaning to taste it, and having no suspicion that so small a quantity could produce any of its specific effects on the nervous system; but scarcely had he applied it, when he experienced a very remarkable and unpleasant sensation, which he chiefly referred to the epigastric region, but the exact nature of which he could not describe,

because he knew nothing precisely similar to it. At the same time there was a sense of weakness in his limbs, as if he had not the command of his muscles, and that he was about to fall; however, these sensations were but momentary, and he experienced no inconvenience whatever afterwards. There is an oil sold under the name of "Peach-nut oil," made from the bitter almonds, by the chemists, which has occasioned death. In one instance a person went into a shop and asked for beech-nut oil, which he wished to take for worms, with some other drugs, according to a recipe which he had received; the wrong oil was given him, and he was destroyed by it. Two drachms of this oil killed a gentleman, forty-eight years of age, twenty minutes, after he had taken it. The physician who was sent for found him insensible, the pupils immoveable, the breathing stertorous and slow, the pulse feeble, only thirty in a minute, the breath exhaling the odour of bitter almonds. In ten minutes more he was dead.

EXPERIMENTS ON THE

PROPERTIES OF THE BLOOD.

THE "Journal Complementary des Sciences Medicales," for April 1837, contains, under this title, a Memoir, by M. LETELLIER, of which M. BOUILLAUD is the reporter, presenting to us some new researches on the blood. It must be acknowledged that further experiments for their confirmation are needful; but the labourers are so few in this direction, that the absence of additional verifications should not operate prejudicially against the present results. M. Letellier endeavours to establish the following positions:—

1. In general the quantity of serum of the blood is in a relative proportion to the water which is contained in that fluid.

2. The separation of the serum from the crassamentum originates in the simple suspension of the circulation of the blood.

3. Acids precipitate albumen, and its colouring matter, in a mass, which is soluble in water. This mass is not coagulable by heat.

4. Fibrin has its origin from the colouring matter, in absorbing oxygen, and disengaging carbon.

5. The acid salts precipitate fibrin in an insoluble mass.

6. Fibrin, which is formed by respiration, is employed for nutrition.

7. In the process of desiccation, fibrin loses more than two-thirds of its weight.

8. Human blood weighs from 1041 to

1058.5. The weight augments by the loss of fibrin.

9. The three principles of blood are globular. The albumen appears to be only suspended.

10. Arterial blood is lighter than venal blood, and contains more fibrin and less serum.

11. Fibrin may change rapidly in the same individual. The other principles of the blood undergo only slight changes.

12. It is the fibrin, only, which appears to have any relation with the febrile movements which occurs in sthenic diseases.

13. The crassamentum, called *inflammatory*, appears to have no relation with albumen.

SOME DISEASES OF THE VITREOUS HUMOUR AND THE RETINA.

DISEASES of the vitreous humour have been but imperfectly studied, and the following observations, taken from Graëfe and Walther's *Journal of Surgery and Ophthalmology*, Vol. xxv., No. 1, 1837, are merely intended as so many hints towards a more full investigation:—

Discharge of a portion of the vitreous humour has the effect of rendering the image on the retina less distinct, and thus weakening vision.

Contusion of the skull, severe pressure during delivery, and acute inflammation of the eye soon after birth, sometimes produce a deep red colouration of the vitreous humour (*hyaloiditis*), from congestion of blood in the hyaloid membrane.

Softening of the vitreous humour.—Diminution or destruction of the sight, an undulatory motion of the iris when the eyeball moves, a softened feel of the globe, are the characteristic signs of softening of the vitreous body, which appears to depend on the extension of inflammation from the iris to the hyaloid membrane. This softening, however, is often observed in cases of imperfect vision, or of amaurosis, without the oscillating movement of the iris.

Viscosity of the vitreous humour is an affection which is still less understood; it has been observed in some cases, after death, where vision had been lost for a certain time.

Hernia of the vitreous humour is known by the projection of a transparent tumour through an accidental opening into the cornea, or sclerotica, but this can never take place until a great portion of the aqueous humour has been previously discharged with the lens, and the iris has been lacerated or prolapsed.

In *atrophy of the eye* the retina is sometimes changed into a white, fibrous, and