PART SECOND.

REVIEWS.

Sicheres Heilverfahren bei dem schnell gefährlichen Lufteintritt in die Venen und dessen gerichtsärztliche Wichtigkeit. Von Dr Ch. Jos. Edl. v. Wattmann, Professor der praktischen Chirurgie, und der ersten Chirurgischen Klinik Vorsteher des Operations, Instituts an der k. k. Universität in Wein u. s. w. Wein: 1843.

(A more sure method of Treatment in the rapidly dangerous Entrance of Air into the Veins, and its Medico-Legal Importance. By Dr Ch. Jos. Edl. v. Wattmann, Professor of Practical Surgery, and of the first Surgical Clinic, Superintendent of the School of Operations in the Imperial University of Vienna, &c. Vienna: 1843.

The rapidly fatal effects of throwing a quantity of air into the blood-vessels of an animal have been long known. The first experiment of this kind has been attributed to Wepfer, who is said to have laid prostrate, and killed an ox of stupendous size, by inflating with his mouth the jugular vein. Redi, in a letter to Steno, written about 177 years ago, mentions that he himself had instantly killed, by the same means, two dogs, a hare, a sheep, and two foxes. Similar experiments were repeated with the same results by Heyde, Brunner, &c. Additional interest and practical importance were given to these facts by Ruysch, Valsalva, Morgagni, and others, who observed in some post-mortem examinations, con-

1 Vide Morgagni de Sedibus et Causis Morborum, epist. v.
considerable quantities of a gaseous fluid in the vascular system, which they believed to be air, and suggested the idea, that quantities of gas may be evolved in the vascular system during life, and kill by inducing apoplexy, or by arresting the movements of the heart. This opinion seems, however, to have gradually lost ground, and the experiments and observations which had given rise to it, had been for many years seldom referred to, even by physiologists, when Bichat published his well known Recherches Physiologiques sur la Vie et la Mort. In this work he made some startling statements, regarding the smallness of the quantity of air capable of causing death; and gave a new explanation of its modus operandi. The carefully conducted experiments of Nysten\(^1\) shortly followed, and fully exposed some of the errors into which Bichat had fallen. In 1818, this subject assumed a novel and important feature to the practical surgeon. Until this time the only evils which the surgeon dreaded from the wound of a vein was haemorrhage, and the subsequent effects of the application of a ligature to it, when this was necessary; but a new danger, most sudden in its occurrence, and most alarming in its consequences, was now made known. In that year, a patient expired at the Hôpital Saint-Antoine, in the hands of Dr Beauchêne, while extirpating a tumour from the right shoulder and lateral and lower part of the neck, under circumstances which led to the belief that this was occasioned by the entrance of air into the vascular system through an opening in a vein. Cases of sudden death during operation attributed to this cause were afterwards reported as having occurred in France, in Germany, in this country, and in America; and, as generally happens, when public attention is roused by new and unexpected results, there was for some time a tendency to extend their application beyond legitimate bounds, and sudden deaths were referred to this cause, which, under the exercise of greater care and discrimination, would necessarily have been excluded. In August 1837, Dr Cormack's Prize Thesis was published. In the same year, a keen discussion upon this question, in the Académie de Médecine of Paris, followed the communication of a case by Amussat, where sudden and alarming symptoms of dissolution occurred during the extirpation of a diseased mamma, attributed by him to the entrance of air into a wounded vein. On this occasion Velpeau, Gerdy, Blandin, and Mallé, not only challenged the accuracy of this explanation given by Amussat, but by a searching analysis of the history of the other cases of this nature previously recorded, demonstrated that some of them, at least, were so imperfectly observed and described, or were attended by phenomena so dissimilar to those remarked in the experiments on the domesticated animals, that the cause of the sudden death of the patient must either be considered a matter of doubt, or attributed to some other agency. Velpeau after-

\(^1\) Recherches de Physiologie et de Chimie Pathologique, 1811.
wards published a connected account of his objections in the *Gazette Médicale de Paris*, 2d February 1838, and though he and his supporters have occasionally manifested a certain degree of hypercriticism, and have not allowed to some facts their due weight, yet there can be no doubt that this discussion was of much service in correcting the tendency to attribute death to the entrance of air into the veins on insufficient grounds, and in fully disclosing certain imperfections in our knowledge of this subject. In this discussion the objectors naturally attached considerable importance to the fact, that the phenomena observed in the experiments on the domesticated animals on the effects of air in the vascular system, were in general different from those which had presented themselves in the alleged cases in the human species, and this must have drawn attention to the circumstance, that hitherto the conditions under which the experiments were performed on animals, were not the same as those under which this occurrence took place in the human species. In all experiments and observations then made upon the lower animals, the air was forced into the vein, either by a syringe, or by blowing with the mouth, with the four following exceptions: one imperfect experiment by Mery upon a dog; a case observed by Verrier in 1806, and a similar one by Bouley in 1821, of the entrance of air into the jugular vein in the horse, when opened in phlebotomy; and the experiment of Magendie, to prove that when a tube, whose walls are capable of bearing off the atmospheric pressure, is introduced into the jugular vein, and carried a certain distance towards the heart, atmospheric air readily enters the vascular system. To remedy this defect Amussat undertook a series of experiments upon what has been termed the *spontaneous entrance* of air into the veins,—which means, that an opening was made into a vein, and the air allowed to enter by it, through the agency of certain physical causes which influence the circulation of the venous blood within and in the neighbourhood of the thorax, and was not mechanically forced in by a syringe, or by blowing through a tube,—and these were repeated in presence of a commission of the Academy, of which Bouillaud was reporter. These and additional experiments were published by Amussat in 1839. The only authors in this country who have written on this subject since the time of Dr Brown Langrish, who made only one imperfect experiment, are Dr Cormack, Sir Charles Bell, and Mr Erichsen.

The treatise of Dr Wattmann contains no new experiments upon

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1 Académie des Sciences, 1707.
2 *Leçons sur les Phénomènes Physiques de la Vie*, 1836.
3 *Recherches sur l'Introduction Accidentelle de l'Air dans le Veins.*
4 *Physical Experiments on Brutes*, 1764.
5 Prize Thesis. *Inaugural Dissertation on the Presence of Air in the Organs of Circulation*, August 1837.
6 *Surgical Essays*, 1840.
7 *Edinburgh Medical and Surgical Journal for January 1844.*
the lower animals, and is chiefly occupied, as its title would lead us to expect, in examining the causes which favour the accidental entrance of air into the venous system in the human species, the modes of preventing this, the remedies to be employed when it does occur, its other surgical relations, and also its bearings upon Forensic Medicine. He points out that the surgeon, by employing a certain procedure, can in most cases at least, prevent the entrance of a fatal quantity of air; and he describes a new method of securing the wounded vein when not more than half its circumference is cut through, by which the further entrance of air is prevented, and the hemorrhage arrested from such large veins as the internal jugular and subclavians, without very much diminution of the calibre of the vessel. He also gives the details of four very interesting examples of the accidental entrance of air into the veins, which occurred in his own surgical practice, and though one of these was published as early as 1823, they have hitherto been entirely unknown to those who have collected and commented upon such cases, in France and in this country.  

In giving an account of the physiological part of his subject, he is necessarily led to examine the results obtained by the different experimenters upon the lower animals,—from which source almost all our knowledge of it is derived,—and in doing this he shows a perfect acquaintance with all that has been previously published on the question.

We shall now proceed to give a connected, and as complete a view as our space will permit us, of the present amount of our knowledge upon the points discussed in the volume before us, selecting from each author those facts and opinions which we deem most worthy of credit. We are the more induced to do this, as we are convinced that our knowledge of this subject is now sufficiently advanced, to enable us to attempt it with considerable confidence and satisfaction.

1. Quantity of air introduced into the venous system necessary to cause death.—We have already referred to the exaggerated notions of Bichat on this point, who asserted that a few bubbles of air introduced into the vascular system were sufficient to cause immediate death. The experiments of Nysten proved that unless a considerable quantity of air enters the blood-vessels it does not prove fatal. He estimates that the injection of from forty to fifty centimetres cubes of air (between 2.83 and 3 cubic inches English) in a small dog, and from 100 to 120 centimetres cubes (120 centimetres being equal to 7.323784, and 100 centimetres to 6.100232 cubic inches English) in a large dog are necessary to cause death, even when injected quickly into the veins, and that larger quantities are required to kill more voluminous animals as the ox and horse. Magendie states that certain animals admit enormous quantities of air to be briskly introduced into their veins, without perishing, and adds, "I remember having thrown with all the force and celerity with

1 These cases are given in the concluding part of this article in our next number.
which I was capable, 40 to 50 pints of air into the veins of a very old horse without his dying immediately, though he sank at last." A considerably less quantity than this is in general sufficient to kill a horse. In the first experiment related by Dr Cormack, and performed upon a horse, a tube a quarter of an inch in diameter was introduced into the left jugular vein, and the person who blew, filled his chest twice and continued to blow for a minute, before the animal exhibited those symptoms of uneasiness which are generally the fore-runners of a rapid death. Though all the other experiments of Dr Cormack and M. Amussat show that the introduction of a considerable quantity of air into the venous system is necessary to produce death in the domesticated animals, it is yet impossible to fix the exact quantity requisite, and it clearly varies not only in different species of animals, but even in different individuals of the same species. Judging from the recorded cases of the accidental entrance of air into the human species, the presence of a smaller quantity of air is capable of inducing death in them, than in the lower animals. Barthelemy, finding that six horses, weakened by previous loss of blood, died after the entrance into the veins of 4 litres of air, and a seventh after 6 litres, calculates that a man weighing 136 lbs. would be killed by the introduction of \( \frac{3}{4} \) of a litre of air into the venous system. Such a calculation, as Wattmann correctly remarks, resting upon the supposition that the human species differs only from the horse in weight, is not entitled to much confidence. The quantity of air necessary to induce death is modified by the rapidity and volume with which it enters the opening in the vein. The same quantity of air which kills when introduced rapidly, will fail to do so if introduced more slowly.

2. Period of death.—When the air is forced largely and rapidly into one of the great veins near the heart, death very soon follows. In one of Dr Cormack's experiments upon a dog, the animal died in twelve seconds, and in another upon a horse, death occurred in three minutes after the commencement of the inflation of air into the jugular vein. In eighteen animals subjected by Amussat to the forced and rapid introduction of air into the jugular vein, death took place in fifteen of these at the following periods:—In rabbits from 50 seconds to 1 minute; in dogs, after 2 minutes; in sheep, from 1 to 2 minutes; in horses, after 3, 5, 6, 6\( \frac{1}{2} \), 13, 16, and 23 minutes.\(^1\) The differences in the period of death in these experiments is partly due to original and unknown differences in the vital constitution of the animals operated on, and to a greater extent perhaps, as Dr Cormack and M. Amussat remarked, to the manner in which the air is forced into the vein. When the air is thrown in forcibly through

\(^1\) As Amussat, however, dates the moment of death from the cessation of the reflex movements of the orbicularis palpebrarum muscle from irritation of the membrana conjunctiva of the eye-ball, and not, as many other experimenters more correctly do, from the cessation of the sensorial functions and the respiratory movements, the period of death will appear to be somewhat later, than if the cessation of the sensorial functions and the respiration had been taken as evidence of death. Op. cit. p. 33.
a large tube into a vein near the heart, and care is taken to prevent the escape of part of the air through the opening in the vein by the sides of the tube, the death is more rapid and certain than when the tube employed is small, or when part of the air again escapes from the vein. All these observations upon the period of death when air is *forced* into the veins do not, however, admit of any direct comparison with those made in the instances of accidental entrance of air in the human species, the conditions under which the air passes into the vein being so different in the two classes of cases. The experiments of Amussat on the *spontaneous entrance* of air into the veins, were on the other hand made under circumstances resembling as closely as it was possible to do, the conditions under which the air accidentally enters the veins in the human species. His first series of experiments were performed upon 20 animals, and of these 24 died and 2 survived. Five rabbits died after $1\frac{1}{2}$, 2, 3, and 5 minutes; seven of nine dogs experimented on, died after 1, 3, 6, 10, 16, 24, and 30 minutes, while the remaining 2 survived; two sheep died after 19 and 56 minutes; ten horses after 14, 15, 17, 26, 28, 35 minutes, 1 hour and 44 minutes, 1 hour 50 minutes, and two hours 30 minutes. One only of the horses resisted the effects of the entrance of air, and this apparently in consequence of the neck resting against a tree, and a clot of blood forming and blocking up the orifice in the vein. When the clot was removed the animal died after 26 minutes. In a second series of experiments, he previously abstracted a certain quantity of blood, and subjected the animals to the usual incisions required in some surgical operations before he permitted the air to enter the vascular system, and thus placed the animal still more nearly in the circumstances of those individuals of the human species in whom the accidental entrance of air into the veins occurred during a protracted operation, and after the loss of more or less blood. This series of experiments was performed upon 16 animals, and only 1 survived. The dogs died after 1, 4, 6, and 25 minutes; the sheep after 7, and 16 minutes; and the horses after $3\frac{1}{2}$, 9, 12, 13, 16, and 23 minutes. Thus it appears, that the period of death was hastened considerably in those animals whose blood-vessels had previously been depleted by the abstraction of part of their blood. Judging from the details of the cases of the accidental entrance of air into the veins during operations on the human species, the presence of a smaller quantity of air is not only capable of proving fatal, but death occurs more rapidly than in the domesticated animal, and this has been urged among other objections, which we shall afterwards notice, against this explanation of the cause of the death of those individuals. We will merely remark at present, that though this objection is one which demands consideration, it must at the same time be remembered, that the loss of blood, with the pain and moral effects attending a protracted operation, must favour the inju-
rious effects of the passage of air into the vascular system, and that the period of death varies considerably, not only in different genera of animals, but in different individuals of the same species. Wattmann, (p. 66) endeavours to show, that the more rapid death in the human species may be also aided by the following circumstances. "Man," he says, "has a larger brain than the lower animals, and requires for its nutrition a greater supply of blood; besides, the human brain manifests more complex functions than that of beasts, and this is a second reason why it requires a greater supply of blood. To effect these two objects, man has relatively a shorter neck, and the cerebral arteries and veins are wider than those of beasts. Further, man has the pre-eminence of the erect position, and the vital processes are in an especial manner more linked and dependant upon each other than in the lower animals, so that they are more readily and speedily brought to a stand when the circulation of the blood is disturbed. From the relatively larger size of the veins in the neck, the air may enter more rapidly and in greater quantity when they are wounded, and readily spreading itself over the vascular system, destroys the conditions necessary for the maintenance of the vital process, and proves rapidly fatal." We cannot admit that this explanation of the more rapid death in the human species is satisfactory, and our reasons for this will be better understood when we come to examine the causes of death in such cases. In the mean time we merely observe, that we are not aware that any interruption of the circulation or respiratory functions, provided that this be to the same extent in both, proves more rapidly fatal in the human species than in the lower animals, or, that in asphyxia for example, the period of death is earlier in the former than in the latter. As we shall afterwards point out, the erect position does facilitate the entrance of air into the veins; but during an operation the patient is as likely to be in a recumbent as in the erect position, and in a number of cases the air entered by the subclavian or axillary veins: the size of the vein is only one, though no doubt an important one, of the conditions which favour the rapid entrance of a large quantity of air. Air may pass into the vascular system, in quantities sufficient to induce alarming disturbance of the heart and respiratory organs, and yet the animal may not only survive, but rapidly recover from its immediate effects, as has been sufficiently proved by the experiments of Nysten, Cormack, Amussat, and others. Nysten found, however, in his experiments, that they subsequently died in the course of a few days from inflammation of the lungs, and Amussat observed the same thing in one of his experiments. The experiments of Cormack and Amussat have shown that this is not so constant a result as Nysten supposed. When an animal recovers from the immediate effects of the experiment, the air disappears from the

1 Op. cit. p. 28. 2 Journal Hebdomadaire, tom. ii. p. 165.
vascular system in the course of three or four days. In some of
the recorded cases of the accidental entrance of air into the veins
in the human species, the patient recovered from its immediate ef-
facts even after the vital processes were almost brought to a stand,
and in Malgaigne’s case the patient died on the fourth day of a
pulmonary affection, probably bronchitis; (par accumulation d’écume
dans les bronches.) Mr Erichsen\(^1\) states, that one of Roux’s pa-
tients died on the 7th day from pneumonia, but on reading over
the autopsy,\(^2\) we are satisfied that the appearances described, indi-
cated nothing more than the congestion of the depending parts of the
lungs, so very frequently found after death. There may have been
some bronchitis in the right lung, but we have no evidence that
there was pneumonia.\(^3\)

3. Morbid Appearances.—An exact knowledge of the state of the
organs after death, is absolutely necessary to enable us to ascertain
the manner in which the vital functions are arrested by the entrance
of air into the vascular system; and will enable us to set aside at
once some of the explanations which have been given of the cause
of death. All experimenters whose results seem worthy of confi-
dence, agree that the right side of the heart is always much distend-
ed with air and blood, whether the air be forced, or allowed to enter
spontaneously into the veins. In general the blood is intermixed
with the air, forming a froth; more rarely, a great part of the air con-
tinues free or unmixed with blood, as observed in a few of the expe-
riments of Dr Cormack and M. Amussat. The pulmonary artery is
also full of frothy blood, except in some cases where the air is forced
rapidly and in large quantity into one of the veins in the neighbour-
hood of the heart, as occurred in one of Dr Cormack’s experiments.
In some cases the air is confined to the right side of the heart and
the venous system; in others, the pulmonary veins, the left side of the
heart, and the arterial system, also contain it. As this last point is of considerable importance in ascertaining the cause of
death, we shall examine it at greater length. Nysten states that
he never found the air in the arterial system; and as he operated
on dogs alone, this will be accounted for by the following details. In
9 rabbits experimented on by M. Amussat and Dr Cormack, air was
found in small quantity in the left side of the heart in 2; and in 7
it was entirely confined to the right side of the heart and the ve-
nous system. In 5 of these experiments it was allowed to enter
spontaneously, and in 3 it was forced into the vein; and the 2 cases
in which it was also found in the arterial system, occurred among
the latter. In 6 sheep, M. Amussat found a small quantity of air in
the left side of the heart in 4, and none in 2. In 21 dogs experi-
mented on by Nysten, Cormack, Magendie, and Amussat, air was
found in the left side of the heart in 1 only, and in very small
quantity. In 12 of these it had entered spontaneously, in 9 it had

\(^1\) Op. cit. p. 23.  
\(^2\) Journal Hebdomadaire, tom. 2. p. 163.  
\(^3\) One of Wattmann’s cases died of inflammation of the lungs.
been forced, and it was in 1 of the latter where the air was forced in slowly, that the small quantity was found in the arterial system. In 26 horses experimented on by M. Amussat and Dr Cormack, the air was confined to the right side of the heart and venous system in 7; it was found in small quantity in 6, and in large quantity in 12 in the left side of the heart and arterial system; and in some of the latter, the arteries of the brain were not only filled with frothy blood, but a portion of the air had escaped into the sub-arachnoidean cellular tissue. In 17 of these the air had entered spontaneously; in 9 it had been forced. The presence of air in the arterial system was proportionally more frequent in those cases where it was forced, than in those where it had spontaneously entered the opening in the vein. In all these cases, the quantity of air in the right side of the heart was always much greater than in the left; and Amussat found that even in all the cases where the air had entered spontaneously, in which the chest was opened immediately after death, the right side of the heart was distended with air and frothy blood, and sometimes to the extent of causing the heart to fill up completely the interior of the pericardium. With regard to the statement of Barthelemy, that he had observed the heart after death, from the spontaneous entrance of air into the veins, collapsed and flabby; and the experiment related by Mr Erichsen, where he found the heart nine minutes after death contracting regularly and vigorously, and its ventricles not fuller than usual, we strongly suspect some source of fallacy, for they are not only completely at variance with the well-conducted and numerous experiments of Amussat, but are very different from what we would expect. One source of fallacy readily suggests itself,—one which we know has led to similar errors, and it is this. In laying open the chest after death, if any of the large veins at the root of the neck be wounded, the right side of the heart may unload itself through the wound in the vein. In the cases of death from the accidental entrance of air into the veins, the air has been sometimes confined to the right side of the heart and venous system; at other times it was also found in the left side of the heart and arterial system. In the 7 cases which Amussat places in the first of the five groups into which he has divided the examples of the accidental entrance of air into the veins in the human species, air was found both in the right and left side of the heart, and in the arteries in 2; \(^1\) it was either not present or not observed in the left side in 5; \(^2\) and only a few bubbles of air were found in the left side of the heart, but none in the aorta in 1 case. \(^3\) As in the remaining case the patient did not die until the seventh day, the air had probably in a great measure disappeared; though bubbles of air were still found in the aorta and its branches, but none in the arteries of the brain. \(^4\) From these observations, it appears that frothy blood passes more readily through the capillaries

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1. Cases of Beauchêne and Dupuytren 1832.
2. Delpech 1830, Ulrick, Roux 1836, Clement, Putegnat.
3. Castara.
4. Roux 1832.
of the lungs in the horse and in man than in dogs. Nysten mentions in his experiments, that the lungs were healthy; and Dr Cormack and M. Amussat, who attended particularly to this subject, state that the lungs were not emphysematous, as had been alleged.

4. Symptoms occasioned by the presence of air in the venous system.

—in experiments upon animals, it has been observed that when the air first reaches the heart, its contractions are at first more rapid, but when it arrives in larger quantity, they become slower and feebler, the respirations become quicker and heaving, the animal gives indications of uneasiness, falls down, occasionally utters cries of distress, and dies in convulsions. The contents of the rectum and bladder are frequently expelled at the time of death. In a very few cases only is death from this cause not preceded by convulsions. Amussat mentions one example of this. In some of the cases of death in the human species, attributed to the accidental entrance of air into the veins, the period of death was not only earlier, but some of the symptoms which uniformly precede death, in the lower animals, either did not occur, or were not observed. The constitutional symptoms which, according to Wattmann, (p. 55), rapidly follow the entrance of air into the veins in the human species, are the following:—"Speedy occurrence of syncope, which is either preceded by a cry, with the expression, 'I die,' 'I am dead,' 'I suffocate,' or by anxiety and tremblings, or without any such precursors. The syncope rapidly reaches such a degree, that all consciousness is lost, and the patient falls down, cold sweat breaks out on the forehead, and in a quarter of an hour, sometimes sooner, sometimes later, he is dead." The increased respiratory muscular movements which precede the loss of consciousness, and the convulsive movements which usher in death, so generally observed in experiments upon the lower animals, have been very seldom remarked in cases of accidental entrance of air in the human species. In the 15 cases forming Amussat's first and second series of facts observed in the human species, convulsive movements were only remarked in 5 of these. In one of the 5 (that of Beauchêne), the patient had slight convulsions; in Ulrich's case, slight convulsions of the face, and then episthotonos followed the sudden attack of syncope; in Roux's case in 1836, the patient became pale, then syncope occurred, followed by convulsions; in Mirault's case, the patient became pale, and had tremblings, with tetanic succussions; in Goulard's case, there was paleness, with convulsive movements of face, hiccough, and after some minutes death. That one of all these 15 cases which approaches nearest in the character of some of its constitutional symptoms to the experiments on the lower animals, was one of the two which occurred to Roux. At the time the sound indicating the entrance of air into a vein was heard, the patient uttered a plaintive cry, turned herself in an agitated manner in all directions in her bed, the inspirations became long and difficult, and the patient was ap-

1 Experiment 3, p. 11. Op. cit.
parently fast dying. She, however, revived, and died seven days afterwards. In some of the other cases, as in those of Castara, Delpech, and Barlow, the death is said to have taken place suddenly, without complaint, and without convulsive movement. In one of Dupuytren's cases (that of Nov. 1822), the patient cried out, "I am dead," was soon seized with sudden tremblings, then sank down upon her chair, and fell without movement and without life. Several of the cases, as we might have expected, are very imperfectly reported; for it is not to be supposed that the surgeon or his assistants should possess the coolness and time to watch narrowly the phenomena, when their minds were agitated by the threatened sudden dissolution of their patient, and their attention distracted by anxious attempts to save him.

5. Cause of death.—The older experimenters attributed death from the inflation of air into the veins, to distension of the right side of the heart, arresting its contractions, and some of them compared its condition to that of the bladder when over-distended with urine. Bichat maintained that death begins at the brain, and depends upon the circulation of frothy blood in the vessels of that organ. Nysten, Cormack, and Amussat have referred the death to the mechanical distension of the right side of the heart. Leroy and Pliédagel attributed it chiefly to emphysema of the lungs. Sir Charles Bell believed that the air, by circulating in the vessels of the medulla oblongata, annihilated the functions of that important portion of the central organs of the nervous system, and thus killed by arresting the respiratory muscular movements. Marchel de Calvi supposes that death is due to the action of the carbonic acid contained in the air,—a supposition which could be readily disproved by a reference to some of Nysten's experiments.1 Bouillaud, in his report to the Academy, attributes the death partly to the distension of the right side of heart, and partly to the difficulty of transmitting the frothy blood through the lungs; and Mr Erichsen refers it entirely to the latter of these two causes. Wattmann (p. 70) gives at considerable length his explanation of the cause of death, which is much too long to transcribe. He attributes it partly to the disturbance and enfeeblement of the contractibility of the heart occasioned by the mechanical effects of the air in its cavities, partly to the derangement of the respiratory function, and partly to the circulation of blood mixed with air in the capillary vessels of the systemic circulation being unable to maintain the nutrition, and the vitality of the tissues, especially of such important organs as the brain, the spinal cord, the lungs, and the heart. We do not think it necessary to enter into any critical examination of the arguments advanced by the supporters of these different explanations of the cause of death, as the account which we have already given of the appearances observed after death, and the symptoms which preceded it, but more especially the former, enables us to

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1 Opus cit., p. 81.
select the true one. As in almost all cases in dogs, in the majority of rabbits, and in individuals of the human species, and in a considerable number of horses and sheep killed either by the forced or the spontaneous entrance of air into the veins, no air was found in the left side of the heart, or in the arterial system, it is perfectly obvious that in all these cases the circulation of air in the arteries of the brain, and in the medulla oblongata, could not be the cause of death: for a thing which did not exist could not act. The theories of Bichat and Sir Charles Bell cannot therefore explain the cause of death in all or even the greater number of cases, and there is no evidence in their favour even in those cases where air was found in the left side of the heart, and in the arterial system, for in all these the right side of the heart was on an average as much distended with air or frothy blood, and the death was as rapid, as when the air was entirely confined to the right side of the heart, and the venous system. If, then, the rapid and great distension of the right side of the heart, and the arrestment of the circulation through the lungs, be sufficient to account for the sudden death, and of this there can be no doubt, and if, as we have seen, these conditions be found constantly present in all experiments worthy of confidence, it is quite unphilosophical to call in the agency of other causes to account for this effect, when we are already in possession of one sufficient for the purpose and admitting of general application, the more especially if the others are only occasionally present, there being, moreover, no facts to prove that even when present, they influence the results. We do not deny that the circulation of frothy blood in the arteries of the brain may produce death, and we can conceive some cases where the frothy blood may pass more readily through the capillaries of the lungs, as sometimes occurs in the horse, where the functions of the central organs of the nervous system might be seriously affected by the circulation of frothy blood in their capillary arteries. It is especially worthy of remark, however, that in Amussat's experiments the period of death did not appear to be hastened by the presence of air in the arterial system, and in those cases in which the air was confined to the right side of the heart and the venous system, the death was on an average equally rapid, and attended by the same symptoms as in those in which the air had reached the left side of the heart, and the arterial system. Besides, as far as we can judge from the result of experiments, the death would not be so rapid when the air enters the venous system, if it acted in this manner, and the symptoms preceding it would be somewhat different. When Nysten injected quantities of air into the carotids, the animals were seized with all the symptoms of apoplexy, became comatose, and did not die until the lapse of some hours. Professor J. Reid states¹ that he injected half an ounce (by measure)

¹ Experimental investigation into the functions of Eighth pair of nerves, Edin. Med. and Surgical Journal, No. 139, Expt. 26.
of air along the carotid artery towards the brain, and that this was followed by strong convulsions of the limbs and trunk, succeeded by coma, which continued for at least four hours before the animal died. He also adds, "I have repeated the experiment of blowing air along one of the carotids, or vertebrals, towards the brain, and always found that it produced convulsions and coma, lasting for some time before death. The quantity of air injected was from half an ounce to an ounce, and even more. The mode of death in such cases is very different from what I observed when air was injected rapidly, and in considerable quantity, into a vein leading directly to the heart, for it then kills by mechanically arresting the movements of the right side of the heart." Lest any one should be led into error by the application of the term syncope to the sudden cessation of the sensorial and respiratory functions, after a certain quantity of air has entered a vein in the human species, we may mention that it is, more correctly speaking, a sudden case of asphyxia arising from the rapid arrestment of the circulation of the blood. Amussat's patient, when describing the difference between his feeling in this state and in common syncope, for he had experienced both within a short time, said, that in the former, "le trouble ne vient pas d'en haut, il vient d'en bas." The supposition that when air enters the venous system in large quantities, it produces emphysema of the lungs, has been rendered completely untenable by the observations of Cormack and Amussat. We believe, then, that it cannot be doubted that when an animal dies from the immediate effects of the entrance of air into the venous system, this is caused by the arrestment of the circulation through the right side of the heart and the lungs. Two circumstances produce the sudden distension of the right side of the heart, and these are, 1st, The mechanical impediments to the circulation of the blood through the right side of the heart from the presence of a large quantity of an elastic fluid in its cavities; and, 2dly, The great difficulty, and in many cases impossibility of transmitting frothy blood through the capillaries of the lungs. The operation of the latter cause is illustrated by the experiments of Magendie and Dr Cormack upon the effects of injecting air into the mesenteric veins, in which it was shown that the air could not pass through the capillaries of the vena portarum; and also by an experiment of Mr Erichsen, who found that a pressure of from 1½ to 2 inches of mercury, was sufficient to propel beat bullock's blood through the pulmonary capillaries of a dog recently dead, while it required a pressure of from 3 to 3½ inches of mercury to drive the same blood when mixed with air through these vessels. In those cases in which the air enters rapidly and in great quantities, the distension of the right side of the heart may be suddenly produced, and be the primary cause of death, while, in those cases in which it enters more slowly, the distension of the right side of the heart may, to a considerable extent, be a secondary effect, and be produced chiefly by the difficulty
it experiences in propelling the frothy blood through the lungs. By the agency of these two causes, the circulation of the blood is suddenly brought to a stand, and all the other vital functions are consequently rapidly suspended.

6. *Spontaneous entrance of air into the veins.*—The experiments of Amussat have demonstrated, that when an opening is made into certain veins in the domesticated animals, the atmospheric air may enter in quantities sufficient to produce death in a few minutes. This result in the normal condition of the part operated on, occurred only in the veins in which the respiratory flux and reflux of the blood were observed. These veins are placed in the anterior part of the neck, the superior part of the chest, and in the axilla, and consist of the jugulars, the subclavians, the axillary veins, and some of their larger branches at their termination near the summit of the chest. Amussat also points out that this dangerous space, "l'espace dangereuse," may be circumscribed by two semi-elliptical lines passing from one axilla to the other,—the one above the clavicles, and the other below them. This dangerous region may be extended by certain physical conditions of the veins, but before we can understand how these operate, it is necessary that we have a distinct knowledge of the causes which produce or facilitate the entrance of air into a vein, when an opening has been made in it. During expiration, when all the parts within the thorax are compressed, the large veins leading to it become turgid with blood, while, during inspiration, the compression of the parts in the interior of the thorax being removed, the atmospheric pressure is for a time less on the veins within the chest than on those outside it, the blood in the distended veins rushes onward towards the heart, and these veins consequently become collapsed. This respiratory flux and reflux is more or less extended, as the respiratory muscular movements are more or less forcible and prolonged. During inspiration, therefore, the blood is drawn into the interior of the thorax from the large veins in its immediate neighbourhood, and this sucking influence or *vis a fronte* would have extended to a greater distance from the chest, had the veins, like the trachea, been provided with walls capable of bearing off the atmospheric pressure. When we tie a tube like a vein upon the nozzle of a common injecting syringe, and attempt to draw water through it by pulling up the piston, we perceive that the part of the tube immediately in front of the nozzle of the syringe alone becomes empty, and that the water beyond this is prevented from passing onwards by the atmospheric pressure forcing together the walls of the tube. That air would be drawn through an opening in one of the large veins leading to the chest placed at points beyond the limits of this respiratory flux and reflux, were their coats capable of bearing off the atmospheric pressure, is proved by the experiments of Magendie and Amussat, who introduced tubes with resisting walls into an opening in the jugular, at some distance above this flux and reflux, and
found that when they were passed sufficiently far in the direction of the heart, the air readily entered the vein during each inspiratory movement. Wattmann, (p. 34,) as some other authors have done, conjoins the sucking influence of the right side of the heart to that of the respiratory movements in drawing air into the veins, and he attributes, like some of the older and even more modern physiologists, the relaxation or diastole of the heart, to a vital power of expansion. It would be easy, however, to show that the arrangement of the muscular fibres of the heart, and the phenomena attending muscular contractility, are at variance with the opinion that the relaxation of the heart is dependent upon any other than mechanical causes. A regurgitation, to a small extent, along the large veins entering the heart, is observed during each contraction of the right auricle, and this becomes more considerable when there is any impediment to the free passage of the blood through the right ventricle, or when the blood becomes stagnated in the veins, but the sucking influence of the right auricle must be so trifling that it can give very little aid to the sucking influence of the lungs. Amussat, in three experiments, found that when an opening was made into one side of the chest, the passage of the air into the opening in the vein ceased, and was immediately renewed when the opening in the chest was obstructed. Bérard thinks that this sucking influence is aided even in the normal state of the parts, by the mode in which the veins of the neck are connected to the fasciae; and Sir Charles Bell has maintained, and in our opinion on good grounds, that the entrance of air into an opened vein at the lower and lateral parts of the neck, is much facilitated by the mechanical expansion of the veins during powerful contractions of the muscles of the neck, and the elevation of the shoulders in forced inspiration, a circumstance very likely to occur during an operation. From these facts it must be perfectly obvious, that when an opening is made into a vein in the proximity of the chest in the human species, atmospheric air may enter and pass on with the blood to the heart, for the same mechanical causes which effect this in the domesticated animals, must operate with equal force in man. It is also apparent that the circumstances which prevent the walls of the veins from being pressed together, by the weight of the atmosphere, must extend the limits of this dangerous region. The most common of these are the following:—The pulling and stretching of healthy veins by the manipulations of the operator or his assistants, or by the position of the muscles; the outer surface of the vein being surrounded by, and adhering to morbid deposits and growths; the thickening of the coats of the veins or the surrounding areolar tissue by inflammation or other causes; and the increased size and width of the smaller veins, as occurs in some cases of what have been termed aneurism by anastomosis. Wattmann, in enumerating various circumstances which enable us to explain the discrepancies in the accounts given of different cases of the accidental entrance of air, mentions among others the following:—1st. "The
erect position of the patient during the operation; for the more the part operated on is placed higher than the heart, so much the less are the veins distended with blood, and so much the more readily will air enter them in greater quantity when opened, if at the same time their walls are prevented from being forced together by the atmospheric pressure. 2d. The partial division of the vein, permitting the air to pass on mixed with the blood which still continues to flow onwards to the heart, as I myself observed in the human species, and which Cormack and Mercier have also made mention of. 3d. The complete division of the vein allowing the air to enter in those cases where the central or proximal end gaps, or is kept expanded, and in such a case is Cormack's observation correct, that air unmixed with blood will rush on to the heart."

When air enters spontaneously by an opening in a vein, two sounds may be heard,—one depending upon the passage of air through the opening made in the vein—the other synchronous with the contractions of the heart, is caused by the intermixture of the blood and air in that organ. This second sound must, from its nature, be also present in those cases in which the air is forced into the vein, while the first can only be heard when it enters spontaneously. The first sound ceases immediately on obstructing the opening in the vein, while the second is not affected by this. Amussat describes the first sound as being faint (un bruit peu fort,) in rabbits; as a lapping sound (bruit de lapement,) in 3 out of 4 sheep, in the greater number of dogs, and much more rarely in the horse; as a gurgling or glou glou sound (bruit de gargouillement ou glou glou,) in 5 out of 17 horses, and in a very few cases in dogs. In one sheep he heard a clicking sound; in 6 of the horses he does not describe it specifically, but in 4 calls it a very loud sound, (bruit très fort,) and in 2 a peculiar sound (bruit particulier.) In 34 cases of the accidental entrance of air into the veins in the human species, collected by Wattmann, he says, (p. 47,) it is described as a hissing sound in 13; 1 as a gurgling or bubbling sound in 5; 2 a sound of aspiration (bruit d'aspiration,) in 2; 3 and a suction or strong sniffing sound in 1; 4 as a whizzing sound (sausendesgeräusch) in 1; 5 as a jerking sound (bruit saccade) in 1; 6 as a peculiar sound (eigen-thümlichcs) in 1; 7 a deep sound (tiefes,) in 1; 8 as a rattling sound (rasselades,) in 1; 9 and in 8 the sound was either not present or not heard. 10 These differences in the sound must depend chiefly upon

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1 Cases of Dupuytren, 3 by himself, Roux, Ulrich, Barlow, Pierre and Condouannes, Delaporte, Malgaigne, Velpau, Mirault, and Toumlouche.
2 Castara, Warren in 2 cases, Begin, Pellis. Clemot in 2 cases. Delpech.
3 Rigaud. [Rigaud, however, really describes the sound in these words, "J'entendia alors un bruit d'aspiration de l'air par trois fois differentes."] Amussat.
4 Mott. [In the Gazette Médicale 1831, to which Wattmann refers for an account of this case, it is described a peculiar sound, but un bruit de gargouillement.] Beauchêne. [Piedagnel, in his account of this case, says, that the sound resembled the air entering a small opening in the chest of a living animal.] Mayor. [Mayor himself says, "bruit terrible de ronflement."]
5 One of these 8 was a case of suicide, and there was no opportunity, even had a
the size of the opening in the vein, the force with which the air enters, and upon the fact whether or not blood be flowing out at the opening while the air is entering. Wattmann has pointed out (p. 45,) that blood does not necessarily, as some seem to believe, flow from a cut vein. When there is no impediment to the onward passage of the blood, and when the vein is not quite full, as generally occurs when the part in which the vein runs is in a vertical position and above the level of the heart, and when less than half the circumference of the vein is cut through, the blood may not flow out at the opening in the vein.

The second sound, as we have already mentioned, is synchronous with the systole of the heart, and varies in character. Nysten described it as resembling the sound produced in beating up the white of an egg with water (en battant ensemble du blanc d'oeuf avec de l'eau.) Amussat in applying the stethoscope over the region of the heart in some of his experiments heard this sound, which varied in different cases, for he describes it as a bruit de souffle, bruit humide, bruit de gargouillement, bruit de rape, bruit de coasement de grenouille. This second sound has also been heard in some of the cases of the accidental entrance of air in the human species. In that of Delaporte it is stated, that "un bruit de siflement se fit entendre a tous les assistans avec un gargouillement dans la poitrine." The seven cases in which air entered the veins in the human species during operations, without any sound being remarked, cannot, says Wattmann, "diminish the certainty and importance of these sounds as signs of the entrance of air into the veins, for there are circumstances sufficient to explain why these sounds may not be heard even when present. To these belong the unexpected occurrence of this phenomenon, and its being overlooked when its signification was not yet known; and also a wider opening in the vein. I plainly remarked that the hissing sound ceased, as I separated the edges of a wound in the vein about the size of the opening generally made in venesection, wider from each other," p. 52. The characteristic phenomena attending the entrance of air into the veins in the human species, are, according to Wattmann, the following, "Want of bleeding from the opened vein in the erect position; in the horizontal position proportionally little hemorrhage; a loud sound occurring while making an incision; the moist sound (2d sound) may not on account of the threatened danger be observed; rapid appearance of constitutional symptoms, such as paleness, trembling, and deep syncope, sometimes anxiety and cries, convulsions very seldom and of short duration; speedy death; and on inspection of the body, air is found in the blood-vessels, more especially in the central organs of the circulation," p. 65. The observing the first sound is evidently a point of very great importance, as it indicates to the surgeon,
that very serious consequences are likely to happen, which may, however, be still entirely, or in a great measure prevented, by active and judicious management.

7. Remedial measures to be employed against the consequences of the entrance of air into the veins, and for their prevention.—These questions are treated of at great length by Wattmann, (p. 80.) After pointing out the methods of ascertaining whether when a sound of air rushing through an opening is heard, while the surgeon is operating on the lower and lateral part of the neck, comes from an opened vein or the sac of the pleura, he goes on to state, that when this comes from an opened vein, the surgeon has neither time nor opportunity to make any examination of the place whence it proceeds, for the patient is liable without loss of blood suddenly to fall into a syncope, with or without convulsions preceding, and is placed in the greatest danger. "It is enough to know, that immediately after hearing the sound, the opening from whence it proceeds should be shut by slight pressure of the point of the finger. Then draw the finger along the course of the vein toward the heart, sufficiently far to expose the opening to view. The sound ceases on the application of the compressing finger, and on exposing the opening in the vein, we observe blood flowing from it, or we see through the opening, appearances which indicate that it is placed in a vein, so that now no doubt can be entertained both regarding the wound in the vein and the entrance of the air. In many of the recorded cases of wounds of the veins in the dangerous region, death has occurred with surprising quickness; while in those cases where the entrance of air into the veins was soon arrested, the individuals were saved, and the same thing has been observed in the lower animals subjected to experiment. In this dangerous region, nature has no means of preventing the entrance of air into the veins, but beyond its limit the walls of the veins would be forced against each other by the atmospheric pressure, and the passage of air along the veins prevented. This hint given by nature can also advantage art, in bringing aid in these cases where nature cannot possibly help herself. Since the entrance of air alone through a wound in a vein, will occasion danger of life, and even sudden death, so can the indication of cure be no other than to prevent the entrance of air into the veins as soon as the conditions for this are established, as rapidly and permanently as possible. In so far as the conditions for the passage of air through the opening in the vein are concerned, this question also presents itself, how to avoid wounding a vein in this dangerous region, with the view of escaping this risk. The one object is therapeutical, the other is prophylactic. The means which have been brought into use for effecting the therapeutical object, are partly founded upon the remedial means applied in ordinary cases of wounded veins in the human species, partly upon the results obtained in experiments upon animals, and partly upon the different ideas entertained of the nature
of the deleterious agency of the air, and the ends which it is wished to obtain. The purposes wished to be attained have been—preventing the passage of air into the vein; removal of the air which has entered the vascular system; the withdrawing of a certain quantity of blood; and recovering from the syncope, many as Magendie, Nysten, Bouley, Mercier, Denot, wished to attain a single one of these ends, others more of them in combination.” Wattman next proceeds to give a short account of the methods by which the various authors who have written on the subject, have attempted to attain the ends mentioned above. Under the section (p. 841) entitled first method of obtaining the first purpose, viz. preventing the entrance of air into the veins, he mentions the different recommendations to effect this; viz., limiting the extent of the respiratory movements, the application of external pressure to the chest and abdomen, bandages, and other means. Under the section entitled second method of obtaining the first purpose, he gives the different directions which have been laid down for preventing the entrance of air into the veins, without restraining the respiratory movements. This method consists in making pressure upon the opened vein: its great importance was first illustrated, the rules for its proper application explained, and its first practical application made in man by Wattmann himself. The second purpose, viz. The withdrawing of the air which has entered the venous system, has been attempted by external pressure upon the chest and abdomen during respiration, so as to force out part of the frothy blood through the opening in the vein; by opening a large vein at the summit of the chest and as near the heart as possible, to allow part of the frothy blood which regurgitates from the right ventricle at each contraction, when the blood ceases to pass freely through the lungs, and it becomes distended with blood; and by withdrawing the air and frothy blood from the heart by sucking it through a syringe, or through a tube, introduced into the opening in the vein, and carried downwards towards the heart. The third purpose, viz. that of withdrawing a quantity of blood, has been recommended by those who believe that the means adopted to withdraw the air is also useful in unloading the venous system and right side of the heart of their blood, and thus facilitating the efforts of the right ventricle to propel the blood through the lungs. For effecting the fourth purpose, viz. recovering from the syncope, all the means employed in syncope from other causes, have been used and recommended, such as placing the head in a horizontal or depending position, dashing cold water on the face, the application of stimulating vapours to the nostrils, &c. Artificial respiration has been also employed in a few of the cases, and Warren recommended that it should be kept up for half an hour or an hour. Mercier advises that pressure be applied to the abdominal aorta and axillary arteries, to send as large a quantity of blood as possible towards the brain, and he states that he succeeded in recovering a dog by this means.
As we have already exceeded the space originally destined for this review, we must reserve the observations we intended to make upon these different remedial measures until next number. We will then also take an opportunity of giving some account of the three cases successfully treated by Wattman, which appear to have hitherto been unknown out of Germany: and we will at the same time also examine the medico-legal questions connected with the entrance of air into the veins.

(To be concluded in next number.)

1. Report from her Majesty's Commissioners for inquiring into the Administration and practical Operation of the Poor Laws in Scotland. With 3 vols. of Evidence and Documents. Folio.

2. Observations on the Epidemic Fever of 1843 in Scotland, and its connection with the Destitute Condition of the Poor. By William Pulteney Alison, M.D., F.R.S.E., &c., Professor of the Practice of Medicine in the University of Edinburgh. 8vo. Edin., 1844.

3. Facts and Observations on the Sanitary State of Glasgow during the last year. With Statistical Tables of the late Epidemic, showing the connection existing between Poverty, Disease, and Crime. By Robert Perry, M.D., President of the Faculty of Physicians and Surgeons, Senior Physician to the Glasgow Royal Infirmary, &c. With an Appendix containing Reports from the District Surgeons. &c. &c. 12mo, pp. 37. Glasgow: 1844.

4. Observations on the Prevalence of Epidemic Fever in Edinburgh and Glasgow; and means suggested for improving the Sanitary Condition of the Poor. By Robert Deuchar, Secretary to the Edinburgh Fever Board. 8vo. pp. 10. Edin., 1844.

So soon as we learned that the Commission appointed to inquire into the administration and working of the Poor Laws in Scotland, consisted of two Scottish peers, two landed gentlemen, two clergymen, one of the Established and one of the Free Church of Scotland, and one English barrister, we augured unfavourably of the final result of the investigation. So far as the Report is concerned, we have unfortunately had our prediction verified to the letter. The inquiry, however, has had the effect of collecting together an invaluable mass of evidence as to the present condition of the Scottish poor, which, we feel assured, will bring the condition of our unfortunate brethren forcibly before parties who have less personal interest in the operation of the present poor laws than the two Peers and the two landed proprietors, and who are less prejudiced in favour of the existing state of matters than the two reverend Commissioners, and who will give a calm and deliberate consideration to the "Reasons of Dissent" which have been so ably tendered by Edward Twiselton, the English barrister.

In a less crowded state of our pages, we would have felt inclined to have entered upon the consideration of the report generally, but at present we must confine ourselves to those parts of it which refer to matters medical, and which are perhaps the most questionable of the whole performance. One would have naturally supposed that, at least, one member of the medical profession would have been placed on a commission of this sort. There is certainly no calling in life which affords a greater facility of ascertaining the condition of paupers than that of the medical practitioner. He sees them when all attempts at subterfuge and deception are laid aside. He sees the honest portion of them struggling to maintain an honest livelihood under every variety of circumstance, and hence, we think he would have been more successful in eliciting the whole truth than any of the parties connected with the commission, who, we think, have overlooked
some very important and essential particulars, bearing on the question of the poor laws, which must have been got at, had there been one of the commission selected from our profession.

As has been already hinted, the members of this commission are not perfectly unanimous respecting the recommendations contained in the report. Lords Melville, and Belhaven, Messrs Home Drummond, and James Campbell, with the Rev. Drs Patrick Macfarlane, and James Robertson, concur, "although not without considerable doubts and difficulties," in laying it before her Majesty; while Mr Twisleton dissent from their conclusions, and tenders eight reasons of dissent. The duties of the commission have been exceedingly arduous, and the difficulty in coming to a determination must have been very great, in consequence of the discrepancy in the evidence and statements tendered to them. In proof of these averments, we may briefly allude to one subject of inquiry which bears upon medicine, viz.—the evidence adduced as to the quantum of allowance necessary to support a human being in life and health. Queries tending to elicit the truth respecting this very important question seem to have been rarely put to the professional witnesses. Dr Handyside, however, (who designates himself "Secretary to the association for obtaining an official inquiry into pauperism in Scotland," ) was examined at an early part of the investigation, and his evidence may probably have induced the commissioners to imagine, that those learned in the physiology of digestion were not the parties best suited to enlighten them as to the least possible cost of keeping the human machine in a proper working condition. But let our readers judge for themselves, how far such a supposition may be based in truth. Dr Handyside says—"I would, with regard to a father and mother with four children under ten, at the working period of life, say from observation, that 3s. 6d. or 3s. a-week might make them comfortable."1 We know not with what Dr H. associates his ideas of "comfort," and would like much to know how he would appropriate the munificent aliment. Let us try to do this for him. Say 1s. per week for lodgings for the family; 1s. for food to the two parents "at the working period of life;" 3d. for each of the children; and lastly, 6d. per week to clothe the whole establishment. Now, let us ask any medical man who has ever inquired the price of the necessaries of life, or who has accidentally glanced at the "average weekly prices current," if such a sum is sufficient to "maintain health," or even to keep soul and body together? But let us learn from the doctor the source from which his observation is derived.—"You referred to a case which was known to Sir George Warrender? It is the case of a poor paralytic from Dunbar, a man thirty-six years of age, with a wife and three children. He was met by Sir George Warrender on the Haddington road. He stated that he had only 1s. a-week,—an insufficient allowance. Sir George asked him where he was going. 'Oh, to Edinburgh,' was his reply. Many come, like this man, to Edinburgh for a subsistence on charity. We have not many statistical facts with regard to such cases; but the children often beg for a time, and then they steal. I may mention, however, when asked about the lowest possible sum to support an adult man, that perhaps 1s. might do for a single man. I know a man (that is the man Forbes,) with whom we had considerable difficulty with reference to his settlement. He says, 'I can do very well with 1s. per week;' he has a pretty comfortable place with his sister. He says 6d. goes for nourishment,—very coarse indeed, but yet sufficient. For a week? Oh yes; sometimes he has not more than a roll a-day; he has no other sources but that 1s. I consider 2s. 6d. the lowest sum on which a man with a family of four children might be supported, exclusive of house and clothing."2

Now, Sir George Warrender might be excused for believing that a roll a-day could support a man in health, but, for the sake of our reputation as a profession, we would recommend Dr H. to make some slight inquiry both as to the quantity and the price of the food necessary for a human being, in case he should be

1 Appendix, part i., page 136, question 2376.
2 Appendix, part i., page 139, question 2417, 8, 9.
again brought to give evidence on this subject. It might be a very good way to settle the question, to try the experiment of living on sixpence per week, for one month, and we venture to think, that if our respected friend succeed in maintaining health, he must indeed be a very moderate man. Did Dr Handside ever hear of the fable of the horse and a straw a-day?—But fortunately men of some worldy experience were called before the Commission.

Mr Sheriff Alison says, “I think a man with a wife and two children, who could not get into the manufactories, could not possibly be kept above almost a total state of destitution under 6s. or 6s., at the very least 4s. a-week, that is, supposing none of them could find work; and the allowance should be increased in proportion to the number of the family not at work.”

Mr Alexander Macaulay, one of the town-councillors of Edinburgh, says “To prevent stealing, and save from downright starvation, 5s. a-week would be necessary.”

The Rev. Mr Brewster considers 4s. 6d. a-week necessary for an old man past work.

Dr Willis thinks an old man should have 1s. per day.

Dr Forbes considers 3s. 6d. a-week necessary in the same circumstances.

These few specimens of the evidence show that the quantum of allowance considered necessary, varies as six to one, or from 1s. to 6s. When we find such a difference of opinion existing between the surgeon of an Infirmary, the sheriff of a county, and several eminent divines, we cannot help regretting that the protection which the poor at present enjoy,—the appeal to the Court of Session, is proposed to be abolished. If government ever acts upon the suggestions contained in this report, Dr Handside will doubtless see his evidence oftener quoted than he would like, and for purposes which, we know, he would be the last to defend; we therefore, fully concur in the second reason of dissent tendered by Mr Twisleton, viz.:

“Because, while it is admitted that the provision at present made for the relief of the aged and infirm poor, is in many parishes of Scotland inadequate, the main reliance for the supply of this deficiency seems to be placed on a proposed board of supervision or Standing Commission of Inquiry, with ample powers of inspection, but with no administrative control or direct authority. But it appears to me, that the striking inadequacy of the allowances at present made to the aged and infirm poor in a large proportion of the unassessed rural parishes of Scotland, arises, not so much from ignorance of facts, as from want of funds, which again is owing, in no small degree, to theories respecting the effect of any provision for the poor, even when it is restricted to the relief of the aged and the infirm. And any statements made annually in reports tending to show that this class of poor are in a destitute condition, will be met by the usual answer, that the only cure for such evils, is in the moral and religious education of the young; and that a provision for the poor creates much of the misery which it relieves, but does not relieve all the misery which it creates.”

It is abundantly manifest from a perusal of the evidence of the medical witnesses, that with a few exceptions, the care of the pauper population in Scotland during the prevalence of epidemics, as well as during ordinary periods of sickness, has fallen exclusively upon the medical practitioners and a few charitable individuals. The commissioners think, however, that “it cannot be said, in point of fact, that the poor suffer materially from the want of medical aid.” An examination of the whole evidence, and some experience in districts where sick paupers are left systematically to the charity of the resident practitioners, have led us to the firm conviction that the poor not only suffer materially from the want of medical aid and medicines, but that the ravages of epidemics are rendered ten times more virulent and more extended over districts, from the want of proper pauper supervision and regulations. It not unfrequently happens, that the heads of a family, or its bread-gainers, are laid up with fever: During the enjoyment of health, and while fully occupied, they could barely scrape together the means of supporting life, and when they are suddenly disabled by disease, what can they do? Why, they must send the members of their families either to beg or steal, or, when opportunity occurs, to follow both avocations.
We have frequently seen the one-half of a family confined with fever; and the other perambulating the country for their support; and not unfrequently have we known the former rise from bed to beg for the support of the latter, when they, in due course, were laid prostrate. The consequences of such procedure, (which we aver is common enough,) is, that habits of the worst description are engendered, while the contagion is propagated far and wide.

The commissioners are by no means supported by the evidence, in asserting that the poor do not suffer materially from the want of medical aid. It is no doubt true that medical men are by far more charitable than any other class of the community; they devote more of their time, and expend a greater share of their limited income, in behalf of the indigent, than in ordinary fairness can be expected of them; still they must keep themselves alive, and cannot afford to give their time on all occasions, far less the medicines necessary for the cure of the patients they are called on to attend. In support of these statements we may refer to the medical portion of the proof, as a whole; but for the benefit of those who may not have access to the three ponderer volumes before us, we give the following quotations. Dr James B. Wharrie of Hamilton,—a gentleman whom we know to have devoted upwards of 20 years to the treatment of all classes of the community—to the pauper as readily as to the aristocrat,—says, "medical practitioners are put to considerable expense in loss of time, and in furnishing medicines to the poor; and they cannot, in general, afford to give the most expensive medicines, although they should be necessary."

L. M. Matheson, Esq., one of two practitioners in the Isle of Skye, says, that "Dr Macleod and himself are the only two practitioners in Skye. They could not give sufficient time to the poor, unless they became independent of practice. It is impossible they can be furnished with proper medicines, unless some fund is provided for that purpose."

James Storrer, Esq., Kirkcaldy, says, "I have frequently experienced a difficulty in treating their cases properly, from being unable to supply them with nutritious diet. From want of such diet, diseases have often been produced, and their cure has often been retarded. I think likewise that a better provision should be made for supplying them with medical relief. I may add, that at present the attendance on the sick poor is a heavy tax on the time and the means of medical men. It is a particular grievance, that we should be required to furnish medicines to them gratis. If we attend the sick poor gratuitously, it may at least be fairly required from the kirk-session that they should defray the druggists' bills; but besides this, it is unreasonable to require of us that we should give our attendance on the poor altogether gratuitously. We are willing to give all that we can to relieve the poor; but still, advantage should not be taken of our liberality in this respect to save the funds of the session."

William Gibson, Esq., Dalry, testifies, "When labouring under disease they depend principally on private charity. If I did not apply for aid in their behalf to opulent individuals in the town, the paupers would suffer extreme privations, and, as far as their allowances are concerned, they might starve. I have never yet applied to an individual heritor without obtaining what I required, but I cannot say that of the heritors collectively; and it is placing me in a very disagreeable position to oblige me to go to beg for poor patients. The parish does not generally allow nutritious diet to paupers in sickness."

Is it necessary to adduce further testimony on this point? We think not. Is it fair that medical men should devote their time, (which is in reality their capital,) bestow the medicines, &c. &c. necessary during times of sickness, or beg nutriment during the convalescence in behalf of sick paupers! We assuredly think they cannot engage in duties of such a multifarious character, without seriously infringing upon those hours which they must necessarily devote to remunerative practice, unless, to use the words of Mr Matheson, "they become independent of practice." But the commissioners do recommend some alteration.

Appendix part iii. p. 377. 2 Ibid. part ii. p. 395. 3 Ibid. part iii. p. 341.
in the law regarding the remuneration of medical men in attendance on sick paupers: they propose "That medical relief should be applied more extensively to the poor, and that this should form a proper charge upon the poor's funds?" But who do they recommend to fix the proper charge? "We do not," say they, "attempt to lay down any fixed rule or plan for enlarged medical relief. The scheme to be adopted, we would leave in the hands of each parochial board of management, since what works well in one parish may be very ill suited to another." If parliament do not fix the proper charge, we feel too certain the lowest fee for which any medical man can be found to do the duty, however imperfectly, will be generally considered by heritors and kirk-sessions, (who are really the interested parties,) the proper remuneration. In fact, the system of medical estimate, although not pointedly recommended, is decidedly the favourite in the eye of this commission. They bring forth in a prominent point of view the recommendation of the Duke of Richmond in favour of medical clubs. The peculiarities of such clubs do no where appear; but if we may judge of what we have seen of institutions for a similar purpose in some parts of Scotland, we hesitate not to say, that instead of relieving paupers, (what pauper can even afford to subscribe to any club?) they are calculated to lower the junior portion of the medical profession to the grade of paupers,—to degrade a man of alleged liberal education to the level of coal heavers, city porters, et hoc genus omne. We refer to the societies of Odd Fellows, which have recently sprung up in every quarter of Scotland. These institutions, we are informed, require the use of a medical man, who must at certain stated periods meet his brethren in general, as personal friends; hail fellows, well met! We know many very well informed members of our profession who have been compelled to join such despicable establishments in pure self-defence. They found that their next-door neighbour who became the surgeon to the "Lodge," under the condition of attending all the sick members of the body for the very moderate sum of 2s. 6d. per annum, generally contrived to insinuate himself into the good graces of the fair portion of the household; and hence, we say, they were forced to meet their competitors for practice with equal weapons.

Supposing such clubs as the Duke of Richmond recommends were established in every village and hamlet of our land, how long would they continue to work? Why, the very first strike, the very first depression of trade, would terminate their usefulness, even to the working classes; and, so far as regards paupers, they must be ab initio inefficient, solely because a pauper could not, although willing, subscribe his mite. The professional aid which such societies can command is generally not of the best kind; in fact, he who offers his services at the lowest rate is generally accepted. At no very remote period, we are well informed, that a surgeon to one of the multifarious orders of Odd Fellows or Druids was requested to lower his price—or retire. He chose the latter alternative, and in less than 24 hours, several medical candidates offered their services to the club at 1s. annually per caput! After this, who would insult a medical man by offering him a fee!!

Before leaving the commissioners and their report, we think it necessary to state, that vaccination, in general, appears to be grossly neglected.

"Dr Wharrie, resident within eleven miles of Glasgow, states, that "there is no provision for vaccination in the parish of Hamilton; it is a matter of accident whether the children of the poor are vaccinated or not. They depend entirely upon the gratuitous services of the medical men or of midwives, and witness thinks there must be a number who are not vaccinated."

We will content ourselves with two more quotations, and we intentionally select the testimony of parties resident in the remote Highlands:

L. M. Matheson, Esq., testifies, that "none are vaccinated but those whom medical men vaccinate gratuitously. About three years ago, he went 20 miles distance from Portree, and vaccinated 87 children gratuitously."

Dr D. Macleod states, "That the poor people generally have not their children vaccinated,—they have no means of having it done, except when he does
it for them gratuitously; and they don’t seem very anxious about it, except when small-pox comes amongst them. Small-pox occurs very often, though it has not done so this year; young persons going to Glasgow in search of shearing, or other work in the low country, catch the infection, bring it home, and it spreads.”

We recommend our readers to examine the evidence contained in the Appendix carefully: and we feel assured they will be convinced, by the perusal of it, that the condition of the paupers over all Scotland, absolutely calls for some legislative interference to provide proper and efficient medical aid in time of sickness, and to secure them against the ravages of small-pox, by regular systematic vaccination. For ourselves, we fully concur in the statements contained in the fourth reason of dissent, tendered by Mr Twisleton, viz.:

“Because it is not proposed to render it compulsory on the Managers of the poor to provide medical attendance for paupers. The arrangements for medical relief, and the power of fixing the scale of remuneration to medical practitioners, are to be left exclusively to the local authorities, who deem that they have a direct pecuniary interest in fixing the scale of remuneration as low as possible, or in throwing altogether upon medical practitioners, as is very frequently the case at present, the burden of attending the sick poor gratuitously.”

For a long period of years Dr Alison has devoted the energies of his mind and body, in attempting to ameliorate the condition of the suffering poor, by bestowing his personal attendance during sickness, affording pecuniary aid with a free, and, we hope, judicious hand, and by bringing forcibly before the public and the rulers of the land, their wants, their sufferings, and the claims they have as starving fellow-men on their wealthier brethren. His labours of pure philanthropy have won for him the delightful reputation of being the “poor man’s friend.”

Dr Alison’s views have been so often brought before the notice both of the general and professional inquirer, that it would be a work of supererogation to enter fully upon their consideration here; the more especially after the remarks which we have made on the report of the Poor Law Commissioners. He believes that destitution is an inadequate cause for the generation of fever,—that it is not the sole cause of its extension, but that it is one cause of the diffusion of fever. To use his own language, “admitting that there are other known causes by which the extension of fever is frequently determined,—and admitting also that epidemics of fever, like those of small-pox or measles, arise, extend themselves, and decline, independently of the operation of any known cause,—I have stated, and still maintain, that the effect of this cause on such epidemics is so great and so well ascertained, that the repeated production and rapid extension of contagious fever in any community, may always excite suspicion of the provisions against destitution there being imperfect; and that where such extension of the disease is found by repeated experience chiefly to affect the poorest classes of the community, and spread upwards, it may even be held as a test of the inadequacy and inefficacy of the measures there adopted, for the relief of that poverty and suffering, which, as we are warned by Scripture, and farther instructed by the experience of all nations, are “never to cease out of the land.”

We fear we do not quite comprehend the meaning of the passage just quoted. We are at a loss to comprehend how a contagious fever can arise and extend itself, independently of any known cause. If it be independent of any known cause, then it is not contagious, and if it be contagious, then its cause is undoubtedly contagion and nothing else. Again, it is well known that all epidemic fevers, and most especially typhus fever, invariably affect chiefly the poorest classes. Plague, pestilence, and famine all go hand in hand. This fact, however, instead of proving that fever is a contagious disease, which propagates itself most readily where destitution exists, is one of the strong arguments of the non-contagionists. We believe, from personal observation, that it is the

1 Appendix, part ii. p. 394.
2 Page 2.
overcrowding of the poor—the close contact into which their poverty brings them with one another—that is the true cause of the spread of most epidemics in Edinburgh and Glasgow.

To those who assert that, in consistency with his principle, the fever might have been expected to have extended more than it actually did in Glasgow, Paisley, &c.; Dr Alison replies, that the mild character and limited diffusion may be held as indications of the epidemic ("which has never fully subsided since 1837,") being on the decline; that the amount of voluntary charity has been greater, and consequently the poor better provided for, and that there has been a greater immigration of strangers into those towns where funds were provided for the unemployed; "and we know that strangers, newly arrived at any town, are always persons peculiarly adapted for the reception and extension of epidemic disease." 1 Now, it is undeniable, that strangers of the lower class, newly arrived in towns, whether hale or sickly, well fed or ill fed, are very liable to suffer from the poison of fever. But this fact only proves that their means are not sufficiently ample to enable them to take other lodgings than those frequented and crowded by the poor, which, in Edinburgh at least, during epidemics of fever, we know to be the very foci of contagion.

We cannot agree with the substance of the following paragraph; we give it therefore as it stands that we may not misinterpret its meaning:

"But, in accordance with the principles which I have stated above, and which are exactly the same as stated formerly (Management of the Poor in Scotland, 2d edit., p. 10), it will be at once perceived, that the relation which I maintain to exist between destitution and fever is not simply that of cause and effect, but that of predispousion, favouring the effect of another cause, which is essentially variable. Where destitution exists, it prepares victims for fever, but the fever "bides its time." It springs from a specific contagion (at least, that is the only source from which we are sure that it springs), which rises and falls in intensity from various causes, known and unknown; but when, in the course of these fluctuations, it invades a community where there is a large amount of misery and destitution, its extension there is, ceteris paribus, much greater than elsewhere."

It is quite correct that destitution only predisposes to fever, just as it predisposes to all epidemics. The other cause, it seems, is "essentially variable," and yet, according to Dr Alison, it is a "specific contagion." "Specific" is diametrically opposed to "essentially variable"—it is something distinct, determinate, fixed, and invariable. It is impossible, therefore, that the cause of typhus fever can be "essentially variable," and at the same time a "specific contagion." We have neither time nor space, at present, to prove our opinions on this subject, but we may state them in one word. Perhaps in the main they do not differ much from Dr Alison. We hold that the cause of typhus fever, and of the other fever lately so prevalent, is, in each case, a specific poison, which will generate the disease in most persons submitted to it in the concentrated form in which it exists in hospitals and crowded lodgings.

The author, after giving several very interesting tables, showing the proportion of patients who were employed at the time of seizure, remarks:—"I beg it may be observed, that in this, as in other instances, I do not assert that destitution is the sole cause of this remarkable extension of fever; but I believe that a very simple calculation of chances is sufficient to demonstrate, that the above results could not have been obtained from so large a number of cases, unless the circumstance of destitution had been one of the conditions on which their taking the fever had depended."

We believe the facts, reasoning, and conclusion are correct; but they only prove, what has never been denied, that the poor are the great sufferers from epidemics of all kinds—but they do not necessarily prove that it is destitution. First, admit that destitution is the great cause of the spread of fever, and then the tables he gives would be strong proof of its correctness. But admit that
the want of physical exertion and mental exercise is the great cause of fever, and the same tables might be triumphantly quoted in support of such an absurd opinion. This shows the danger of first assuming a point, and then bringing forth supposed facts in support of it.

We are often asked,—"Why does fever seldom spread among the better classes?" Dr Alison replies,—"I have had many opportunities, in this, as in other epidemics of fever in Edinburgh, of observing, that there is no kind of locality to which the fever particularly attaches itself. The highest stories of some of the highest houses in the High Street and Canongate, and the lowest stories of some of the lowest in the Cowgate and Grassmarket, have been equally affected. I have named almost all the closes, stairs, and lands, in which the fever has chiefly prevailed, before I saw any of the patients there, (although many of these are changed since former epidemics), simply from knowing that these are inhabited by the poorest of the people; and from the conviction that this fever, like others that I have seen in Edinburgh, and like those described by Dr Cowan in Glasgow, and Dr Sym in Ayr, would ‘fix on the destitute wherever it found them.’"

Now, we would make this correction, and say—"would fix equally on rich and poor who may be subjected to the influence of the poison in an undiluted form, there being some additional chances of escape in favour of those who are well clothed and fed." We, therefore, say that, besides other comforts, the poor of our towns are in urgent want of fresh air. If we rest contented with remedying the evils which Dr Alison includes under the term "destitution," epidemic fever will continue to spread, but if, along with this, the poor are made to live in well-ventilated, and not unduly crowded houses, it will generally admit of easy isolation.

Dr Alison thinks that the misfortunes under which the poor labour are not by any means generally referable to their own misconduct, and adduces in proof of his opinion a letter from Mr Johnston, in which occurs the following statement:—"The cry, that drink is the sole cause of distress, comes only from those who wish some kind of an excuse for withholding their means; it could never come from those who have taken the trouble to investigate its causes." Here there is some truth: for we know that destitution is often the cause of dissipation.

The small number of benevolent individuals makes the burden of supporting the poor during the prevalence of an epidemic, press very heavily upon those who contribute. Dr Alison therefore insists on the necessity of some legislative provision for the unemployed, though able-bodied poor. Dr Chalmers and his followers would point to the encouragement that should thereby be given to idleness, or, at least, to diminished exertion, and the destruction of the independent spirit of the Scottish poor. Without entering upon this questio nezata, we think the arguments of both parties clearly prove, that the expense of maintaining and treating fever patients in hospitals, &c. during epidemics, ought to be borne by a general assessment, and not solely by private benevolence, as at present. Hospital accommodation, proportionate to the size of a town should always be had in readiness, so that it might be opened speedily, before disease can spread.

But mere hospital accommodation for the recovery of the fever patients is not enough. They must be looked after, till they are able to resume their ordinary occupation; and those who have been made orphans or homeless by the pestilence, must not be sent adrift on the town, to beg, steal, or starve. Every place, therefore, liable to the ravages of epidemic disease, ought to be provided with a convalescent hospital, as well as a fever house. On this subject, Dr Cormack has the following remarks in his Treatise on the Epidemic of 1843.

"Often have I known that heads of families, dismissed in good health, but too feeble to resume their employments, have gone back to their cheerless homes, only to pledge the few articles of furniture which they possessed, and thus at once to get involved in difficulties, from which they never could extricate themselves.

"I cannot imagine anything which would have a more powerful effect in repressing juvenile prostitution, theft, and kindred delinquencies, as well as in preventing the spread of careless poverty, and its constant companion, desolating disease—than a large and well-managed Convalescent Hospital. Is there no influential citizen in Edinburgh of sufficient energy to move the public in good earnest, in behalf of so noble an enterprise?" P. 170.

1 Page 18.
It seems unnecessary to follow out Dr Alison’s views in the remainder of the book. He argues strongly, as in former works, for a right to relief to all the destitute, from whatever cause their destitution may have arisen.

The appendix contains two interesting papers, entitled, 1st, Note on the application of the English Poor-Law, to the manufacturing districts. 2d, Note on the management of the poor in Berlin, as explained by Mr Laing, in his Notes of a Traveller. The author’s remarks on these documents all tend to prove his position—the necessity for a legal provision for the Scottish poor. The details of his plan for applying the English Poor-Law to the manufacturing districts appear correct.

The mode of managing the poor in some parts of Prussia, may be read with interest and advantage; the following presents a picture very different from what is seen in most of our Scottish towns:

“The parish of Montreux is divided into three communes; in one of these, Veytaux, there is not a single pauper, although there is an accumulated poor fund, and the village is of sufficient importance to have its post-office, its fire-engine, and watchmen, and has a landward population around. The parish is one of the best cultivated vineyards in Europe, and is divided in very small portions among a great body of small proprietors. These small proprietors, with their sons and daughters, work on their own land, know exactly what it produces, and whether the land can support two families or not. Their standard of living is high; they are well lodged, their houses well furnished, and they live well, although they are working men. There is no chance living, all that is wanted is supplied; and until a vacancy naturally opens, in which a labourer and his wife can find work and house-room, he cannot marry. The economical restraint is quite as strong among the labourers as among the proprietors.”

We would like to know the state of morality in such places as Montreux. What is the number of illegitimate births? In England, where they are as one to sixteen, illegitimacy is one of the most fruitful sources of penury and crime.

Dr Alison, in a postscript, dated May 1844, makes some important additional statements. He gives in a tabular form the extent and progress of the fever, and the funds raised for the support of those labouring under it, and although he has cause to praise the exertions of the benevolent, he thinks the means adopted for the prevention, have been lamentably unsuccessful, partial, irregular, and defective.

Repeated observation has convinced Dr A. of the correctness of the general opinion, that there were in Scotland two specific poisons, the one giving rise to the fever of 1843, described by himself, Dr Cormack, &c.; and the other producing the disease marked with the typhoid eruption. In support of his opinion he advances the following statement:

“That the two poisons are distinct, we judge from this fact, repeatedly and carefully observed, that a well-marked case of either form of fever, occurring in any locality previously unaffected, is followed by a succession of others, within narrow limits of space and time, all presenting the same characters, although occurring in different families, and, of course, in a great variety of constitutions; which would not be the case if the two forms of the disease were merely varieties resulting from the same poison.”

After adding some statistics, Dr Alison says, “The general result of this table is, that of 47 inhabitants, in the two highest flats, 37 took fever, and 10 escaped; while of 50 inhabitants, in the three lower flats, only 5 took fever, and 45 escaped.”

This table may prove exactly either the one or the other, according to the pre-conceived notion of the inquirer, viz., that the individuals in the lower flats had better ventilated houses, and kept them cleaner, or that they were better off, and had more to eat.

It must be remembered that the epidemic made its appearance just at a time when the working classes were pretty well employed, after a year or two of depressed trade. Dr Alison turns every circumstance to the advantage of the

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1 Page 51.
2 “Of 248,554 children registered, 15,839 were illegitimate;” i.e. 1 in 16 or 64 in 1000. In France the proportion is 71 in 1000.—Annual Report of the Register General for 1843, p. 10.
3 Page 60.
4 Page 65.
argument in favour of his particular views; and premising that we do not agree with him in every respect, we give the following passage entire.

"That so much destitution should exist in a year of returning prosperity, when the whole circumstances of the case are considered, is easily understood. A part of the destitute poor consists of those who are unable for work, or able only for 'light work,' for which the demand has not increased; another portion consists of persons able for work, but, sometimes from misconduct, sometimes from misfortune, not yet employed—or belonging to trades in which the depression still exists,—and who, a year before, would have been supported by the charity funds; and a third portion have regained employment so recently, that they are still destitute of all comforts. Nay, I am informed, that it has often been observed in Glasgow, as I have myself observed here, that upon men weakened by the privations of a long want of employment, the return to their usual habits of muscular exertion has proved the exciting cause of fever." 71

The remainder of the Postscript is principally occupied with extracts from the pamphlet we are about to speak of.

We are induced to notice Dr Perry's pamphlet, not only on account of the paramount importance of the subject of which it treats, but also in consequence of the fact, that the author has had very peculiar facilities of acquiring information, and is pretty generally known to have investigated the subject of Fever with very great attention. Dr Perry has been engaged in the active practice of his profession in the city of which he now gives this "Sanitary State," for a period of 34 years, and he has been officially connected with its Royal Infirmary for 25 years; so that his "facts and observations" are deduced from a most extensive sphere of experience, and ought to be studied carefully by every inhabitant of Glasgow who has the weal of his fellow-citizens at heart.

The aim and object of the pamphlet appear to us to be fourfold. The author wishes to prove, 1st. That the Epidemic fever, of which so much has been said and written, was the result of the privations and destitution of the poorer classes. 2d. That a poor law is necessary for the support in hospitals of the poor, afflicted with epidemic fever. 3d. That a board of health should be established in every large city, headed by a medical inspector; and, 4th, That hospital accommodation for epidemic fever should be provided and kept in readiness for any emergency which may occur.

The writer does not discuss the various topics quite so systematically as we could desire, but by leaving out the matter which appears somewhat irrelevant and superfluous, we will give our readers the advantage of his experience, and counsels.

For the two years preceding the appearance of this epidemic fever, the poorer classes in the city of Glasgow had suffered great privations in the comforts of life, and therefore, Dr P. thinks, were less able to resist "the external influences of an injurious tendency." In January and February, 1843, catarrhal affections, complicated with biliary derangements, were unusually prevalent. It was observed, that the most delicate class of patients were seized with rigors and exacerbation of fever after very trifling exposure, such as opening a window for the purpose of ventilation. As the season advanced, the cases became more numerous and the symptoms more urgent; severe headache, vomiting of biliary matter, and yellowness of the eyes and skin, were observed before the nature of the epidemic was understood, and consequently several of these cases were admitted as cases of jaundice.

In the author's description of the symptoms and sequel of the disease, we cannot discover anything which is not already known. He does not agree with those who assert that a fever of a similar character prevailed in this country in 1818; although he has been an attentive observer for upwards of thirty years, he has never witnessed a similar disorder. This statement of Dr Perry, when viewed in connection with the descriptions of the then prevailing epidemic, by Christison, Welsh, and others, has greatly astonished us.

He thus discusses the question,—What is the cause of the present epidemic? Respecting the immediate cause of any epidemic disease with which a community may be visited, very little satisfactory information has hitherto been obtained;
so that to give a definite answer in our present state of knowledge is beyond our power. Attempts have indeed been made; and those who have the least experience generally speak with most certainty on the subject. At present it is the fashion to ascribe every epidemic, whether malignant fever, cholera, dysentery, or influenza, to malaria arising from decaying animal or vegetable substances, owing to the want of sewers for carrying off such substances, and the scanty supply of water. There are perhaps few places better supplied with water than Glasgow; and I have observed on more than one occasion during the prevalence of malignant fever, that its progress was equally rapid and violent during a period of intense frost, when everything has been covered with snow, and the whole liquid substances in the streets firmly bound up for weeks together, without the possibility of any putrefaction going on. This was particularly the case in 1837, when the frost continued very intense for upwards of six weeks, when the number of fever cases was greatest; the same thing was observed at Moscow during the prevalence of cholera. It appears that some epidemics are spread solely by means of infection; there are specific poisons generated in the bodies of those who are undergoing the disease, and spread either by contact, or by the emanations from the bodies affected by the specific disease. This is the case with all that class of infectious fevers called exanthemata, as small-pox, measles, scarlatina, and typhus. There are other epidemics which seem to depend on some peculiar state of the atmosphere, predisposing the bodies of those whose constitutions are weak to suffer under their influence, of which the present epidemic affords a good example. This brings us to the more practical part of the question: viz. the causes which predispose persons to be affected with any prevailing epidemic: and in this inquiry very little difficulty presents itself, there are so many facts which attest that it is the poor and indigent part of the population who furnish the earliest (?) and by far the greatest amount of victims.”

In corroborating his views, the author refers to the reports in his appendix, from which it appears that the disease prevailed most extensively in over-crowded houses, where families of six, eight, or ten individuals were huddled together in small apartments, without beds, or with perhaps only a quantity of straw or filthy rags, emitting a smell unsupportable to those unaccustomed to it. Individuals residing in such places, and indulging in the most vicious habits, unquestionably are more liable to every kind of diseased action than those occupying well-ventilated apartments, and practising the virtue of temperance, but we think that throughout the pamphlet the author puts too much stress upon the “immense amount of destitution and misery” as the cause of the late epidemic. Circumstances equally favourable in every respect for the propagation of fever have frequently existed without giving rise to any epidemic such as that of 1843. It is necessary to distinguish between what originates and what favours the spread of an epidemic disease.

There is no single passage we can select which gives the author’s views of fever in general; but from a careful perusal of all his writings, it is evident that he considers the poison of fever to be generated by some as yet unknown agency, but not by filth, imperfect drainage, or bad fare. When the poison is generated, it is propagated much more rapidly in crowded, ill-ventilated apartments than any where else; and hence the imperative necessity of separating at an early period the sick from the healthy. The extent and progress of the epidemic in Glasgow will be seen by a perusal of the following paragraph and table. We have been privately informed, (with what truth we know not,) that the table is not quite accurate, but if such be the case, an opportunity of correction will be given. It is at first sight strange, that in district No. 10, there should have been no cases of this fever in May, and only 90 in June, although immediately afterwards it became one of the most severely visited.

“The number of cases of the present epidemic reported to the directors of the Town’s Hospital, as attended by the district surgeons during the last eight months, commencing May 1843, amounted in round numbers to 14,000, as seen by the table. Of those occurring in Calton, Bridgeton, and Anderston districts, I have got no accurate return, but it is certainly within the mark to estimate it at 7,000; those in the Gorbals and Tradeston districts at 2,000; those treated in the Infirmary during the same period at 3,000; those who were attended by private practitioners, not in the poor roll, at 5,500; and those treated in the
Barony parish, in the suburbs, without the parliamentary boundary, at 500; making a total of 32,000, cases of epidemic fever in Glasgow and suburbs, during the last eight months, from the beginning of May till 30th December, exhibiting a fearful amount of poverty and disease; as it affected the poorest and most destitute of the population. Great as it is, however, I have been assured by various practitioners who have attended the poor, that the estimate is far too low.

The following TABLE exhibits a monthly return, for eight months of the New Cases of Fever, as they occurred in the different Districts throughout the City, among the pauper population; the progress of the Epidemic from one District to another, also the number sent from each District during the same period to the Infirmary, showing how inefficient were the means employed for checking its progress by isolation.
The following passage proves the ratio of mortality. We, however, place no
dependence on the number of coffins given out by the town's hospital. It may
be true that all on the poor's roll do not apply for coffins, but we have it on
the authority of unexceptionable parties, (district surgeons and others) that it is
equally true that the grave is frequently deprived of her just rights: that coffins
are frequently obtained for the purpose of being converted into matches and
faggots for the benefit of the west end. We are, therefore, of opinion that the
\textit{coffin statistics} prove nothing.

"The returns from the Glasgow Royal Infirmary show a mortality from the
fever of 5 per cent. The city district surgeons estimate theirs at 3 per cent.,\textsuperscript{1} but from the table of the number of coffins given out by the town's hospital to
the poor during the epidemic period, it is probable that there is some fallacy, as
it is known that all the poor on their roll do not apply for coffins, and that during
the epidemic period there was a remarkable immunity from all other dis-

edases. If we subtract 500 from 1346, it leaves 846, being more than the whole
number of coffins given out during the whole of the previous year, giving a propor-
tion of mortality to the epidemic in the city of about 6 per cent. during the
eight months of its prevalence; but taking the whole at 5 per cent. the
mortality will amount to 1500 as the result of the present epidemic during a
period of eight months."

We cordially acquiesce in the sentiments expressed in the following para-
graph:—

"Credit has been taken for the saving supposed to have been effected to the
community, by treating the poor in their own houses, in place of sending them to the Infirmary, where their keep and treatment would have cost the community about 15s. or 20s. each, whereas it has been assumed that it only cost the public a few hundred pounds. Against this doctrine I beg to enter my most solemn protest, and if those who hold this opinion believe the disease to have been contagious, I ask, if the public had possessed the means of isolating the first cases as they appeared, by sending them to an hospital, would the epidemic not have been checked? and in place of having 32,000 cases, with all their ac-
companying sufferings, it might have been limited to less than 5,000?"

Dr Perry is not the only writer who has expressed his disapprobation of the
\textit{stinted} charity of the Glasgow officials. Mr Deuchar, a person unconnected with our profession, in his observations on the prevalence of the epidemic fever
in Edinburgh and Glasgow, thus expresses himself:—

"The small amount of relief afforded in money in Glasgow, (viz. L.283) ap-
pears to be little more than a mockery of charity. There is surely a wide discre-
pancy betwixt the amount of necessity alleged to have existed, and the amount of
relief alleged to have been afforded. Each of the seventeen district surgeons, it appears, was allowed to distribute about twenty-three shillings per week! How 'a vast amelioration' was thus \textit{effect}ed in the state of so many persons in
the condition described, it is rather difficult to conceive.

"These observations cannot be considered out of place, for this is not a question of mere local importance, it is a matter which deeply involves the in-
terests of the whole community.

"In Edinburgh, matters have been conducted in a very different manner, and
with better success; for instead of expending a trifling sum in \textit{penny tickets}, the
Fever Board has expended about L.10 per week in removing patients to the
hospital, and cleaning houses; while the extra contribution of the public in aid
of the hospital funds has, during the last few months, amounted to above L.6000,
in addition to a late contribution for the unemployed, which amounted to L.6400; and the Destitute Sick Society has expended during last year a large
amount in supporting the diseased poor and their families." P. 6.

Perhaps the most important part of the pamphlet is that which refers to the
measures which the author recommends for the purpose of averting, or mitigat-
ing, the calamitous visitsations of typhus, or epidemic fevers. His recommenda-
tions we give in his own language:—"If I am asked what measures I would

\textsuperscript{1} We are in a position to prove that the rate of mortality has been \textit{understated}, and the number of cases possibly \textit{overstated}, in Edinburgh, Glasgow, and elsewhere. To this topic we intend to revert when noticing "The Glasgow Bills of Mortality," by Dr A. Watt.
recommend, I answer in the first place, let the authorities earnestly urge upon the legislature the necessity of a poor law, by which the whole property of the country shall be taxed, for the support in hospitals, of the poor afflicted with epidemic fever. Let there be a board of health established in every large city and town, at the head of which there is placed a medical inspector, whose duty it will be to receive reports, visit, and inspect the different districts of the city. Whenever epidemic disease is reported, let him give in his report to the board of health, whose duty it shall be to cause the proper officers to remove the infected, and have the houses cleaned and purified, and, with the assistance of the police, keep a strict surveillance over all lodging-houses. We have already part of the machinery constructed under the cholera act, when a board was appointed for the suppression of that pestilence. Such is a short outline of the plan which I think ought to be urged upon the Government by the authorities, and I am satisfied it will not be refused. By such a measure the saving of sufferings to the poor, and of funds to the community, would be incalculable. At the same time, hospital accommodation for epidemic fever ought to be provided and kept in readiness, for any necessity that may occur."

Let us consider these measures seriatim.

1st, Nothing can be more just or equitable than that the whole property of the country should be taxed for the maintenance of the destitute poor labouring under fever. At present the whole burden falls upon the authorities in large towns, or on a few philanthropic individuals. It is a well known fact, that parties from the surrounding villages, labouring under epidemic disease, are frequently despatched in carts, and other similar conveyances, and left in the precincts of Glasgow, to find their way to the police-office, and from thence to the Infirmary. Several instances of this kind came before the public notice in the course of last winter, and we are informed that the practice is pursued on a somewhat extensive and systematic scale. In fact, every parish seems anxious to avoid the expense of maintaining the unproductive pauper population, and "the effects of man's cupidity are exhibited" more generally than Dr P. would lead us to believe, in the following sentence, if we understand him correctly.

"It is in large cities where the greatest amount of misery is to be found, and the darkest picture of the effects of man's cupidity is exhibited. There the human species, more vicious than their inferiors, are seen preying upon each other, each in his own way, from the monopolist down to the common thief, the former with the sanction of the law, the latter by stealth and violence." Pp. 7, 8.

2d, We quite concur in the opinion of Dr Perry, that a board of health in every large city, with a medical inspector as the chairman, would be of incalculable advantage.

3d, But the third and last recommendation appears to us of the first importance. To check the ravages of an epidemic, the first step to be taken is the separation of the sick from the healthy, and this can only be effected when hospital accommodation is in readiness, and can be immediately put into active operation. The system of "securing the door when the steed is stolen" is always to be deprecated, but never more so than when a pestilent disease is extending its ravages, and laying prostrate large numbers of the productive classes. We understand that the managers of the Glasgow Royal Infirmary have for some years possessed ground for a new Fever House, in a convenient part of the town, and it is to be hoped the liberality of the public will enable them to complete a suitable erection before the appearance of another epidemic. Dr P. deserves the thanks of the public for bringing the subject so forcibly and prominently before the civil authorities of his city.

The appendix to the pamphlet contains seventeen reports by district surgeons, and others connected with medical superintendence of the poor, which are highly creditable to the various gentlemen who furnished them, more especially as none of them were aware that their communications were intended for publication. "In a few cases," says Dr P., "I have failed; whether from apathy in obtaining any statement, I am not prepared to say." We trust apathy was not the cause of failure; we think it is more likely to have been overwhelming occupation. These reports give a very melancholy picture of the habits and condition of a large number of our fellow-beings, and must be read
by every one with deep and painful interest. It appears that the individuals with whom the district surgeons had chiefly to deal, belonged to the very lowest grades of society, such as (a few) labourers, hawkers, beggars, thieves, and prostitutes, all occupying ill-ventilated hovels, and manifesting a total disregard for cleanliness. The practice must, therefore, have been anything but pleasing, and cannot have afforded any scope for useful clinical study of the fever. Indeed, it appears that the diagnosis required occasionally to be formed through a door, window, or wall!! At page 25 we are told, “At the corner of Mews Lane and Pettigrew Street, there is a new building of four stories, five of which houses do not exceed five and a half feet square, yet in one of these houses on the ground floor, there was a man, his wife, and four children, all of whom had fever at one time. As they occupied the whole space as a bed, I frequently could not gain admission, and had to supply them with what was necessary through the window: no death occurred in this family.” After reading this painful, and, we doubt not, faithful picture, we were very much startled by finding the same gentleman conclude by stating, “I am decidedly of opinion that pauper patients under fever, treated at home, have a better recovery than those we send to the Royal Infirmary.”

Surely there must be some mistake here. We can barely conceive circumstances more unfavourable for any invalid. In this apartment of five and a half feet square were confined, during the course of an attack of epidemic fever, no fewer than six human beings. We have the testimony of the medical attendant, that access could not always be had to the apartment, and, consequently, no philanthropic hand could administer even a draught of water to their feverish lips, or remove the evacuations from their dismal cell; under such circumstances, we maintain, that it was the imperative duty of the officials to have afforded the family hospital accommodation, and if, cognisant of the real state of matters, they left them to their fate, they incurred a very serious responsibility. True, none of the family died, but neither the directors of the Town’s Hospital, nor the medical attendant seem to have contributed much to the fortunate event. We could cite many neglected cases, and families among whom there were no deaths; but we have hitherto been in the habit of attributing this to the mildness of the disease, not to the circumstance of their having been neglected.

We are convinced that Dr Perry undertook the task, which he has so well executed, from motives of pure philanthropy, and we cordially wish that his labours may have the effect of rousing the official and influential men of Scotland, so far, at least, as to induce them to give the subject-matter of the pamphlet their most serious and deliberate attention. The pamphlet is dedicated to the Lord Provost of Glasgow, and we observe by the public papers, that it has been brought under the notice of the Directors of the City Poor’s House, and the Town Council. These bodies will not in future have ignorance of the existence of the present state of matters to plead as their excuse, after this serious warning and remonstrance by the President of the Faculty of Physicians and Surgeons of their city.

Mr Deuchar, who, in his official capacity, as Secretary to the Edinburgh Fever Board, has had very favourable opportunities of judging, lays before the public, in a lucidly written pamphlet, the results of his observation and experience. We regret we can only give a few extracts, showing the prevalence of fever per month for a series of years, and a few of the suggestions he proposes for the improvement of the public health.

“The following Table will show the number of cases per month during a period of nine years:

| January | April | July | October |
|---------|------|------|---------|
| 1166    | 701  | 631  | 888     |
| February| 810  | May | August |
| 749     | 678  | 784  | November |
| March   | 845  | June | September |
| 712     | 784  | 74  | December |

"The same result is observed in other places. Thus, in Glasgow, the numbers in 1838 were,—in

| January | August |
|---------|--------|
| 502     | 218    |
The following suggestions are submitted, with the view of calling attention to the subject:

"First, It is manifest that a new poor law is essentially necessary.

"1. A change in the law of residence and settlement is essential, so that each parish may be compelled to support those who in fairness and justice can be regarded as its own poor.

"2. The rate of relief to the sick, disabled poor, widows, and orphans, ought to be much more liberal.

"3. There ought to be a board of managers for every city, elected in the same manner as the board of police, and in each district there should be a local board with a surgeon attached, the representative at the general board being chairman at the local board. The general board would thus possess all the united experience of the local boards.

"The local boards ought also to have the power of inspecting all houses under a certain amount of rent, and of ordering the proprietors (not the occupants), to repair and clean them periodically, or when certified to be necessary, or otherwise to prohibit them from being let. Internal cleanliness in the dwellings of the poor would thus in a great measure be secured.

"4. A plentiful supply of water ought to be provided for the poor gratis, and baths erected at the public expense.

"Secondly, The Police act ought to be enlarged so as to enforce external cleanliness and drainage where necessary.

"Thirdly, Fever hospitals should be erected in various districts, and fever boards instituted in every city where none exist.

"The observations contained in the preceding pages, showing the benefits which must have arisen from the removing patients to the hospital, were intended to bear upon this point. And with the fearful example of Glasgow before us, where so many patients are treated 'at their own homes,' it is impossible to deny that the removal of patients to an hospital under proper regulations, is the only certain means of checking the increase of fever, which is so evidently promoted by the crowded state of the dwellings of the poor.

"Fourthly, In connection with the hospitals, district surgeons should be appointed, whose official duty it should be to visit the sick poor, and take measures for the instant removal of fever patients, and to direct their houses to be cleaned and fumigated when necessary. The expense of maintaining the hospitals would fall to be paid out of the assessment.

"Lastly, As it has been shown, that the working classes and their families are the principal sufferers from fever, it is their duty to exert themselves, and to adopt measures calculated to improve their condition."3

In concluding our analysis of the works the titles of which prefaced this article, we would most earnestly implore the profession to use their influence with the public to secure for the poor food, ventilation, and medical care. Let there be an efficient sanatory board established in every large town, and suitable medical supervision in the rural districts; and let it be remembered that no system will be likely to do good unless the labours required from practitioners be sufficiently remunerated.

1 In Glasgow, there are "District Surgeons;" but not in Edinburgh.  
2 Page 11.  
3 Pages 18, 19, and 20.
When we direct attention for a moment, to the great proportion of our race, assailed by the ravages of Scrofula in its various forms and modifications, (amounting it is said to not less than one third,) and consider how often it forces itself upon the anxious notice of the physician and the surgeon, mocking the most assiduous efforts of their ingenuity and skill, it is impossible to regard with indifference the many attempts which are now being made for its further elucidation. Among these the elaborate work of M. Lugol holds a distinguished place. And when we remember, that this able physician has for 25 years directed particular attention to this subject in the Hôpital Saint Louis, and very extensively in private practice, and is already known to the profession by his Treatise on the Use of Iodine in these complaints, no one can turn to this additional work, embodying an account of his experience in a particular and most important department of his labours, without the liveliest expectancy and interest. It was with feelings of this character we opened the volume, and we have not been disappointed. We proceed then with pleasure, to lay before our readers, such an analysis of its contents as our space admits, trusting it may prove interesting in itself; and direct to the original, the especial attention of all whose opportunities allow the further prosecution of the subject.

As the title implies, the present work is entirely confined to the causes of the disease. But before entering upon his proper subject, M. Lugol endeavours, shortly, in his preface to convey a general idea of scrofula, a task which has ever been found to be no easy one. Manifesting its terrible effects even in intra-uterine life, it produces abortions in consequence of which more than a fourth of the subjects affected by it perish before they see the light; after birth it arrests their development moral and physical, it complicates all their diseases, all the evolutions of their childhood and youth, rendering these difficult and full of danger. Its presence is revealed by a number of morbid states, whose common origin has been hitherto overlooked, and which, in consequence, have been described by authors as so many different complaints. Affecting the mucous membranes, it manifests itself in the shape of particular varieties of ophthalmia, coryza, leucorrhœa, &c.; in the dermal tissue, in the form of abscesses, ulcers, or cutaneous affections, such as eczema, acne, &c.; or attacking the osseous system it produces caries, rickets, necrosis, &c. In a word, the disease may assail every tissue, and every organ, and its development in one of these should always make us dread its invasion of some other parts of the system. The same observations may be applied to families. Appearing in one child its development is to be feared in the others; and the remark may be extended to the different branches of a family. In whatever form, however, scrofula may show itself, whatever be the number of its symptomatic expressions, whatever apparent differences these may offer, they have, nevertheless, a common physiological whose aspect reveals the presence of the scrofulous taint. What this taint or vice essentially is, M. L. does not attempt to define. "We can only affirm," he says, "its existence whatever that may be, and that it is congenital, and always reveals itself by the development of tubercles; this production is, in fact, scrofula itself, its anatomical and pathognomonic sign—that which characterises it and gives value to all the other symptoms." In other words, let a patient be affected with ophthalmia, leucorrhœa, ulcers, abscesses, caries, white swelling,—these are all regarded by M. L. as of a scrofulous origin, provided there is a concurrence of tubercle either in the patient himself, or his immediate relatives. In his eyes "tubercle has the same origin and follows the same mode of formation as other organs; it is itself a species of organ endowed with its own peculiar life like the spleen and liver; like them it has its spontaneous evolu-
tion; it is a pathological production which modifies deeply all the organic elements, and consequently their functions, and impresses on those subjects affected by it a peculiar temperament (complexion) viz., the tuberculous temperament, an original one, whence tubercles subsequently arise, and which again may invade every tissue and produce a number of maladies which are improperly called scrofulous." *Preface*, p. 6.

This statement may be considered by our readers as somewhat obscure and incomprehensible, and this we are not disposed to deny. The author’s meaning we take to be this,—that scrofula has a constitutional origin,—which manifests itself by a peculiar physiognomy,—but which for a time may be kept in abeyance. Under favouring circumstances, however, and in the long run, it will manifest itself in the formation of tubercles; and these tubercles become a new taint or poison, which again, even more powerfully than the foregoing, invades the other tissues, and destroys the unhappy sufferer. Tubercle, in a word, is the chief exponent of scrofula.

Many morbid states, he well remarks, have hitherto been erroneously separated, which all derive their importance, and should be referred to this one disease, and it is owing to this separation, and to our not studying the disease in its unity, and as a generic one, that our acquaintance with it is so unsatisfactory; and its elucidation so long retarded. Thus, a mother having four scrofulous children, brings them to the hospital for admission,—“the first is affected with white swelling; and given over to the surgeon; the second is phtialical, and sent to the physician; the third has ophthalmia, and is sent to the occultist, whilst the fourth, having subcutaneous tubercles alone, is recognised as scrofulous, and sent to the Hôtel Saint Louis. Who, however, will affirm, that these four children do not carry within them the germ of a common vitiation,—a scrofulous vitiation, and yet they will each be submitted to very different modes of treatment.” *Preface*, p. 7.

The Causes—are all referred by Lugol to three separate heads, viz., the hereditary, the pathological, and the external.

Hereditary transmission from parent to child he found, in far the greater number of his observations, to be the source from which he could most readily trace its origin. In those families possessing the scrofulous diathesis, the children are endowed with a peculiar appearance and temperament, the scrofulous temperament, common to all, and which reveals the fatal tendency to disease with which they are tainted. This peculiarity of temperament exhibits itself in a combination of external marks, or physical signs, which may be either so prominent that they cannot be mistaken, or so slight that they may be overlooked, in consequence of the individuals possessing otherwise the elements of a sound organization, and which, for a time, may conceal the morbid disposition they have inherited from their birth. It has been generally stated that light hair and a fair skin more usually accompany this diathesis, than those of a dark colour. Lugol, however, states that he has seen few with light hair; in more than the half it was black; and in the others it was generally of an auburn colour, and more frequently a dark auburn than a light: the same observations apply to the eyes and skin. We believe his remarks are quite applicable to France, whilst, in this country, scrofula still more frequently manifests itself in those of a fair complexion; in both, however, we imagine it no very difficult matter for the experienced eye to detect the scrofulous diathesis, although it would be exceedingly difficult to define minutely and clearly the peculiarity in words.

But in addition to the physical signs, there are, according to Lugol, two principal characters by which the hereditary nature of the disease may be recognised; and these are, 1st, The prevalence or universality of the disease in a family; and, 2d, The great mortality occasioned by it in that family, a mortality so great, that it can only be referred, he conceives, to the disease having its source in a common origin, viz., that of the depraved health of the parent. Scrofula he believes to be the most active agent in the destruction of the human race; it not only has victims more numerous, but also at an earlier period of life, than any other disease. Parents who transmit this disease to their progeny, may
either have inherited it themselves, or have contracted a state of disease which shows itself in their progeny in the shape of scrofula.

As regards the former, the disease may be transmitted, or arise from parents either actually scrofulous at the time being, or who have at some period of their life been so, even though at the time they are in the enjoyment of good health. It may also be transmitted from those believed to be exempt from the disease, but whose immediate relatives are afflicted with it.

Tubercle being the predominant character of scrofula, it may be transmitted from those labouring under phthisis; the connection indeed between the two complaints is marked and intimate, and in proof of this, M. Lugal states, that in his wards, containing upwards of 80 beds, he has been able to demonstrate that phthisis had manifested itself in fully a half of the parents of those under his care for scrofula, and that the natural termination of this disease is death by phthisis.

The transmission of the disease he believes to be inevitable when it has its source in the father; but this law he has found liable to some rare exceptions, as in the case where a healthy man procreates from a scrofulous female. It was also, we may remark, an opinion of Cullen, that scrofula was oftener transmitted from the father than the mother.

When, however, M. L. states that scrofula arises from hereditary transmission, he does not mean to affirm that it arises exclusively and directly from scrofulous parents; if it had no other origin, and this an independent one, it would not long afflict the human species, for it would become extinct with the death of those who were thus afflicted. “It is perpetuated and propagated not because it has a single origin. It arises from several sources or states of disease, all however, tending to enfeeble the procreative power of man, and render his progeny scrofulous.” Accordingly, “it will be found,” he says, “that man originally healthy acquires certain morbid states of health which he transmits to his children under one of the forms of scrofula; and thus he becomes the origin of a scrofulous race, and this in consequence of his own imprudence,” p. 116. The infirm conditions here alluded to, are all of such a kind, that the powers of reproduction are weakened, and they may be developed by other infirmities, such as the progress of years or other physiological causes. Syphilis, for example, he conceived to be one of the most common causes of hereditary scrofula; but, as may readily be supposed, it is very difficult in this instance to trace the hereditary transmission. A man may know that his parents have been afflicted with gout, tubercles, &c., but he seldom knows if they have had any syphilitic complaint.

The resemblance between syphilitic and scrofulous complaints is sometimes so great, that a natural relation between them has often been supposed, and some, as Stoll, Rosenstein, Portal, and Alibert, have gone so far as to regard scrofula as a mere transformation or degeneration of the syphilitic virus. “But, however great the resemblance between many of the symptoms in these two diseases, they are nevertheless perfectly distinct. Syphilis is contagious, scrofula is not. Scrofula may arise from syphilis, but the latter never originates from scrofula; a man in the most robust health may become syphilitic in a few minutes, and be cured in a few weeks, whereas scrofula is generally the sign of an organic predisposition, which we can only cure by a long and continued course of treatment,” p. 122. In fine, primary syphilis only begets syphilis, whilst the syphilitic cachexia which is no longer contagious by venereal intercourse, may be transmitted under the form of scrofula or other pathological states. Whatever in fact tends to weaken the reproductive faculty in man may thus become a cause of this disease, and under this class of causes may be included the abuse of venereal pleasures, too early marriages on either side, and a disproportionate age between the parents.

It is sometimes stated as a curious circumstance connected with the history of these hereditary diseases, that they frequently pass over a generation, affecting, it may be, the grandfather and grandchild whilst the intermediate parties are exempt from them. This account of matters, however, Lugol conceives has arisen from ill-observed facts, and that there is in reality no such exemption in
the intermediate race. "The opinion," he says, "that scrofulous diseases pass over a generation is perfectly gratuitous; a father born of scrofulous parents and who has children affected with this disease, is himself scrofulous,—and the proof is his progeny; otherwise we are affirming that a man may give that which he has not,—that there may be an effect without a cause," p. 160.

The whole chapter, extending to 74 pages, on the hereditary nature of the disease, is exceedingly interesting and well worthy of perusal. This is true, not only because he gives ample details of the many cases which have fallen under his notice, and these in one generation only, but also because he traces the manifestations of the disease, whether latent or conspicuous, through all the lateral and affiliated branches of the families in which it has occurred.

Believing hereditary transmission to be the general cause of scrofulous diseases, the only one he has been able to recognise and verify, he has, he says, devoted a larger space to its consideration than may be thought necessary; but it is only by analysing the hereditary taint under every aspect, that another subject, of no less importance, the intermarriage of scrofulous subjects, can be appreciated. Society should interfere to prevent such marriages. The law, he states, interferes so far as to declare the marriage tie indissoluble, and this with a view to the interests of the children; and, he argues, should not its care be equally extended to procure for them the first of all blessings, a sound state of health. How many marriages, he adds, do we not witness every day, which carry within them the germs of all the infirmities scrofula is capable of producing,—what can be expected from them but a source of misery to the parents in witnessing the sufferings and death of their children, one after another, by a hereditary disease. Can there be any prospect more dreadful? The subject is no doubt surrounded with difficulties, but that is no cause why society should be left a prey to the many evils arising from the propagation of hereditary diseases. The task of preparing laws on this subject, he thinks, should be committed to men of science. The subject is indeed a difficult one; and we cannot but fear that science would have little prospect of success in contending with it, involving, as it does, so much of the short-sightedness and selfishness of man. Such matters can only be combated by an appeal to principle and correct moral feeling. Physicians have frequently, unanimously, and urgently, protested against matrimonial alliances among the unhealthy, and the intermarriages of those nearly allied by blood, but with how little practical effect? The simple peasant well knows that his seed-corn degenerates in a few successive crops,—the man of science and the agriculturist are familiar with the fact that farm stock must be crossed, and that breeding in must be avoided; and yet how constantly are we seeing individuals, in other respects prudent and intelligent, proceeding, in respect to themselves and their own race, necessarily creating misery and woe, as if such laws had never been recognised, and such marked and melancholy results had never been experienced.

The chapter on pathological causes, as well as the one which succeeds, may be considered rather as subdivisions of his subject than independent ones. All the causes to be reviewed in these two latter, he considers as merely occasional, and they are brought under notice more with a view to facilitate the study of the disease, than because they are efficient causes of it. "They no doubt," he says, "favour the invasion and development of these diseases, but rigorously speaking, there is but one truly generating cause, and that is transmission by hereditary descent," p. 294.

Pathological causes.—The development of scrofula after the exanthemata, has often been noticed; and in such circumstances its origin has been attributed to the effect of these diseases. In reviewing their influence on this disease, M. L. remarks that whatever relation they may have with it, these can only be regarded as excitants or complications, but never as inherent causes. Many other morbid states, such as catarrhal fever, worms, painful dentition, &c., erroneously considered as pathological causes of the disease, are rather to be regarded as its first symptoms, or as a peculiar mode of invasion. This manner of viewing the subject, he says, has been entirely overlooked by his contemporaries, both in their theory and practice; the medical treatment of children being
far too antiphlogistic and debilitating, having no regard either to their temperament or predisposition. The abuse of blood-letting in children he considers as one of the most common causes of the irremediable impetus often given to scrofulous diseases. Its abuse is the cause of scrofula in this sense, that it creates feeble subjects, the future parents of a feeble or scrofulous race.

He next considers pregnancy and parturition in their relations with scrofula; these in a healthy woman are generally simple and natural functions; but if either parent is scrofulous, they then become complicated. Pregnancy often exercises a marked influence on the progress of scrofulous diseases,—thus it retards phthisis; but on the other hand, the scrofulous taint re-acting on the product of conception, often becomes a cause of abortion. Such abortions may have their origin either in the morbid state of health of the father or mother, or in that of both.

Progeny scrofulous by the father’s side, if the mother is strong and healthy, may derive sufficient nourishment to enable it to reach the full time. But if the procreative powers of the father are greatly enfeebled, and similar debility exists on the mother’s side, the progeny will not be endowed with vitality which shall enable it to pass through all the phases of the fetal life, just as grains deteriorated in quality cannot germinate in the richest soil. When the mother alone is scrofulous, abortion may take place; if her health, however, is much deteriorated, it is very apt to occur. The child scarcely assumes vitality ere struma develops itself, and grows with its growth. The circumstances in which it is placed favour the development of the complaint, and abortion is the consequence. Ceteris paribus, however, this event has its origin more frequently in the infirmities of the father, than in those of the mother. Again, abortion is almost a necessary consequence when both parents are in feeble and indifferent health. Conception, then, proves but a cruel deception. The fruit of such alliances often fails to struggle into life, and if it issues into the light, its lot proves nothing better than an ephemeral existence oppressed with infirmities.

Many of the causes to which abortions have been attributed,—a false step, fatigue from walking, carrying too heavy a burden, grief, fright, anger,—have little or no effect in producing this result in a well constituted woman; indeed, if these circumstances were causes of abortion, few would reach the full time, all being more or less alike subject to them. When, however, abortion has its source in the morbid state of health of the parties themselves, it generally arises without any apparent external cause. “Spontaneous abortions,” says M. L., “are numerous, but in order to recognise them, we must make ourselves acquainted with all the antecedents and coincidences, two sources of diagnosis too much neglected in our day; of this any one may be convinced by a perusal of the article Abortion by the late Desormaux, in the Dictionnaire de Médecine. The article contains many good things, and, among others, his observations on medicines reputed abortive. He remarks, with justice, that these often fail in their effects, and do not produce the evil intended, even though they be powerful enough to cause the death of the woman. But he makes no mention of the species of abortion which now occupies our attention, yet of all it is the most common in our day. I should say that it alone is of more frequent occurrence than all the others put together. Had the attention of Desormaux been less directed to local causes, he would have better understood the bearing of all such criminal attempts to procure abortion by means of emmenagogue remedies. He would have seen in these facts the insufficiency of the local causes of abortion which he has mentioned, and he could not have failed further to see, that in those families where abortions are frequent, the cause is to be sought in the diseased health of the father or mother.” “Spontaneous abortions are a most interesting subject of study. An abortion from a local cause is an isolated fact, without value for the future. If a woman has an abortion in consequence of having taken too long a ride on horseback, carried too heavy a burden, &c., it is sufficient for her to avoid these causes in future, to enable her to reach her full term; but it is very different in the case of spontaneous abortion. Here the effect is in actual operation. This abortion will be followed
by many others, unless we comprehend the cause which has produced the first, and under the inspiration of sound doctrines apply the proper remedies.” Pp. 259, 260.

Should a woman, however, escape abortion, and go her proper period, her labour will be slow and painful, and this owing to her own state, and that of her child, both concurring to render the delivery difficult. One cause is a laxity and debility of fibre; but there is another equally frequent, and often coincident with this, viz. a hypertrophical state of the spongy bones of the pelvis. In one case of this kind, where labour had continued for three days, the mechanical hindrance was overlooked, but was discovered by M. L. three months afterwards.

External causes.—The concluding chapter of the work is occupied with a critical examination of the external and occasional causes which are sometimes considered as productive of struma.

Under this head he reviews the effect of climate and seasons, of vaccination, of infirmities of the generative and uterine systems, its alleged spread by contagion, by the inoculation of scrofulous matter, by cold, moisture, &c. &c. All these he considers as capable of rousing the latent germs of the disease into activity, and of aggravating them when so caused, but as altogether incapable of themselves originating or producing them. We had almost forgotten that, at one time, the Medical Faculty of Paris deliberately found and decided, that scrofula was contagious in its nature; and that the French Parliament and other governments prescribed laws for guarding against its spread and ravages. On this point the author remarks, “Although we have now for twenty-five years watched scrofula in all its forms in a vast number of patients, we have not been able to discover a single case which owes its origin to contagion.” P. 331.

From a careful examination of so many particular cases and general facts, M. L. thinks himself entitled to draw the conclusion, that the exciting or occasional causes enumerated by authors, have no inherent effect on the production of the disease, and that when scrofula manifests itself under their influence, it is to be ascribed to the constitutional predisposition of the individuals; that when these occasional causes operate continuously, they always prove most injurious to man, and that wherever they exist in a community, there the rising generation will be emaciated and feeble.

The study of the occasional causes as bearing upon the communities which are under the charge of the public authorities, has already, and especially within the last few years, had great influence on the well-being of these communities. The rights of humanity are now respected in jails and prisons far more than they were wont to be, and epidemics in them are far less frequent than formerly. The privations and hardships of our mariners are now greatly mitigated, their food is more nourishing, their repose better secured, and their accommodation and comforts greatly increased; and hence, within the last half century, many naval expeditions have been undertaken, and scarcely a vessel has exhibited a single example of those distressing epidemics, fever, scurvy, dysentery, &c. &c. The same remarks are applicable to the military service, where the barracks, food, ventilation, and many such matters have undergone great improvements, with corresponding results in the superior healthiness of the troops.

Nor are these efforts at improvement confined to the public services. In our municipalities, and in private life, these subjects are beginning to vindicate for themselves the attention they alike require and deserve. Common sewers have been cut, narrow lanes and streets pulled down, insalubrious manufactories removed; much, moreover, has been done in regulating and deepening the courses of rivers, and in supplying public baths.

The food of the lower orders, though not all that might be desired, has unquestionably greatly improved within the last half century, and there has been a comparative melioration in the comfort and morals of the great mass of our people. Scurvy is one of those complaints which, from such causes as these, is now rarely or ever seen. The diminution of the number of diseases in those towns and districts where the rules of health are carefully attended to, demonstrates the evil agency of those occasional causes of the disease now under con-
sideration; and shows how carefully every community should endeavour to remove and prevent them. Scrofula would assuredly be less common among the poorer classes if their food were more substantial, and among our factory population, if they were not overworked. But these remarks, however true, and based on the incontrovertible principles of science, cannot conceal the appalling fact, that scrofula often produces a frightful mortality in families where all these external and occasional causes are wanting, and where the children receive all the attention which wealth, care, and luxury can bestow. Every medical man knows that there are opulent families, in which children cannot be reared. Their number may be above the ordinary average; but they are speedily worn down by hydrocephalus, mesenteric, and other tuberculous affections, by worms, convulsions, and other complaints of scrofulous origin, which destroy the offspring of families in the most affluent circumstances. Instances of this sort, though far from few, are not sufficiently considered. In them are exhibited all the potency of original predisposition; and to an extent which mocks and resists all rules as to regimen and treatment, however judiciously and faithfully applied.

We strongly recommend our readers to study the work of M. Lugol: and we are happy to be able to announce that Dr Cowan, the talented translator of Louis on Phthisis, is preparing an English version of it.

PART THIRD.

PERISCOPE.

PRACTICE OF PHYSIC AND PATHOLOGY.

Case of Singular Formation of Cataract. By Fron-Mueller.

A MERCHANT, aged 65, who had previously enjoyed good health, while sitting one day opposite a window was struck in the face by a sun-beam, and suddenly experienced severe pain in the right eye. The pain soon diminished; but vision, which was previously perfect, was quite lost on that side. He was seen three days after by Fron-Müller, who discovered a lenticular cataract of the right eye. On examining the window through which the light passed, Fron-Müller discovered, in one of the panes of glass, two convex cataracts, similar in size and form to lenses, a circumstance which probably explains the occurrence.—Gaz. Medica di Milano, April 1844.

Case of Spontaneous Hæmorrhage from the Bulb of the Eye.

By Fron-Mellier.

F. M. was sent for to visit an operative who had been for some time labouring under the commencement of a staphyloma of the right eye, in consequence of a