

ditariness, as some maintain, or in a constitutional (so-called) one, as others believe, is beside the question. It only concerns us to ask, if, admitting that the general features of carcinoma have during recent times undergone no alteration, there is any obvious augmentation in the prominence of the hereditary character of the disease? Now, here again our deductions must be necessarily those derivable from numbers, for according to Walshe, "whatever be our general theory of hereditary influence, a satisfactory conclusion regarding its connection with cancerous disease can only be obtained by the well-advised application of the numerical method. But however applicable the numerical method may be in this instance, we are opposed by the difficulty of putting it in force, and of carrying it to the extent of acquiring data in sufficient quantity to render it reliable. In other words, in the absence of public records, the minute details bearing upon the hereditariness of cancer are only to be found in the note books of those whose position enables them to see much of the disease. Charles Moore, by means of the information supplied him in connection with the history of 101 cancerous persons, was enabled to show, thus far satisfactorily, that the eldest born of a given family are more liable to cancer than the younger; and, by further inquiry, he also ascertained the arrangement of families among whom eighty-nine of the foregoing cases of cancer occurred. By this means he was able to determine that the largest number of cancerous persons belonged to families of which there were five children.

Many similar observations have been made with a view of determining the influence of fecundity upon the production of the disease; and Scanzoni, who inquired into the cases of seventy-two women suffering from uterine cancer, found that in twenty-one instances, or, in by far the majority, the family of the patient consisted of six. But cannot we derive some information from the annual reports, in order to determine the increase, if any, of cancer by means of hereditary influences? Possibly, if we apply the rule that a disease of pronounced hereditariness is prone to assert its presence sooner than later in the offspring. Consequently, if the hereditariness of cancer is increasing, the records in the reports would presumably exhibit a gradually augmenting mortality from the disease during infancy, or the first quinquennium. What, however, do we learn? On referring to the tables, it at once becomes evident, as we have already shown, that the mortality from cancer during the first quinquennium, has, for some years, maintained a very low rate; and, on closer inspection we find that, if anything, even this shows signs of some diminution. Hence it is clear that, even if the increase of cancer can be attributed, in some measure, to its hereditariness, it does not appear that at the period of life, when, presumably, this influence would be most apparent, there is any trace of increase. Therefore, we may conclude, that either the hereditariness of cancer fulfils a very subordinate position in the immediate production of the disease, or that it only becomes manifest under special predisposing circumstances, the accumulation of which increases proportionately with the advance of age.

The consideration of this subject, however, involves the question of whether it is right to hold, that in every case of so-called constitutional disease, inheritance implies simply a predisposition to the disease and not the disease itself? In the absence of direct evidence, and in the face of the insufficiency of our knowledge of the life history of cancer, it seems most rational to believe that the inheritance of this disease simply implies a predisposition to become cancerous at some period of life at which, so to speak, a concentration of other predisposing causes unites to render the manifestation of the disease, as it would seem, unavoidable. We confess, however, to the difficulty of obtaining data upon the subject of the hereditariness of cancer. It is, nevertheless, one which, in the face of facts to which we have drawn attention, seriously demands inquiry, not only upon the grounds of adding knowledge to a disease of the inner life, so to speak, of which we know so little, but upon the higher motives of obtaining facts for purposes of public utility, from which the optimist might with reason expect real advantage to accrue. It cannot yet be that we know all of the manner in which cancer is disseminated hereditarily. If not from concurrent individual experience, surely from numbers we should be able to formulate a better statement of the facts in connection with this subject; and placed, as this island of Great Britain is, in the centre of the geographical area of the disease, it behoves us to be strenuous in our efforts to attack the fell destroyer and besiege his works, with a view of obtaining, if only for a time, a truce from his avenging virulence. A gleam of satire certainly pierces the boasted brilliancy of our advanced measures for public health, when, step by step, with, and forming, as it would seem, an integral part of

civilisation, a disease of the nature of cancer obtains such a sway in our midst.

We will now close this imperfect sketch of the subject we have attempted to discuss, by embodying, in a tabular form, the conclusion at which we have arrived.

1. In the face of incontrovertible facts, cancer is increasing in England.

2. This increase is due (a) to the success attending the legislative measures and other means for the preservation of the infant population, by which a large proportion of persons reach adult age, and the general healthiness of the community is increased; (b) to the greater prominence which, in the present day, prevails of the most predisposing causes of the disease—such as the fecundity of women, the prevalence of high nervous tension, and the existence of possibly greater general luxury in the mode of living.

3. The immunity apparently demonstrated by the records as present in certain counties of England and Wales, is presumably, as we have attempted to show, not due to any real declination of disease, but rather to such causes as can be explained by local predisposition to other diseases, to which a large proportion of the adult population succumb.

4. In consequence of this, if each district of England and Wales were equally healthy, each would probably exhibit a high cancer mortality.

5. The geographical area of which England and Wales is composed, is insufficient to account directly for interruption in the distribution of cancer as met with in this island.

The writer acknowledges his indebtedness to the following works:—*The Annual Reports of the Registrar-General of England*; *Clinical Lectures and Essays* by Sir James Paget, edited by Marsh; *On Functional Nervous Disorders*, by Dr. Handfield Jones; *Antecedents of Cancer*, by Charles Moore; *Transactions of the Pathological Society*, the discussion on Cancer, the speeches of Sir James Paget and Dr. Crisp; *The Journal of the Society of Arts*, 1879, on the Distribution of Disease, popularly considered by Alfred Haviland; *On Cancer*, by Dr. Walshe; *On Cancer of the Breast*, by Thomas W. Nunn.

## ON TRANSFUSION.\*

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THE operation, to matters concerning which I wish to direct attention, may justly, if not logically, be styled both old and new; old, because it was practised in England by Dr. Lower, of Oxford, and by Sir E. King, in the year 1665—six generations back; new, for the reason that a large majority of general practitioners have never had the opportunity of witnessing it—an operation which is untaught in our schools; which has never received the recognition it deserves; which has not yet attained to its legitimate place in surgery and in obstetrics.

When, from hæmorrhage, our patient having sunk to the lowest ebb, life is flickering, and dissolution apparent, hope is still justified, resuscitation is still possible; and more, it is the very general result of this most important operation. How, then, is it, that its use is almost limited to specialists? Is it not because the general practitioner does not fully realise its precise indications, nor indeed the pathological nature of the conditions which require it?

Let us suppose that we have a patient who, having suffered excessive hæmorrhage, is rapidly sinking. What do we observe? A gasping for air; an absence of pulse; jactitations, and so on. And we say, death is resulting from the draining away of vital fluid. We consider it a very proper thing to attempt to give stimulants, and to supply nutriment by enemata. But what is the result? Our patient dies, and we are satisfied that the case was beyond the reach of human aid.

Surely it is time that the marvellous discoveries in physiology and pathology should open to the sight of the intelligent physician that vista through which he may distinctly discern the relationships existing between effect and cause; the pathological nature of the conditions; and the basis of a rational and scientific treatment. It is utterly futile to attempt to administer stimulants, when the functions of the stomach are altogether suspended, or when it rejects everything; and to inject nutritive enemata, when the absorbent system is completely paralysed, and has lost its faculty of assimilation. Now, in such a patient, the first thing we notice is a gasping for air. But what is gasping? It is an indication that the

\* I read at the autumnal meeting of the Northern Branch.

respiratory centre in the medulla oblongata is not duly stimulated; or that, being stimulated, the force is not at hand for it to transmit. Let us note that the natural stimulant of the respiratory centre is carbonic acid, and that, when carbonic acid is in excess in the blood, respiration is abnormally rapid; provided that the force is not deficient, as in sleep, or almost entirely absent, as in the partial stasis of profuse hæmorrhage. No inspiration, as an involuntary act, could, in health, take place, were it not for the presence of carbonic acid in the venous blood traversing the medulla. How, then, does it come that this centre fails after hæmorrhage? In this way: The respiratory centre is the transmitter, at regular intervals, of nerve force to the respiratory muscles; but it is not the mechanism which transforms matter so as to develop that force. Whilst carbonic acid is essential to the inspiratory act, oxygen is equally essential in the generation of that force which the centre transmits. Well, there is a deficiency of oxygen because there is a deficiency of blood in the brain; and what little is there, is in a state approaching stasis. Propel more blood through the cerebral vessels, and what happens? Oxidation goes on; force is developed, which the inspiratory centre, stimulated by the carbonic acid in the blood, rhythmically discharges, and respiration is reestablished.

Again, we notice the absence of pulse after extreme hæmorrhage. Pulse is the wave of propelled fluid dilating the arteries. But what if there is no fluid to propel? The absence of the pulse is the result of the heart's dynamic inability to work when deprived of that on which to spend its energy. Give it blood to propel, and propulsion will follow.

This leads me to the indications to which these considerations point. Oxygen must be sent to the brain, carbonic acid to the respiratory centre in the medulla, and fluid to the heart. And how can we accomplish this? I have adopted this plan in patients who were not actually *in articulo mortis*; and, so far, with complete success. First, place the head low and raise the pelvis, so that blood may gravitate to the medulla; then autotransfuse; that is to say, transfuse the patient's own blood from the extremities to the vital centres. This is done by firmly bandaging both legs and arms, commencing at the feet and hands. At this stage, ether may with very great advantage, as a most valuable means of stimulating nature's powers, be injected intermuscularly; and I venture to suggest that it would be both rational and expedient to inject a minute quantity of strychnine with the ether, for strychnine we know to be a most powerful and certain stimulant of the inspiratory centre. It now becomes our duty to supply the patient with such nutriment as is capable of sustaining life; and to this end, should the stomach still reject liquids, the assimilation of nutritive enemata will meet the case.

Striking as is the success of this treatment, desperate cases do occur in which there is absolutely no hope excepting by placing directly into the circulation new fluid capable of arousing and sustaining life; and in these cases, as in the resuscitation of the drowned, there is ground for hope even after death has practically taken place.

A question of no little importance is that of the form in which the aliment shall be used. There are many cases on record in which whole blood has been used with complete success. The same thing may be said of defibrinated blood, and also of saline alcoholic solutions. The objection to the use of pure blood is its tendency to coagulate. Clotting may take place in the heart, in the vein, or in the instrument. How, then, can we avert its coagulation? By the very careful exclusion of air, by preventing cooling of the blood, and by the admixture of a small quantity of ammonia. In the first drawings of my transfusion apparatus, I had a device by which I could inject small quantities of ammonia into the blood as it passed through the instrument. As this involved a more complex mechanism than I desired, I was led to an experiment which, so far as I know, is original. Not only ammonia, but salines generally, retard fibrination; and it occurred to me that a very convenient process would be that of preparing the blood of the giver before it was drawn from his vein. I need not here explain the experiments I made at length; but the deduction was this, that by administering, ten minutes before blood is drawn, as large a dose of a saline with ammonia as can well be borne, fibrination is very materially retarded. I infer that, with the precautions against cooling and the admission of air, this preparation of the blood will effectively remove all danger from clotting.

Defibrinated blood has its advocates; and their grounds of preference are, that all danger of coagulation is avoided, and that it is unnecessary to bring the giver of the blood into the room.

In favour of the saline alcoholic solutions and milk, may be urged

the impossibility, which must often present itself, of obtaining blood at the time when alone it can be of any avail; and the fact that they are always available at short notice. Dr. Hodder records, in the *Practitioner* of 1873, the cases of two patients, moribund from cholera, in whom he injected pure milk, in one fourteen ounces, in the other twenty-eight ounces. Both recovered. And here there was not simply a draining of blood to contend with, but a most potent poisonous influence. A teaspoonful of common salt, half a teaspoonful of carbonate of soda, with two teaspoonfuls of alcohol in a pint of water; or even simple water, with a few drops of ammonia in it, may be used. Half the mischief arises from the heart and arteries having nothing to contract upon; and hence we see how it is that these simple fluids answer the purpose. It is, of course, necessary to follow up transfusion by warm enemata of beef-tea, with brandy, and probably a little opium; to keep the legs and body warm, and, as soon as deglutition can be performed, to give brandy and hot water.

The operation itself is performed thus: Transfix transversely a fold of skin pinched up in the course of a vein at the bend of the elbow. Seize the vein and raise it with forceps, which are made for that purpose. Then open by a longitudinal incision. An assistant may now compress the vein with his thumb, whilst a vein is opened in the same way in the giver's arm. Then, having carefully charged the instrument with a warm saline solution, insert the cannulas into the veins; of course, pointing centrally in the patient's and distally in the giver's arm. Now, propel the blood slowly and smoothly, and watch the effect. Six or eight ounces will probably be ample. Then remove the cannulas, apply a compress, and bind with broad tape with figure of eight round the elbow.

Of a certainty, the pouring away in very profuse *post partum* hæmorrhage must be arrested by styptics, or otherwise, before we begin to replenish. Let us not, however, rest satisfied because the styptic is effective in arresting, and in preventing a recurrence of, the hæmorrhage: for the patient may sink rapidly from the loss sustained.

In cases of placenta prævia, when hæmorrhage has been profuse, death often follows the shock of artificial delivery. I very vividly remember two such cases which have come under my own observation. Here, transfusion before delivery would relieve the extreme depression, and avert a fatal issue.

But, I take it, conditions do exist in which transfusion appears to be indicated where there has been no loss of vital fluid whatever. I refer to those where blood-poisoning exists. Take, for instance, puerperal convulsions. In convulsions with albuminuria, is not the blood unquestionably poisoned? Our ancestors, two generations ago, would have bled, had they recognised this condition; and may not we, from them, take this lesson, pregnant with truth: that venesection, abused and ridiculed as it is in the present day, is a most powerful agent in our hands for good, could we but cast aside that demon, fashion, which so detracts from the innumerable and inestimable benefits our noble profession is ever conferring on our race?

In puerperal convulsions, prostration threatens to be fatal. By bleeding, we necessarily abstract a portion of the poison; by transfusing new fluid, we dilute the poison still circulating. The effect, reasonably to be expected, is, that the system rallies from the prostration. And, carrying this thought further, I venture strongly to urge the expediency of venesection and subsequent injection in many other poisoned conditions of the blood; be the poison generated within the body, or received from without.

We know, and recognise, the signs of threatening dissolution; and we should be prepared, with clear and well defined ideas, vigorously to adopt a treatment which may not fall short of the urgent demands of the case, even when an operation, which has hitherto been looked upon as so formidable, is indicated.

I am convinced that the time is not far removed when, to permit a patient to die of hæmorrhage, will be considered little short of culpable homicide; when transfusion will take its proper place in medicine, in surgery, in obstetrics; when many valuable lives will be saved, which would inevitably be lost but for a weapon so potent, so effective, in defeating our common enemy, death.

**CREMATION.**—The late Mr. Henry Seybert, of Philadelphia, was cremated at Washington, Pennsylvania, on March 7th. This is the seventeenth cremation at this place. Mr. Seybert left 60,000 dollars to the University of Pennsylvania, by which bequest it is stipulated that an impartial investigation of modern spiritualism be made.

**THE DUCHESS DE GALLIERA**, in consequence of the breach made in her fortune by her agent in Italy, will be shortly compelled to suspend the works of the three hospitals she is building in Genoa. The frauds are said to amount to at least 10,000,000 francs.