THE SEASONS AT THE SWISS ALTITUDES, AND WHEN TO SEND OUT PATIENTS.

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THE Alpine cure for phthisis, regarded not many years ago with incredulity or distrust by untravelled physicians, and hardly known to the great body of practitioners, is now generally accepted in this country; but a practical knowledge of its details has not yet extended for the majority beyond the initial stage in which it was first introduced to our notice. Meanwhile the subject has moved beyond a mere recognition of the fact that an Alpine winter is good for phthisis, and progress has been made both in the selection and management of cases. All cases are not suitable, and in a given proportion of them the responsibility of giving advice must remain an anxious one. It is probably exceptional in this country for phthisical subjects to take the decision into their own hands, as not infrequently happens abroad, and to proceed to Davos without medical advice or even in spite of it. Most patients sent out from England are fit subjects, but too often they do not avail themselves of their opportunity to the full extent under a mistaken idea that it must be winter before phthisis can gain any good in the Alps. This lessens the chances of recovery of so many that it is perhaps less of a presumption than of a duty to mention the impressions gathered during thirteen yearly visits to the Alps in winter.

If health were always the chief and only consideration a long unbroken residence in the high altitude would be the best form of treatment for nearly all sufferers from phthisis. It is, however, the smaller number only who choose to avoid the risk of losing ground again, which too often attends a return to England for the summer months. Still, the colony of permanent residents is a growing one, and it is among them that the most remarkable results are to be seen. They have experience of all the Alpine seasons, and are naturally, therefore, the persons best qualified to form an opinion as to their relative value.

Unfortunately home-sickness and the monotony of hotel life—from which those who occupy their own private homes in Davos are exempt—are important factors bearing upon the advisability of change; and they cannot be disregarded entirely, though some variety might be found within the Swiss altitudes themselves. The summer visit to England will therefore probably continue to be the rule rather than the exception for those who have wintered in the Alps.

It is for those whose illness comes under observation after the close of the winter season that a question arises which is not always answered in a sense conducive to their best interests. Ought they to be made to wait until the following winter? Such a course would mean for them the loss of a golden opportunity, that of applying the remedy at an early period of the disease. A moment's consideration will show that the influence of pure air and high elevation, which are the principal agents of cure, is not limited to the winter. If a summer spent in the Alps is the best of tonics for the overworked and jaded, could it possibly be detrimental to the phthisical? Experience shows that it is good for them; why, therefore, should they be deprived of this help?

As a fact, a climatic advantage is to be gained *at all seasons*, more marked it is true in winter, chiefly on account of the evils attending a winter residence in England, but not on account of any essential therapeutic inferiority of the Alpine summer. It cannot be too widely known that all seasons in the Alps are good for phthisis, and that as soon as a patient has been found fit to travel he cannot defer his journey without incurring a positive loss. A summer in the Alps is the best of all preparations for an Alpine winter. This is also the season of least risk for the invalid, when the journey can easily be so arranged as to break the suddenness of the change to a high elevation, which is always a source of some anxiety. In the depth of winter, too, the sudden change to an intensely cold atmosphere is not in itself desirable or always favourable. These risks are avoided by patients who take up their winter quarters before the weather hardens.

Cases must of course be dealt with on their individual merits and with due regard to all their circumstances, but it may be stated in general terms that the benefits of a residence in the high altitude are largely independent of the season of the year, and that the best time for each patient to start is the earliest that can be safely managed. The melting of the snow in spring and the uncertain and snowy days in the late autumn are the least desirable periods, but the newly arrived patient who spends them with open windows in his room or even, according to the rest-cure now in vogue, in his bed is better off than he would be in England and is turning time to the best account. I have sent patients to the high altitude at various periods in the year irrespectively of seasons without any cause for regret. As regards the fitting of the winter contingent I am in favour of an early rather than a late start, and of acclimatisation rather than of abrupt change in elevation and in temperature. What may be gained by patients going out early is best described in the words of a recent correspondent of mine, an old Davoser who in describing a patient says: "He like others was sent out late last year (the end of November), and thinks he never gained real good all the winter because he arrived so late. This year he asked no advice as to the date, but came early in September, and rejoices daily that he did so, as he has got on steadily and has come in for all this most perfect weather. We are having a record autumn. Our autumn is always lovely, though rarely so lovely as this. This is the thirty-first day of fine weather—days not to be described, sun ablaze all day, not a particle of moisture, no clouds, no wind, about 8 to 15 degrees of frost at night, making the days deliciously bracing, and yet they are warm, almost like summer at midday. Of these thirty-one fine days only three or four have been cloudy, but none bad. All this time in the lowlands, even up to two stations above Landquart, and almost everywhere in England, a damp raw mist prevails; and yet we hear from people in England that they are coming out here the end of November, but that they are advised not to come till then."

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MEDICAL HÆMORRHAGE.¹

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THE term "medical hæmorrhage" is one which does not require much explanation. Bleeding is usually thought of, perhaps, as peculiarly the province of the surgeon but the instances are by no means few in which it forms a very important feature in strictly medical cases; and when it does thus occur it is so terrifying to the patient and causes such anxiety to the attendant medical practitioner that no excuse is needed for bringing the subject forward; it is imperative on us all to be as sure as possible of the ground on which we stand when attempting to control it. To give a clear idea of my meaning of the term I offer the following list of cases to which it is applicable. All intracranial hæmorrhages not due to violence; hæmorrhages appearing from the mouth or nose, as "spitting or bringing up of blood"; epistaxis of youth or old age; bleeding from spongy gums or pharyngeal varicose veins; aneurysm of the aorta; hæmorrhage from the lungs in bronchitis, pneumonia, phthisis, emphysema, malignant disease, &c.; hæmorrhage from the stomach or duodenum; hæmorrhages appearing from the anus either as blood or melæna, or in typhoid fever and other forms of ulceration—e.g., tuberculous or dysenteric; gastric hæmorrhage if not vomited; hæmorrhage from piles internal and external; hæmorrhages appearing from the urethra as blood in the urine; from bladder or kidney, from the vagina in women, metrorrhagia, menorrhagia, or post partum hæmorrhage; and subcutaneously—purpura, idiopathic or rheumatic, &c., and scurvy. A mixed class of cases is due to serious disease—leucocythæmia, acute yellow atrophy of liver, some other forms of blood poisoning, and hæmophilia. This list, probably incomplete, is sufficient to show how important and frequent is that loss of blood which may be termed medical and concerning the treatment of which I wish to mention a few points.

¹ A paper read before the Hunterian Society on Nov. 10th, 1897.

The cases divide themselves very naturally into two groups—(1) those with some severe, perhaps even necessarily fatal, constitutional or general dyscrasia or diathesis; and (2) those without such concomitant. The first group, containing purpura, scurvy, hæmophilia, leucocythæmia, blood poisoning, &c., is perhaps the most interesting from the great obscurity of the pathology of any member of it, but to discuss it at all fully would occupy too much space. Suffice it to say briefly that in scurvy good and proper food is all important; in purpura, if of rheumatic origin, Dr. S. Mackenzie swears by turpentine; if due, as so many cases of mild purpura are, to a chronic lack of good nourishment, especially of vegetable origin, the remedy is tolerably obvious—to supply this want—and the cases get well as a rule; in severe purpura (so-called hæmorrhagica) and leucocythæmia treatment is of little avail, though the most hopeful would appear to be large doses of calcium chloride both internally and applied as a styptic; Professor Wright has shown that this, at any rate in hæmophilia, is of considerable service. But in all these diseases and others of the first class we are trying as far as possible to cure a tendency to bleed; it is comparatively seldom (and then the principles laid down below will apply) that the external appearance of blood is of such character or amount that we are called upon to check the bleeding itself, and it is to the immediate treatment of actual hæmorrhage that I wish to direct attention, commencing with the assumption that both the blood and the vessels are healthy in general with merely a local lesion of the latter, and proceeding more especially to the inquiry, what place, if any, have ergot and astringents in the treatment of the condition. My attention has been particularly drawn to the subject in consulting practice—the cases are of such a startling character as to naturally suggest a second opinion—and my almost invariable experience is that ergot has been freely administered directly any severe hæmoptysis or hæmatemesis has appeared. Now underlying this routine practice I am convinced that there is a serious fallacy.

The following is perhaps the most marked example I can produce, but it does not stand alone. I was called to see a man in consultation on a Thursday and found that he was suffering from a severe loss of blood by the mouth, he was so blanched and weak that I dared not make any careful examination to definitely determine the source of the blood, and for immediate treatment I do not consider this very important. The history given me by his medical man was that the hæmorrhage had begun on the previous Friday; ergotin had been injected subcutaneously on Friday, on Saturday, and on Sunday; on Monday the hæmorrhage had been more profuse and, notwithstanding the injections, had reached its acme on the Wednesday evening; when I saw him on Thursday morning he had brought up about an ounce of blood; in the evening of that day he brought up a little more; after this he had no return of bleeding and steadily improved—got well, in fact, as far as my present purpose is concerned. On talking over the case we agreed to omit the ergot and substitute for it a little morphia. So far and were this all the case against ergot would seem to be almost too simple, but there is a sequel to the event which complicates matters and which was, in fact, the cause of my determination to try to get the question discussed. The sequel was this: I wrote, as is my custom, to the medical man to inquire how the case had progressed. In his reply he mentioned the hæmorrhage on the Thursday subsequent to our consultation, but confessed that he had again administered an injection of ergotin, and wound up his letter: "I trust you will not be offended, as not even you will convince me that ergot will not stop bleeding from lung or stomach if it be given sufficiently boldly." I was certainly not offended, but I was led to think very seriously of our present problem.

The points in the argument stood and stand thus: Did ergot finally check the hæmorrhage? If so, why did it not check it sooner? Did it really increase the hæmorrhage in the first two or three days? or had it no real influence whatever? In any case, was it a matter of dosage? Modern pharmacology, as represented by Dr. Lauder Brunton (and, I might say, by all other authorities, for there is no serious discrepancy between them in the physiological action of the drug), asserts of ergot that it (1) stimulates the vaso-motor centre in the medulla and any other subsidiary centres controlling blood pressure, and thereby causes an increase in this pressure; (2) depresses the motor ganglia of the heart

bringing about a slower and less powerful pulsation; (3) acts on unstriated muscular fibres causing their contraction, and thus a diminution in the calibre of the arterioles; (4) has no effect in producing a coagulum in a blood-vessel; (5) is a direct emmenagogue and ecboic; and (6) markedly increases the peristalsis of the bowel. There seems to be only one point of dispute amongst experimenters—viz., whether the universally admitted increase of blood pressure is brought about by direct action of the drug on the unstriated muscle of arteries, or whether it is indirectly due to stimulation of spinal and other vaso-motor centres, a point which I venture to think is immaterial for clinical purposes.

We are now in a position, so far as ergot is concerned, to discuss the second group of medical hæmorrhages, viz., those in which except for the local damage the blood and the vessels are in general fairly healthy, and where the arrest of bleeding is the immediate object of our therapeutical measures, which by assumption cannot include surgical ligatures or forcipressure. It is obvious at once that the blood must come from (1) an artery, (2) a vein, or (3) capillaries, and it seems to me that here in a nutshell lies the possible, if not probable, explanation of the variable effects of ergot and the real scientific clue to the principles which should guide us in attempting to control a hæmorrhage which is beyond the reach of strictly topical applications. If the bleeding be arterial I cannot understand how the effect of ergot can be other than to increase it; blood pressure is increased throughout the arterial system, the damaged artery must therefore feel it equally with the others for we have not even a suggestion that ergot can exert a selective action on particular arteries; if it does thus feel it, then from the very fact of its damage and laceration it must be less capable than before of restraining the outflow of blood from its lacerated extremity—the stream may not be so large but the force of current is greater, and hence the greater liability to wash away any clot that nature has formed; it must be remembered in this connexion that it is distinctly stated that ergot has no tendency whatever by its presence to promote clotting at the end of the vessel or in the extravasated blood. If, on the other hand, the blood comes from a vein or from capillaries it is easy to understand why ergot might be expected to act beneficially, by diminishing the flow of blood through arterioles to the damaged spot. If my steps in the argument are sound, it follows that we ought to try to determine whether it is arterial, venous or capillary hæmorrhage which we are attempting to arrest before we administer ergot. This we cannot expect to determine by the intermittence and jerkiness of the flow; we must judge by other considerations gleaned from clinical study and the facts of the post-mortem room. These help us materially, and I shall say a few words about them in connexion with one or two varieties of our second group of medical hæmorrhages. Before I do so I would like to consider what are the means other than ergot at our disposal in the treatment of the condition under discussion.

Rest.—Rest, complete and absolute, bodily and mental, must occupy the place of foremost importance. The need for rest of body by lying in bed is obvious to all; it requires no argument, nor need I mention the means for obtaining it. To secure mental rest and allay the terrible fright into which the sight of copious bleeding throws the patient is even more important; it is fright that depresses vitality and tends to kill its victim. We must first of all hide our own anxiety, for patients are quick to read the faces of those attending them, and, indeed, we usually need have none, for cases of hæmorrhage are either from the first obviously and hopelessly fatal, as ruptured aneurysm, for instance, when we have no time to show anxiety, or they are rarely fatal directly from the loss of blood. As for drugs, none that I am aware of, unless it be cannabis indica, can come near to opium in efficacy for the relief of mental terror. It has no specific effect on heart or vessels when given in moderate medicinal doses, but its value is incalculable, and when we see its soporific effect stealing over the patient we may confidently assume that danger has passed.

Cold and heat.—It is the fashion to place an ice-bag on the chest or abdomen when severe bleeding has taken place, but I have not seen the slightest reason for believing that it has any effect whatever in checking the hæmorrhage. It hinders sleep and rest and constantly reminds the patient of his peril, and should therefore be avoided.

Styptics and astringents.—Of these I would mention sulphuric acid, bismuth, chalk, lead acetate, iron perchloride,

and tannic acid with the vegetable preparations that contain it, such as catechu, kino, hamamelis, &c. Any of them are extremely useful if they can be applied directly to the bleeding vessel—e.g., in gastric or intestinal hæmorrhage, but as indirect—i.e., after absorption—controllers of bleeding I believe them to be as useless or even harmful as ergot itself. Turpentine, too, must not be omitted, as from its volatility it may reach the affected area by inhalation, while iodide of potassium and purgatives are very useful adjuvants. Accepting this list as fairly representative of our armamentarium I will bring this paper to a close by a very brief sketch of the means I would propose to adopt in treating the individual cases of Group 2, mentioning the reasons deducted from post-mortem experience.

Cerebral hæmorrhage is almost invariably arterial, consequently I believe that ergot and its allies are contraindicated, rest is strongly indicated, and possibly purgatives and iodide of potassium may be given if further treatment seems desirable. The epistaxis of youth rarely requires more than the application of cold to the nose or sniffing up of powdered alum; that of age should not be too early interfered with as it forms a safety valve against intracranial arterial rupture; should it be too prolonged the local measures will again be useful, if also the patient be placed sitting upright with the feet and legs in very hot water, then plugging of the nares will be but rarely required. Pharyngeal hæmorrhage rarely requires any treatment, but the electric cautery may be applied if necessary. In hæmorrhage from the lung I believe that all our active efforts will have but little real effect. In bronchitis, pneumonia, and in the early stages of phthisis, the bleeding is rarely more than slight and will usually stop by itself if the patient be kept quiet in bed and his mind put at rest as to his danger; should it prove more profuse, in my opinion, opium must be pushed and iodide of potassium freely administered. It is in rare cases of emphysema and in the advanced cases of phthisis that we feel so anxious to employ more active measures. But post mortem we find that in such cases the bleeding is almost invariably arterial, and I must confess myself feeling very sceptical as to the value of any more active treatment which has been hitherto advocated. I feel that to bring and keep the patient well under the influence of opium with perhaps the inhalation of turpentine is as much as we can do, however distressing it may be to us to stand by and feel so helpless. I wonder whether artificial pneumothorax would be of any use.

In hæmatemesis we are more favourably situated and can adopt measures more actively and with greater hope because our drugs can reach the bleeding spot. In the young an ulceration into an artery is the almost universal causation of such trouble, and here the swallowing of ice or ice-cold water in small quantities or per contra (and better, I believe) hot water at 110° F. is very likely to be of use, while bismuth, chalk or strong solutions of tannin will very rapidly cause the formation of a plugging clot. Ergot in such cases I think worse than useless. In the hæmatemeses of older people there are two probable or possible sources for free bleeding: (1) an ulcer, chronic or malignant, in which the treatment just suggested is the best; and (2) a ruptured vein or capillary oozing from a cirrhotic liver. Here, in addition to the foregoing, ergot may perhaps be useful, though I would prefer to try free purgation.

In the hæmorrhages of typhoid fever, if profuse and accompanied by collapse and subnormal temperature, morbid anatomy has shown that an artery has always been ruptured. Such are I fear almost invariably fatal, but I believe that even here opium freely administered may save some lives. I would also give bismuth and liquid preparations of lead, though I doubt if they can reach the spot in time; ergot I feel sure must make bad worse. Slight hæmorrhage in typhoid fever I have been led to look upon as a favourable sign and one that does not require any active treatment beyond a little extra care in withholding food and seeing that the bowel is kept open. It is in all forms of uterine hæmorrhage that ergot finds its best and most correct application. On the grounds, firstly, that such hæmorrhage is almost invariably venous or capillary; secondly, that the mass of unstriated muscle in the organ is so large relatively to that in an arteriole as easily to overcome any extra arterial blood pressure.

To conclude a somewhat rambling and yet very condensed article, I would make four propositions for discussion:—1. That most cases of medical hæmorrhage cease spontaneously and are essentially not dangerous to life from loss of blood. 2. That active treatment by ice-bags and ergot

frequently defeats its own purpose; if the bleeding ceases it does so in spite of treatment. 3. That where experience of morbid anatomy or the profuseness of the blood loss makes an arterial source certain ergot is distinctly contraindicated. 4. That complete rest, opium, and iodide of potassium are our most powerful and most trustworthy agents for the emergency, except in certain special cases—e.g., from stomach—where additional treatment by astringents should be applied.

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CONCERNING THE ACTION OF X RAYS ON CULTIVATIONS OF TUBERCLE BACILLUS.¹

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THE treatment of pulmonary tuberculosis in man by means of x rays has been described by several experimentalists.² In the cases thus treated improvement in the state of the patient was ascribed to the curative agency of the x rays, but no sufficient proof of this action has been given, nor is there any indication of the manne in which the rays affect either the tubercle bacilli or the surrounding tissues. The experiments detailed below were undertaken with a view to ascertaining whether x rays inhibit the growth of or kill the tubercle bacillus. Preliminary experiments with x rays and glass test-tubes showed that different makes of glass were opaque to x rays in very different degrees. Soda-glass test-tubes with sensitive paper beneath them were exposed to x rays of the same intensity as those used in the subsequent experiments. Objects such as pins, keys, and chains were placed inside and underneath the test-tubes. The resulting skiagrams gave perfect pictures of those objects opaque to the rays which were inside and underneath the test-tubes, whilst the soda-glass test-tubes themselves were but faintly outlined at those points where the x rays had had to pass through the greatest thickness of glass. The slight resistance offered to x rays by thin soda-glass test-tubes was not considered to be sufficient to mar the value of the inference drawn from the following experiments.

Into twenty-five sterilised test-tubes glycerine agar-agar peptone was run and allowed to solidify in the position used for streak culture, so as to give a large flat surface. On April 21st, 1897, the agar in the tubes was sown with tubercle bacilli taken from a cultivation belonging to Dr. Arthur Ransome which had been obtained from University College Hospital and been shown to be pure and vigorous. The laboratory work was carried out by Mr. F. J. Tanner at Bournemouth. The twenty-five inoculated test-tubes were incubated at 37°C. for a month. By this time characteristic colonies of tubercle bacillus had developed in each of the tubes either as films, small colonies, or heaped-up masses. No growths other than tubercle appeared in the agar. The test-tubes were divided into sets of three and one set of four, numbered and lettered. One tube from each set was reserved as a "control," the remaining seventeen being exposed to the x rays. To ensure an equal distribution of x rays over each inoculated surface of agar the test-tubes were laid flat upon a horizontal rotary table with their closed ends converging to the centre of the table. This arrangement placed all the test-tubes well within the focal area of the Crookes's tube which hung above them, whilst it allowed the table and its load to be shifted around from time to time. Beneath the rotary table there was a space for the admission of a sensitive plate. To demonstrate that the x ray apparatus was working well at any moment during the lengthy exposure a sensitive plate was slipped into its place, exposed, and developed at once, producing a picture of the pins and metallic trifles which had been scattered amongst the test-tubes. The apparatus used for producing the x rays consisted of an induction coil giving a 5" spark, a ten volt accumulator, and several Crookes's tubes of modern pattern. These tubes were occasionally interchanged to rest them. At the

¹ A paper read before the Bournemouth Medical Society on Nov. 10th, 1897.

² Chapteloube and Descomptes: Archives d'Electricité Médicale, vol. v., 1897. Bergonié and Mongour: Académie de Médecine, &c.