

and I hope that in this way interesting information may be obtained. I feel sure that every tumour should be examined. The case above recorded of an apparently simple ovarian tumour and cancer of the head of the pancreas would seem to indicate that even the most innocent-looking tumours of the ovary may be associated with cancerous formations. I do not discuss the question of the possibility that the ovarian tumour and the cancer may be independent phenomena occurring coincidentally. The points which I wish to emphasise are that ovarian tumours are malignant in a considerable number of cases and that the gradations from innocent to malignant tumours are so insensible that it is not always easy, and perhaps not always possible, to separate them definitely.

A consideration of the foregoing cases leads to one conclusion so obvious that it might almost be considered unnecessary to state it—viz., that the removal of an ovarian tumour should be advised whenever its existence is diagnosed. This is undoubtedly the proper course to pursue and yet I sometimes see cases in which the existence of an ovarian tumour has been recognised for months or years and operation has been delayed until urgent symptoms have arisen. The dangers of the formation of adhesions, of twisting of the pedicle, of the occurrence of pregnancy, of the development of suppuration, &c., should urge the surgeon to immediate action. But of all the arguments in favour of early operation the possibility that the tumour may be malignant, or that it may become malignant, seems to me to be the most forcible and urgent and at the same time the least considered.

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ON THE DANGER OF HIGH ALTITUDES FOR PATIENTS AFFECTED WITH ARTERIO-SCLEROSIS.

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WE are living in days when the struggle of life and therefore the strain on our nerve power grow more and more intense. To counteract these detrimental conditions changes of scene and air at seaside and Alpine health resorts have to play their part and no one better than the weary practitioner can estimate the value of even a couple of days' rest thus indicated as a necessity to prevent a breakdown. But the practice of patients going up to Alpine heights without medical advice has its grave dangers which year by year come more clearly to my view and into which a long practice at Alpine health resorts has given me a good insight. The public are careless, almost reckless, in this matter; they often disregard judicious medical advice, with the result that serious or even irreparable damage may be done, and sometimes death ensues—a catastrophe easy to be predicted by a careful family physician.

The public, and sometimes the inexperienced physician—inexperienced not in general therapeutics but in the physiological effects of altitude on a weak heart—make light of a danger they cannot understand. But if an altitude of from 4000 to 5000 feet above the sea-level puts a certain amount of strain on a normal heart and by a rise of the blood-pressure indirectly also on the small peripheral arteries, must not this action be multiplied in the case of a heart suffering from even an early stage of myocarditis or in the case of arteries with thickened or even calcified walls?

It is especially the rapidity of the change from one altitude to another with differences of from 3000 to 4000 feet which must be considered. There is a call made on the contractibility of the small arteries on the one hand and on the amount of muscular force of the heart on the other hand, and if the structures in question cannot respond to this call rupture of an artery or dilatation of the heart may ensue. In the case of a normal condition of the circulatory organs little harm is done beyond some transient discomfort, such as dizziness, buzzing in the ears, palpitation, general malaise, and this often only in the case of people totally unaccustomed to high altitudes. For such it is desirable to take the high altitude by degrees in two or three stages, say first stage 1500 feet, second stage from 2500 to 3000 feet, and third stage from 4000 to

6000 feet, with a stay of one or two days at the intermediate places. The stay at the health resort will be shortened, it is true, but the patient will derive more benefit. On the return journey one short stay at one intermediate place will suffice. Even a fairly strong heart will not stand an overstrain in the first days spent at a high altitude. A Dutch lady, about 40 years of age, who had spent a lifetime in the lowlands, came directly up to Adelboden (altitude 4600 feet). After two days she went on an excursion with a party up to an Alp 7000 feet high, making the ascent quite slowly in four hours. Sudden heart syncope ensued, which lasted the best part of an hour, though I chanced to be near and could give assistance, which was urgently needed. The patient recovered, but derived no benefit from a fortnight's stay, and had to return to the low ground the worse for her trip and her inconsiderate enterprise.

Patients between the ages of 45 and 70 years who are the subjects of arterio-sclerosis can often stand altitudes of 4000 feet and higher; this depends on the degree of the sclerotic process and especially on the localisation, though patients in advanced stages all do better at altitudes of not over 3000 feet, and the reason is fairly simple. Take Engelberg, for instance, which corresponds to this height; it is obvious that the patient will want to go for walks and that not only on level paths. He will soon get to altitudes of from 4000 to 5000 feet, even if warned to keep from climbing; if sent to a place already 4000 feet high he will take walks up to 5000 and 6000 feet and damage may ensue, for if in company one cannot always choose the pace one wishes. I have had patients with arterio-sclerosis coming year after year to Adelboden (4600 feet) and only after four or five years symptoms would ensue, and I was obliged, not actually to send the patients away, but to confine them to the level walks. In a couple of years the same patients will have to choose an altitude not above 3000 feet if they are to derive benefit. The question must in each case be answered separately and only general rules can be laid down. Patients with arterio-sclerosis should not attempt a residence at a high altitude without medical advice. The family medical attendant is the best judge of the possibility of danger, but sometimes nothing short of a trial will decide, and the patient must be put under the care of a medical man at the health resort in question.

In any case the patient should take medical advice if symptoms show themselves, such as sleeplessness, dyspepsia, giddiness, buzzing in the ears, palpitation, paræsthesia, shortness of breath, or definite slight angina pectoris. If I have to decide the question in Zurich the altitude of the place (1400 feet) comes to my assistance and by letting the patient ascend the hills around up to 3000 feet, combined with an examination of the blood-pressure by means of the Riva-Rocci sphygmomanometer, I can arrive at a safe opinion on the advisability of a stay above an altitude of 3000 feet. Rapid ascents to a high altitude are very injurious to patients with arterio-sclerosis and the mountain railways up to 7000 feet and 10,000 feet are positively dangerous to an unsuspecting public, for many persons between the ages of 55 and 70 years consider themselves to be hale and healthy and are quite unconscious of having advanced arterio-sclerosis and perchance contracted kidneys. An American gentleman, aged 58 years, was under my care for slight symptoms of angina pectoris pointing to sclerosis of the coronary arteries. A two-months' course of treatment at Zurich with massage, baths, and proper exercise and diet did away with all the symptoms. I saw him by chance some months later. "My son is going to St. Moritz (6000 feet) for the summer," said he; "may I go with him?" "Most certainly not," was my answer. The patient then consulted a professor who allowed him to go. Circumstances, however, took him for the summer to Sachseln, which is situated at an altitude of only 2000 feet, and he spent a good summer. But he must needs go up the Pilatus by rail (7000 feet), relying on the professor's permission, and the result was disastrous, for he almost died from a violent attack of angina pectoris on the night of his return from the Pilatus and vowed on his return to Zurich to keep under 3000 feet in future.

I may here mention that bad results in the shape of heart collapse, angina pectoris, cardiac asthma, and last, not least, apoplexy, often occur only on the return to the lowlands and that patients with cirrhotic kidneys are in the greatest danger. In the case of apoplexy it is generally the combined influence of a few things slight in

themselves which added to the detrimental effect of the high altitude produce the fatal result. Over-exertion immediately after reaching the Alpine resort, over-feeding, an unusual amount of alcohol, exposure to a hot sun, sometimes constipation neglected for a couple of days, play their part. The physician is called in to a hopeless case, a valuable life is shortened by some years—avoidably so—and there lies the peculiar sadness of such cases. Patients suffering from arterio-sclerosis at whatever altitude they may be should be kept on an almost vegetarian diet with sufficient mineral water, such as Vichy, Passugg, and Seltzer. They should be restricted in respect of alcohol and strong tea or coffee, and, above all their walks on hot days must be limited to the hours between 8 and 10 A.M. and from 4 to 7 P.M. The heat of the sun on the Alps health resorts is often doubled in comparison with the lowlands, especially in shut-up valleys where the reflection of heat from the rocks and glaciers and snow-covered mountains is intensified in the rarefied air. Few people have any consideration for these facts. The hours between 10 A.M. and 4 P.M. on a hot day should be spent on a cool balcony or in the shade of woods which are in most cases easy of access.

These remarks, suggested by a lengthened experience of the effect of altitude on healthy and weak constitutions, are written in the hope that they may be the means of directing apparently healthy elderly patients to select an altitude where they risk nothing and can derive great benefit.

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EVOLUTION OF THE LINES OF SIGHT.

By CHALMERS PRENTICE, M.D.

THE eyes of herbivorous animals generally look outward from each other. A large proportion of such animals are unable to look at an object with both eyes at the same time, because the lines of vision, optic axes, diverge from each other. In some birds the eyes are so situated that they look in opposite directions, or nearly so. Birds and beasts with such divergent eyes present the side of the head to an object to get the best view of it; also they are of a milder disposition, with small means of self-defence except their wide range of vision which gives them timely warning of approaching danger. The eyes of carnivorous animals are in such a relative position that the "lines of sight" are not nearly so divergent as they are in the herbivora; their relation is such that by a contraction of the internal rectus muscles they are rotated inward, so that both eyes can centre their vision on a single point at the same time, thus increasing the impact and sense of vision in the nerve centres. This class of animals have nervous, irritable, and sometimes vicious dispositions; they kill and live upon their prey. Their field of vision is not so extensive as that of herbivorous animals, but this deficiency is made up for by their exceeding activity and physical combative powers. The eyes of animals having single binocular vision have a tendency to diverge and are only held in visual alignment by a contraction of the internal rectus muscles. For many years past I have frequently interested myself by observing the eyes of lions, tigers, and other carnivorous animals as they lay half asleep on dull lazy days, languidly closing and opening their eyes. As the eyes opened I was able to observe a slight, quick, converging movement, small, but perceptible in a majority of cases, especially in the older and lazier beasts. After death there is a considerable divergence of the eyes in all such animals.

In the summer of 1895 I opened an inquiry with 10 zoological gardens and animal-keepers whose observations verified the above statements in main particulars. As a result of this inquiry I learned of but two cross-eyed carnivorous animals—so small a percentage that it has no bearing on my general conclusion. In 1893, with the assistance of the United States Army Department of the West, I secured examinations of 1000 North American Indians. The test consisted of a prism, base down, before one of the eyes, creating vertical diplopia. There was a general tendency of the eyes to diverge. A similar examination of 800 uncivilised African negroes showed the same tendency. In making the above examination of 1800 aborigines three cases of convergent strabismus were met with among the Africans.

The eyes of new-born babes are hyperopic; they lack refractive power, while the optic axes are seldom if ever straight. The eyes of these little ones give us no accurate data of the relative anatomical lengths of the eye muscles or the amount of insufficient magnifying power of the eyes, for the reason that the energy-impulses which correct these anatomical defects are inherited and at work before birth, so that without ever having seen the light of day these little ones enter the world with eye-strain of various degrees. An observation of many years, which I think will be concurred in generally, leads me to the conclusion that when eyes once straight go blind they turn outward. Eyes lose their proper axial relation under various states of insensibility, excepting sleep. When we reach men of civilisation this general tendency to diverge seems to have changed into a tendency to converge; it only seems, and is not due to anatomical shortness of the internal muscles, but to a tonic, fixed spasm or innervation of them.¹ It is a functional convergence which in death or blindness changes into a divergent condition. As early as possible all such anatomical defects are compensated for by nerve-strain which pulls the eyes into proper axial alignment and increases the deficient magnifying power or refraction by squeezing the periphery of the crystalline lens, thus increasing its convexities.

Those following the various pursuits of civilisation a great share of the time have their eyes fixed on near objects—for illustration, say, 13 inches or three dioptries. The refraction of the crystalline lens has to be increased three dioptries, 13 inches, and the eyes converged many degrees, which is accomplished by the excessive use of brain energy or nerve-strain. In various pursuits these positions and strains are kept up day after day for months and years, until the strain or nerve impulses will not easily and completely suspend themselves when the person seeks for distant vision, and then we have a tending inward of the eyes and sometimes myopia. When we think of it we can see what excessive nerve-strains such persons are relieved of by change of scene into the open country. The strains which keep up many degrees of convergence and about 13 inches of refraction are for the time being relaxed and thus the nerve-centres are much relieved. This may be a greater factor of relief to nervous persons than the so-called "change of air."

No tests are effective in showing the anatomical defects that necessitate brain-strain to bring about good vision, for two reasons: first, nerve impulses that have been kept up for years become persistent and will not suspend during tests; secondly, the various muscles and parts become more firmly fixed in their assumed shapes by the material deposits under the nutrition of the high innervation and their shapes and positions are statically fixed for the time being. Some eight years ago it occurred to me that the eyes of the dead would come nearer showing the true anatomical condition, but not absolutely, owing to the material deposits just mentioned, so I instituted an investigation of the eyes of the dead in morgues, deadhouses, and other places. I have thus obtained a record of over 3000 cases. In from 24 to 48 hours after death the eyes turn outward from each other almost without exception. Sometimes one eye turns up more than the other; again, both eyes may turn upward and outward. I have not in any single case seen eyes in the dead which appeared to me to be perfectly straight. I have examined by "retinoscopy" 364 subjects as to the refraction with the average result of about four dioptries of hypermetropia, varying from two to 10 dioptries, excepting three cases of axial myopia. I exerted some pressure on the sides of the eyes so that any flattening of the cornea due to death might not affect the results. My improvised retinoscope consisted of pasteboard tubes joined at proper angles to get the light through one and to reflect it to the eye through the other; this made my distances invariable and much facilitated my work. During the space of 20 years I have examined the same people before and after death to the extent of 17 in number and have found their vision normal and the alignment of the optic axis perfect during life, but after death all of these eyes were hypermetropic and divergent.

The above facts lead me to the conclusion that the eyes of man are in a state of evolution as yet incomplete, requiring nerve-energy or eye-strain to bring about normal vision. This strain would be variable and not in any relation to the amount of axial deviation. Two cases having the same amount of deviation might vary in strain as one to 100.

¹ Strabismus Theories, New York Journal, July 24th, 1897.