illness of a few days. There was no post-mortem examination.

These brothers presented a singularity in gait, walking with a slight bend or incline at the hips. At first I thought the elder brother had had spinal disease but the spine was straight and the motion of the hip-joints was perfect. He had had rheumatic pains in many joints and there were several Heberden's nodes.

Dr. Ogden of Milwaukee writes with reference to his alkaptonuria patient, whose condition was described in the *Zeitschrift für Physiologische Chemie*, 1895, that "the colour of the inside of each concha is a pearly, light-greyish lead-blue, much the colour of the inside of some of our common mussel shells." This is evidently staining of the cartilages similar to that which exists in the two patients here described and in Albrecht's case.

There is no question that these are cases of ochronosis in long-standing alkaptonuria and they support Albrecht's suggestion that the pigmentation of the cartilaginous tissues is associated with the remarkable disturbance of metabolism which we have heretofore only recognised by the changes in the urine. The condition is thus brought within the range of the clinical physician. Fortunately it is not of much moment, so far as we know, and in the recorded cases there have been no symptoms directly due to the alkaptonuria. Dr. Garrod informs me that there are only two recorded post-mortem examinations in alkaptonuria cases. In Fürbringer's case⁷ the patient, a male, aged 29 years, died from phthisis. There is no mention of the duration of the alkaptonuria. The necropsy was made by Thoma and the description is complete. Blackening with alkalies was looked for in the body fluids, but there is no mention of blackening of the cartilages. In von Moraczewski's case (a woman, aged 43 years) the alkaptonuria was supposed to be of late development. There is no mention of the cartilages in the protocol of the post-mortem examination. Some of the cases of ochronosis have not been in alkaptonuria and, as Dr. Garrod writes, it looks as if possibly even the very few cases described may belong to two distinct classes. Of the three cases in which black urine is mentioned two at any rate seem not to have been in alkaptonuria, and in Albrecht's patient Zdarek could not find in the fresh urine either homogentisic or uroleucic acid.

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SOME SIMPLE EXPEDIENTS IN PHYSICAL THERAPEUTICS.¹

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IN the whole range of therapeutics there is no more important subject than the proper and efficient treatment of pyrexia. Without, however, entering upon an exhaustive consideration of so important a theme it will be allowed that while minor and transient degrees of fever can safely be left alone or dealt with by the various antipyretic drugs, and the more serious forms of hyperpyrexia demand rigorous application of cold in the form of bath or ice pack, there remains an intermediate class of continuous fever in which the repeated use of either of these modes of treatment is undesirable. It is only necessary in explanation of this statement to say that all internal antipyretics have a more or less depressant action on the heart and their repeated administration is apt to induce collapse or cardiac failure in the very cases in which steady heart action affords the main road to recovery. On the other hand, while the application of cold to the surface, acting as it does as a tonic to the circulation, effects the reduction of temperature without involving this risk, many of the methods employed for the purpose, such as sponging, packing, and bathing, though undeniably efficacious and wholesome, possess undoubted drawbacks in practice. The use of water in any way involves trouble and difficulty on the part of attendants, not always skilful when available, and such proceedings, adapted as they must be to the severity of the case and the endurance of the patient, and liable if mismanaged to serious mishap, necessarily involve the presence of the medical attendant for a

longer period and on more frequent occasions than may be convenient or even possible.

Taking these considerations into account, especially in such a state of continued pyrexia as that of typhoid fever, the system known as *cradling* offers undeniable advantages. It consists merely in arranging a sort of tent over the bed in which the patient lies naked or very lightly covered. The two ends may be left partly open to encourage a current of air or the effect may be intensified by suspending a trough inside containing broken ice. In hospital the tent is usually made of metal hoops covered by a sheet or blanket but in an ordinary bedstead a rod or cord extending horizontally about two feet above the patient and attached to the head- and foot-pieces is all that is necessary. In this way the surface of the body can be exposed indefinitely to an atmospheric temperature of about 60° F. which can be easily regulated, the natural cooling effect of radiation and evaporation being thus enhanced. The great advantages of this method are its simplicity; its remarkable efficiency, the continuity of effect being not only of value in continued febrile states but in reducing high temperatures; its comfort to the patient; the avoidance of the repeated shock and disturbance of applying water; and the freedom and security it gives to the medical attendant who is not called upon to cope with periodical alarming temperatures but can leave the nurse to meet the variations of the thermometer within a reduced range by regulating the draught or by applying ice or a blanket within the tent as indications require (see Fig. 1).

FIG. 1.

Cradle with ice trough.

In dealing with children whose consent and collaboration in times of sickness are less easily obtained than those of adults, as also in delirium and in highly nervous subjects, cradling is of special service and may be continued for ten or 14 days if necessary.

While considering the means of reducing temperature generally it may be useful to mention a simple method for keeping the head cool and controlling the circulation in cases of injuries and diseases of that part. In meningitis, skull fractures, and concussion, and sometimes in the delirium of fever, it has been the practice to apply cold to the head by means of an ice cap or simple bag, or perhaps only by evaporating lotion to the forehead. It is scarcely necessary to remind anyone that, with perhaps the exception of the last named, there is little satisfaction to the patient in any of these, and in unconsciousness or delirium it may exceed the powers of the nurse to maintain any contact at all. Moreover, the regions of the head to which these means are applied—the forehead and vertex—are already the cooler on account of their position, being in the periphery of the circulation and in addition freely exposed to the effect of radiation and evaporation. The part to which cold can be more profitably applied is the occiput and the nape of the neck and this can be done without difficulty or discomfort by using as a pillow an ordinary rubber water-bottle filled with ice-cold water and crushed ice and having a smooth towel pinned round it as a pillow-case. The substitution of this for the troublesome and inefficient appliances hitherto recommended in head cases has justly earned the gratitude both of patients and nurses and is particularly satisfactory to the medical attendant, as when ordering his patient "cold to the head" he can see that he gets it. In the delirium of fever, besides the local effect, this method has the great advantage of notably reducing the temperature and so relieving the condition on which delirium chiefly depends. For the feverish patient a constantly cool, smooth, and elastic water

⁷ Berliner Klinische Wochenschrift, 1875, Band xii.

¹ A paper read before the Brixton Medical Society.

pillow is an absolute luxury, and while he is lying flat as in typhoid fever it is more convenient than an ordinary bolster. If filled with water containing shaved or finely crushed ice the bottle does not require refilling more than once in from four to six hours. The tension can be regulated to a nicety by the quantity used and it is as well to exclude air, both to insure the better conduction of heat and to avoid gurgling noises on movement of the head.

Before bidding good-bye to the rubber water-bottle it may be worth while recalling what many patients have discovered for themselves, that when hot it supplies a convenient and efficient substitute for a poultice or fomentation, more particularly in cases of colic or local pain, though, of course, the heat is dry instead of moist. Owing to its collapsable nature the rubber bottle, suspended, inverted, and fitted with a suitable arrangement of tubing, has been employed as a reservoir in administering douches of various kinds; this might possibly be useful in an emergency.

Having devoted the foregoing to a consideration of the application of cold in the treatment of certain morbid conditions, it seems appropriate to mention here some ready methods of applying heat and the diseases in which it is useful. Radiant heat from a red-hot coal fire, *pace* asseverations to the contrary, is effective in subduing the almost unbearable irritation of chilblains. This irritation is at its worst during about two hours in the 24, and can be controlled for that occasion by holding the affected part for a minute or two as near the fire as can be tolerated with considerable fortitude; steeping in very hot water approximates to this. The trouble recurs the next day but it can be abolished in the same way, and after three or four repetitions a cure is effected. Relief of the itching in psoriasis and eczema has also been found by many patients to follow exposure of the part to strong heat of a fire, a lamp, or water, and it is recorded of the Emperor Napoleon I. that he spent much time sitting in hot baths for the relief of a life-long eczema of the thighs which caused him serious torment. There is probably nothing which produces such unbearable irritation as pruritus ani, rendered more difficult to relieve by the comparative inaccessibility of the part. This, however, may be mitigated by the use of hot douches, the temperature being borne by some as high as 130°. Where this cannot be arranged the application of a hot cone such as an inverted soda-water bottle filled with hot water will serve instead. Though in all these cases relief is only temporary it is greatly valued by the patient, and the rest from friction locally and respite to the nervous system ultimately lead to cure.

Another simple and effective means of applying dry heat particularly to joints and surfaces is afforded by silver sand loosely inclosed in a linen-lined flannel bag, baked in an oven, and closely packed round the part. The heat lasts for half an hour and is both comforting and curative in chronic joint affections and lumbago or muscular rheumatism. On a more extensive scale the subjects of rheumatoid arthritis in Egypt spend hours buried in the hot sand with remarkable benefit.

Patients with pulmonary or cardiac disease who are

FIG. 2.

Usual position in orthopnoea; pelvis flexed.

mattress, and perhaps more so on a feather one, the pelvis is flexed and the weight is received obliquely on the lower part of the sacrum and coccyx which, owing to its irregularity and the thinness of its covering, soon becomes sore (Fig. 2). Moreover, the body, supported only by what engineers term "skin friction," tends to slide away from support, the clothes become "rucked," and the patient is only maintained in his precarious position by muscular effort and the frequent attentions of the nurse. By placing a firm bolster across the middle of the bed below the mattress a double-inclined plane can be formed like a Singapore chair which with the pillows or bed-rest affords thoroughly comfortable and firm support (Fig. 3). The

FIG. 3.

Position with bolster under the mattress.

weight of the body is then received through the ischial tuberosities in a line with the spine without tendency to displacement and its attendant troubles or any necessity for muscular effort. The abolition, too, of the flexure of the lumbar spine does away with the consequent compression of the abdomen and the sense of suffocation and oppressive flatulence which so often afflict patients in this position. The bolster may be put in position while making the bed, otherwise it is best arranged by lifting the lower half of the mattress and pushing it up from below till it meets and supports the buttocks. Those who have not attempted to sit up in bed for hours or perhaps days and nights at a stretch can scarcely realise the effort and discomfort it involves and the amount of ease this form of support affords. Not the least of its benefits is the partial flexion of the knees with support, relieving the tension on the nerves and tendons at the back of the thigh as well as the pressure on the heels, while the security from slipping downwards permits the weight of the trunk to be freely transferred to the pillows at the back.

FIG. 4.

Feet raised in pleural effusion. A, Level of fluid.

A very simple method of affording support to a patient sitting up for brief periods after an enfeebling illness is to pass an ordinary roller towel round the back below the armpits and to make it fast to the foot of the bed. This of course does not prevent him slipping down and involves more confinement of the chest than one suffering from respiratory difficulty would tolerate, but as a simple

compelled by orthopnoea to sit up in bed suffer much in addition to their other troubles from the discomfort and insecurity of their position. On an ordinary flat

mechanical support in uncomplicated convalescence it is often useful.

While considering the decubitus in pulmonary disease I would allude to the benefit in certain cases of pleurisy with effusion of raising the foot of the bed about 12 inches, so as to make the shoulders the lowest point, the patient lying supine or on the affected side (Fig. 4). The position is perfectly comfortable and quite easy to maintain continuously, the head being raised on an ordinary pillow not too high. The cases in question are those of pleurisy with effusion in which the fluid continues to rise to the top of the chest, recurring after tapping, and which are usually unaccompanied by pain though there is some fever. In these instances experience shows that the pleurisy is at the upper part of the chest and is probably always associated with a tuberculous lesion in the upper lobe. These at least are the cases of which I am now speaking. In ordinary circumstances the fluid poured out naturally gravitates to the lowest part of the pleura; towards the diaphragm if the patient is up, or distributes itself over the back if he lies in bed. In either case it flows away from the seat of inflammation in the upper lobe and incapacitates the lower and presumably healthy portion of the lung, by its bulk also displacing the heart and mediastinum and so limiting the expansion in some degree on the sound side. Certainly, these patients apply for aid on account of dyspnoea rather than for any other symptoms. By the time the fluid has mounted to the dome of the pleura where it might do some good by bathing and separating the inflamed surfaces and collapsing and resting the diseased area of lung, it is usually considered necessary, on account of the dyspnoea combined with the physical signs of a full pleura, to perform paracentesis, and the chance of natural relief for the local inflammation is lost. With a full pleura and dyspnoea there would be scarcely two opinions as to the necessity for tapping the chest, but after relief has been so obtained, or in cases where the condition has been recognised in an earlier stage, decided benefit results from this position. The temperature falls and the exudation ceases, so that subsequent tapplings are not required and recovery is more rapid. The ultimate effect on the pulmonary lesion is probably favourable; the treatment is, at all events, in accord with the generally received opinion of physicians that functional inactivity and collapse due to the presence of effusion round a tuberculous lung tend to arrest the progress of phthisis and should not be unnecessarily interfered with. Whether there is a lessened tendency to the formation of adhesions it is difficult to say, but undoubtedly adhesions are infinitely more common in the upper half of the pleura, usually the dry areas, than in the lower half, the usual site of accumulation of fluid. Of course there are many instances of pleurisy accompanied by pain and friction at the base followed by effusion, both tuberculous and otherwise, but of these I am not now speaking.

The greater freedom of movement in the lower as compared with the upper half of the chest probably accounts for the greater frequency and severity of pain where the lower part is affected by pleurisy. On lying down, however, expansion of the upper lobes increases at the expense of the lower and this change is probably answerable for both the occurrence of pleuritic pain and the constant exacerbation of cough so notable in the subjects of pulmonary tuberculosis on assuming the recumbent position. In addition to posture the movements of the arms have a decided influence on expansion and contraction of the chest and after the febrile period rhythmic exercise, as in tolling a bell, definitely accelerates absorption of fluid from the pleural cavity. The influence of violent exertion in inducing dryness of serous cavities is familiarly illustrated by a "stitch in the side."

Enteroptosis.—A condition taken into account in recent years, though formerly overlooked or regarded as hardly beyond the bounds of the normal, is that laxity of attachment of the abdominal viscera which leads to their displacement on assuming the erect position, this being attended by a sensation of dragging and various functional disturbances. When this affects the kidneys only, and particularly when unilateral, a remedy is found in artificial fixation by operation. There are, however, many instances of the kind in which this is not resorted to and where the looseness extends to many or all the viscera operation is practically out of the question. If these patients, who, so far as I know, are all women, are to have any ease apart from the

recumbent posture some form of mechanical support to the abdomen is necessary. Various forms of belts and pads are employed, but comparatively recently a sufficient number of cases of this sort have been submitted to one particular form of treatment to prove its general value and applicability. This consists in applying a nearly rigid support to the anterior wall of the abdomen by means of plates of sheet lead, trusting to the elasticity of the contained gases to furnish a resilient padding to the solid organs and to distribute the pressure exerted. To prepare these plates a pattern is first cut in paper by shaping a piece to cover the entire front from loin to loin and ensiform to pubes, taking care to leave a space of half an inch at the bony points and margins. By folding along the middle and trimming symmetry is assured and by cutting off the folded part an inch wide sufficient space is allowed for the edges to come together without overlapping. These patterns are then cut out of five-pound sheet lead and sewn into brown holland cases, which are stitched to the inner aspect of the corsets after temporarily adjusting with pins in the proper position. The corsets should be long as the two plates are liable to bend and to crack if they extend below them. The apparatus should be applied carefully before the patient arises from the recumbent posture so as to apply the pressure while the organs retain their normal position; the patient can then rise and get about without displacement occurring. By this means it is certainly possible for a woman to get up at once and to go about her ordinary avocations in comparative comfort, free from the disability, pain, and vomiting which without such aid force her to maintain a recumbent position. The steady retention of the viscera in their proper place and the improved nutrition and health that ensue usually enable the patient to dispense with these artificial supports after three or four months, though in the mean time they may require renewing. It is useful therefore to retain the original paper pattern or a copy. As the plates are worn they adapt themselves to the figure, becoming more comfortable and effective, and should not therefore be straightened out when removed at night. Considering the difficulty of making any suggestion for the relief of enteroptosis and the great disability it involves this simple and harmless method will prove a welcome aid.

Reflex inhibition.—Many people are aware that pressure about the bridge of the nose or between the eyebrows will arrest an inconvenient sneeze, but it is not so generally known that gentle massage of the cricoid cartilage will usually arrest hiccup, especially in infants and young children in whom it most frequently occurs. So simple a proceeding could scarcely be expected to stop this distressing symptom in its severe form dependent on serious organic disease of the abdomen, but as a means of relieving the temporary attacks due to gastric disturbance, such as those ensuing on the ingestion of hot condiments, it is very efficacious. I have myself frequently found it of practical service while attending children. Stimulation of Arnold's nerve in the external auditory meatus or behind the ear is also effective.

Some forms of vomiting can be checked by counter-irritation of the epigastrum by means of a blister or a mustard leaf or plaster. It may be worth mentioning that the least disagreeable mode of obtaining a rubefacient effect with mustard is to rub the dry flour into cotton wool and to apply this to the skin closely covered with oilsilk, when the natural moisture of the skin gradually brings the sulphocyanate of allyl into action, producing a mild calefacient effect which can be tolerated for several hours if necessary with very slight discomfort. Physiologically any peripheral irritation exerts a depressing effect on the action of the heart and the nervous mechanism of heat production, particularly when the temperature is above normal, and I can recall several instances of typhoid fever in which this means of simultaneously checking vomiting and reducing temperature has proved of immediate service. Considering how inappropriate many remedies for vomiting are, which involve ingestion and digestion by an organ which can neither retain nor absorb, any indirect method such as this will often afford useful help where the long list of anti-emetics are disqualified at once simply because they are internal remedies. Until quite recently we scarcely possessed an alternative to these, saving the subcutaneous injection of morphine, the remote effects of which often forbade its employment; no apology therefore is needed for mentioning another and quite new one though not actually

germane to my present text. This is the continuous or repeated inhalation of oxygen. As to the rationale of the treatment I am not aware that physiologists have expressed an opinion, unless it is to suggest a parallel to the state of apnoea. I can, however, testify from its frequent employment in various forms of persistent vomiting—functional, reflex, and organic—that, so far, no means has proved so uniformly effectual. The inhalation of oxygen, and there is little trouble now in obtaining a cylinder, has this great advantage: it is perfectly harmless under all conditions and its administration may be repeated as often and continued as long as may be necessary and by comparatively inexperienced hands. It requires no effort on the part of the patient beyond that of ordinary respiration and involves no suffering or after-effects of a disagreeable character. Being administered by the lungs it not only acts independently of vomiting, which may continue for a time, but is peculiarly serviceable in such cases as those of gastric neurosis, irritability, inflammation or ulcer, in which it is undesirable or useless to introduce anything into the stomach, or after laparotomy where, in addition to this, retching is particularly obnoxious on account of the strain on the abdominal wound. Perhaps the most notable instance of its utility that could be offered was that of a nurse recently under my care for perforated gastric ulcer, involving laparotomy and suture of the stomach, where nothing could be given by the mouth and where the oxygen speedily arrested the vomiting following the anæsthetic and a recurrence some days later.

Other examples of reflex action, such as the contraction of the uterus following manipulation of the breast or distension of the vagina, sometimes contributory in accelerating labour or arresting post-partum hæmorrhage, are too familiar to need mentioning; as is the effect of dilatation of the anus or distension of the rectum in exciting contraction and evacuation of the colon. There is, however, a well-established reflex inhibition of the detrusor urinæ, illustrated in physiology by the arrest of micturition on stimulation of the sciatic nerve and in clinical experience by retention of urine, usually inseparable from operations about the anus and perineum. Apart however, from direct interference with the sciatic nerve, the effect of stimulation of its branches by pressing or pinching the skin below the buttock, in diminishing the desire for micturition, is readily demonstrated and may well be turned to account in dealing with cases of irritability of the bladder of nervous origin, and those more numerous and troublesome instances of enuresis in children for which there are so many remedies and so few cures, where a blister or even a calefacient plaster, made by moistening ordinary strapping with tincture of cantharides, would probably exercise sufficient restraint.

Internal hæmorrhage.—It is fortunately a very rare event for sudden internal hæmorrhage to prove immediately fatal unless due to the rupture of an aortic aneurysm, but it sometimes happens that before it is arrested by the occurrence of fainting and lowered blood pressure either so much blood has been lost as to involve tardy convalescence or the hæmorrhage, of little consequence in itself, causes serious damage to the organ in which it escapes, as occurs in the brain and lungs. It has been urged in such cases that it were better to induce syncope and cessation of hæmorrhage, either continuous or recurrent, by phlebotomy than to permit the continuance of the internal hæmorrhage at the risk of important tissues. But where such loss is already threatening life one naturally hesitates to induce further loss by other means, and the administration of antimony and other depressants has been suggested and carried out with a view to "bleed the patient into his own veins." This procedure, though useful in some instances of recurrent hæmoptysis and others of a slow and continuous nature, is hardly suited to emergencies, but a somewhat similar effect without the prostration and more under control can be obtained by applying elastic bands to the proximal end of the limbs. A moderate constriction is sufficient to retain the blood in the veins without arresting the flow in the arteries, so as to trap the fluid and to prevent its return to the heart. In this way a degree of anæmia in the central part of the circulation is obtained without further blood-let, favourable to cessation of hæmorrhage and coagulation at the bleeding point, while the surplus remains in the limbs against future needs.

Whilst dealing with hæmorrhage it may be useful to allude to that common form epistaxis, which used to be treated by the barbarous practice of plugging the anterior and posterior nares. Now, happily, we have a remedy in a spray of

adrenalin solution, 1 in 1000, which rarely fails in immediately arresting the bleeding and nothing could be cleaner, more inoffensive, or easier of application. But in the very exceptional instances in which it may be necessary to apply pressure this can now be done by means of a suitable rubber bladder introduced and inflated through the nostril and known as a "condom." Before this instrument was invented, and even now in its absence, an effectual plug for the nose could be improvised out of a piece of raw bacon fat from two to three inches long and of sufficient bulk, cut into appropriate shape, so that it can be just squeezed into the nostril, where it should remain several hours. It forms an efficient plug, is always at hand, and is not uncomfortable, neither is it so difficult to apply nor liable to adhere in its place or to lead to soreness and septic changes as are tampons. In minor cases the popular ideas of applying cold to the nape of the neck or raising the arms above the head are physiologically correct, as both tend to diminish the calibre of the vessels and to reduce the local tension and blood flow, but the plan of lying flat on the back, though tending to lower the force and frequency of the heart beat, is chiefly operative in causing the escaping blood to disappear into the pharynx. Perhaps as simple and effective a method of arresting minor forms of epistaxis as any is merely "champing" the jaws, when the blood flow of the internal maxillary artery is diverted to the muscles of mastication and the smaller terminal vessels in the nose are starved and cease to bleed.

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SPIRAL FORMATIONS IN RELATION TO WALKING, SWIMMING, AND FLYING.

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THE universality of the spiral in nature is a subject alike for surprise and reflection. As regards beauty of outline, the spiral transcends all other forms and is a source of pleasure. The spiral occurs very frequently both in the inorganic and organic kingdoms and, as I hope to show in the present article, has its own special uses. It is seen on a grand scale in the spiral arrangements of nebulae, in the whirlwind and whirlpool, in the waterspout and the sand-storm, in the cyclone, and other natural phenomena. As concerns living things it is fundamental and manifests itself in the most rudimentary plants and animals, in the cells and seeds of the higher plants, and in the spermatozooids of the more complex animals. It makes its appearance, so to speak, at the very threshold of life and can be traced through the whole vegetable and animal kingdoms up to man himself. It is seen in spiral stems, spiral tendrils, spiral leaves, spiral flowers, spiral fruits, &c., in plants, and in spiral bones and joints, spiral muscles, spiral horns, spiral teeth, spiral shells, &c., in animals. It not only abounds in every department of plant life but it also lends itself freely to the construction of large numbers of external and internal skeletons in animals. All the hard and soft parts of the higher animals are, with few exceptions, dominated by it. It is a thing not of accident but of design.

Apart from the beauty and grace which inhere in every variety of spiral I think I can trace in it a hidden and far-reaching purpose. Indeed, I can show that not only do spirals enter largely into the formation of plants and animals but also that the complicated movements of climbing plants and tendrils and of walking, swimming, and flying are directly traceable to their existence; nay, more, that the circulation of the blood in birds and mammals is in great measure due to the ventricles of the heart being composed of powerful combinations of spiral muscular fibres. As a matter of fact, the blood in birds and mammals is forced by the ventricles into the larger blood-vessels (especially the aorta) by spiral movements which cause it to gyrate within them much in the same way that a rifle bullet is made to gyrate within a rifle when the weapon is discharged. The ancient and grim phrase "wringing the heart's blood" has, curiously enough, its foundation in fact. The spiral ventricles of the heart in birds and mammals are typical of