at the same time wanted the animal to work. The whole difficulty consists in breaking with old habits. To return to the comparison that we just made, we shall run the risk of exploding the boiler of a steam engine if we heat it or cool it abruptly, but we can run it very slowly and for a very long time with but very little fuel. We may even preserve a little fire under the ashes, and this, although it may not be capable of setting the parts running, will suffice later on to revivify the fireplace after it has been charged anew with fuel.

We have recently had the example of Dr. Tanner, who went forty days without any other nourishment than water. Not very long ago Liedovine de Schiedam, who had been bedridden for twenty years, affirmed that she had taken no food for eight of them. It is said that Saint Catharine of Sienna gradually accustomed herself to do without food, and that she lived twenty years in total abstinence. We know of several examples of prolonged sleep during which the sleeper naturally took no nourishment. In his *Magic Disquisitions*, Delvis cites the case of a countryman who slept for an entire autumn and winter. Pfendler relates that a certain young and hysterical woman fell twice into a deep slumber which each time lasted six months. In 1882 an *enceinte* woman was found asleep on a bench in the Grand Armee Avenue. She was taken to the Beaujon Hospital, where she was delivered a few days after while still asleep, and it was not till the end of three months that she could be awakened from her lethargy. At this very moment, at Tremille, a woman named Marguerite Bouyenville is sleeping a sleep that has lasted nearly a year, during which the only food that she has had is a few drops of soup daily.

What is more remarkable, Dr. Fournier says in his *Dictionary of Medical Sciences* that he knew of a distinguished writer at Paris, who sometimes went for months at a time without taking anything but emollient drinks, while at the same time living along like other people.

Respiration is certainly more necessary to life than food is; but it is not absolutely indispensable, as we have seen in the cases of apparent death cited in our previous article. It is possible, through exercise, for a person to accustom himself, up to a certain point, to abstinence from air as he can from food. Those who dive for pearls, corals, or sponges succeed in remaining from two to three minutes under water. Miss Lurline, who exhibited in Paris in 1882, remained two and a half minutes beneath the water of her aquarium without breathing. In his treatise *De la Nature*, Henri de Rochas, physician to Louis XIII., gives six minutes as the maximum length of time that can elapse between successive inspirations of air. It is probable that this figure was based upon an observation of hibernating animals.

In his *Encyclopedic Dictionary*, Dr. Dechambre relates the history of a Hindoo who hid himself in the waters of the Ganges where women were bathing, seized one of them by the legs, drowned her, and then removed her jewels. Her disappearance was attributed to crocodiles. One woman who succeeded in escaping him denounced the assassin, who was seized and hanged in 1817.

A well known case is that of Col. Townshend, who possessed the remarkable faculty of stopping at will not only his respiration, but also the beating of his heart. He performed the experiment one day in the presence of Surgeon Gosch, who cared for him in his old age, two physicians, and his apothecary, Mr. Shrine. In their presence, says Gosch, the Colonel lay upon his back, Dr. Cheyne watched his pulse, Dr. Baynard put his hand upon his heart, and Mr. Shrine held a mirror to his mouth. After a few seconds no pulse, movement of the heart, or respiration could be observed. At the end of half an hour, as the spectators were beginning to get frightened, they observed the functions progressively resuming their course, and the Colonel came back to life.

The fakirs of India habituate themselves to abstinence from air, either by introducing into the nostrils strings that come out through the mouth, or by dwelling in subterranean cells that air and light never enter except through narrow crevices that are sometimes filled with clay. Here they remain seated in profound silence, for hours at a time, without any other motion than that of the fingers as the latter slowly take beads from a chaplet, the mind absorbed by the mental pronunciation of OM (the holy triune name), which they must repeat incessantly while endeavoring to breathe as little as possible. They gradually lengthen the intervals between their inspirations and expirations, until, in three or four months, they succeed in making them an hour and a half. This is not the ideal, for one of their sacred books says, in speaking of a saint: "At the fourth month he no longer takes any food but air, and that only every twelve days, and master of his respiration he embraces God in his thought. At the fifth he stands as still as a pole; he no longer sees anything but Baghavat, and God touches his cheek to bring him out of his ecstasy."

It will be conceived that by submitting themselves to such gymnastics from infancy, certain men, already predisposed by atavism or a peculiar conformation, might succeed in doing things that would seem impossible to the common run of mortals. Do we not daily see acrobats remaining head downward for a length of time that would suffice to kill 99 per cent. of their spectators through congestion if they were to place themselves in the same posture? Can the savage who laboriously learns to spell, letter by letter, comprehend how many people get the general sense of an entire page at a single glance?

There is no reason, then, *a priori*, for assigning to the domain of legerdemain the astonishing facts that are told us by a large number of witnesses, worthy of credence, regarding a young fakir who, forty years ago, was accustomed to allow himself to be buried, and resuscitated several months afterward.

An English officer, Mr. Osborne, gives the following account of one of these operations, which took place in 1838 at the camp of King Randjet Singh:

"After a few preparations, which lasted some days, and that it would prove repugnant to enumerate, the fakir declared himself ready to undergo the ordeal. The Maharajah, the Sikhs chiefs, and Gen. Ventura, assembled near a masonry tomb that had been constructed expressly to receive him. Before their eyes, the fakir closed with wax all the apertures in his body (except his mouth) that could give entrance to air.

Then, having taken off the clothing that he had on, he was enveloped in a canvas sack, and, according to his wish, his tongue was turned back in such a way as to close the entrance to his windpipe. Immediately after this he fell into a sort of trance. The bag that held him was closed and sealed was put upon it by the Maharajah. The bag was then put into a wooden box, which was fastened by a padlock, sealed, and let down into the tomb. A large quantity of earth was thrown into the hole and rammed down, and then barley was sown on the surface and sentinels placed around with orders to watch day and night.

"Despite all such precautions, the Maharajah had his doubts; so he came twice in the space of ten months (the time during which the fakir was buried), and had the tomb opened in his presence. The fakir was in the bag into which he had been put, cold and inanimate. The ten months having expired, he was disinterred, Gen. Ventura and Capt. Ward saw the padlock removed, the seals broken, and the box taken from the tomb. The fakir was taken out, and no pulsation either at the heart or pulse indicated the presence of life. As a first measure for reviving him, a person introduced a finger gently into his mouth and placed his tongue in its natural position. The top of his head was the only place where there was any perceptible heat. By slowly pouring warm water over his body, signs of life were gradually obtained, and after about two hours of care the patient got up and began to walk.

"This truly extraordinary man says that during his burial he has delightful dreams, but that the moment

CONVALLARIA.

By OTTO A. WALL, M.D., Ph.G.

CONVALLARIA MAJALIS is a stemless perennial plant, found in both the eastern and western hemispheres, with two elliptic leaves and a one-sided raceme bearing eight or ten bell-shaped flowers. The flowers are fragrant, and perfumes called "Lily of the Valley" are among the popular odors.

Both leaves and flowers have been used in medicine, but the rhizome is the part most frequently used.

The fresh rhizome is a creeping, branching rhizome of a pale yellowish white color, which, on drying, darkens to a straw color, or even a brown in places. When dry it is about the thickness of a thick knitting needle, swelling to the thickness of a quill when soaked in water. It is of uniform thickness, except near the leaf-bearing ends, which are thicker, marked with numerous leafscars, or bare buds covered with scales, and often having attached the tattered remains of former leaves. Fig. A shows a portion of rhizome, natural size, and Fig. B shows another piece enlarged to double linear size.

The internodes are smooth, the rootlets being attached at the nodes. The rootlets are filiform, and darker in color.

The rhizome is covered by an epidermis, composed of muriform cells of a bright yellow color, after having been treated with liquor potassæ to clear up the tissues. These cells are shown in Fig. G. An examination of the transverse section shows us the endogenous structure, as we find it also in various other drugs (sar-

CONVALLARIA.

of awakening is always very painful to him. Before returning to a consciousness of his existence he experiences vertigoes. His nails and hair cease to grow. His only fear is that he may be harmed by worms and insects, and it is to protect himself from these that he has the box suspended in the center of the tomb."

This sketch was published in the *Magasin Pittoresque* in 1842 by a writer who had just seen Gen. Ventura in Paris, and had obtained from him a complete confirmation of the story told by Capt. Wade.

Another English officer, Mr. Boileau, in a work published in 1840, and Dr. MacGregor, in his medical topography of Lothiana, narrate two analogous exhumations that they separately witnessed. The question therefore merits serious examination.—A. de Rochas, in *La Nature*.

SOME experiments recently made by M. Olszewsky appear to show that liquid oxygen is one of the best of refrigerants. He found that when liquefied oxygen was allowed to vaporize under the pressure of one atmosphere, a temperature as low as -181.4°C . was produced. The temperature fell still further when the pressure on the liquid oxygen was reduced to nine millimeters of mercury. Though the pressure was reduced still further to four millimeters of mercury, yet the oxygen remained liquid. Liquefied nitrogen, when allowed to evaporate under a pressure of sixty millimeters of mercury, gave a temperature of -214°C ., only the surface of the liquid gas became opaque from incipient solidification. Under lower pressures the nitrogen solidified, and temperatures as low as -225°C . were recorded by the hydrogen thermometer. The lowest temperature obtained by allowing liquefied carbonic oxide to vaporize was -220.5°C .

saparilla, etc.), namely, a nucleus sheath, inclosing the fibrovascular bundles and pith, and surrounded by a peri-nucleous or peri-nuclear portion, consisting of soft-walled parenchyma cells, loosely arranged with many small, irregularly triangular, intercellular spaces in the transverse section. Some of these cells contain bundles of raphides (Fig. 2), one of which bundles is shown crushed in Fig. J. Sometimes these crystals are coarser and less needle-like, as in Fig. K. Fig. C shows a transverse section through the leaf-bearing portion of the rhizome (at c), and is rather irregular on account of the fibrovascular bundles diverging into the base of the leaves of flower-stalks. A more regular appearance is seen in Fig. D, which is a section through the internode (b). In it we see the nuclear sheath, varying in width from one to three cells, and inclosing a number of crescent-shaped fibrovascular bundles, with their convexities toward the center and their horns toward the nuclear sheath. There are also from two to four or five free closed fibrovascular bundles in the central pith.

These fibrovascular bundles consist mainly of dotted or reticulated ducts (Fig. F), but all gradations from this to the spiroids, or even true spiral ducts (Fig. E), may be found, though the annular and spiral ducts are quite rare. These ducts are often prismatically compressed by each other. The fibrovascular bundles also contain soft-walled prosenchyma cells. The peri-nuclear portion consists of soft-walled parenchyma, smaller near the nuclear sheath and the epidermis, and larger about midway between, and of the same character as the cells of the pith. In longitudinal section they appear rectangular, similar to the walls of the epidermis (G), but with thinner walls.

All parts of the plant have been used in medicine,

either separately or together, and according to some authorities the whole flowering plant is the best form in which to use this drug.

The active principles are *convallamarin* and *convallarin*.

It is considered to act similarly to digitalis as a heart-stimulant, especially when the failure of the heart's action is due to mechanical impediments rather than to organic degeneration. It is best given in the form of fluid extract in the dose of 1 to 5 cubic centimeters (15 to 75 minims), commencing with the smaller doses, and increasing, if necessary, according to the effects produced in each individual case.—*The Pharmacist*.

FLIGHT OF THE BUZZARD.

DURING my visit to the Southern States of America, I have had several opportunities of watching, under favorable conditions, the flight of the buzzard, the scavenger of Southern cities. Although in most respect this bird's manner of flight resembles that of the various sea-birds which I have often watched for hours sailing steadily after ocean steamships, yet, being a land bird, the buzzard is more apt to give examples of that kind of flight in which a bird remains long over the same place. Instead of sailing steadily on upon outstretched pinions, the buzzard often ascends in a series of spirals, or descends along a similar course. I have not been able to time the continuance of the longest flights during which the wings have not once been flapped, for the simple reason that, in every case where I have attempted to do so, the bird has passed out of view either by upward or horizontal traveling. But I am satisfied that in many cases the bird sweeps onward or about on unflapping wings for more than half an hour.

Now, many treat this problem of aerial flotation as if it were of the nature of a miracle—something not to be explained. Explanations which have been advanced have, it is true, been in many cases altogether untenable. For instance, some have asserted that the albatross, the condor, and other birds which float for a long time without moving their wings—and that, too, in some cases, at great heights above the sea-level, where the air is very thin—are supported by some gas within the hollow parts of their bones, as the balloon is supported by the hydrogen within it. The answer to this is that a balloon is not supported by the hydrogen within it, but by the surrounding air, and in just such degree as the air is displaced by the lighter gas. The air around a bird is only displaced by the bird's volume, and the pressure of the air corresponding to this displacement is not equivalent to more than one five-hundredth part of the bird's weight. Another idea is that when a bird seems to be floating on unmoving wings there is really a rapid fluttering of the feathers of the wings, by which a sustaining power is obtained. But no one who knows anything of the anatomy of the bird will adopt this idea for an instant, and no one who has ever watched with a good field-glass a floating bird of the albatross or buzzard kind will suppose they are fluttering their feathers in this way, even though he should be utterly ignorant of the anatomy of the wings. Moreover, any one acquainted with the laws of dynamics will know that there would be tremendous loss of power in the fluttering movement imagined as compared with the effect of sweeping downward and backward the whole of each wing.

There is only one possible way of explaining the floating power of birds, and that is by associating it with the rapid motion acquired originally by wing flapping, and afterward husbanded, so to speak, by absolutely perfect adjustment and balancing. To this the answer is often advanced that it implies ignorance of the laws of dynamics to suppose that rapid advance can affect the rate of falling, as is implied by the theory that it enables the bird to float.

Now, as a matter of fact, a slight slope of the wings would undoubtedly produce a raising power, and so an answer is at once obtained to this objection. But I venture to assert, with the utmost confidence, that a perfectly horizontal plane, advancing swiftly in a horizontal direction at first, will not sink as quickly, or anything like as quickly, as a similar plane let fall from a position of rest. A cannon-ball, rushing horizontally from the mouth of a cannon, begins to fall just as if it were simply dropped. But the case of a horizontal plane is altogether different. If rapidly advancing, it passes continually over still air; if simply let fall, the air beneath it yields, and presently currents are set up which facilitate the descent of the flat body; but there is no time to set up these aerial movements as the flat body passes rapidly over still air.

As a matter of fact, we know that this difference exists, from the difference in the observed behavior of a flat card set flying horizontally through the air and a similar card held horizontally and then allowed to fall.

I believe the whole mystery of aerial flotation lies here, and that as soon as aerial floating machines are planned on this system, it will be found that the problem of aerial transit—though presenting still many difficulties of detail—is, nevertheless, perfectly soluble.—*R. A. Proctor, in Newcastle Weekly Chronicle*.

AN ASSYRIAN BASS-RELIEF 2,700 YEARS OLD.

THERE was exhibited at the last meeting of the Numismatic and Antiquarian Society, in Philadelphia, on May 7, an object of great interest to archaeologists, with which, says *The Church*, is also connected a very curious history.

It appears that about forty years ago a young American minister, Rev. W. F. Williams, went as a missionary to Syria, and he visited among places of interest the site of ancient Nineveh about the time that Austin Henry Layard was making his famous explorations and discoveries; he wrote to a friend in Philadelphia that he had secured for him a fine piece of Assyrian sculpture from one of the recently opened temples or palaces, representing a life size figure of a king, clad in royal robes, bearing in one hand a basket and in the other a fir cone. One portion of the stone was covered with hieroglyphics, and was as sharply cut as though it had been carved by a modern hand instead of by an artist who was sleeping in his grave when Nebuchadnezzar, King of Babylon, was yet an infant.

The letter describing this treasure arrived duly, but the stones did not come. It appears that the caravan bringing them down to Alexandretta, from whence

they were to be shipped to Philadelphia, was attacked by robbers, and the sculptured stones were thrown upon the desert as useless, and there they remained for some years. Finally they were recovered, shipped to this country (about twenty-five years ago), and arriving at their destination during the absence of the consignee, were deposited temporarily in a subterranean store-room at his manufactory. In some way they were overlooked, and here they have remained unopened until they were rediscovered a few days ago; meanwhile the missionary and his friend have both passed away, ignorant of the fact that the rare gift had finally reached its destination and had become again lost.

The cuneiform inscription is now being translated by an Assyrian scholar (Rev. Dr. J. P. Peters, of the Divinity School), and its identity is established; it came from the temple of King Assur-nazir-pal, a famous conqueror who reigned from 883 to 859 B.C.

The slab was cut into three sections, 3x3½ feet each, for convenience of transportation, and they have been somewhat broken on the journey; fortunately, however, this does not obliterate the writing.

Mr. Tolcott Williams, a son of the late missionary, was present at the meeting of the Society, and gave an interesting account of the classic ground from which the slab was obtained. It was one of a number lining the walls of the palace of Assur-nazir-pal. The inscriptions, as translated by Dr. Peters, indicate that this particular slab was carved during the first portion of this king's reign, and some conception of its great antiquity may be gained when it is stated that he was a contemporary of Ahab and Jehoshaphat; he was born not more than a century later than Solomon, and he reigned three centuries before Nebuchadnezzar, King of Babylon. After the slabs were procured, it was necessary to send them on the backs of camels a journey of eight hundred miles across the Great Desert, through a region which was more or less infested at all seasons with roving bands of robbers. Mr. Williams well remembered the interview between his father and the Arab camel owner, who told several conflicting stories by way of preliminary to the confession of the actual facts, in order to account for the non-arrival of the stones at Alexandretta, the sea coast town from whence they were to be shipped to Philadelphia.

Mr. A. E. Outerbridge, Jr., gave a brief account of the finding of these stones in the subterranean store-room where they had reposed for a period of a quarter of a century. The space between the slabs and the boxes had been packed with camels' hair, which had in progress of time become eaten by insects and reduced to a fine powder. The nails with which the cases were fastened were remarkable both for their peculiar shape and for the extraordinary toughness of the iron, far exceeding in this respect the wrought iron made in America to day.

The Rev. Dr. J. P. Peters gave a very instructive exposition of the chronology of the kings of Assyria, their social and religious customs and ceremonies, their methods of warfare, their systems of architecture, etc. He stated that the finest Assyrian bass-reliefs in the British Museum came from the same palace as this specimen, the carving of which is not excelled by any period of the ancient glyptic art. The particular piece of alabaster selected by the artist for this slab was unusually fine, being mottled with nodules of crystallized gypsum.

The cuneiform inscription is not unlike the Hebrew in its character, resembling it about as closely as the Yorkshire dialect resembles good English. The characters are so large and clearly cut that it is a pleasure to read them after the laborious scrutiny of the minute Babylonian clay tablets. The inscription on this slab is identical with a portion of that of the great "Standard Monolith," on which this king subsequently caused to be transcribed the pages, as it were, from the different slabs which were apparently cut at intervals in his reign.

Translation of a Portion of the Cuneiform Inscription.—"The palace of Assur-nazir-pal, servant of Assur, servant of the god Beltil, the god Ninit, the shining one of Anu and Dagon, servant of the Great Gods, Mighty King, king of hosts, king of the land of Assyria; son of Bin-nirari, a strong warrior, who in the service of Assur his Lord marched vigorously among the princes of the four regions, who had no equal, a mighty leader who had no rival, a king subduing all disobedient to him; who rules multitudes of men; crushing all his foes, even the masses of the rebels. . . . The city of Calah, which my predecessor, Shalmaneser, King of Assyria had built had fallen into decay: His city I rebuilt; a palace of cedar, box, cypress, for the seat of my royalty, for the fullness of my principedom, to endure for generations, I placed upon it. With plates of copper I roofed it, I hung in its gates folding doors of cedar wood, silver, gold, copper, and iron which my hands had acquired in the lands which I ruled, I gathered in great quantities, and placed them in the midst thereof."

DEPOSITING NICKEL UPON ZINC.

By H. B. SLATER.

To those interested in the electro deposition of nickel upon zinc, the formula given below for a solution and a brief explanation of its use will be of service.

The first sample of this solution was made as an experiment to see what substances could be added to a solution of the double sulphate of nickel and ammonium without spoiling it.

In addition to several other combinations and mixtures of solutions from which I succeeded in obtaining a good deposit, I found that the solution here given would plate almost anything I put into it, and worked especially well upon zinc. In its use no "scraping" or rescouring or any of the many operations which I have seen recommended for zinc needs be resorted to, as the metal "strikes" at once and is deposited in a continuous adherent film of reguline metal, and can be laid on as heavily as nickel is deposited generally.

I believe that the addition of the ammonium chloride simply reduces the resistance of the double sulphate solution, but the office of the potassium chloride is not so easily explained. At least, I have never been able to explain it satisfactorily to myself. It is certain, however, that the solution does not work as well without it, nor does the addition of ammonium chloride in its stead give as fine a result.

Some care is necessary in the management of the current, which should have a density of about 17

amperes per square foot of surface—not much above or below. This may seem a high figure, especially when it is discovered that there is a considerable evolution of gas during the operation.

I have repeatedly used this solution for coating articles of zinc, and always with good success. I have exhibited samples of zinc plated in this solution to those conversant with the deposition of nickel, and they have expressed surprise at the appearance of the work. Some strips of sheet-zinc in my possession have been bent and cut into every conceivable shape without a sign of fracture or curling up at the edges of the nickel coating.

The solution is composed of—

Double sulphate of nickel and ammonium.....	10 ounces.
Ammonium chloride.....	4 "
Potassium chloride.....	2 "
Distilled water.....	1 gallon.

The salts are dissolved in the water (hot), and the solution is worked at the ordinary temperature, about 16 degrees C.

The zinc may be cleansed in any suitable manner, but must be perfectly clean, of course, and finally rinsed in clean cold water and placed in the bath as quickly as possible; care being taken that it is connected before it touches the solution.—*Electrical World*.

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