Arsenic is often serviceable in rheumatoid arthritis and nodosity of the joints, but the indications for its employment are unknown. The pains of this troublesome affection are sometimes increased, sometimes benefited, by heat. Some cases are worse in summer, others in winter; some are worse during the day, others at night. All these forms arsenic will sometimes cure; yet its action is capricious, for in cases apparently identical, it sometimes fails, and sometimes cures. Its effects are sometimes astonishing. Stiffened joints, for a long time considerably enlarged, become reduced to their natural size, and regain their suppleness. Large doses, given for a considerable time, are necessary, and it must be borne in mind that if improvement does not speedily ensue it must not be concluded that the medicine will fail. Some consider it necessary to produce the toxic effect of arsenic; but in many cases improvement certainly results without pushing the remedy to this extent.

Dr. Simpson employed arsenic in that peculiar affection of the bowels prevalent among women, characterized by the copious discharge of membranous shreds, accompanied by much emaciation, and a long train of neuralgic and other nervous symptoms. This affection occasionally co-exists with dysmenorrhœa, the membranous shreds being discharged both from the bowels and uterus.

Like other metals, arsenic is retained a long time in the body. It is more quickly eliminated than some metals, as lead. Some maintain that arsenic is to be found in the bones as arseniate of lime. This statement is denied by others. It may be detected in the milk.

It is found in the blood chiefly with the red corpuscles. It is separated from the body by the urine, the stomach, and intestines, and, perhaps by the liver. After poisoning with arsenic, the metal is found in the liver in quantities larger than elsewhere. It may be that, like many other metals, it is separated from the body with the bile.

We know nothing of its influence on the composition of the urine. Some experimenters assert that the urea is lessened,

and, as the carbonic acid separated by the lungs is diminished they conclude that arsenic diminishes considerably tissue metamorphosis. Vogel observed hæmato-globulin in the urine of an individual poisoned with arseniuretted hydrogen.

Dr. Garrod maintains that arsenic acid is less irritating to the stomach than arsenious acid.

PHOSPHORUS.

For many years this substance has fallen into disuse, but quite recently, owing to its signal success in neuralgia in the hands of homœopathic practitioners, it has been restored to favour.

In large doses, sufficient to produce acute poisoning, its its effects are most singular. It is an irritant poison, but the symptoms are sometimes delayed for hours or even days. The patient complains of burning in the throat with intense thirst and severe burning pain in the stomach, followed by distention of the abdomen and vomiting; the rejected matters are dark green or black, with the odour of garlic, and are sometimes phosphorescent. There are the usual symptoms of collapse. There is, not unfrequently, jaundice, and suppression of urine; hæmorrhage and purpura often occur. In one case it is reported that the temperature of the rectum was 89° Fah. The *post-mortem* examination shows that the stomach and intestines are commonly inflamed. Most of the tissues are found in a state of advanced fatty degeneration, especially the liver heart and kidneys; the liver presents a very peculiar appearance. The fatty degeneration affects likewise the whole of the arterial system, down to the microscopic arterioles, (Wegner). The effects of chronic phosphorus poisoning are also most singular, and have lately been elaborately worked out on animals by Dr. George Wegner. It has long been known that workmen exposed to the fumes of

phosphorus are liable to necrosis of the jaw. Dr. Wegner believes that this results from the direct action of the phosphorus on denuded bone, and necrosis will not set in unless from wounds or from carious teeth, some of the soft tissues are destroyed, thus enabling the phosphorus to reach the exposed bone; and he adduces the following reasons in support of this view. 1. If the periosteum of an animal is severely wounded, and phosphorus is given in the form of a pill, even for months the periostial changes do not take place. 2. When the tibia of a rabbit is partially bared, a healthy granulating wound is soon established, but under exposure to a phosphorus atmosphere periostitis is set up similar to that in the jaw. 3. Many workers in phosphorus escape, whilst those who suffer have carious teeth.

Dr. Wegner found that gradually increasing doses of phosphorus or phosphorus fumes administered to rabbits produced congestion of the mucous membrane of the stomach, this membrane becoming of a brown colour and three times its natural thickness. The liver is chronically inflamed, with great increase of the interstitial tissue affecting earliest that portion surrounding the acini. This new tissue contracts, producing atrophy of the liver cells, and obstruction of the vessels and ducts. The organ, at first enlarged and livid in colour, sometimes gradually changes into the hob-nailed liver or into a shrunken irregular mass, deformed by contracting bands.

Given in doses too small to affect the stomach and liver in this way, phosphorus affects the bones, especially of growing animals. Thus, where spongy tissue should be formed in the growing bone, dense solid tissue takes its place, which by the naked eye and microscope is found to consist of well-formed bone. If the phosphorus is continued the proportion of dense bone increases, and the cancellous structure in accordance with a natural process becomes absorbed to make room for marrow tissue, till at last no cancellous structure is left, and afterwards the solid newly-formed tissue itself also undergoes absorption. Changes occur likewise in the bony

substance formed by the periosteum. The new bone looks natural, but the microscope reveals that it is dense, and compact masses encroach on the Haversian canals and at last a general narrowing of these canals takes place which affects even bone formed before the administration of phosphorus. If phosphorus is given for a long time to adult animals, the spongy tissue thickens, and the compact tissue becomes still more dense. After a time new bony tissue is deposited on the inside of the shaft, increasing till the bone actually becomes solid. The chemical composition of the bone is natural.

Dr. Wegner found also that under the influence of phosphorus callus after fractures or resection is more dense, and the formation of new osseous tissue is favoured.

The changes above described are produced by phosphorus as such, and not after its conversion into phosphoric acid. For phosphoric acid does not produce the peculiar changes in the stomach and liver. It does, however, affect the bones similarly, in very large quantities, larger than could be produced by the phosphoric acid generated from phosphorus introduced into the system, Wegner considers that it acts as a food, promoting natural growth.

The jaundice occurring in acute poisoning has been variously explained. Dr. Ebstein holds that it is not due to destruction of the liver cells, but to catarrh of the small biliary ducts, causing obstruction and leading to absorption of bile. The ductus communis choledicus has sometimes been found occluded by a tenaceous plug of mucus, thus greatly assisting the obstruction of the smaller ducts in the production of jaundice. Sometimes the contents of the intestines are found free from bile.

Phosphorus has been given lately in neuralgia with considerable success. It appears to be efficacious in neuralgia of any part of the body. Dr. J. Ashburton Thompson, in a valuable paper, records eighteen cases, and arranges them in three classes, acute primary attacks, acute recurrent attacks, and chronic cases. Each class is completed by six cases. In the first class the ages ranged between twenty-five and

forty-six; in the second between thirty and sixty; in the third between twenty-four and forty. Some of the patients suffered from trigemenal; some from cervico-occipital, others from cervico-bronchial neuralgia. All the cases in the two first classes were cured, of the third class three were cured, including one patient who had been afflicted sixteen years without a week's freedom from pain; two consumptives were relieved; and one uncomplicated case, a woman, aged forty, with disorder of the fifth nerve of ten months duration, was unbenefited, although under treatment for fifteen days. As might be expected, chronic cases take longest to cure, but relief followed the first few doses, in all the instances benefited. Dr. Thompson employs large doses, giving never less than one-twentieth, and generally one-twelfth of a grain every three hours. The testimony of other writers is equally strong, some regarding phosphorus as well nigh a specific. Some writers think one-hundredth of a grain a sufficient dose.

The most intractable and severe cases generally occur, as Dr. Anstie points out, in the degeneration period of life; but even in these instances phosphorus may prove useful. My own experience has hardly been so successful as that of Dr. Thompson. Phosphorus is probably most efficacious in typical neuralgia, and much less useful, as far as my experience goes, in those imperfectly-developed cases, where the neuralgia appears to be allied to, or passing into sick headache or pleurodyni, and in those instances of nerve pain which lack many of the more distinctive characters of neuralgia. Phosphorus is often serviceable in angina pectoris, a disease which is closely allied to, if it be not a true neuralgia.

Dr. Richard Hughes recommends phosphorus in chronic inflammation of the rectum, and Dr. Fleischmann of Vienna, approves its use in pneumonia especially if accompanied by typhoid symptoms.

Phosphorus has been tried in a variety of diseases. General nervous prostration, many affections of the nervous system, as mercurial tremors, paralysis agitans, and locomotor ataxy, in impotence, &c., but at present the evidence of its influence over these diseases is very unsatisfactory.

It has been asserted that phosphorus increases largely the quantity of urea of the urine, and it has been suggested that phosphorus splits up the nitrogenous tissues, converting them into fat and a compound which ultimately forms urea; others hold that the fatty degeneration is due to deficient oxidation (see turpentine).

COLLODION.

Collodion is useful in many ways. It is sometimes applied to chapped hands and chapped nipples; but chapped hands and lips are better treated with glycerine of starch, arnica cerate, or two parts of eau de Cologne to one of glycerine. Chapped nipples are often difficult to heal, and if other treatment fail, as equal parts of sulphurous acid and glycerine, collodion may be employed.

Collodion is used to adjust accurately and bind together the edges of cuts and wounds, and to exclude air.

Collodion, when painted over superficial erysipelas, slight burns, or patches of herpes before vesicles are developed, subdues inflammation, eases pain, and checks vesication. Unfortunately the collodion coating often cracks, admits air, and ceases to be efficacious; hence collodion is inferior to a solution of nitrate of silver in water, or nitrous ether (*vide* p. 201).

Dr. Hare, we believe, first employed collodion for boils. There are many kinds of boils. The common form begins as a pimple or pustule, whence the inflammation spreads, producing a hard painful swelling, the centre of which dying forms a core. Now if collodion is applied at the papular or pustular stage, the swelling around the pustule subsides, and the further development of the boil is arrested in the pustular stage. Collodion appears to be useless if the pustule has burst. The matter must not be let out after the collodion ap-

plication, or inflammation recommences, and the boil follows the usual course. It is desirable to apply fresh coatings of collodion over the old ones, allowing them to remain till the pustule has dried up, and the sore has healed. If much pus accumulate beneath this covering, causing considerable pain, the collodion should be incised under carbolic acid, and the pus allowed to escape. The subsequent treatment should be conducted on Lister's carbolic acid plan. This treatment allays the great irritation often accompanying the early stages of boils. Dr. Hare prefers the contractile collodion, and attributes much of its success to the pressure it exerts. The author has succeeded with flexible collodion; perhaps the contractile would have answered still better.*

Collodion, solutions of gutta-percha, or india-rubber in chloroform, prevent the pitting of small-pox. The flexible variety of collodion is better for this purpose (*vide* p. 200).

A mixture of collodion and carbolic acid is useful in tooth-ache due to an exposed and inflamed pulp. A jelly is made by melting in a test-tube some crystallized carbolic acid, then adding an equal quantity of collodion, and a portion of this preparation on a small piece of cotton-wool, inserted into the hollow painful tooth, at first may aggravate the pain, but in a few seconds, diminishes, and soon abolishes it.

Contractile collodion, with which some mix iodine, painted over the inflamed part in acute gout, will speedily relieve the pain, although for a brief space the application increases it. Too many coats must not be applied, or the contraction is too great and dragging on the skin excites a good deal of pain, or even produces vesication.

Sir D. Corrigan treats the incontinence of children with collodion. The prepuce is drawn forward by the left hand, and the little cap thus formed at its extremity is smeared over with collodion, which contracting, draws closely together the edges of the prepuce, and effectually prevents the exit of

* The extension of a carbuncle may be limited by tightly strapping with strips of adhesive plaster applied concentrically from the border inwards, around and over the swelling.

urine. A fortnight of this plan, which gives no pain and does not prevent sleep, sometimes suffices for the cure. When it is needful to pass water, the little cap of collodion can be easily chipped off with the nail. The prepuce in the morning is found distended with urine. Sir D. Corrigan thinks that it would answer as well to paint the collodion over the orifice of the urethra. The author finds this plan unsuitable for girls as it excites smarting, and induces them to pick off the collodion.

Two parts of glycerine to a hundred parts of collodion, sets without contracting or dragging the skin.

COD-LIVER OIL, ALMOND OIL, POPPY OIL, HEMP-SEED OIL, LINSEED OIL, COCOA-NUT OIL, DUGONG OIL, PALM OIL, LARD, SUET, WAX, &c.

Fats in one form or other are found abundantly in both the animal and vegetable kingdoms, showing their great importance in organic life.

Fats are necessary foods to the animal body, being heat-giving, force-supplying, and plastic. Their combustion contributes mainly to the generation of the heat of the body. They are essential to tissue-formation, for without them nutrition and growth would be very imperfectly performed, if not impossible.

Their combustion, moreover, supplies most of the force appropriated by the nitrogenous structures, and through them to be converted into muscular force, secretive force, nerve force, etc.

For the most part, all fats, so far as we know, have the same physical properties, differing only in the melting point. In their chemical nature, however, they differ much, but after their entrance into blood they are probably converted into fats having much the same composition.