

enough; but the problem of changing the sensitized plates for new exposures turned out to be much more difficult, especially where a large number of exposures were required.

Where the plates were small and the exposures few, a sliding plate holder was found to work best. Here it was only necessary to fasten a ratchet to the back of the plateholder and then attach a pawl to the vibrating side of the bellows. But some of the plates were of the size 17 inches by 20, and they could not be advantageously managed in this way. I finally hit upon the idea of attaching them to a revolving crate or barrel, set in motion on its axis by means of a small weight fastened to a cord wound upon a pulley or wheel at one end. The whole was then rigged escapement fashion, with detents equal to the number of plates, and each detent so adjusted that when at rest its corresponding plate lay in the focal plane of the objective. A very small pneumatic then sufficed as a pallet, or as a trigger to set off the mechanical device on the conclusion of each exposure. This simple movement was found to be sure of action, easy of construction, and to require a minimum of time for shifting the plates. Also the capacities of other devices for shifting plates were tried. At the focus of one of the smaller instruments a plate was set in a small frame sliding laterally in a frame of twice its own dimension, and this latter again sliding longitudinally in a shallow box of twice the dimension of the outer frame. By means of three pneumatic bellows, appropriately set and fitted with ratchet movements, every part of the sensitive plate was brought to the center of the focal plane, and the exposure duly made.

For the reflectors, it was found best to employ an endless chain or belt of plates, double hinged together by means of continuous flexible tapes.

In order to test the utmost capacity of the automatic apparatus, and at the same time to furnish a large series of pictures of the same corona with a given instrument, a quick-acting lens was rigged with a long plate barrel, sliding automatically forth and back in a frame rigidly attached to the tube. The barrel had ten plate strips upon it, and the ratchet movements gave ten exposures for each strip. In this manner one hundred exposures, from a half second to two seconds long, were readily obtained with a single instrument.

In order to avoid the construction of a camera box for each telescope, I adopted the plan of mounting the polar axis near the middle of a large Ducker portable house, one end of which had a removable roof, while the other formed a dark room. The spaces between all the instruments in the axis were readily stopped, and a partition athwart the house was built up underneath the axis, and down from the rafters of the house.

It was then a simple matter to connect the partition with a wooden frame around the exterior of the polar axis, by means of heavy opaque cloth, secured to the partition and the frame, with sufficient slack to allow the necessary motion of the polar axis and all the instruments mounted on it.

It may be further stated that substantially all this apparatus was devised, constructed, and tested at sea, during the voyage of the U. S. S. Pensacola from New York to Saint Paul de Loanda.

Notwithstanding the evident impossibility of securing any pictures of the corona, as a thick cloud stood nearly stationary over the sun at the time of totality, the pneumatic commutator was brought into operation and the control chronograph set going fifteen seconds before the predicted time of second contact. The duration of totality was 190 seconds, and over 300 exposures were made. The automatic movements of exposing shutters and the other apparatus in the uncovered portion of the house were apparent, while in the absence of pictures on the plates, the accurate registration of the movable plate holders was rendered certain by the subsequent examination of marks so placed upon the slides and revolving barrels as to disclose any failure of the mechanism to act.

After many months of experimentation, it may now be said that the automatic operation of a large amount of photographic apparatus simultaneously has been carried beyond the experimental stage. Many of the mechanical applications which operated successfully at Cape Ledo might evidently be covered by letters patent, but their use will not be so restricted.

The simplicity and directness of the methods employed leave little to be desired, while the moderate expense of the apparatus puts it within easy reach. Of course, the equal facility of its application to the automatic working of every sort of physical apparatus will not escape notice.

### THE PHOTOGRAPHIC NECKTIE.

WHERE will the progress of instantaneous photography end? In view of the admirable results obtained by scientists, and especially by Mr. Marey, inventors have for several years been setting their wits to work to devise small apparatus for allowing amateurs to take photographs without any one seeing them do it. We have already made known the photographic opera glasses and hat; but here we have something cleverer, and designed to meet with great success among practitioners: it is a question of a necktie provided with a pin. The latter is an objective, and the necktie is a camera. When any one approaches you and speaks to you at a distance of 2 or even 3 ft., you press a rubber bulb concealed in your pocket, and you have the portrait of your interlocutor.

This ingenious little apparatus, with which also general views may be taken, was devised by Mr. Edmond Bloch, who has operated it in our presence, and, although the instrument is not yet being manufactured for sale, we have decided to make it known to our readers at once.

Fig. 1 represents the photographic necktie, and Fig. 2 gives a front view of it as it is to be worn by the operator, the metallic camera, which is flat and very light, being hidden under the vest. Fig. 1 gives a back view, the cover of the camera being removed to show the interior mechanism, comprising six small frames which are capable of passing in succession before the objective, and which permit of obtaining six negatives. The instrument may be constructed with 12 or 18 frames. The apparatus is operated as follows. The necktie hav-

ing been adjusted, the shutter is set by a pull upon the button, A (Fig. 1, No. 2), which passes under the vest. In order to change the plate, it is necessary to turn from left to right the button, B, which has been introduced into a button hole of the vest, and which simulates a button of that garment. This button must be turned until the effect of a locking, which occurs at C (Fig. 1, No. 1), is perceived, and which puts the plate exactly before the objective. In order to open the latter, it is necessary to press the rubber bulb, D, which has been put into the trousers pocket. The rubber tube, E, passes under the vest and serves to transmit the action of the hand.

In order to charge the apparatus, it is opened at the bottom by turning the small springs, G G G; the sensitized plates are put into the frames, and the springs are turned back to their former position.

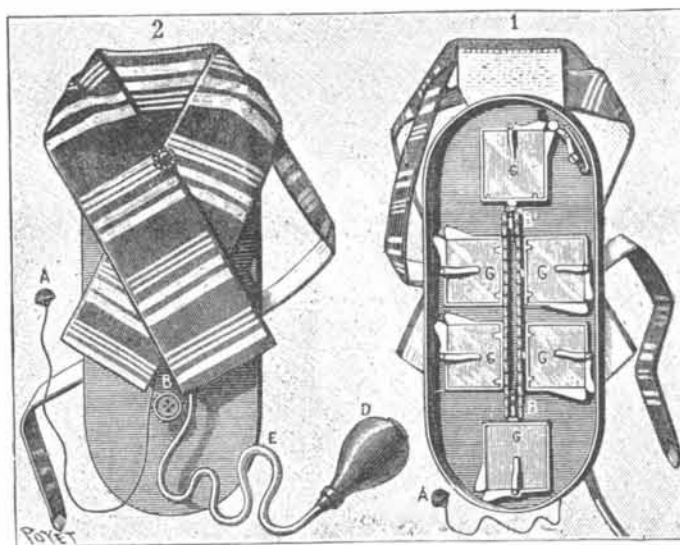
The apparatus is scarcely any thicker than the ordinary necktie called "Régate." The camera that contains the plates is not more than 0.2 inch in thickness. The six frames are carried before the objective through an endless chain, as shown in the figure.

Mr. Bloch has shown us some of the photographs that he has taken with this first apparatus, which he considers as yet but an experimental instrument. We reproduce herewith three portraits obtained with the apparatus, Fig. 3, through the minute objective skillfully concealed in the center of the pin. These photographs are about 1½ inch square, and are sufficiently

Sulphur is a constant constituent of albumen. It is present in from 1 to 1.6 percent, in different varieties of albumen. Animal hair contains about 4 per cent. The proportion of albumen found in lymph is, according to Goup-Besanez, 24.6 in 1,000 parts; in chyle, 40.9; in blood, 19.56; in brain, 86.3; in liver, 117.4; in muscle, 161.8. A sulphur combination, sulpho-cyanide of potassium, exists in the saliva, while taurin, a normal component of the bile, contains a large proportion of sulphur.

From these facts of chemical composition we are led to suspect that sulphur may have a place as a remedy in the same category as iron and phosphorus; that is, as an element conducive to the health of albuminous organs and tissues. If sanguification be improperly performed, if the work of secretion be impaired, if elimination be checked, sulphur is one of the remedies which may be relied upon as a corrigent.

Sulphur is insoluble in water, slightly soluble in alcohol, ether and fatty oils. It is likewise soluble in the oil of turpentine and in the alkaline fluids. It is next to oxygen in its affinity to other elements. It unites with most of them and often in several proportions. When heated in the air it readily absorbs oxygen and is transformed into sulphurous acid gas. This latter compound, again, is gradually converted into sulphuric acid by exposure to air in the presence of water. The sulphites, in their turn, abstract oxygen from the air, and are converted into sulphates. Sulphuric acid ex-



FIGS. 1 AND 2.—PHOTOGRAPHIC NECKTIE—BACK AND FRONT VIEW.



FIG. 3.—FACSIMILE OF PORTRAITS OBTAINED WITH THE APPARATUS.

sharp to allow the portraits to be recognized. If this apparatus can be well constructed, we predict a great demand for it.—*La Nature*.

### THE PHYSIOLOGICAL AND THERAPEUTICAL ACTION OF SULPHUR.

By JOHN V. SHOEMAKER, A.M., M.D.

THE mutations of medical practice as regards the employment of certain remedies is a fact no less curious on account of its familiarity. It might naturally be supposed that if a drug had been proved to possess valuable properties, it would never be suffered to fall into disuse. Such neglect, however, we do constantly observe.

New agents continue to be brought forward, more numerous of late years than ever before, and while it is true that some of these are valuable additions to the resources of the therapist, it is equally true that many are found to be destitute of peculiar power. Nevertheless, amid this crowd of claimants for favor, old and tried remedies sometimes fall into unmerited neglect. It is incumbent upon us, therefore, to critically survey from time to time the entire list of active medicaments.

We should seek to establish a consensus of professional opinion as regards the work of drugs. As practitioners, whose duty is above all to relieve suffering and repair the ravages of disease by all means within our power, it behooves us to examine our weapons, the drugs and the physiological remedies at our disposal, just as carefully as the quality, the sharpness of edge and antiseptic condition of our instruments and appliances prior to an operation in surgery. The more thoroughly physicians are acquainted with the manifold properties of the drugs they employ, the more successful are they in combating disease.

Among active medicinal agents few have been more completely neglected than sulphur. Few have less deserved neglect. In the hands of a preceding generation it was frequently and beneficially employed. The object of the present paper is to demonstrate that sulphur has a well defined field of usefulness, within the limits of which it can be surpassed by no other means.

It should seem that an element so widely distributed throughout the kingdoms of nature, an element which is a necessary component of the physical basis of all life, must play an important part in the processes of nutrition.

It exhibits a no less marked affinity for water, by virtue of which it exercises an escharotic effect upon organic tissues. These powerful chemical attractions by which sulphur is continually carried to higher combinations, with oxygen, are closely concerned with the absorption, therapeutic action and elimination of the element discussed.

The action of sulphur when directly applied to a surface is somewhat irritant. Yet it is marked by a more specific property, in that it is an energetic germicide. From these two qualities it is capable of use in a variety of accidents or diseases of the skin.

Wherever gentle stimulation is required, whether the affection be of a parasitic nature or not, sulphur may be properly and beneficially employed. Upon venereal sores, indolent ulcers, unhealthy or sloughing wounds, it acts as a stimulant and antiseptic. Its principal and external use, however, is the destruction of the itch-mite, together with its ova.

But it is not the external application of sulphur to which I am to-day desirous of calling your attention. I seek to present it in the light of a constitutional remedy having a well marked effect upon nutrition.

Being insoluble in the acid contents of the stomach, sulphur presumably exerts little or no influence upon the function of that organ.

Dissolved in the alkaline juices of the small intestine, a portion is absorbed under its own form into the portal circulation. Another portion enters the blood under the form of soluble sulphides. It has been conjectured that some is also absorbed after being dissolved in the fatty materials present in this part of the alimentary tract. If given in doses of half a drachm and upward, it is probable that a large proportion passes unabsorbed into the large intestine, and there combines to form sulphureted hydrogen gas, which is passed in considerable quantity by those who have taken full doses of sulphur. In some cases this gas appears to enter the blood and produces prostration and anemia.

The secretion of the intestinal glandulæ is increased and the elaboration of healthy bile promoted by the comparatively small amount which is absorbed. At the same time that portion undergoing change acts as a stimulant to the muscular coat of the bowel. Thus the food detritus is softened and urged forward and the substance acts, as every one knows, as a gentle laxative. The depravative effect of the intestinal secretion, the antiseptic property of the bile, the depletory effect upon the mesenteric radicles, must be of valuable

service to the economy in certain conditions. Yet, as an illustration of the slight place which sulphur holds in the therapy of this country at the present time, I may remark that in Vol. II. of the *System of Practical Medicine* by American Authors, edited by Dr. William Pepper, treating of general diseases and diseases of the digestive system, two scant references to its laxative effects are all the notice which sulphur obtains.

After absorption this substance exercises a tonic, corrective or alterative effect upon many secretions. It is rational to believe that as it is conveyed to the liver, and as one of the peculiar constituents of the bile, taurocholic acid, normally contains sulphur, it must favor the bile-producing function of the organ. Taurocholic acid is a compound of taurin and cholic acid, and 25 per cent. of the former body has been found to consist of sulphur. That the administration of sulphur is capable of producing a beneficial effect upon the biliary function of the liver is seen in cases of inactivity of that organ, to which I shall hereafter more particularly allude. From a similar course of reasoning, I believe that the activity of the absorbent system is stimulated by the exhibition of small quantities of sulphur. The secretory functions of the skin and mucous membranes are modified or improved under the use of sulphur. The epithelial appendages contain normally a notable proportion of this element. In perverted nutrition of these structures I have often witnessed decided improvement from the administration of minute doses of the same substance, which, in such cases, may be looked upon as a specific nutrient remedy. It produces a beneficial effect upon the bronchial mucous membrane. It probably has a similar influence upon the mucous membrane of the genito-urinary tract.

A remedy which is connected with the action of the largest and most important gland of the body, which is closely related to the processes of secretion and excretion and probably to the function of the absorbent system as well, must have an important if obscure influence upon the quality of circulating blood. It must, consequently, minister to the nutrition of the muscular and nervous system. It has been stated that sulphur increases the power and frequency of the heart's contraction. While I can speak with no actual knowledge upon this point, and while I should not anticipate a direct or speedy action upon the heart, nevertheless I believe that its remote constitutional effects are to increase the heart's vigor. It favors, I think, the contractility of muscular tissue wherever situated.

A considerable proportion of sulphur is normally present in muscle, and must consequently be continually supplied to the tissue. Hence, in certain conditions the administration of sulphur improves the muscular health and tone. This being the case, it seems highly probable that cardiac contractility is promoted in the same way. The muscular coats of blood vessels, of the intestinal tube and hollow muscular viscera, as the heart, bladder and womb, should partake of the same benefits. With the improvement of circulation, the respiration should also be strengthened, deepened and quickened.

Now these constitutional results do not follow the use of sulphur as ordinarily administered. Of a full dose, a comparatively small proportion reaches the blood directly, but the larger portion descends the tube and is in the large gut a source of sulphureted hydrogen. This is a toxic gas, and although it usually escapes *per anum*, yet a small quantity may always be absorbed, since the prolonged administration of full doses of sulphur or a sulphide lead to emaciation and debility referable to the continued action of sulphureted hydrogen, which impairs the red blood corpuscles and depresses the motor ganglia of the heart.

The numerous chemical affinities of sulphur, its ready combination with the alkaline bases, which it encounters in the small intestine, the ascending scale of its combinations with oxygen, blend the physiological and therapeutical actions of the elements and its compounds into an intricate study.

The interesting question arises, How does sulphur eventually do its work, and is it possible sharply to distinguish between the medicinal effects of sulphur, a sulphide, sulphurous acid, a sulphite, sulphuric acid and a sulphate? The chemistry of the blood is, indeed, a dark subject. All that I can say is that sulphur is readily converted into a sulphide, the sulphides and sulphites into sulphates, and that most if not all the sulphur eliminated by the kidneys is combined in the form of sulphates. Whether administered free or combined, it is probably always as a sulphate that it circulates with the blood, and the tissues of which it is normally a component are capable of separating and appropriating the element as needed.

Sulphur is eliminated by means of the secretions of those glands which it stimulates, the liver, skin and intestinal glands. It has also been found in the milk and in the expired air. It is chiefly, however, excreted by the kidneys as sulphuric acid in combination with alkaline bases, potassium, sodium or magnesium. From the skin and the lungs it escapes as sulphureted hydrogen. I have been in the habit for a number of years past of administering sulphur in quite small doses as a constitutional remedy, not only in diseases of the skin, but also in various affections of the alimentary tract, mucous membranes, muscular and articular structures, and in certain infectious disorders. It was consequently with great pleasure that I read the testimony to the same effect of the distinguished practitioner and writer, Sir Alfred B. Garrod, published in the *Lancet* for April 6, 1889.

The most obvious indication for sulphur is as a laxative in affections of the lower bowel. Accordingly we find that it has long enjoyed good repute in hemorrhoids when operative interference is forbidden. It likewise proves useful even in cases of bleeding from piles. It arrests bleeding here by unloading the engorged hemorrhoidal vessels, removing obstruction to the circulation, and allowing the propulsive forces an opportunity to act. In stricture of the rectum, the softened feces produced by sulphur pass through the narrowed portion of the tube with less difficulty than more compact masses, while if the stricture be due to cancer, sulphur stools are less likely to occasion pain than those due to more active purgatives. For the same reason sulphur may be beneficially administered in fissure of the anus or anal fistula. It forms an appropriate laxative, also, as Prof. Bartholow has pointed out, after operations upon the pelvic viscera. It may not be generally appreciated, however, and yet it is not surprising, on reflection, that a very much small-

er dose than that laid down in the books and generally employed is efficient, since, comparatively, so small a portion is absorbed. For the laxative power of sulphur is far more due to its action upon the glands and the muscular layer of the intestine than to the local effect of the unabsorbed portion. This, at least, is the conclusion to which one is led who sees regularity of alvine evacuation established by so small a dose as five or ten grains daily. It is to such small quantities, continued for a considerable period, that we are indebted for the systematic action of sulphur. If bulky doses be administered, much of it is lost, much of it combines with hydrogen, either in the bowel or the blood, to form a toxic gas, while the albuminous tissues cannot be forced to appropriate more sulphur pabulum than their needs require.

Sulphur will often prove remedial in a form of chronic sore throat associated with and perhaps springing from imperfect digestion. The patients are generally those who lead sedentary lives and habitually overtask their powers in monotonous labor unrelieved by cheerful recreation. The digestive and nervous system suffer, and various ills result either from nervous sympathy or a mild grade of toxemia. In such cases a change of habits, open air exercise, mental relaxation and small doses of sulphur as an alterative suffice to effect a cure.

The more closely the functions of the liver are studied the fuller must become our appreciation of its immense influence upon nutrition. It is true that in the processes of primary digestion, the bile seems to perform a less important and peculiar part than the gastric or pancreatic secretion. But in what may be termed the secondary digestion of albuminous material a further and no less necessary elaboration takes place by which unnecessary or deleterious nitrogenized bodies are separated in forms fit for excretion, and the crude peptones are transformed into the normal nutrient albumens of the blood.

We are ignorant, indeed, of the precise manner in which these changes are effected. It appears probable, however, that bile, absorbed from the small intestine and carried in the portal blood back to its place of origin, is intimately connected with the metabolism of albuminous substances. Now, in order that this work may be properly carried on, it is necessary that the hepatic circulation be active and that the bile be secreted in normal abundance and quantity. If this be not the case, we are all aware of the ill that results.

Digestive difficulties are perpetuated and intensified, imperfect preparation and separation of histogenetic and excrementitious products throw into the blood noxious materials which impair intelligence, embarrass the kidneys, disturb the bowels, and eventually excite structural disease of heart, blood vessels or kidneys, hepatic or renal calculus, gout, and very possibly diabetes or carcinoma. It is the sluggish and overworked condition of the liver which serves as a starting point of this long train of evils, consequently the habits of life must be radically altered. This is the first necessary step in the right direction. Such hepatic torpor I have often found to be benefited by the prolonged administration of small doses of sulphur.

The cases which I have sketched are often hereditary, and the functional weakness would seem to point to a congenital insufficiency of the gland, as Dr. Budd many years ago suggested. Sir Alfred Garrod has seen wonderful relief result in a case of hepatic colic of many years' duration, from the use of a five grain sulphur lozenge persisted in for months. This is, indeed, removing the effect by striking at the cause.

If, as often the case, hepatic digestion be accompanied by constipation, a mercurial purge may fitly inaugurate the course of treatment on account of the promptness of its impression, but the systematic use of small doses of sulphur is less hazardous and more beneficial. Let me, then, ask my hearers when confronted with chronic ailments due, in their inception, to derangement of the liver—and we all know how extremely common these cases are—to think of sulphur given in small and what I may call tonic doses.

Sulphur is a gentle stimulant to mucous membranes. It is an excellent remedy in chronic catarrhal conditions. As the bronchial mucous membrane is the most frequently and constantly exposed to this process, it is particularly in chronic bronchitis and bronchorrhœa that the remedy under discussion is found most serviceable. Excessive secretion is checked, the sputum becomes more liquid and more easily ejected, and the cough, consequently, less frequent and less troublesome. The eminent Irish physician, Dr. Graves, in his clinical lectures, which are a model of style, and may, even after the lapse of so many years, be consulted with advantage, dwells upon the use of sulphur in chronic bronchitis. He tells us that his attention had been drawn to the value of this remedy in long-continued congestion of the bronchial mucous membrane by observing the happy effect attending the use of sulphurous waters, as those of Harrogate. He recommends it especially in the disease as it occurs in aged and debilitated persons with copious secretion into the bronchial tubes. It would probably be found useful in obstinate affections of other mucous membranes. Garrod suggests that it may be of service in cystitis, and perhaps in some disorder of the kidney. I think that it might very properly be tried in tubercular or gouty pyelitis and likewise in disordered menstruation when not obviously dependent upon serious organic diseases of the womb or its adnexa. As a normal constituent of muscular tissue sulphur claims attention as a remedial agent in disturbed nutritive conditions of that system. Such disturbance is usually due to the toxic influence of either gout or rheumatism. Not infrequently the outbreak of a gouty paroxysm is preceded by painful muscular cramps. Rheumatism often attacks the muscular system, and lumbago, torticollis or other myalgia refer the inquiring physician to a specific toxæmia. These muscular aches are often notably relieved by the persistent use of sulphur. Its applicability to the sub-acute or chronic muscular involvements leads one to think of making trial of sulphur when the same poison affects articular structures. In chronic articular rheumatism or gout the same method of treatment has been found beneficial. In rheumatoid arthritis, likewise, improvement results from the use of sulphur. Garrod tells us that it was in this disease he first employed small and continued doses of sulphur. He adds that he is doubtful as to what precise share sulphur may have in the benefit secured, since he has been in the habit of concurrently administering other remedies,

such as iodine or arsenic. Reasoning by analogy, however, I have no doubt that sulphur is of decided therapeutic importance in cases of this nature.

This remedy is of value in acute infectious disorders. In diphtheria and the sore throat of scarlatina, the direct action of flowers of sulphur, which may be conveniently applied by blowing it through a paper cone, is decidedly antiseptic. It limits the spread of the membrane of diphtheria, destroys the micro-organisms upon which the growth of the membrane depends, and disinfects the organic product whose decay and absorption intensifies the blood poisoning.

A similar beneficial action is exerted in scarlatina, erysipelas, measles, and small pox. An ointment containing sulphur moderates the heat of the skin, allays the congestion or inflammation and disinfects the pus of variola. In place of sulphur itself, sulphurous acid may be applied to the throat by atomization in diphtheria, scarlatina, tubercular or syphilitic ulcers of the pharynx or larynx, and bronchorrhœa. Sulphurous acid and the sulphites have been employed internally in most of the infectious fevers and in puerperal septicæmia. We are obliged to confess the same disappointment with regard to sulphurous acid as of other germicides. They are not as effective within the human body as in the pathological laboratory. Nevertheless, certain of them do ameliorate, modify and shorten the disease which they are not able to abort. In fact, profound alteration of the blood, disturbance of the nervous system, the circulation, secretion and excretion, once inaugurated by a specific cause, cannot always rapidly subside even upon destruction of that specific and material cause.

Syphilis is another great general disorder which is, to a certain extent, influenced favorably by sulphur. We all know that in the management of syphilis much depends upon the functional activity of the skin. Hence baths and drugs which cause a slight determination to the integument, which heighten the respiratory and sudorific functions of that tissue, are important adjuncts to the more energetic antidotal treatment. Nothing is more unwise than a routine administration of mercury and iodide of potassium. There are times when such a course should be temporarily abandoned, and the patient placed upon simple tonics. Again it is always advantageous to occasionally suspend specific medication for a few days. During this period it is well to act gently upon the emunctories, and baths containing sulphide of potassium are very serviceable for their effect upon the skin. A resort to one of the sulphur springs may also be recommended, especially in cases of late syphilis and in debilitated subjects.

Sulphur baths and mineral waters have long been esteemed as curative in mercurial and saturnine intoxication. While they exert no attractive influence upon the metallic poison, they probably augment the effect due simply to temperature.

Sulphur has been used in tuberculosis. It often seems to have a good effect upon local tubercular lesions, though I have never been able to assure myself that it had any influence upon the generalized disease. Both sulphurous acid and hydro-sulphuric acid have been used. Sulphurous acid and its combinations are extremely valuable in yeasty vomiting.

Sulphur is a valuable remedy in many diseases of the skin. As it stimulates the depuration of the blood, the capillary circulation, nutrition and functions of the skin, as it enters into the chemical composition of the skin, the hair and the nails, it is not surprising that sulphur should be found of great service in many chronic cutaneous affections.

When seborrhœa is not obviously produced by frequently operative local causes, such as exposure to heat and cold, I have usually been able to detect some deterioration of the general health in its subjects.

Digestive ailments, exhaustion of the nervous strength by anxiety, overwork or excess; constitutional states, as scrofulous, tuberculous, anæmia, chlorosis, malaria, and other depressing influences, may be accountable for its occurrence. Except when it is associated with advanced phthisis, I have often witnessed marked improvement under the use of sulphur, especially in the dry variety of the affection. Nearly the same remarks may be made about acne, with the addition that it is peculiarly apt to develop in connection with the changes which take place at puberty. Manifestly, in maladies of which this may be said, no single plan of treatment is applicable to all cases. On the other hand, their common occurrence and their obstinacy compel us to the mastery of all our resources.

Sycosis betokens impaired nutrition, whether due to deficient alimentation or waste of energy from habits or disease.

Premature baldness and alopecia circumscripta are the result of impoverishment. The bulbs are shrunken, the shafts split and ragged. The condition may have been brought about by either local or general causes. In all these cases the internal administration of sulphur in small doses, and for considerable periods, has yielded admirable results, combined with appropriate topical treatment.

Chronic eczema is an inveterate complaint, and we are often obliged to run the whole scale of remedies before we find the effective one. Not infrequently this effective remedy will be sulphur. Again, boils, carbuncles, eczema and urticaria are among the manifestations of liver indigestion; general paræsthesia and the itching which often is attendant upon eczema may also be produced by the same cause. Here, then, we meet with a double indication for sulphur which acts at once upon the liver and the skin. And here, although something of a digression, I may call your attention to the virtue of sulphide of calcium in furunculosis. Given early, it will often prevent the formation of pus and cause resolution. But if suppuration be inevitable, the sulphide of calcium will, at least, limit its extent, favor its early evacuation and closure of the cavity.

In eczema, also, both of the acute and chronic form, I have found this sulphur combination beneficial. Malnutrition of the nails, expressed by hypertrophy, atrophy, or eczema, is sometimes amenable to sulphur in union with appropriate local measures.

Sulphur proves of avail in some of the most intractable maladies of the integument. In psoriasis it is of the utmost importance to secure functional activity of the skin, bowels and kidneys. This is effected by sulphur, and I have found it of use in psoriasis given internally, and also applied externally. Experi-



ence forbids us to expect much improvement in ichthyosis, scleroderma and lepra, yet some amelioration or at least arrest of the disease seems, in certain instances, to follow the administration of sulphur. The substance called ichthyol, which has recently been introduced into dermatological practice, and has been found efficacious in these same chronic affections, owes its activity, for the most part, to the large proportion of sulphur which it contains. Ichthyol is also, like sulphur, a most valuable topical medicament.

It has been my intention rather to invite your attention to the prolonged internal use of sulphur in small doses than to its local employment. Its use in scabies is time honored. It is excellent also in pediculosis, tinea versicolor, chronic eczema and psoriasis. Sulphurous acid is an admirable germicide, one of the best which we possess. It is used with the most striking success upon neglected and foul ulcers, and upon unhealthy wounds. It may be advantageously applied in *tinea favosa*. Dr. Schuster, of Aix la Chapelle, has devised an ingenious manner of applying it to the scalp. A net of strings is stretched across the lower third of a card-board box which fits to the head, and can be closed by a lid of the same material. A saucer containing burning sulphur is laid upon the net of strings and the box covered. The patient must sit still for half an hour. An abundance of sulphurous acid gas is generated, the sulphur ceasing to burn, of course, as soon as all the oxygen is exhausted.

Some doubts have been thrown upon the value of sulphurous acid as a disinfectant by the experiments of Koch and Sternberg. These, however, related to the power of the gas in disinfecting apartments and large masses of material, such as contaminated rags in bale. The gas was rapidly lost by diffusion, and was found to have slight influence upon dry stores. Nevertheless, it deserves to be ranked high as an antiseptic to moist cultures or under the conditions in which micro-organisms develop in human tissues.

My remarks have applied for the most part to uncombined sulphur. The ready combination of the element and the ready conversion of sulphites into sulphides establish a close community of the therapeutic action between sulphur, sulphides, sulphurous acid and the sulphites. Sulphuric acid and the sulphates exhibit diverse properties.

I have been accustomed to administer washed or precipitated sulphur in milk or in capsules. Garrod gives it in the form of a lozenge containing five grains of the milk of sulphur and one grain of cream of tartar. —*Dietetic Gazette*.

#### THE SAHARA DESERT.\*

THE arid regions of the world are, speaking roughly, distributed in two bands north and south of the equator. They comprehend all inland drainage areas, or areas where the streams have no connection with the sea, which are also regions where evaporation is in excess of precipitation, for if the latter were in excess the water would rise till it could flow into the sea, as in the case of the great lake region of North America, and the area would no longer be one of inland drainage.

The largest of the deserts, the Sahara, is about 3½ million square miles in area, and the area of all the deserts of the world together about 11,500,000 square miles. In other words, over one-fifth of the land of the world has no outlet for drainage to the sea, and in all that area evaporation is greater than precipitation. These areas correspond very closely with the regions of the world where the rainfall is less than 10 in. annually.

In no place in the world can there be found such enormous ranges of temperature as in these deserts. In the Sahara the temperature sometimes falls from 100° during the day to the freezing point during the night, due to the great dryness of the atmosphere and to the radiation that takes place from the soil after the sun has set. These inland drainage areas correspond very much in their barometric phenomena. In all desert regions during summer all the winds blow in upon them. In winter the reverse takes place—the winds flow out of them; and that holds good both for the northern and the southern hemispheres. This occasions the low rainfall, for the great majority of these regions are more or less bounded by high hills. The winds arrive at the deserts over these hills, and the vapor is precipitated from the atmosphere by the hills, with the result that when the winds reach the interior regions there is nothing left to be deposited. If there are not hills all around any desert area, then, as in the case of northern Asia, the winds pass from a colder to a warmer climate, and as they get to warmer regions they are able to contain more vapor, and consequently no rain is precipitated.

The author then gave an account of his own views and impressions as to the Sahara. When staying in May last in Algeria, he was anxious to make a trip to the desert, principally with the object of examining the sand and other deposits. During the Challenger expedition they had found in the bed of the Atlantic for a long distance west of the African coast opposite the Sahara, and in the bed of the Indian Ocean to the south of Australia, small grains of red quartz sand, and they had found scarcely a trace of such in the seabed in any other part of the world. He suspected this quartz sand had been blown out from the Sahara in the one case and from the Australian desert in the other.

In the south of Algeria he got a light carriage which could traverse the desert, such as was now in use for the post just established by the French to Touggourt, in the Sahara. Taking bedding and food with him, he first skirted a large area covered with salt, and then passed on through the long belt of oases which the French have planted on the way to Touggourt. Along this route numerous artesian wells had been sunk, and an abundant supply of water thereby obtained for the palm trees which had been planted. There were now three companies in existence, who had dug artesian wells, and were planting thousands of palm trees, with the view of getting a valuable return in a few years.

At Touggourt the real sandy part of the desert began, and he made excursions into it, with that town as his headquarters. He exhibited to the meeting a specimen

of the sand, of a light yellowish brown color, and exceedingly fine in the grains. There were a good many clay particles in it, and the quartz particles, which were also numerous, were identical with those they had got in the bottom of the Atlantic. There was no doubt that the winds from the desert carried the sand a long way out to sea. He had also examined the region geologically, and the formation of the rocks was entirely that of fresh water, and of Quaternary date.

The great majority of geographers and geologists had expressed the belief that the Sahara was an old sea bed, but he was of opinion that it had never as a whole been covered by the sea since Cretaceous or Devonian times, and no part of it had been covered by the ocean since Tertiary times. All the assertions as to the discovery of shells rested upon one common species being found very rarely in one region of the desert. He thought that, owing to recent researches, the opinion as to the Sahara being an old sea bottom was likely soon to disappear from our text books. He considered that the features of the region had been produced by atmospheric conditions. The sand was the product of the disintegration of the rocks *in situ* which engirdle the Sahara. The existing rock was not far below the surface, and by digging down to it, the hard, sandy particles were found embedded in the stone. The sun shone on the rocks, and they expanded. The sudden cooling at night broke them up, the wind carried away the smaller particles, and so continually the rocks were being disintegrated by means of changes other than water, although water perhaps had in times past played a greater role there than it did now.

There was a range of hills in the desert to the south 7,000 feet high, and for three months in the year their summits were covered with snow. Descending the hills were river courses, some of great length. Much of the region, he considered, had once been a large fresh water lake. Speaking of the commercial aspect of the Sahara, he said it was difficult to go there without becoming enthusiastic about it. There seemed to be no limit to the amount of water that was to be got by sinking artesian wells. The head of the water must be a long distance away in the higher lands surrounding the desert.

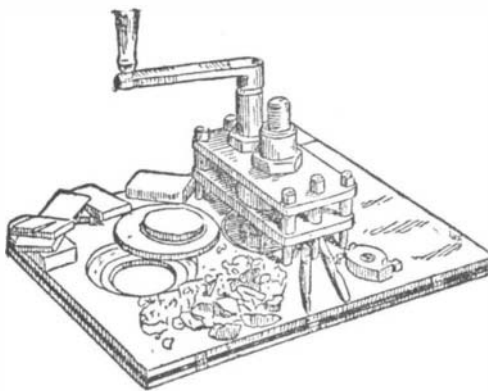
The cultivation of palms was extending to an enormous extent, and the French expected to carry on their railway to Touggourt (at present nearly a week's journey from Algeria) in the next few years. The French were also hopeful that France would tap all the trade of the North Soudan across the Sahara, by making a railway across the desert. He did not think it was at all impossible to build and keep open such a railway. There was plenty of water to be had, and the sand never drifted to such an extent as to bury a railway. The climate, though very warm, was at the same time very healthy. If the French built the railway, they would then have no cause to complain about Britain remaining in Egypt.

#### A BURGLAR'S KIT.

THE ingenious methods employed by thieves to overcome the obstacles that are set in their way to thwart their nefarious schemes are surprising and show a large degree of mechanical skill. Bolts and bars are brushed away as if they were merely wisps of straw. Simple devices to protect property are overcome by simple means; but when the appliances are intricate, scientific and supposed to be invulnerable, the enterprising burglar rises to the occasion and quickly demonstrates that the idea of safety is a delusion.

Burglars keep pace with the times. Improved methods of protection are met with improved systems of burglary. Inventors burn the midnight oil in building strong boxes where money, jewels, and bonds can be placed without danger of being removed by nightly visitors, and the burglar studies just as hard to find the weak spot in the box.

The many successful robberies that are planned and executed constantly show that the thief has much the best of the argument, and that the tools employed in his trade are more than a match for inventive genius backed by science. Men who make a business of robbery are not idle during their leisure moments. Besides keeping an eye upon the police, they are ever on the watch for short cuts to plunder. They do not want to be bothered when out on a job by running



BURGLAR'S PLATE CUTTER.

across a new obstacle in the shape of an improved bolt, lock or fastening, to get rid of which might delay them so as to interfere with the success of the work.

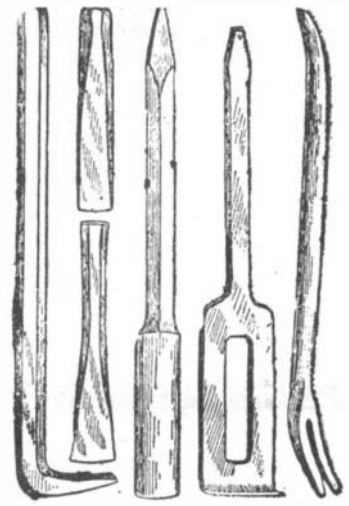
One successful means of avoiding these tantalizing delays is the Patent Office reports. No lawyer scrutinizes the monthly reports more carefully for infringements than the skillful thief. He studies every mechanical device for the better protection of goods and chattels with a critical eye, until its virtues and defects are a fixture in his mind. He does not complain to any court about the infringement on his rights, but takes the law in his own hands and puts a permanent injunction on the patent by knocking the invention sky high when the interference is brought to his notice professionally.

Burglars are excluded from polite society, and yet they are in a way public benefactors. Being practical communists, they believe in a division of all worldly

goods. Having nothing themselves, they seek from others enough articles of value to give them a fair show and standing in the community. The public does not share their belief, and mildly protests by shutting itself up with its property with bolts, bars, and fastenings all around. The manufacture and sale of these goods afford a splendid investment for capital, and thousands of workmen are employed in factories making locks, bolts, keys, and other useful things, and in stores selling them, who, if it were not for the progressive burglar, would have to seek other and perhaps less congenial fields of labor.

Robberies occur more frequently than the public have any idea of, because the police have, in this city at least, adopted the policy of keeping the facts secret until after an arrest has been made, and it is only when the knowledge leaks out accidentally that it is gained.

Though the midnight intruder makes his rounds with great regularity and depletes the private treasury to a greater or less extent, there are comparatively few



JIMMIES.

persons who have any idea of the manner in which thieves work, and of the ingenuity displayed in carrying their schemes to a successful issue.

Burglars, as in every other branch of mechanical industry, have to serve an apprenticeship and learn their trade. They do not go up the ladder at a bound, but step by step, and if they have the requisite qualities and do not spend too much time in jail, may get a world-wide reputation as first-class experts. Thieves, according to Inspector Byrnes, like poets, are born, not made, but they have to be trained and instructed in the rules and regulations of the business. There are no salaried professors in the burglars' academy, the expense of the education being defrayed by a regular assessment upon the public treasury. There are grades in the business, and the lowest order is the house sneak thief.

This class is made up of the young thieves who are just starting on the rosy road to glory or to jail, and the superannuated thief whose usefulness in other fields is over. The old thief is the instructor, and bends the sapling in the right direction. The young man does the work and divides the "swag" with his partner. There are rarely more than two in this branch of the trade, principally because the profits are small, though frequent changes are made in the partnership.

Sneak thieves gain an entrance into houses either by force or fraud. In the first case the point of attack is almost invariably the front or basement doors. They are not really in the class of house breakers, although they may force an entrance. A favorite method is based on the carelessness of housekeepers who do not secure the outer doors. The thief, with rubber soles on his shoes, will go from house to house early in the evening hunting for a door that is unlocked. He opens it noiselessly, enters the hall, and perhaps the room opening upon it, grabs quickly whatever is in sight that can be carried away without attracting too much attention, and disappears with his booty. He usually takes clothing, silverware, and ornaments. He dresses well and might easily be mistaken for a member of the household by a stranger. At the time when these thieves work, doors, if they are locked, are not bolted, and the thief, watching his opportunity, will open the outer door with a false key or picklock. They take few chances, rarely go up-



RATCHET DRILL.

stairs, unless they get into a house in the summer, when the family is away.

Sneaks, after their spines have become stiffened by experience, boldly enter houses under the pretense of being agents, canvassers, plumbers, health inspectors or something else, and, if they get a chance, will steal anything they can reach, even if it is of trifling value.

They have generally to deal with women, who are usually unsuspecting and become accomplices without knowing it, and often make a rich "haul" in the shape of diamonds and other jewels. Flats afford an excellent opportunity for these impostors to exercise their talents. An easy entrance is made into the halls, which communicate directly with the living rooms, and the presence of a stranger in the house would not excite suspicion. Even if they are questioned, the names on the letter boxes in the vestibule give them a ready acquaintance with the tenants that often

\* Abstract of a paper read by Dr. John Murray at the meeting of the Scottish Meteorological Society, held in Edinburgh, on July 14. —*Nature*.