

Ostræ, Patelidæ, Turritellæ, Conus, Ammonites, and others are found in great numbers, while Nummulites have not yet been discovered. They seem to be wanting in the Central Lybian Desert; for even those petrifications which were collected by Sokna, and which so nearly resemble the Nummulites, are, according to Zittel, Orbitulites. In the sandy ground of the oasis a great number of the foraminifera are found, having sometimes a diameter of nearly half a line. The ground of Abu-Naim is excellent, being sand, mixed with marl and small lime particles, and would be perfectly well adapted for good agriculture if the chief thing were not wanting, viz., good water.

It is a remarkable fact that a great quantity of sulphur is found in many parts of the oasis, and the whole region of the large Syrtis contains rich layers of sulphur. By Arabic geographers the whole bay of the large Syrtis is called Djun el Kibrit, *i. e.*, Sulphur Gulf. It is also well known that the founder of the Egyptian dynasty of the Mehemed Alides, Mehemed Ali, imported sulphur from the Sulphur coast. In the extreme southeast corner of Abu-Naim there is a locality called Hofrat el Kibrit (sulphur mines), and about twelve miles from that place we made our camp.

In the neighborhood we also found sebcha formations and djef-djef fields,\* which, like those of the sebcha, are mostly formed by polygonal clods. The sebcha formations are found in every oasis of the Sahara, and it is not true that palm trees cannot grow in the salt ground; on the contrary, just this kind of ground is well adapted for the growth of palms, which bear a delicious kind of fruit; but the water of the sebcha (plural of sebcha), on account of the great quantity of salt which it contains, is still less drinkable than that of the sulphur springs. These latter are found in a rocky ridge of limestone, which crosses about the middle of the oases, from northeast to southwest. The water is contained in small cavities, which usually have a depth of about seven feet, and the subterranean resources of these natural wells seem to be inexhaustible. The temperature of the water, which fills the cavities to the brim in the month of March, when we visited Abu-Naim, had a temperature nearly equal to that of the air, the latter being 73° F., the former 72°-75° F. The neighborhood of these sulphur wells offered a very disagreeable resting place on account of the vapors of sulphureted hydrogen which filled the air and the water which we were obliged to drink.

The yearly mean temperature at Abu-Naim must be about 88° F., viz., the same as that of the oases which are located in the northern part of the Sahara. The presence of the djef-djef formations, and the fact that in Abu-Naim, in the same latitude and at the same height above the sea level, "gerara"† are found, corroborate the assumption that Abu-Naim still belongs to the region of the Mediterranean rains. This region, therefore, extends much more south than meteorologists hitherto have believed.

At the time when we visited Abu-Naim the country did not look torrid and bare, though there had been no rain for over two years; on the contrary, our eyes enjoyed the view of beautiful palm shrubs and ethel thickets. Ethel (*Zamarix*) formed the most important part of the vegetation, and often we saw this tree grown to a great height. A peculiarity of the ethel is the fact that, when the shrubs are nearly buried in the sand, blown over them by the winds, they try to escape by growing out of it. So it frequently happens that hills, having the height of from twenty-five to thirty-five feet, upon which an ethel grows, are formed by the roots and branches of this plant, which are surrounded by sand. The palms of the oases are very seldom found singly; they grow together in groups, forming thickets. They are all wild and bear only small fruit; no one takes the pains to cultivate them. Of other smaller plants which are found, I mention especially the two camel herbs, agol (albagi) and belhal (*Anabasis articulata*), which cover large stretches of the ground. I also discovered kasbah (*Arundo phragmitis*), rhardak (*Nitraria*), and fers (*Tragacanth nudatum*). The first one is a kind of rush which grows everywhere where there is water under the surface; the other two are shrubs. These were the only plants that we found, though I doubt not that there are many more when the season is propitious.

Of large animals that live in this oasis, I mention gazelles and antelopes, of which we found traces on the ground. The rest of the mammals probably consists of rats, mice, fennecs, and perhaps jackals. I could discover no traces of hyena. Of birds, only sparrows, wag-tails, and a few ravens seem to be stationary inhabitants of the oasis. The swarms of swallow and a few storks which came in the evening to look in every bush for snakes, lizards, and other tid-bits, remained only one night, and then continued their flight northward. (Swallows often remain for several days in the oasis, where flies and gnats are abundant.)

Of other living beings we saw lizards, chameleons, snakes, and especially the poisonous horn-viper, several kinds of ants, a great blue-black wasp, which builds very beautiful habitations and feeds its larvæ with caterpillars, and a butterfly (*Vanessa cardui*), which, in 1879, could be daily seen in the northern part of Tripoli and at the Mediterranean Sea, even far from the coast. This butterfly we found later in the terrible deserts between Cyrenaika and Kufa, hundreds of miles from this oasis. If we add to this a number of midges we will have the whole fauna of Abu-Naim.

As already mentioned above, human inhabitants are not found in that region, and it may be said to be perfectly masterless.

#### EASY METHODS OF DETECTING BLOOD-STAINS.

By PROF. D. S. KELLCOTT, Buffalo State Normal School.

THE detection of blood-stains, in a medico-legal sense and for other purposes, is certainly a question of grave importance. In criminal cases experts are ordinarily employed, but it is a hard fact that these experts have various degrees of expertness. Physicians are often called upon to testify in court, either as experts, or to corroborate or destroy expert testimony; therefore, the plain obligation to acquaint themselves with the recognized methods, and the state of scientific and professional knowledge relating to this subject, and to get both a theoretical and practical acquaintance with these methods. Although I am neither a doctor nor a professional chemist, I undertake to state several easy methods of detecting blood-stains, and in your presence attempt to demonstrate their efficiency.

\* "Sebcha" is the name for salt swamps, the surface of which has become dried out, but a few feet under the surface salt water and salt seas are found. "Djef-djef" is different from the former formation on account of the fact that, under the clods, no water is found, and the peculiar formation of the ground seems to have been caused by strong rainfalls.

† "Gerara" originally means a sack made of camel's hair or sheep's wool, serving for carrying the baggage of the travelers through the desert; but in this case it indicates cavities in the ground, which, after rain, are very fertile, and may be used for agriculture. Springs are not found in the gerara.

The questions presented are these, "Is a given spot or stain caused by blood, and if so, is it human or not?" two very distinct inquiries. To the first the examiner can ordinarily give a positive answer, obtaining his proof from one or all of these methods. 1. Chemical reactions. 2. Microscopic examinations. 3. Spectroscopic examination.

It is often of much consequence to be able to affirm that the spot in question is due to blood. To the second question, although of more consequence, unfortunately a less positive answer can be given. There is at present but one known method of approaching the problem, *i. e.*, by the size, shape and character of the corpuscles under the microscope, and when these are restored from blood once dried, many, I may say most, experts deny that these qualities are sufficiently constant to be decisive. The chemical and spectroscopic behavior of red blood after drying, derived from whatever source, is now held to be identical. I shall omit all consideration of the spectroscopic in relation to this matter, except to remind you of Beal's statement that "the application of the microspectroscope to the detection of blood-stains has, on the whole, been most satisfactory; probably for the future this test will be that universally adopted." (*Mic. in Med.*) On the other hand Dr. J. G. Richardson says "that it is not so delicate as the microscope, and of no use in determining the kind." (*Med. Mic.*) I have too little practical acquaintance with this instrument to have an opinion. It seems to me that the microscope or chemical tests are sufficiently delicate for most cases, besides I incline to the plainest methods, yet after all, the nature of the case must determine what means shall be employed.

The easy chemical tests may be mentioned as follows:

1. Blood readily dissolves in distilled water, giving a reddish color. Blood dried upon iron and acted upon by the hydrated oxide of iron is insoluble in water. It dissolves, however, on adding citric acid. The undissolved threads of fibrine may be examined under the microscope and chemically tested. (Dissolves in acetic acid, colored by test liquid of Millon and Pettenkofer.)

2. To the solution in water add weak ammonia, no change of color, or at least no change to crimson, which excludes certain vegetable stains.

3. Boil a small quantity of the aqueous solution, the color is discharged and grayish flocculi appear in it from coagulated albumen; these disappear on adding solution of caustic potassa, the color becoming green by reflected light, red by transmitted light.

4. Obtain the hæmin crystals. This last reaction I consider very delicate, the crystals never failing to appear even when the quantity of dried clot is exceeding small; a fragment large enough to see distinctly is ample to afford scores of these characteristic forms. There are several methods of obtaining them, viz.:

1. Virchow's plan: The fragment is crushed, an equal quantity of common salt added. After thoroughly mixing, moistened with glacial acetic acid, covered and brought to boiling, or to dryness over the water bath.

2. Crush the fragment, add a drop of water holding a trace of common salt. I use one drop of a one-per-cent. solution to ten of water. Cover and so place a drop of glacial acetic that it will slowly run under, then heat over the water bath as before.

3. Boil the powdered blood with glacial acetic acid in a test tube and evaporate to dryness on a glass slip.

Other courses are prescribed, but unless the case is a special one, these, while simple, are entirely satisfactory. Reasonably skillful manipulation can not fail to give the characteristic, brown rhomboidal crystals, many lying singly, others in crosses or stars. There are no known crystals of other substances thus obtained likely to deceive a practiced eye. Different kinds of blood give similar crystals. They may be examined with a quarter. I prefer the first method named above, although the second gives the crystals more evenly distributed over the field.

The microscopical examination of blood-stains has received much careful attention, and this instrument of precision has in this field undoubtedly great possibilities; it has surely suffered on account of its friends, still I am not without hope, indeed I have the expectation that it may yet abundantly triumph. Is it not so that adverse opinions, as to its ability in these matters, arise more often from want of excellence in the glasses, or from want of manipulative skill in the operator than from the nature of the case?

The microscopic test depends mainly upon obtaining the corpuscles, red or white, or both; to determine whether or not it is mammalian upon their shape, size, melus, and if mammalian, whether it is human or not, by the size alone. There are several rules given us for restoring the corpuscles; the simplest and most rational are these:

1. Dr. J. G. Richardson's method: Crush a minute fragment under cover, focus upon a suitable piece, a thin edge, then slowly run under distilled water.

2. The same with a one-per-cent. solution of common salt.

3. The same with glycerine and water—specific gravity 1.028, prepared by mixing four fluid ounces of water with three and one-half drachms of glycerine; some carbolic acid should be added if the mixture is to be kept for use.

After using each of the above fluids, I conclude that distilled water is quite as sure to give results as the others. To obtain red blood globules from a dried mass, sufficiently perfect for the determination of their characters, is not nearly so easy or sure as the books make it, and to get them so well that measurements differentiate the blood is of course much more so. Beal and Richardson mention high powers and glasses of superior quality as the necessary equipment for such work. My experience teaches that there is no use to try to do anything with this matter without high powers. I believe the very best objectives for the purpose are the modern four-system, sixth or tenth of the highest angle, and these in connection with solid eye-pieces.

Experimenting with human blood, dried in a mass on a glass slip, using a fairly good one-sixteenth inch objective, I obtained results as follows: 1. Every trial gave the lymph globules. 2. Every trial gave, after the color was washed discharged, threads of fibrine. 3. One-half of the trials gave the red globules so well that I could declare that they were not from reptiles, fishes, or birds. 4. One attempt in five gave the red ones so satisfactorily, that some few could be measured with accuracy, and, by the way, my measurements of such (using the camera) came very near the standard size of these disks when dried in film on a glass slide. A series of experiments with dried snake's blood, using the one-eighth inch objective, gave rather more favorable results. When too much water was used, and the outline of the corpuscles were invisible, the nuclei were often seen in masses which were quite deceiving; under a quarter-inch objective they appeared quite like globules of another sort.

Is a stain due to human blood or not? I would not undertake to say in a case where anything in particular depended upon it. I will not say that I think it doubtful whether those professing to be able to so determine are really able or not, but I can pretty safely say that the number who ought to attempt such determination are very few.—*Buffalo Med. and Surg. Journal.*

#### COTTON.

THE National Cotton Exchange of New Orleans give the consumption of cotton in Southern cotton mills the past year at 221,337 bales; of Northern mills at 1,573,997 bales—altogether 1,795,334 bales—out of a total crop of 5,741,252 bales. Other authorities make the Southern consumption 179,000 bales, but the aggregate is nearly the same for both sections. The home consumption is 31 per cent of the whole crop, as compared with proportions not much exceeding 25 to 28 per cent heretofore. In 1878-9 the consumption was 1,761,933 bales in the United States in a total crop of 5,074,155 bales. The increased consumption is some what more than 15 per cent., which sustains the views generally entertained as to the growth of the cotton manufacturing industry, and establishes the fact that the last year was the best in its general activity for the last five.

The success of a few cotton mills in the Southern States, Mr. Edward Atkinson claims, does not prove that many mills could succeed at the South. It is probable that the wish is father to the thought, Mr. Atkinson's local interests being strong enough to bias his judgment.

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#### TABLE OF CONTENTS.

	PAGE
I. ENGINEERING AND MECHANICS.—Improved Torpedo Boat Engines. Large illustration and 6 figures.—Perspective and sections of improved compound engines for French torpedo boats. . . . .	4151
The First Steamboat . . . . .	4152
Proposed Railways in Mexico . . . . .	4152
Northeastern Railway Bridge over the River Wear at Sunderland. Full page illustration. . . . .	4152
Salmon and Crossland's Stone Grinding and Polishing Machine. 1 figure . . . . .	4154
II. TECHNOLOGY AND CHEMISTRY.—Extraction of Grease from Wool. . . . .	4155
Review of the Most Important Changes in the Industrial Applications of Chemistry Within the Last Few Years.—General chemical treatment of textile materials.—Bleaching and the manufacture of chloride of lime. Preparation of dyestuffs.—Artificial coloring matters.—Mordants.—Dyeing.—Calico printing.—Tanning.—India-rubber, gutta percha, etc. . . . .	4152
Scientific Notes.—Maize meal.—The diastatic power of barley.—Use of Fehling's solution.—Reducing powers of different kinds of sugar. . . . .	4159
Assembly of German Natural Scientists, Dantzic, 1880.—Dr. Kiel on acetol and grape sugar.—Dr. Scheibler on saccharine.—Dr. Blochmann on the flame of the Bunsen burner, etc. . . . .	4160
Ozone in the Air . . . . .	4160
A New Optical Milk Testing Apparatus. 2 figures. . . . .	4160
Easy Chemical and Microscopic Methods of Detecting Blood Stains. By Prof. D. S. KELLCOTT. . . . .	4166
III. NATURAL HISTORY, ETC.—The Animals of the Deep Sea. Dr. H. ALEX. PAGENSCHER'S observations. . . . .	4164
Scale Insects. A valuable paper by Prof. COMSTOCK.—The natural history of the coodæ.—A second group of scale insects.—A third group of scale bugs.—The forms of scale bugs occurring on the Pacific Coast.—How the scale insect is spread.—Methods of preventing the pest. Remedies for exterminating the pests.—Smut on orange trees and oleanders . . . . .	4164
Cattle and Dairy Interests in Kansas. . . . .	4165
Some Natural History Notes Regarding the Jews. . . . .	4165
Mexicans as Primitive People . . . . .	4165
A Newly Discovered Oasis. The remarkable district of 'Abu-Naim, in the Sahara, discovered by Dr. Gerhart Rohlf. . . . .	4165
IV. ART, ARCHITECTURE, ETC.—Artists' Homes, No. 8. Mr. Val C. Princep's House, Kensington. Large illustration and 6 figures, plans, and sections. . . . .	4154
Theories Regarding a Gradual Development of the Sense of Color. . . . .	4156
V. ARCHEOLOGY.—Ancient American Pottery.—Contributions to the Archaeology of Missouri.—The Ancient Pottery of Southeastern Missouri. 28 figures . . . . .	4161
Ancient Warriors Uncovered. The Remains of the Theban Three Hundred. . . . .	4163
VI. MISCELLANEOUS.—A Miner's Daring and Endurance. . . . .	4154
How a Fast Racer Trots. . . . .	4156
The Tea Trade of the United States. . . . .	4156
The Egg Trade. . . . .	4156
Where the Oleomargarine Goes . . . . .	4157
The Tide of Immigration . . . . .	4157
The Population of the Earth . . . . .	4157
Continental Libraries. . . . .	4157

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