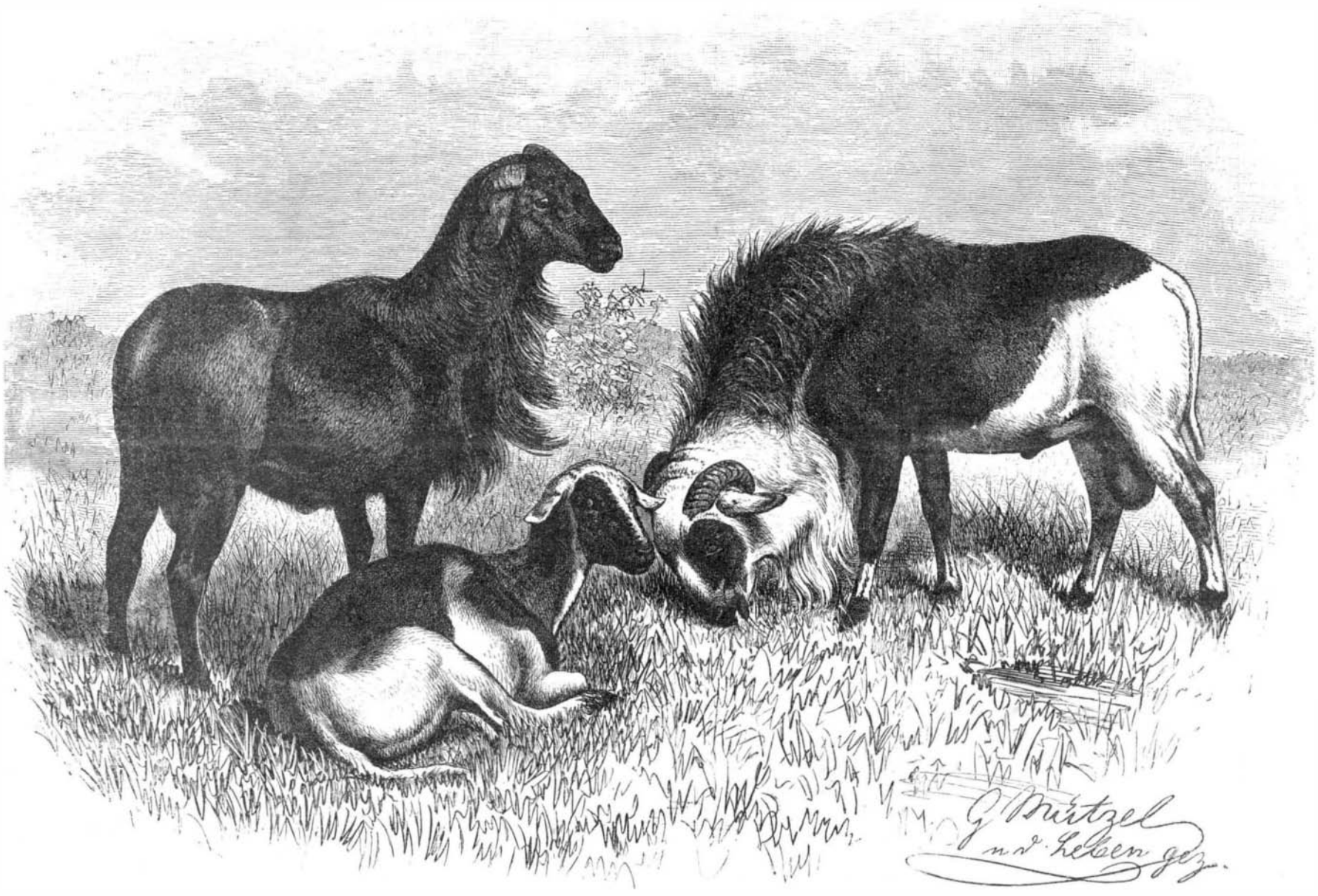
AFRICAN SHEEP IN THE BERLIN ZOOLOGICAL GARDENS.

Their essential characteristic is that they are not covered with wool like their European relatives, but have stiff, coarse hair. There is a diversity in their size and shape, which varies according to the food and climate of the different places in which they are raised.

Sometimes the profile of the forehead is straight, then again it is more or less curved. The ears vary in length and breadth, sometimes standing out and sometimes hanging down; while the body is more or less curved on the sides. The length and strength of the legs and tail are likewise varied, the latter sometimes showing a tendency toward clumsiness in size.

The color of these sheep is always black and white, the white forming the groundwork for the black, round spots, which are found upon the nose, the eyes, ears, and just above the hoofs.

The shape of the specimens here illustrated is rather small and graceful, the profile is straight, the finely shaped ears stand out horizontally from the head, the line of the back is even, and the tail is of medium length. The body is curved, the limbs are slender, very similar to those of a deer.



AFRICAN SHEEP IN THE BERLIN ZOOLOGICAL GARDENS.

The hair is short and even, except on the buck, and even then it grows long only on the under side of the neck. The large colored spots which are distributed about the body are essentially black and characteristic.

The Cameroon sheep are only useful as food, but they are considered of great importance among the black population, on account of their easy fattening qualities. —*Illustrirte Zeitung.*

Removing the Ring.

"Will you please saw this ring off my finger?"

It was an old woman who made this request of a Broadway jeweler, and as the worker in gold and silver took the wrinkled, though fat and shapely, hand in his it trembled violently, and a tear dropped upon the counter.

"Excuse me," continued the old lady, "but it is my wedding ring. I have never had it off since I was married—forty-five years ago. I have refrained from having it cut, hoping that my finger might get thinner and that I could take it off without breaking it."

"And what if I can remove it without cutting?" inquired the jeweler.

"But can you?" said she, looking up in a credulous way. "If you can, do it by all means."

Then the jeweler took the swollen finger and wound it round from the top downward in a length of flat rubber braid. The elastic cord exerted its force upon the tissues of the fingers gently and gradually until the flesh seemed to be pushed down almost to the bone. The old woman's hand was then held above her head for a brief interval. Then the bandage was quickly uncorded and rewound about the member. This was repeated three times, and finally it was found upon uncovering the finger that it was small enough to admit of the ring being removed with ease.

"I have never failed but once," said the jeweler, "and I have removed many rings from fingers even more swollen than yours. Do I charge for it? Oh, yes. I ask the same amount that I would get if the ring were left to be mended after being cut. One dollar. Thank you!" and as he turned to his bench and the old woman left the store, he added: "But after all, she might have done the same thing herself. It's not the work, however, I charge for. It's the 'know how.'"

Naval Engineers.

The Secretary of the Treasury has issued the following rules concerning the examination of applicants for the position of second assistant engineer in the United States revenue marine.

A candidate for an appointment as second assistant engineer must be not less than twenty-one nor more than thirty years of age; he must be of good moral character and correct habits; he must have worked not less than eighteen months in a machine shop and have had responsible charge of a steam engine, or else have served not less than that period in charge or assisting in the care and management of the machinery of a steam vessel in active service. Upon examination, he must be able to describe and sketch all the different parts of the marine steam engine and boilers, and explain their uses and mechanical operation, the manner of putting them in action, regulating their movements, and guarding against danger. He must write a fair, legible hand, be well acquainted with arithmetic, simple mensuration, English orthography and composition, also with rudimentary mechanics and its practical applications; he must possess some skill in the use of ordinary hand tools, and have a fair practical knowledge of the nature of heat and steam, of the general laws in relation to the expansion of steam, of the use of the indicator and interpretation of diagrams, of the chemistry of combustion and corrosion, of the composition of sea water and use of the salinometer, and of the usual calculations to determine loss by blowing, gain by heater, and water necessary for condensation.

No person otherwise qualified will be commissioned as an engineer before he has shown his ability to perform duty at sea in a satisfactory manner for a period of at least six months. This service may either antedate or be acquired subsequent to an examination.

No person will be originally appointed to a higher grade than second assistant engineer, nor until he shall have passed a physical and professional examination. The physical examination shall precede the professional, and if a candidate be rejected physically, he will not be examined further. All professional examinations will be competitive in character, and applicants who pass the minimum standard required in the several subjects will be placed upon the list of persons eligible for appointment, in the order of the excellence of their examinations, respectively. From this list appointments will be made in regular order, as vacancies may occur, until another examination.

No person will be designated for examination until he has filed in the department the necessary certificates showing his proper qualifications as to character, habits, and time or times of service, and the ability that has been displayed during such service.

Any person producing a false certificate of age, time of service, or character, or making a false statement to a board of examination, will be dropped immediately.

Any person who, subsequent to his examination, may become disqualified from moral considerations will not be appointed.

CRYSTALLIZED tin plate has a variegated primrose appearance, produced upon the surface by applying to it in a heated state some dilute nitro-muriatic acid for a few seconds, then washing it with water, drying, and coating it with lacquer. The figures are more or less diversified, according to the degree of heat and relative dilution of the acid. The *Iron and Steel Trade Journal* (London) tells its readers how this crystallization is produced. Place the tin plate, slightly heated, over a tub of water, and rub its surface with a sponge dipped in a liquid composed of four parts of aquafortis and two of distilled water, holding one part of common salt or sal ammoniac in solution. When the crystalline spangles seem to be thoroughly brought out, the plate must be immersed in water, washed either with a feather or a little cotton, taking care not to rub off the film of tin that forms the feathering, forthwith dried with a low heat, and coated with a lacquer varnish, otherwise it loses its luster in the air. If the whole surface is not plunged at once in cold water, but is partially cooled by sprinkling water on it, the crystallization will be finely variegated with large and small figures. Similar results will be obtained by blowing cold air through a pipe on the tinned surface, while it is just passing from the fused to the solid state.

Tricks of Memory.

Memory, which differs so greatly among individual men, varies also in such marked degree in the same person at different times that we are all interested in the inquiry how far memory is a measure of mental strength. In childhood and boyhood we find memory occupying so high a position among mental qualities that the idea grows up with most of us that he who has the best memory has also most talent, if even a remarkable memory be not regarded as of itself proving absolute genius. At least this is so in most of our schools, where the boy who remembers his lessons best takes highest position, not he who best understands them.

I learned very early that memory and mental power, though they may be associated together, are yet very different things. I valued my memory, which had often stood me in good stead in examinations, the only tests with which boyhood is apt to be acquainted; but I valued more the power of understanding and enjoying the reasoning of dear old Euclid, the one geometrician with whom, in those days, English school lads could become acquainted. Soon after I had left school—and when I was a freshman at college—I made the acquaintance of a young man of about my own age who possessed a most marvelous memory, while he also showed most marvelous mental density. He had occasion to pass examinations in Euclid, and one would have said that he would have been singularly successful in these examinations, for though he had only read through our college Euclid once, he could recite or write out the whole of it. Or, if preferred, he could begin at any point where one might start him and reproduce any quantity *verbatim et literatim—atque punctuatim*, so far as that was concerned. But not only was he utterly unable to understand a word of it all—he had not even brains enough to keep his real ignorance of Euclid to himself. He was always forgetting the good old rule *ne quid nimis;* and as he did not know where to stop in his marvelous recitations, the examiners naturally came to the conclusion, perfectly justified by the facts, that though he knew his Euclid by heart, he knew nothing about geometry. His knowledge was akin to that of one who should repeat by rote a number of Greek or Hebrew words, the meaning of which was unknown to him; or like that of a tutor I once had, who, when hearing me deal with a problem in Euclid, would send me back to relearn my lesson if I called a triangle A C B instead of A B C, as the book showed it.

We need not then either despair of our mental powers when we hear of marvelous feats of memory, or think that our minds are failing because with advancing years our memory may occasionally play us false. Memory, as Dr. Diordat, of Montpelier, long since pointed out, and as hundreds of facts show, is rather the offspring of the vital force than of the intellectual principle; and it is not surprising if in old age, when the vital force diminishes, memory should sometimes fail, even while the intellectual power preserves its full integrity. As for marvelous feats of memory, though they certainly indicate possibilities of future developments which would greatly increase man's grasp over mental problems, they need no more discourage those who feel incapable of any achievements in this line than the mental powers of Blind Tom should cause those who see his performances to despair because they can never hope to do the like.

The examples themselves which most strikingly display the capacity of special brains for remembering words and syllables show also how little this capacity has to do with intellectual power—some of them indeed seem almost to suggest that a very keen memory may be a mark of disease. That excessive keenness of memory may result from a diseased cerebral action is indeed certain; but, fortunately, we are not obliged to regard this fact as giving any unpleasant significance to exceptionally good powers of remembrance. If foolish or even idiotic persons, or persons in the delirium of fever, have manifested remarkable memories, men like Macaulay, Prescott, Euler, and others have had marvelous memories without being feeble-minded and without the aid of disease.

Pepys tells us of an Indian who could repeat a long passage in Greek or Hebrew after it had been recited to him only once, though he was ignorant of either language. This man would doubtless have been able to repeat (so far as his vocal organs would permit him to imitate the sounds) the song of a nightingale or a lark, through all its ever-varying passages, during ten or twenty minutes, and with as much understanding of its significance as of the meaning of the Greek and Latin words he recited so glibly. We certainly need not envy that particular "poor Indian" his "untutored mind," though as certainly the power he possessed would be of immense value to a philosopher.

If any one is disposed to believe that perhaps, after all, that Indian may have been a man of powerful understanding, a case of even more wonderful recollection of mere sounds will at least dispose of the idea that the man's peculiarly retentive memory proved mental power. Coleridge relates in his "Literaria Biographia" that in a Roman Catholic town in Germany a young woman who could neither read nor write was seized with a fever, during which, according to the priests, she was possessed by a polyglot devil. For she talked Latin, Greek, and Hebrew, besides uttering sounds which, though not understood by her hearers, had doubtless meaning, but belonged to languages unknown to them. "Whole sheets of her ravings were written out," says Coleridge, "and were found to consist of sentences intelligible in themselves, but having slight connection with each other." It appeared rather inconsistent with the theory of demoniac possession that some of these sentences were biblical; but as it is proverbial that the devil can quote Scripture for his purpose, this evidence might not have availed to save the girl from such rough treatment for her "possession" as would probably have served very ill for her fever. Fortunately, a physician who, being skeptically inclined, was disposed to question the theory of a polyglot spirit, "determined to trace back the girl's history. After much trouble, he discovered that, at the age of nine, she had been charitably taken by an old Protestant pastor, a great Hebrew scholar, in whose house she lived till his death. On further inquiry it appeared to be the old man's custom for years to walk up and down a passage of his house into which the kitchen opened, and to read to himself in a loud voice out of his books. The books were ransacked, and among them were found several of the Greek and Latin fathers, together with a collection of rabbinical writings. In these works so many of the passages taken down at the young woman's bedside were identified that there could be no reasonable doubt as to their source."

If the girl had remembered these passages in a normal way, and had merely uttered them during her sickness, the story would have been remarkable enough, since she was altogether uneducated. But, as a matter of fact, she remembered none of them in health, either before or after her sickness. It was doubtless the activity of the circulation during the access of fever which brought out, as it were, the impressions of sounds really recorded in the brain, but so lightly that except during such situation she remained unconscious even of their existence.

A case cited by Dr. Abercrombie confirms the suggestive theory that the stimulus which fever gives to the circulation (sign of disease though it is) may bring dormant mental impressions into temporary activity. A boy at the age of four had undergone the operation of the trepan, being at the time in a stupor from a severe fracture of the skull. After his recovery he retained no recollection either of the accident or of the operation. But at the age of fifteen, during an attack of fever, he gave his mother an account of the operation, describing the persons who were present, and even remembering details of their dress and other minute particulars.

Even an accident may stimulate the memory in such sort as to recall long-forgotten neutral impressions, and so to convey that the mind is regularly retentive. Dr. Abercrombie relates a case of this kind which suggests many perplexing problems in regard to memory. A man who had been completely stunned by a blow on the head remained still partially out of his mind when he had recovered from the first effects of the blow. In his unconscious state he spoke a language which nobody in the London Hospital, to which he had been removed, could understand, but which was presently found to be Welsh. It was subsequently discovered that, though Welsh by birth, he had been thirty years away from Wales when the accident occurred, and had quite forgotten his native tongue. On his restoration to full consciousness he lost his Welsh again completely, but recovered his English.

The effects of an accident in destroying temporarily—or, so far as it appears, wholly—all neutral impressions received within certain intervals, are sometimes curious enough. Thus Dr. Carpenter mentions the case of a friend of his—a clergyman—who was pitched out of a phaeton, and received a severe concussion of the brain. On recovering he found that he had forgotten all that had happened, not only when the accident actually took place, but during some previous time. The last thing he remembered was that he had met an acquaintance on the road, just about two miles from the accident.

An access of fever may produce, as we have seen, a local disturbance of brain functions. It is further worthy of notice also that the recollection a man has of events preceding intoxication is apt to be similarly limited in a definite but not readily explicable manner.

I remember a Cambridge man who, though not given to drinking, and now "a sober man among his sons," was more than once overtaken by liquor during the time when he had yet to learn his brain's exceptionally limited power of resisting the action of intoxicants. This man would not only be unable to recall what had happened during the time when he was intoxicated, but a number of preceding events which had taken place while he was still perfectly sober. His friends would tell him of things which had happened a full hour before he was "overtaken" (as the quaint expression has it), which had altogether passed from his remembrance. He used to say that his recollection was clear up to a certain point, beyond which everything seemed "veiled."

But it was clearly shown by an experiment which he arranged for his own satisfaction—being one of the inquisitive sort—that the veiling was, as it were, extended backward from the time of actual intoxication, for whereas his forgetfulness extended over the whole interval from the first glass of wine (which he always remembered drinking) to the sixth or seventh, at which intoxication began, he could remember with accustomary readiness all that happened at a sitting where he had drunk four or five glasses of the same wine. Of course he had to trust to his friends to note for him at what stage intoxication began. In fact, until he had learned this from others he could know little about it, because of the peculiar veiling of past events which took place after he had passed that stage. But his friends not being of the sort who rejoice to see a man under the influence of liquor, he had confidence in them; and besides, he could prove so much as this for himself, that whereas he could never remember more than the first glass if he drank too much, he could drink four or five glasses safely, remembering all that happened. What he could not learn for himself was, how many more glasses he could take without intoxication. At last he could only obtain this knowledge in such sort that he was conscious of it while intoxicated; for his friends found that after the sixth or seventh glass, which produced intoxication, he could always remember every detail of what had happened during previous accessions of the temporary insanity we call drunkenness.

The way in which this man's mind came out from the "veiling" was as strange and as suggestive as the way in which it was thrown under that veiling. I remember being present at the moment when consciousness or sanity (whichever we choose to call it) came back to him. He was a mathematician, and a man had put in his hand to test his condition a mathematical treatise on mechanics, over which my friend had maundered, as drunken men will. Suddenly his mind seemed to straighten up, and, in response to a remark that he was "screwed," he turned to the pages in the book dealing with the screw, and said quaintly, "See here, A. You're a classical man, and know nothing about mathematics; but these angles, alpha and beta" (showing a diagram) "represent the pitch of these screws. Now you needn't pitch into me about being screwed, for if I'm screwed at an angle alpha, you're screwed at an angle beta." (A. really was at the time the worse for liquor, but the other, who had been so a moment before, was, from the moment he had opened the book, perfectly clear-minded, and a few minutes later was at his mathematical studies.)—*Knowledge.*

The Parkes Smelting Process.

A method of treating the concentrated pyritic products obtained in the working of gold and silver bearing quartz has lately been perfected by Mr. Alexander Parkes, the well known inventor of the process of desilvering lead by means of zinc, which has now almost entirely replaced the Pattinson process both in Europe and America. These concentrates, which even in their most enriched forms are very siliceous, contain iron pyrites and other sulphides and arsenides so intimately associated with the gold and silver that they can as a rule only be very imperfectly reduced by amalgamation, even after undergoing a preliminary calcination. Mr. Parkes proposes to treat them by a concentrating fusion resembling the Swansea coarse metal process, for which purpose they are fluxed in a reverberatory furnace, without previous calcination, with a mixture of ferric oxide, lime, sulphate of soda, fluor spar, and carbon, the ore and fluxes being finely reduced and intimately mixed. The charge is completely melted in about three hours and a half, giving as products slag and regulus. The latter, which is exceedingly fluid, is essentially ferrous sulphide, and contains practically the whole of the valuable contents of the ore, while the slag, from the diversity of the fluxes employed, being comparatively low density, and fusing easily, is sufficiently free from interspersed regulus to be regarded as clean, and may be thrown away. The regulus contains a small quantity of sulphide of sodium, and falls to powder when damped with water, in which state it is subjected to a partial calcination until about half the sulphur is expelled, when it is run down with lead in order to collect the gold and silver for cupellation. The latter stages of the process may, however, be varied according to circumstances; the essence of the method being the retention of the whole of the original sulphur in the material, and utilizing it as a vehicle for the collection of the metallic contents, instead of getting rid of it by a preliminary calcination. The London *Engineer* says: The process has been carried on experimentally for some time at East Greenwich, where a large number of samples of refractory concentrates from many of the principal gold and silver producing localities in America and Australia have been treated with considerable success, the assays of the slags made by Messrs. Johnson, Matthey & Co. showing that very complete separation has been effected in most cases. The first practical trials of the method are to be made in New Zealand under the personal supervision of the veteran inventor, now in his 74th year, who sails for that colony in February next.

Stolen Secrets.

One hundred years ago, before the day of protection by patents, what a man discovered in the arts and mechanics he concealed. Workmen were put on oath never to reveal the process used by their employers. Doors were kept closed, artisans going out were searched, visitors were rigorously excluded from admission, and false operations blinded the workmen themselves. The mysteries of every craft were hedged in by quickset fences of empirical pretension and judicial affirmation.

The *English Mechanic* relates the following: There used to be, close by Temple Bar, in London, an old chemist's shop. The proprietor of it, in days gone by, enjoyed the monopoly of making citric acid. More favorably circumstanced than other secret manufactures, his was a process that required no assistance. He employed no workmen. Experts came to sample, and assort, and bottle his products. They never entered the laboratory. The mystic operations by which he grew rich were confined to himself. One day, having locked the doors and blinded the windows, sure, as usual, of the safety of his secret, our chemist went home to his dinner. A chimney sweep, or a boy disguised as such, wide awake in chemistry, was on the watch. Following the secret-keeper so far on his way to Charing Cross as to be sure he would not return that day, the sooty philosopher hied rapidly back to Temple Bar, ascended the low building, dropped down the flue, saw all he wanted and returned, carrying with him the mystery of making citric acid. The monopoly of the inventor was gone. A few months after, and the price was reduced by four-fifths. The poor man was heartbroken, and died shortly afterward, ignorant of the trick by which he had been victimized.

The Secretion of Pure Aqueous Formic Acid by Lepidopterous Larvæ for the Purposes of Defense.*

BY E. B. POULTON.

It has long been known, that the larvæ of the genus Cerura (Dicranura) have the power of ejecting a colorless fluid from the mouth of a gland which opens on the prothoracic segment. The latter segment is dilated when the larva is irritated, so that the fluid is thrown in a forward direction, and for a distance of several inches. When the larva is touched, the head and anterior part are immediately turned toward the source of irritation, and the fluid is thrown in this direction.

In 1885 I found that the secretion was strongly acid to test paper, and that it caused very strong effervescence when placed upon sodium bicarbonate; while a little later I showed the fluid to Prof. Wyndham Dunstan, who told me that the characteristic smell of formic acid could be plainly detected. This opinion was further confirmed when it was found that silver nitrate was readily reduced by the secretion (Trans. Ent. Soc. Lond., 1886, part ii., June, pp. 156–57).

In 1886 I obtained a larger number of larvæ, and with the kind help of Mr. J. P. Laws I was enabled to show that the secretion contains about 33 per cent of anhydrous acid. All the well known qualitative tests were applied to the secretion and to the alkaline salts obtained by neutralizing with standard alkali. Among other tests, the secretion was found to dissolve the oxide of lead, a white crystalline salt being deposited.

Although only a very minute weight of this was obtained, Prof. Meldola kindly offered to estimate the amount of lead present in the salt. The weight was found to correspond to one of the basic formates of this metal formed by the action of the normal formate upon the excess of oxide. During the past summer I have had a very large number of these larvæ, and the investigation has been continued with larger amounts of secretion. The pipette has been applied for the removal of secretion between 500 and 600 times, and between twenty and thirty volumetric determinations have been made.

A mature larva which has not been previously irritated will eject 0·050 gramme of secretion, containing about 40 per cent of anhydrous acid. Half-grown larvæ eject nearly as much, but the fluid is weaker, containing about 33–35 per cent of acid. The rate of secretion is comparatively slow—*e. g.*, two days and a half after ejection, two large larvæ only yielded together 0·025 gramme of secretion. Two captured larvæ, to which the eggs of parasitic Ichneumonidæ had been affixed, only ejected 0·035 and 0·045 gramme of secretion, having incompletely made up the amount lost during the attack of the Hymenopterous insect.

Starvation lessens the amount of secretion, and also decreases the proportion of acid, but probably both these effects are due to general health, and do not imply the direct formation of the acid from the food. The different food plants—poplar and willow—do not make any difference in the amount or strength of the secretion. About half the total quantity of secretion obtained was made use of in preparing a relatively large amount of the normal formate, which is now in Prof. Meldola's possession. The weights of the constituent elements will be determined by combustion. The rest of the secretion has been used for other exact methods of estimation and analysis under the kind direction of Mr. A. G. Vernon Harcourt, the work having been conducted in his laboratory at Christ Church.

Mr. Harcourt suggested that it was most important to prove that the amount of acid shown to be present by volumetric analysis is formic acid, and nothing else. This proof was obtained in two ways: (1) A certain weight of the secretion was divided into two parts; the amount of acid in one of these was determined by the volumetric method, while the other was decomposed by strong sulphuric acid, and the carbon monoxide which was evolved was exactly measured in the apparatus for gas analysis, and the amount of formic acid present was calculated from the data thus obtained. The two percentages nearly corresponded, and, as the latter was the higher, it was obvious that no other acid could be present. (2) A certain weight (0·186 gramme) of secretion was heated in a tube over a water bath, and, after drying at 100° C., only 0·0004 gramme of solid residue remained, and this was probably accidental. The rest of the fluid was distilled into a tube containing carbonate of lead, and this was afterward heated to 100° C., and the water collected in drying tubes.

As a result, the increase in weight of the latter, and the tube containing lead carbonate, the weight of formate of lead obtained from the latter, and of sulphate of lead obtained from the formate, all corresponded almost exactly to the weights which would have been given by pure aqueous formic acid having this composition: water, 62·5 per cent; formic acid, 37·5 per cent.

Since writing the above I have received the results of Prof. Meldola's analysis, from which he concludes that the secretion consists of aqueous formic acid almost in a state of purity.

* Read before the British Association.

The Typhoid Poison.

Dr. Victor C. Vaughan, Professor of Physiological and Pathological Chemistry in the University of Michigan, has announced to the State Board of Health the result of a series of experiments, which have ended, he claims, in the confirmation of the germ theory in cases of typhoid fever. The fever was produced in a cat, with more completeness and success than has ever before attended such endeavors; and those of Dr. Vaughan's friends who have witnessed the experiments and their results declare that the germ theory in typhoid fever is now a settled fact. The cat inoculated showed all the symptoms of the disease, especially that of a greatly heightened temperature, a symptom heretofore lacking in all other cases of inoculation. Dr. Vaughan, in reference to his discovery, said:

"Last August there was an epidemic of typhoid fever in the village of Iron Mountain, a place in northern Michigan of about 4,000 inhabitants. Part of the town was supplied with water from a mountain spring and part from private wells from six to twenty feet deep. It was noticed that all those who used the spring water escaped the disease, while those who depended upon the shallow wells were generally stricken down. In all, there were many hundred cases and about forty deaths. I secured some of the water from these shallow wells, and with it experimented upon a number of cats, finally obtaining, after labors protracted over a period of six months, the result which I announce to the State Board of Health."

Pure Air Indicator.

It is estimated that the air in a room becomes distinctly bad for health when its carbonic acid exceeds one part in 1,000. An apparatus has been recently patented by Prof. Wolpert, of Nurnberg, which affords a measure of the carbonic acid present. From a vessel containing a red liquid (soda solution with phenolphthalein) there comes every 100 seconds, through a siphon arrangement, a red drop on a prepared white thread about a foot and a half long, and trickles down this. Behind the thread is a scale beginning with "pure air" (up to 0·7 per 1,000) at the bottom, and ending above with "extremely bad" (4 to 7 per 1,000 and more). In pure air the drop continues red down to the bottom, but it loses its color by the action of carbonic acid, and the sooner the more there is of that gas present.

AN example of deterioration in values is shown in the sale of the Great Eastern for less than $100,000. The original cost of the vessel was three and a half million dollars, but she was a gigantic failure from the start. The building of this ship, however, was of value in demonstrating that there was a limit in steamships in the direction of size. She has been of use also in the laying of the Atlantic cables. While those who invested their money in building this ship lost heavily in the venture, they can console themselves with the fact that their loss was not altogether in vain. The last report is that Barnum is trying to negotiate for its purchase, with a view of converting it into a mammoth floating show.

Drawing on Glass.

To write or draw on glass, it is necessary to impart to the surface a certain degree of roughness. This may be done by grinding or etching, but much more easily by applying some appropriate varnish. A good matt varnish is made by dissolving in two ounces of ether 90 grms. of sandarac and 20 grms. mastic, and adding benzol, ½ oz. to 1½ oz., according to the fineness of the matt required. The varnish is applied to the cold plate after it has set. The glass may be heated to insure a firm and even grain. To render the glass again transparent, after writing upon it, apply with a brush a solution of sugar or gum acacia.

Still better as a surface for writing or drawing is a varnish of sugar. Dissolve equal parts of white and brown sugar in water to a thin sirup, add alcohol, and apply to hot glass plates. The film dries very rapidly, and furnishes a surface on which it is perfectly easy to write with pen or pencil. The best ink to use is India ink, with sugar added. The drawing can be made permanent by varnishing with a lac or mastic varnish.

Greenish-Brown Patina for Brass and Bronze.

The bronze industry has long been devoting itself to the improving of the various processes by means of which art bronzes are given that "patina" so much admired by connoisseurs. In Germany much admiration is expressed for the rich tints that bronzes of Parisian make exhibit, and that usually vary from light yellow-brown to dark red-brown, frequently touched up with gold. Among these patinas, the one called in commerce Barbedienne bronze is among the most esteemed.

The "Portefeuille Economique des Machines" copies from a German journal a process devised by Mr. R. Hampschulte for obtaining a very beautiful and durable patina of a brown color, with greenish reflections, which may be applied without any expense, so to speak, other than that of manual labor, to all objects of bronze or brass.

Before all else, the surfaces to be treated must be perfectly cleaned and polished. Then the objects are immersed in a bath composed of 60 grains of sulphide of potassium to 5 quarts of water, to which dissolved potassa has been gradually added until the liquid is slightly mucilaginous to the touch.

After remaining in this bath for a few seconds, the objects are taken out and immediately put into another bath, very slightly, acidulated with sulphuric acid. The proportion of the acid is not given by the author, who confines himself to the statement that the water should have a slight acid taste.

As soon as the surface begins to verge on brown, it is rubbed with a metallic brush, under the action of which the patina reveals itself. If it be desired to deepen the tint, the object is passed through the two baths in succession again, and afterward vigorously brushed. This process is applicable to small objects chiefly.—*Revue Industrielle.*

A Practical Man's Experience with Steel.

Twelve or fifteen years ago, writes G. W. Tinsley, to the SCIENTIFIC AMERICAN, when I wanted cast steel for any purpose, I went to the hardware merchant and purchased a piece that would serve my purpose best, with the very least forging, that is, I got the nearest size to the one I wanted, which I could find. If too small, I could "stove" it a little; if too large, it was drawn. But after a while I found that some steel would make springs for gun locks, knife blades, surgical instruments, etc., with but a few failures, probably one in one hundred; while with other pieces I could not make one spring in a dozen stand. The first fact I was able to discover was that every piece of steel that gave me trouble was clean and new.

For a year or two after, I avoided this clean pigeon blue colored article; and I bought anything that was rusty, regardless of size. This naturally led me to suppose that my trouble was all located in an article lately put upon the market. But as time corrodes all things, all the pieces of steel kept by the dealers became more or less rusty, and I was no longer able to pick out the rusty steel that used to be good, or discard the clean and bright blue as bad; and so my rule that had served me well died a natural death. At last it occurred to me to examine the qualities of steel under a glass. This I did, and found the one that gave me trouble was coarse in grain, showing large crystals, with spaces between (like those in burnt steel); while that which gave no trouble was fine in grain and seemingly perfectly homogeneous throughout.

When I go to buy steel now, I carry my little glass in my vest pocket. I don't know the power of it, but I do know that it saves me a power of work and vexation.

Firemen Clothed in Asbestos.

The London firemen are about to be uniformed for duty in asbestos cloth, a material which has already been adopted by the Paris fire brigade with satisfactory results. Equipped in this incombustible apparel, the fireman is practically master of the flames.