electric current, is exercising the minds of electricians just now. Mr. Bosanquet has put it very clearly that when there is any opposition to a physical change of such a nature that it is the greater the greater the measure of the cause, and the less the measure of the effect, it is clearly a resistance; and in this sense the quotient of magneto-motive force (ampere-turns among practical men) by magnetic flux per unit area (magnetic induction) is clearly resistance. It must, however, not be forgotten, that magnetic permeability is the analogue of electrostatic capacity, and if we regard iron as the analogue of a dielectric or an insulator, the use of the term is wrong.

THE following relative figures of the cost of the production of 1000 watt-hours, the unit of electrical energy introduced by the Board of Trade, are given by Peukert in the *Centralblatt fur Electrotechnic.*

	s.	d.
Thermo-electric battery (gas)	33	4
Bunsen battery	3	2
Daniell ,, ...	2	2½
Dynamo (gas)	0	6¼
,, (steam)	0	2½

MENGARINI is continuing the work originated by Blaserna, by which the maturing of wine is considerably expedited by the passage of powerful currents through it.

HEIM (Hanover) has recently made some interesting measurements of the intensity of light emitted by various artificial sources of light in daily use:—

Lamps.	Candle-power.	Consumption per Candle per Hour.
Ordinary petroleum	15	3·65 grammes
Argand (gas)	21·9	10·9 litres
Welsbach (gas)	14·4	6·6 ,,
Wenham (gas)	28·4	8·77 ,,
Flat burner (gas)	16·9	14·8 ,,
Pieper arc, 6 mm.	377	·405 watts
Pilsen arc, 10 mm.	1420	·291 ,,
Siemens arc, 14 mm.	3830	·236 ,,
Siemens glow	16	3·25 ,,

VON LANG has measured the counter-electromotive force of an arc lamp, using 5 mm. carbons, and finds it 37 volts, or for Edlund's formula—

$$E = a + bl\text{C},$$

where a and b are constants, l the length of the arc, and C the current—

$$a = 35{\cdot}07,\ b = 1{\cdot}32,\ l = 2{\cdot}5 \text{ mm.},\ \text{C} = 5 \text{ amperes.}$$

He has found these constants for various other materials. Cross and Shepherd (Boston) had found this back electromotive force to be 39 volts. What is this so-called counter-electromotive force? Surely it is an abuse of terms.

MR. SHELFORD BIDWELL (Royal Society, March 1) is continuing his admirable researches on the changes produced by magnetism in the lineal dimensions of the different magnetic metals. He finds that iron, which first expands with the magnetizing force, soon reaches a maximum point, whence it retracts until it attains its original length; but, on still further increasing the magnetizing force, it contracts until it apparently reaches a minimum point, beyond which his means have not enabled him to proceed. Bismuth appears to continually expand; nickel to continually contract; whilst cobalt contracts, reaches a minimum point, and then expands, approaching its original length. Manganese steel was unaffected. His apparatus was so perfect and sensitive that he could read a variation of one hundred-thousandth of a millimetre.

PROFS. AYRTON AND PERRY have satisfactorily disposed of the question as to whether there is any difference in the light emitted by a glow-lamp when incandesced by alternate or direct currents. They find no difference. The same power (3·39 watts) applied gives the same light (one candle) in each case.

THE PRESIDENT'S ANNUAL ADDRESS TO THE ROYAL MICROSCOPICAL SOCIETY.[1]

RETROSPECT may involve regret, but can scarcely involve anxiety. To one who fully appreciates the actual, and above all the potential, importance of this Society in its bearing upon the general progress of scientific research in every field of physical inquiry, the responsibilities of President will not be lightly, whilst they may certainly be proudly, undertaken.

I think it may be now fairly taken for granted that, as this Society has, from the outset, promoted and pointed to the higher scientific perfection of the microscope, so now, more than ever, it is its special function to place this in the forefront as its *raison d'être.* The microscope has been long enough in the hands of amateur and expert alike to establish itself as an instrument having an application to every actual and conceivable department of human research: and whilst in the earlier days of this Society it was possible for a zealous Fellow to have seen, and been more or less familiar with, all the applications to which it then had been put, it is different to-day. Specialists in the most diverse areas of research are assiduously applying the instrument to their various subjects, and with results that, if we would estimate aright, we must survey with instructed vision the whole ground which advancing science covers.

From this it is manifest that this Society cannot hope to enfold, or at least to organically bind to itself, men whose objects of research are so diverse.

But these are all none the less linked by one inseverable bond; it is the microscope: and whilst, amidst the inconceivable diversity of its applications, it remains manifest that this Society has for its primary object the constant progress of the instrument—whether in its mechanical construction or its optical appliances; whether the improvements shall bear upon the use of high powers or low powers; whether it shall be improvement that shall apply to its commercial employment, its easier professional application, or its most exalted scientific use; so long as this shall be the undoubted aim of the Royal Microscopical Society, its existence may well be the pride of Englishmen, and will commend itself more and more to men of all countries.

This, and this only, can lift such a Society out of what I believe has ceased to be its danger, that of forgetting that in proportion as the optical principles of the microscope are understood, and the theory of microscopical vision is made plain, the value of the instrument over every region to which it can be applied, and in all the varied hands that use it, is increased without definable limit. It is therefore by such means that the true interests of science are promoted.

It is one of the most admirable features of this Society that it has become cosmopolitan in its character in relation to the instrument, and all the ever-improving methods of research employed with it. From meeting to meeting it is not one country, or one continent even, that is represented on our tables. Nay, more, not only are we made familiar with improvements brought from every civilized part of the world, referring alike to the microscope itself and every instrument devised by specialists for its employment in every department of research; but also, by the admirable persistence of Mr. Crisp and Mr. Jno. Mayall, Jun., we are familiarized with every discovery of the old forms of the instrument wherever found or originally employed.

The value all of this cannot be over-estimated, for it will, even where prejudices as to our judgment may exist, gradually make it more and more clear that this Society exists to promote and acknowledge improvements in every constituent of the microscope, come from whatever source they may; and, in connection with this, to promote by demonstrations, exhibitions, and monographs the finest applications of the finest instruments for their respective purposes.

To give all this its highest value, of course, the theoretical side of our instrument must occupy the attention of the most accomplished experts. We may not despair that our somewhat too practical past in this respect may right itself in our own country; but meantime the splendid work of German students and experts is placed by the wise editors of our Journal within the reach of all.

I know of no higher hope for this important Society than that it may continue in ever-increasing strength to promote, criticise, and welcome from every quarter of the world whatever will improve the microscope in itself and in any of its applications, from the most simple to the most complex and important in which its employment is possible.

There are two points of some practical interest to which I desire for a few moments to call your attention. The former has reference to the group of organisms to which I have for so many years directed your attention, viz. the "Monads," which throughout I have called "putrefactive organisms."

There can be no longer any doubt that the destructive process of putrefaction is essentially a process of fermentation.

[1] Delivered by the Rev. Dr. Dallinger, F.R.S., at the annual meeting of the Royal Microscopical Society, February 8, 1888.

The fermentative saprophyte is as absolutely essential to the setting up of destructive rotting or putrescence in a putrescible fluid as the torula is to the setting up of alcoholic fermentation in a saccharine fluid. Make the presence of torulæ impossible, and you exclude with certainty fermentive action.

In precisely the same way, provide a proteinaceous solution, capable of the highest putrescence, but absolutely sterilized, and placed in an optically pure, or absolutely calcined air; and while these conditions are maintained, no matter what length of time may be suffered to elapse, the putrescible fluid will remain absolutely without trace of decay.

But suffer the slightest infection of the protected and pure air to take place, or, from some putrescent source, inoculate your sterilized fluid with the minutest atom, and shortly turbidity, offensive scent, and destructive putrescence ensue.

As in the alcoholic, lactic, or butyric ferments, the process set up is shown to be dependent upon and concurrent with the vegetative processes of the demonstrated organisms characterizing these ferments; so it can be shown with equal clearness and certainty that the entire process of what is known as putrescence is equally and as absolutely dependent on the vital processes of a given and discoverable series of organisms.

Now it is quite customary to treat the fermentive agency in putrefaction as if it were wholly Bacterial, and, indeed, the putrefactive group of Bacteria are now known as Saprophytes, or saprophytic Bacteria, as distinct from morphologically similar, but physiologically dissimilar, forms known as parasitic or pathogenic Bacteria.

It is indeed usually and justly admitted that *B. termo* is the exciting cause of fermentive putrefaction. Cohn has in fact contended that it is the distinctive ferment of all putrefactions, and that it is to decomposing proteinaceous solutions what *Torula cerevisiæ* is to the fermenting fluids containing sugar.

In a sense, this is no doubt strictly true: it is impossible to find a decomposing proteinaceous solution, at any stage, without finding this form in vast abundance.

But it is well to remember that in Nature putrefactive ferments must go on to an extent rarely imitated or followed in the laboratory. As a rule the pabulum in which the saprophytic organisms are provided and "cultured," is infusions, or extracts of meat carefully filtered, and, if vegetable matter is used, extracts of fruit, treated with equal care, and if needful neutralized, are used in a similar way. To these may be added all the forms of gelatine, employed in films, masses, and so forth.

But in following the process of destructive fermentation as it takes place in large masses of tissue, animal or vegetable, but far preferably the former, as they lie in water at a constant temperature of from 60° to 65° F., it will be seen that the fermentive process is the work, not of one organism, nor, judging by the standard of our present knowledge, of one specified class of vegetative forms, but by organisms, which, though related to each other, are in many respects greatly dissimilar, not only morphologically, but also embryologically, and even physiologically.

Moreover, although this is a matter that will want most thorough and efficient inquiry and research to understand properly its conditions, yet it is sufficiently manifest that these organisms succeed each other in a curious and even remarkable manner. Each does a part in the work of fermentive destruction; each aids in splitting up into lower and lower compounds; the elements of which the masses of degrading tissue are composed; while apparently, each set in turn, does by vital action, coupled with excretion, (1) take up the substances necessary for its own growth and multiplication; (2) carry on the fermentive process; and (3) so change the immediate pabulum as to give rise to conditions suitable for its immediate successor. Now the point of special interest is that there is an apparent adaptation in the form, functions, mode of multiplication, and order of succession in these fermentive organisms, deserving of study and fraught with instruction.

Let it be remembered that the aim of Nature in this fermentive action is not the partial splitting of certain organic compounds, and their reconstruction in simpler conditions, but the ultimate setting free, by saprophytic action, of the elements locked up in great masses of organic tissue: the sending back into Nature of the only material of which future organic structures are to be composed.

I have said that there can be no question whatever that *Bacterium termo* is the pioneer of Saprophytes. Exclude *B. termo* (and therefore with it all its congeners) and you can obtain no putrefaction. But wherever, in ordinary circumstances, a decomposable organic mass, say the body of a fish, or a considerable mass of the flesh of a terrestrial animal, is exposed in water at a temperature of 60° to 65° F., *B. termo* rapidly appears, and increases with a simply astounding rapidity. It clothes the tissues like a skin, and diffuses itself throughout the fluid.

The exact chemical changes it thus effects are not at present clearly known; but the fermentive action is manifestly concurrent with its multiplication. It finds its pabulum in the mass it ferments by its vegetative processes. But it also produces a visible change in the enveloping fluid, and noxious gases continuously are thrown off.

In the course of a week or more, dependent on the period of the year, there is, not inevitably, but as a rule, a rapid accession of spiral forms, such as *Spirillum volutans*, *S. undula*, and similar forms, often accompanied by *Bacterium lineola:* and the whole interspersed still with inconceivable multitudes of *B. termo*.

These invest the rotting tissues like an elastic garment, but are always in a state of movement. These, again, manifestly further the destructive ferment, and bring about a softness and flaccidity in the decomposing tissues, while they without doubt, at the same time, have, by their vital activity and possible secretions, affected the condition of the changing organic mass. There can be, so far as my observations go, no certainty as to when, after this, another form of organism will present itself; nor, when it does, which of a limited series it will be. But, in a majority of observed cases, a loosening of the living investment of Bacterial forms takes place, and simultaneously with this, the access of one or two forms of my putrefactive monads. They were amongst the first we worked at; and have been, by means of recent lenses, amongst the last revised. Mr. S. Kent named them *Cercomonas typica*, and *Monas dallingeri* respectively. They are both simple oval forms, but the former has a flagellum at both ends of the longer axis of the body, while the latter has a single flagellum in front.

The principal difference is in their mode of multiplication by fission. The former is in every way like a Bacterium in its mode of self-division. It divides, acquiring for each half a flagellum in division, and then, in its highest vigour, in about four minutes, each half divides again.

The second form does not divide into two, but into many, and thus, although the whole process is slower, develops with greater rapidity. But both ultimately multiply—that is, commence new generations—by the equivalent of a sexual process.

These would average about four times the size of *Bacterium termo:* and when once they gain a place on, and about, the putrefying tissues, their relatively powerful and incessant action, their enormous multitude, and the manner in which they glide over, under, and beside each other, as they invest the fermenting mass, is worthy of close study. It has been the life-history of these organisms, and not their relations as ferments, that has specially occupied my fullest attention; but it would be in a high degree interesting if we could discover, or determine, what beside the vegetative or organic processes of nutrition are being effected by one, or both, of these organisms on the fast-yielding mass. Still more would it be of interest to discover what, if any, changes were wrought in the pabulum, or fluid generally; for after some extended observations I have found that it is only after one or other, or both, of these organisms, have performed their part in the destructive ferment, that subsequent and extremely interesting changes arise.

It is true that in some three or four instances of this saprophytic destruction of organic tissues, I have observed that, after the strong Bacterial investment, there has arisen, not the two forms just named, nor either of them; but one or other of the striking forms now called *Tetramitus rostratus*, and *Polytoma uvella;* but this has been in relatively few instances. The rule is that *Cercomonas typica*, or its congener, precedes other forms, that not only succeed them in promoting, and carrying to a still further point the putrescence of the fermenting substance, but appear to be aided in the accomplishment of this by mechanical means.

By this time the mass of tissue has ceased to cohere. The mass has largely disintegrated, and there appears amongst the countless Bacterial and monad forms, some one, and sometimes even three forms, that whilst they at first swim and gyrate, and glide about the decomposing matter, which is now, much less closely invested by *Cercomonas typica*, or those organisms that may have acted in its place, they also resort to an entirely new mode of movement.

One of these forms is *Heteromita rostrata*, which it will be remembered, in addition to a front flagellum, has also a long fibre, or flagellum-like appendage that gracefully trails as it swims. At certain periods of its life they anchor themselves in countless billions all over the fermenting tissues, and as I have described in the life-history of this form, they coil their anchored fibre, as does a Vorticellan, bringing the body to the level of the point of anchorage, then shoot out the body with lightning-like rapidity, and bring it down like a hammer on some point of the decomposition. It rests here for a second or two, and repeats the process; and this is taking place, by what seems almost like rhythmic movement all over the rotting tissue. The results are scarcely visible in the mass; but if a group of these organisms be watched, attached to a small particle of the fermenting tissue, it will be seen to gradually diminish, and at length to disappear.

Now, there are at least two other similar forms, one of which, *Heteromita uncinata*, is similar in action, and the other of which, *Dallingeria drysdali*, is much more powerful, being possessed of a double anchor, and springing down upon the decadent mass with, relatively, far greater power.

Now, it is under the action of these last forms, that in a period, varying from one month to two or three, the entire substance of the organic tissues disappears, and the decomposition has been designated by me "exhausted"; nothing being left in the vessel but slightly noxious, and pale gray water, charged with carbonic acid; and a fine, buff-coloured impalpable sediment at the bottom.

My purpose is not, by this brief notice, to give an exhaustive, or even a sufficient account, of the progress of fermentive action, by means of saprophytic organisms, on great masses of tissue: my observations have been incidental, but they lead me to the conclusion that the fermentive process is not only not carried through by what are called saprophytic Bacteria, but that a *series* of fermentive organisms arise, which succeed each other, the earlier ones preparing the pabulum or altering the surrounding medium, so as to render it highly favourable to a succeeding form. On the other hand, the succeeding form has a special adaptation for carrying on the fermentive destruction more efficiently from the period at which it arises, and thus ultimately of setting free the chemical elements locked up in dead organic compounds.

That these later organisms are saprophytic, although not Bacterial, there can be no doubt. A set of experiments recorded by me in the Proceedings of this Society some years since would go far to establish this (*Monthly Microscopical Journal*, 1876, p. 288). But it may be readily shown, by extremely simple experiments, that these forms will set up fermentive decomposition rapidly, if introduced in either a desiccated or living condition, or in the spore state, into suitable but sterilized pabulum.

Thus while we have specific ferments which bring about definite and specific results; and while even infusions of proteid substances may be exhaustively fermented by saprophytic Becteria; the most important of all ferments, that by which Natura's dead organic masses are removed, is one which there is evidence to show is brought about by the successive vital activities of a series of adapted organisms, which are for ever at work in every region of the earth.

There is one other matter of some interest and moment, on which I would say a few words. To thoroughly instructed biologists, such words will be quite needless; but, in a Society of this kind, the possibilities that lie in the use of the instrument are associated with the contingency of large error, especially in the biology of the minuter forms of life, unless a well-grounded biological knowledge form the basis of all specific inference, to say nothing of deduction.

I am the more encouraged to speak of the difficulty to which I refer, because I have reason to know that it presents itself again and again in the provincial Societies of the country, and is often adhered to with a tenacity worthy of a better cause. I refer to the danger that always exists, that young or occasional observers are exposed to, amidst the complexities of minute animal and vegetable life, of concluding that they have come upon absolute evidences of the transformation of one minute form into another; that in fact they have demonstrated cases of heterogenesis.

This difficulty is not diminished by the fact that on the shelves of most Microscopical Societies there is to be found some sort of literature written in support of this strange doctrine.

You will pardon me for allusion again to the field of inquiry in which I have spent so many happy hours. It is, as you know, a region of life in which we touch, as it were, the very margin of living things. If Nature were capricious anywhere, we might expect to find her so here. If her methods were in a slovenly or only half-determined condition, we might expect to find it here. But it is not so. Know accurately what you are doing, use the precautions absolutely essential, and through years of the closest observation, it will be seen that the vegetative and vital processes generally, of the very simplest and lowliest life-forms, are as much directed and controlled by immutable laws, as the most complex and elevated.

The life-cycles, accurately known, of monads, repeat themselves as accurately as those of Rotifers or Planarians.

And of course, on the very surface of the matter the question presents itself to the biologist why it should not be so. The irrefragable philosophy of modern biology is that the most complex forms of living creatures have derived their splendid complexity and adaptations from the slow and majestically progressive variation and survival from the simpler and the simplest forms. If, then, the simplest forms of the present and the past were not governed by accurate and unchanging laws of life, how did the rigid certainties that manifestly and admittedly govern the more complex and the most complex come into play?

If our modern philosophy of biology be, as we know it is, true, then it must be very strong evidence indeed that would lead us to conclude that the laws seen to be universal break down and cease accurately to operate, where the objects become microscopic, and our knowledge of them is by no means full, exhaustive, and clear.

Moreover, looked at in the abstract, it is a little difficult to conceive why there should be more uncertainty about the life-processes of a group of lowly living things, than there should be about the behaviour, in reaction, of a given group of molecules.

The triumph of modern knowledge is the certainty which nothing can shake, that Nature's laws are immutable. The stability of her processes, the precision of her action, and the universality of her laws, is the basis of all science; to which biology forms no exception. Once establish, by clear and unmistakable demonstration, the life-history of an organism, and truly some change must have come over Nature as a whole, if that life-history be not the same to-morrow as to-day; and the same to one observer, in the same conditions, as to another.

No amount of paradox would induce us to believe that the combining proportions of hydrogen and oxygen had altered, in a specified experimenter's hands, in synthetically producing water.

We believe that the melting-point of platinum and the freezing-point of mercury are the same as they were a hundred years ago, and as they will be a hundred years hence.

Now, carefully remember that so far as we can see at all, it must be so with life. Life inheres in protoplasm; but just as you cannot get *abstract matter*—that is, matter with no properties or modes of motion—so you cannot get *abstract* protoplasm. Every piece of living protoplasm we see has a history: it is the inheritor of countless millions of years. Its properties have been determined by its history. It is the protoplasm of some definite form of life which has inherited its specific history. It can be no more false to that inheritance than an atom of oxygen can be false to its properties.

All this, of course, within the lines of the great secular processes of the Darwinian laws; which, by the way, could not operate at all if caprice formed any part of the activities of Nature.

But let me give a practical instance of how, what appears like fact, may over-ride philosophy, if an incident, or even a group of incidents, *per se* are to control our judgment.

Eighteen years ago I was paying much attention to Vorticellæ. I was observing with some pertinacity *Vorticella convallaria*; for one of the calices in a group under observation, was in a strange and semi-encysted state, while the remainder were in full normal activity.

I watched with great interest and care, and have in my folio still the drawings made at the time. The stalk carrying this individual calyx fell upon the branch of vegetable matter to which the Vorticellan was attached, and the calyx became perfectly globular; and at length there emerged from it a small form with which, in this condition, I was quite unfamiliar: it was small, tortoise-like in form, and crept over the branch on setae or hair-like pedicels; but, carefully followed, I found it soon swam, and at length got the long neck-like appendage of *Amphileptus anser!*

Here then was the cup or calyx of a definite Vorticellan form, changing into (?) an absolutely different Infusorian, viz. *Amphileptus anser!*

Now I simply reported the *fact* to the Liverpool Microscopical Society, with no attempt at inference; but two years after I was able to explain the mystery, for, finding in the same pond both *V. convallaria* and *A. anser*, I carefully watched their movements, and saw the *Amphileptus* seize and struggle with a calyx of *convallaria*, and absolutely become encysted upon it, with the results that I had reported two years before.

And there can be no doubt but this is the key to the cases that come to us again and again of minute forms suddenly changing into forms wholly unlike. It is happily amongst the virtues of the man of science to "rejoice in the truth," even though it be found at his expense; and true workers, earnest seekers for Nature's methods, in the obscurest fields of her action, will not murmur that this source of danger to younger microscopists has been pointed out, or recalled to them.

And now I bid you as your President farewell. It has been all pleasure to me to serve you. It has enlarged my friendships and my interests; and although my work has linked me with the Society for many years, I have derived much profit from this more organic union with it; and it is a source of encouragement to me, and will, I am sure, be to you, that, after having done with simple pleasure what I could, I am to be succeeded in this place of honour by so distinguished a student of the phenomena of minute life as Dr. Hudson. I can but wish him as happy a tenure of office as mine has been.

SCIENTIFIC SERIALS.

American Journal of Mathematics, vol. x. No. 2 (Baltimore, January 1888).—In the opening paper (pp. 99–130), entitled "Soluble Quintic Equations with Commensurable Coefficients," G. P. Young develops at some length the application of his general method, described in vol. vi., to the solution of twenty quintic equations, such as $x^5 - 10x^3 - 20x^2 - 1505x - 7412 = 0$.—Mr. D. Barcroft discusses (pp. 131–40) forms of non-singular quintic curves. The subject is profusely illustrated by drawings of 47 curves on twelve large pages (interpolated between pp. 140 and 141).—F. Morley (pp. 141–48) writes on critic centres in cubics.—The expression of syzygies among perpetuants by means of partitions, by Captain P. A. MacMahon, R.A. (pp. 149–68), is a very interesting addition to the author's previous papers on the subject.—The number concludes with three short papers: "Démonstration directe de la formule Jacobienne de la transformation cubique," by the Abbé Faà de Bruno; note on geometric inferences from algebraic symmetry, by F. Morley; and "Surfaces telles que l'origine se projette sur chaque normale au milieu des centres de courbure principaux" (pp. 175–86), by P. Appell.

Rivista Scientifico-Industriale, January 31.—On chemical valency, by Prof. Fr. Mangini. The probable cause of valency, that is, the varying proportions with which the atoms of the simple bodies combine with hydrogen, or its equivalent chlorine, to form molecules, is here attributed to the varying degrees of motion assumed to be pre-existent and inherent in the atoms themselves. A numerical coincidence is pointed out between the acoustic, luminous, and chemical phenomena, seven being the number of the chief musical notes, of the chief colours in the spectrum, and, as is now generally admitted, of the chemical valencies. It is further to be noted that the temperature required to produce the spectral lines varies with the valencies of the different elements. Thus, a much higher temperature is required for the polyvalent than for the monovalent alkalines, and in all these phenomena a connection is seen to exist between the heat required to show the spectral lines and the quantivalence of the atoms. Another nexus is found between the allotropic state and the number of vibrations needed to produce the spectroscopic phenomena. This highly suggestive paper will be continued in a future number of the *Rivista*.

Bulletins de la Société d'Anthropologie de Paris, tome x. fasc. 3 (Paris, 1887).—On the various methods of measuring the thorax, by Dr. E. Maurel. The writer, in enumerating the various instruments in use for this purpose, gives the preference to those designed by MM. Woillez, Niely, and Fourmentin, by which a graphic representation of the dimensions of the chest is obtained; although he claims to have improved upon their design in an instrument to which he has given the name stethograph.—On a Breton amulet, called "Kistin Spagn," by M. Bonnemère. Under this name the people of Locmariaque treasure a seed, probably a cashew nut, or, according to some, the seed of the mahogany-tree, which is brought home by Breton sailors. The nut is carefully scraped and boiled in new milk, when it is supposed to be a sovereign remedy against intestinal disorders. By some of the peasant women, however, the nut is pierced and worn on a chain, with their keys, scissors, &c., as an amulet. Singularly enough, it is found that even in Paris these nuts are believed to be specifics against various diseases, more especially the gout, three or four when carried in the trousers pocket being regarded as capable of warding off this malady.—On calves born with so-called bull-dog heads, by M. Dareste. Animals of this description were at one time characterized in South America as constituting a distinct race, but the gradual diminution in their numbers since the cattle of the pampas have acquired a marketable value leads to the inference that they are being killed when first dropped, in order to eliminate deformed animals from the herds, and this opinion of the deformity of the so-called "natos-calves" is confirmed by the presence of other abnormalities in all the animals of this description which have been examined in Europe.—On the colour of the hair and eyes in Limagne, near the Monts-de-Dôme, by Dr. Pommerol. These observations refer to 200 individuals, and appear to indicate that, taken generally, one-fourth of the population have light hair, and three-fourths dark hair, while light and dark eyes are equally frequent.—On the worship of Taranis in popular traditions of Auvergne, by Dr. Pommerol. The writer believes that under this name we have the Gallic representative of the supreme god of the heavens, and wielder of thunder and storms; and that the custom still prevalent in France of building an uncut stone into the gable or roof-top of a house, or hammering into the newly finished walls an irregularly formed metal, wooden, or stone cross, or mallet, to keep bad luck from the building, is a survival of the ancient usage of averting evil by the help of emblems connected with the worship of the supreme gods, as Baal's stone, Jupiter's thunderbolt, or Thor's hammer.—Circumcision in its social and religious significance, by M. Lafargue. The fact that this rite was practised among the Egyptians long before its adoption by the Hebrews has led to the inference that its practice was due to hygienic considerations only. But the author believes that we have here merely one of the numerous forms of mutilations submitted to by primæval men with a view of propitiating their deities, and of which we have such varied and striking evidence among different peoples, as the Assyrians and Aztecs, as well as among the black races; while survivals of similar faith in the efficacy of voluntarily inflicted suffering and mutilation are to be traced in the mythology of the Greeks and Romans.—On the influence of their surrounding medium on the peoples of Central Asia, by M. de Ujfalvy. Referring to the services recently rendered to science by Richthofen in unravelling the tissue of misconceptions in regard to the geognosy of Central Asia, due to the theories of Humboldt, Klaproth, and others, the writer considers the influence which the soil and their surroundings have had on the inhabitants of the four distinct zones into which the first-named of these *savants* has subdivided the Asiatic continent. Thus, while the central zone, by the general levelling of the surface through the chemical disintegration of the rocks, and the absence of streams to enrich the soil, compels men to follow a nomadic, or pastoral, rather than a settled life, the peripheral zone abounds in rich and fertile lands, yielding abundant opportunities for the exercise of human industry, and a corresponding advance in mental and social development. The intermediate zones correspond ethnographically with the transitional character of their geognostic features. Next to the extraordinary influence of the varied configurations of Asia on the destinies of its inhabitants, M. de Ujfalvy points out the importance of loess formations as factors in determining the spread and establishment of civilization. This part of the subject is treated at great length, and deserves the careful attention of the palæologist no less than the student of ethnography, seeing that the loess constitutes an important agent in the preservation of the animal and industrial remains of prehistoric ages.—On the nervous system, considered from a physico-chemical point of view, by Dr. Fauvelle. Here the nervous system of man is regarded as a physical apparatus, presenting certain analogies with an electric pile.—Anthropology and philology, with reference to the