SCIENCE:

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Attention is called to the "Wants" column. All are invited to use it in soliciting information or seeking new positions. The name and address of applicants should be given in full, so that answers will go direct to them. The "Exchange" column is likewise open.

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THE DEGENERATION OF THE TECHNICAL SOCIETIES.

THERE is much current discussion of the present condition of the great technical societies in the United States. The older members seem to be somewhat apprehensive lest the fruits of their great labor and zeal in the earlier days, in the formation, especially, of the national societies of engineers, may be sooner or later wholly lost. The discussions at recent conventions of the Society of Civil Engineers, the most venerable of them all, and the criticisms of our exchanges among the technical journals most interested in its work, lead us to suppose that there is a question whether it does not require some such agitation and revolutionary reconstruction as brought it out of its stupor and threatened decadence fifteen years or more ago, to prevent its utter evanescence now. It is said by the agitators, that the number and quality of its papers, and its influence and growth as a national association, are falling off constantly; that local societies are absorbing those who should enter it, and who should form its material of the coming generation, so generally, that it must apparently, unless this retrograde movement be promptly checked, soon lose its old pre-eminence. It is said by the critics that it no longer holds interesting sessions at its central office; nor does it get together, except by robbing its regular meetings, either much or valuable material for its annual conventions. It is said that a few of the older members only, "run" the society; and that the great men of the profession, and the promising young men, do not come in as they should, either submitting papers or taking part in the discussions.

Of the Mining Engineers' Society we hear little of such criticism. But it is sometimes suggested that it is by no means a representative or a professional association; that it includes whoever chooses to join; and that those who thus choose are largely non-professionals, or, at least, that the semi-professionals form a large proportion of its body of members, as well as associates. The criticism made of its publications is, that they often include the purely mercantile rather than the professional and scientific element, and that shop and advertisement are too often mixed with the more instructive and original papers.

Of the mechanical engineers we note the observation, by its special constituency among the journals, that while its growth seems to be healthy and steady, its finances well managed, and its conventions well attended, the reader of its "Transactions" misses the names and the papers of a number of the able men who were in its earlier days regular contributors; while the tone of the discussions has deteriorated, and courtesy and good breeding are sometimes forgotten by too youthful or too earnest disputants.

Of the electrical engineers are said, so far as we have observed, only words of praise; though the remark is made that its membership seems to be drawn from among the electricians rather than from the engineers of the great body of electrical engineers who are its natural recruits. Many and excellent papers are presented relating to the dynamo and its physics; few relating to the dynamo as a piece of engineering, or to the designing and construction of stations, of engines and boilers fitted to this department of work, or the engineering of the distribution of electrical energy.

We presume that in many respects these criticisms are simply the outcome of that spirit of fault-finding which is rife in all young societies and among the "fresh" members, who are more ambitious and earnest than wise or just; but there may be some reason behind it all, and the questions are often asked, How may these societies be made more truly national? How may they be given a more representative character? How may the distinguished and experienced members of each be brought into view, and induced to work with and for their continued growth and improvement? The formation of committees of each of the societies to confer together, and to seek some way in which all can be brought into closer relations, and of other committees looking to the absorption of local societies as chapters of the national body, give color to the suspicion that there may be some cause of criticism, and some opportunity of improvement.

If we might make a suggestion, it would be about as follows: see that the presiding officer and the members of the boards of management are elected invariably from among the oldest and most distinguished of available candidates, and that Benjamin Franklin's principle — "No American citizen has a right to seek office; but no true American citizen will refuse to accept office, when called by his fellows to take a position of honor and responsibility" — be paraphrased, and adapted to the case; see that the wise, experienced, able, and honest members are encouraged to present the best fruits of their labors; and especially see that they are treated respectfully, and fairly and kindly, in all discussions. See the "Transactions" carefully placed in the great libraries, and that the papers going before any meeting are given in advance to the representatives of the technical press; see, also, with especial care, that these journals have capable and discreet representatives at the conventions and meetings; and insure, if possible, with still greater care, their treatment with all courtesy, otherwise no complaint of discourtesy will hold against them or their principals. Let the presiding officer and the secretary see that the slightest rudeness or discourtesy, the least variation from the rules of good manners and good breeding, is instantly reprimanded, and the offender properly dealt with; making it the

habit, as well as the principle, that all discussion must be conducted fairly and kindly, and in a proper spirit, whoever may be on either side the controversy. Make all members of the profession welcome at headquarters; and let them see that they cannot, without injury to their own interests, defer becoming members of so representative and powerful a body of their comrades. We think the observing of these few simple principles will insure prosperity, without changes of constitution.

HEALTH MATTERS.

Chemical Salts developed in Living Organisms.

A MEMOIR by Mr. Robert Irvine and Dr. Sims Woodhead, entitled "Secretion of Carbonate of Lime by Animals," recently published in the "Proceedings of the Royal Society of Edinburgh," deals with the interesting question of the assimilation of food and the development of structures partially composed of a definite proportion of insoluble chemical salts. Thus, hens supplied with sulphate of lime, but no other lime salt, produce well-formed egg-shells composed of carbonate of lime. The process of shell-formation in the crab appears to differ chemically from egg-shell development in the hen. Sulphate of lime is not assimilated in the same manner, so that crabs which throw off their shells in artificial sea water in which sulphate of lime as well as chloride of sodium are present, but from which chloride of calcium is excluded, do not form a new exo-skeleton of carbonate of lime. As soon as chloride of calcium is added, although the sulphate be withheld, shell-formation may go on. The authors of the paper minutely describe the share which epithelial and other cells play in secreting, or causing the deposit of, chemical salts in shells and in bone. The histological and chemical processes differ considerably in bone, in egg-shells, in the shells of crustacea, and in the "mantle" of mollusca.

The Use of Leeches in Bacteriology.

Dr. Pasternatski has found that a very convenient method for collecting and preserving for cultivation the spirillum of relapsing-fever is to use leeches. If the leeches are kept in a cold place, the spirilla they contain preserve their vitality for a considerable period, much longer than they do when kept in capillary or other glass tubes. When exposed for some time to a temperature of from 27° C. to 30° C., the spirilla were found to undergo transformation into other forms.

Lead-Poisoning.

Investigations made this year appear to show, as reported by a contemporary, that the lead-miner does not really suffer in health more than any other worker under ground, as the ore is not in a condition to be absorbed by the body, but that lead-smelters and all engaged in the manufacture of lead, particularly white lead, run a very great risk of being contaminated sooner or later. It also appears that at Tyne-side, the chief centre of the English lead trade, there is one type of ailment which is rarely seen elsewhere, attacking those who have been engaged in the work only a few months, or even weeks, — a fatal disease, the principal victims being girls of from seventeen to twenty-three years of age. They rapidly display symptons of this form of toxemia in the way of severe headache, followed by colic and blindness: and unless they speedily leave work for a considerable period of time, and undergo most careful treatment, the fatal result is rapidly ushered in, usually with epileptiform convulsions and coma. It is remarkable, however, that but little trace of lead is found in their bodies after death, perhaps not more than a few grains in the internal organs, after they have been subjected to the most complete and exhaustive examination.

LETTERS TO THE EDITOR.

Osteological Notes.

VIRGIL never wrote a more truthful or more appropriate line than the one in which he says,

"Felix qui potuit rerum cognoscere causas."

How is the fact to be explained, that, with the exception of a single family, the marsupials have no patella, or, at the best, a very rudimentary one, when all the other orders of the *Mammalia*, as well as certain of the reptiles and birds before them, are thus supplied?

The patella is the largest of the sesamoid bones, and, like the other sesamoids, is developed in the course of a muscle or tendon, wherever marked friction occurs, or where protection or increased leverage is demanded. Placed on the anterior surface of the knee joint in the conjoined tendon of the four extensors of the leg (*quadriceps extensor*), this bone is of a triangular form, its base being turned upwards to receive the above tendon, and its apex downwards to be united by the strong ligament to the tubercle of the tibia.

John Bell says, "The patella is manifestly useful chiefly as a lever, gliding upon the fore-part of the thigh-bone, upon the smooth surface which is betwixt the condyles. The projection of this bone upon the knee removes the acting force from the centre of motion so as to increase the power; and it is beautifully contrived, that while the knee is bent, and the muscles at rest, as in sitting, the patella sinks down concealed into a hollow of the knee. When the muscles begin to act, the patella begins to rise from this hollow; in proportion as they contract, they lose their strength, but the patella, gradually rising, increases the power, and, when the contraction is nearly perfect, the patella has risen to the summit of the knee; so that the rising of the patella raises the mechanical power of the joint in exact proportion as the contraction expands the living contractible power of the muscles."

In the marsupials the patella may be entirely absent, or its place may be supplied by a cartilaginous disk, with occasionally slight specks of bony matter intermingled, or, in some cases, by a simple broadened expansion of the tendon. In only one family, the bandicoots (*Peramelidæ*), is this bone fully developed, and the groove in the femur, for its action, well marked. In the phalangers (*Phalangistidæ*), as also in the native cats (*Dasyuridæ*), the groove is broad and shallow, and the patella but slightly developed, consisting of a moderate thickening of the tendon *quadriceps extensor*.

In the flying phalangers (*Petaurists*), in the native bear (*Phascolarctos cenoreus*), and in the wombat (*Phascolomys*), as well as in the banded ant-eater (*Myrmecobius*), the anterior distal surface of the femur is almost plane from side to side, exhibiting no depression for a patella, which does not exist. In the opossums (*Didelphidæ*) there is a slight thickening of the tendon. In the typical kangaroo (*Macropus*), as well as in the kangaroo rat (*Hypsiprymnus*), the muscular tendon is fairly developed, and the femoral groove correspondingly well marked. Owen says that he has found a small patella in *Macropus bennetti*.

In searching for a solution of the problem thus presented, the low organization of the order of the *Marsupialia* must be especially recognized. They have close affinities with the reptiles and birds (*Sauropsida*), in most of which no patella exists. The presence of this bone in certain lizards among the reptiles, and in certain birds, offers no greater anomaly than its existence solely in one family of the marsupials. Then, again, we find similar provisions made for its absence in the reptiles, birds, and marsupials; viz., a prolongation and modification of that tubercle of the tibia which thus supplies increased leverage.

Moreover, there is nothing observable in the anatomy or in the habits of the bandicoots that would lead us to suppose that they specially needed a normally constructed patella. They are small, rat-like animals, about eighteen inches in length, having a singular gait, which is made up of jumping and running; and they live among stony ridges in the eastern and south-eastern portions of Australia. They are allied in their food to the placental *Insectivora*.

Cope, in his "Hard Parts of the Mammalia," says, "The existence of tibia and fibula of subequal size gave rise to two distal articular surfaces of the femur. The constant use of these in flexion and extension gave them the convexity which they possess in the *Mammalia*, — a process already commenced in the *Reptilia*. The strong tendon of the rectus muscles passing over the anterior face of the extremity gave rise to the rotular groove. This became better defined and more important after the development in placental mammals of a sesamoid bone or patella in the tendon."