nature or distance, have been brought to a high degree of perfection, especially by Zöllner, who used for this purpose the following apparatus: The polariscope, an ingenious tool invented by Malus in France in 1808, is based on certain peculiar properties of reflected light, by which it may be ascertained what light or portions of light belong to a luminous body itself, and which are borrowed from other sources; while it also shows the direction whence the borrowed light arrived before it was reflected by the body under investigation. Zöllner applied to this instrument several ingenious devices, making it the most perfect measurer of the intensity of light, and has thus founded a new branch of astronomical research, called astro-photometry.

The spectroscope, based on a discovery made in 1790 by Fraunhofer, and in 1840 by John W. Draper of New York city, is the invention of Bunsen in Germany, and, next to the telescope, is the greatest gift astronomy has ever received. By means of this instrument, Secchi, in Rome, has so successfully investigated the light of the stars that he has classified them by their temperatures, which may be distinguished by the number of dark lines or bands in their spectra; the hottest stars show the least number, the next class (to which our sun belongs) showing a greater number, and the third class having so many dark lines, obscuring portions of their spectra, that a peculiar color prevails in them; while a fourth class, of a still lower temperature, are still more obscure. Next come the dark globes, so cool that they have no light of their own, and cannot be seen except when they are so near to a luminous star as to shine by reflected light. This is the case with most of our planets, as well as with we do not know how many, perhaps much larger, darker bodies, floating in the infinity of space, and to which the disappearance and reappearance or changes in luminosity of some stars are ascribed, these phenomena taking place when their light is intercepted by an intervening dark body.

Secchi has just published some of his recent observations on Coggia's comet. He combined the spectroscope and polariscope with his telescope; the spectroscope showed that there were two spectra, one continuous, and the other consisting of luminous bands, agreeing with those of oxide of carbon; while the polariscope showed that the latter spectrum was original light, while the continuous spectrum was reflected light, also showing that the latter came from the direction of the sun: consequently that the continuous spectrum was reflected sunlight. He proved thus that this comet shone not only with reflected sunlight, but by its own light also, thereby revealing the nature of its original luminosity. This is an instance of the highest degree of refinement as yet obtained in modern astronomical research.

SAMSON OR SOLOMON?

This is the muscular period of the year, the time at which the collegian suddenly wakes up to the fact that poring over books, or the clerk to the idea that too close a confinement in the counting room, is resulting in flaccid biceps and a general depreciation to physical tone. One cannot pick up a newspaper now-a-days without being informed that this or that college crew is busily preparing for a coming regatta, or that some enthusiastic individual is training to walk an incredible distance in an equally incredibly brief space of time; while there is even an *on dit* fluttering about that the elegant Mr. Blank, so refined and so gentle in society, actually nightly pummels a professional pug, or stands manfully up and allows his sconce to be soundly rapped or his nose to be painfully abraded by his short-haired tutor.

They say abroad that we Americans make the pursuit of pleasure an elaborate business transaction; we do even more in the way of athletic culture, for we contrive to convert such sport not merely into a business, but too often into a kind of martyrdom.

"Well!" we can hear the reader exclaim, "does this paper, which fairly bristles with health axioms, and which preaches sanitary measures year in and year out, propose to take ground against healthy exercise? Does it argue that gymnasiums are pitfalls, and race boats and ball grounds only so many roads leading to bodily destruction?"

No! not by any means, gentle reader; on the contrary, we think physical exercise a physical necessity—but, in moderation. And there's the point which, it seems, can never be rendered keen enough to penetrate the brain of the average "muscular Christian." Let us illustrate: Suppose two men of equal strength enter for a contest—say a race with single sculls—to take place a year hence. One individual depends on future training, and lets the subject escape his attention until three months or so before the appointed time. Then he abandons books or business and goes to work. He radically changes his diet; from lazy inactivity, he subjects his body to severe strains, and, in brief, endures all kinds of privations in order to work himself into fit condition. The other person starts at once with a little gentle exercise, which in nowise interferes with his regular pursuits; he maintains his generous diet, and in general, save, perhaps, a slight augmentation of muscular work as the time grows short, his mode of life is the same at the end as at the beginning. In the hour of trial it would be found that the first could make "spurts"—momentary efforts of herculean strength—but that the second would show that steady uniform labor which would tell in the end. We should expect to see one man leave his boat collapsed, and in "condition" fit only for the sick room; but the other, we are certain, would step ashore, warm and tired to be sure, but with eye as bright, nerves as steady, pulse as regular and head as clear as when he took up the oars. From the result, any one would say that the first man's course had been wrong, and yet it is precisely the course of thousands of young men just at the present time

It is the same with mental labor. The merest tyro of a scholar knows that no information is so fleeting as that acquired by cramming for some special occasion; while none is so enduring as that gained by slow plodding, inch by inch. Moreover, these sudden transitions from inactivity—for there is hardly any period when the body is more sluggish than in the spring—to intense activity are hurtful, permanently so in some cases. It is well understood that one set of muscles cannot be developed by excessive work without a general weakening of the rest; and if feeble hearts or lungs be included in the organism, this weakening cannot be withstood, and irreparable injury may easily result. A strong frame does not imply a strong constitution; and nothing is truer than that the ultimate strength of the human system, like that of any mechanical structure, is only equal to that of its weakest part. The early deaths of Heenan the prize fighter, Renforth the oarsman, and of a dozen other magnificent specimens of physical development, which we might name, are common examples in point.

A well known professor told us, not long since, that every man of a college crew, which had covered itself with the laurels of victory in a great race, had failed in his studies. The time, in that particular instance, necessary for the severe training was taken from the hours of scholastic work, and the natural result followed. This only adds further proof to the assertion that there is a metaphorical antagonism between brains and muscles; and it leaves open to us the question of which we propose to consider the better type of humanity, him of big muscles or him of well balanced, powerful brain. We once saw a renowned athlete strip, and we looked with admiration on the great knotted fibers which lay beneath an unblemished skin, soft as any woman's, and on the feats of strength impossible to ordinary men. We admired that man's muscles; we thought of them as beautifully made mechanism; we simply admired them. But it was with a very different feeling that we listened to the eloquent words of a great lawyer summing up a great cause the other day. The highest triumph of one man had been to move vast weights; of the other, to stand as the representative of a nation molding the judgment of the loftiest tribunal the world has ever known. Which is the higher ambition?—and yet this renowned lawyer would physically be classed as of the lowest grade. The stooping shoulders, the contracted chest, and the spare muscles have offered no obstacles to his ascent of the topmost pinnacle of that temple of human fame wherein the strong man has but an instant's and the lowest place.

We do not argue against physical culture; but we say that it never should displace or rise superior to that of culture of the mind. It is not to the smith who wields the massive hammer, or handles great bolts of metal, that the world is indebted for the grandest results of inventive skill; but to the quiet, patient student who thinks, and whose thought brings forth that soul which animates arms of steel and iron, to do his bidding. Victory does not now perch on the banners of the nation whose army is composed of the strongest men or whose hosts are the most numerous; but on the standards of that land among whose children the genius of invention, the power of thought, most widely dwells. Brains rule this world—not muscles.

SCIENTIFIC AND PRACTICAL INFORMATION.

DISCOVERY OF THE PHYLLOXERA REMEDY.

M. Dumas recently announced to the French Academy of Sciences that a mode of treating vines attacked by the phylloxera had been discovered, which is certain in its results in destroying the insect and in restoring the vine to health and fecundity. The remedy is the combined employment of sulpho-carbonate of potash, which kills the insect at any depth, to the soil, and of potassic, ammoniacal, and sulphureted manures. *Les Mondes* states that M. Dumas himself is the fortunate discoverer, though his announcement to the Academy was not made until after his process had been tried by exhaustive experimenting by the commission appointed to examine into the various plans submitted. This being the case, M. Dumas becomes the possessor of the $60,000 reward, beside the numberless other prizes of smaller sums offered throughout France.

A NEW SOURCE OF MAGNETISM.

M. Tommasi states that, when a current of steam under a pressure of 5 or 6 atmospheres is driven through a tube of copper 0·08 to 0·12 of an inch in diameter, rolled in a spiral about an iron cylinder, the latter becomes so highly magnetized that an iron needle, placed at a fraction of an inch from it, is strongly attracted and remains magnetized during the passage of the current.

HOW TO KEEP MEAT FRESH A LONG TIME.

We have for authority the *Inter-Ocean* for saying that the following recipe is worth the subscription price of any newspaper in the land:

As soon as the animal heat is out of the meat, slice it up ready for cooking, Prepare a large jar by scalding well with hot salt and water. Mix salt and pulverized saltpeter in the proportion of one tablespoonful of saltpeter to one teacupful of salt. Cover the bottom of the jar with a sprinkle of salt and pepper. Put down a layer of meat, sprinkle with salt and pepper, the same as if just going to the table, and continue in this manner till the jar is full. Fold a cloth or towel and wet it in strong salt and water, in which a little of the saltpeter is dissolved. Press the cloth closely over the meat and set in a cool place. Be sure and press the cloth on tightly as each layer is removed, and your meat will keep for months. It is a good plan to let the meat lie over night after it is sliced, before packing. Then drain off all the blood that oozes from it. It will be necessary to change the cloth occasionally, or take it off and wash it—first in cold water—then scald in salt and water as at first. In this way farmers can have fresh meat the year round. "I have kept beef," says the writer, "that was killed the 12th of February, till the 21st of June. Then I packed a large jar of veal in the same way during the dog-days, and it kept six weeks."

INSECT AESTHETICS.

L. G. Fellner states that the large red ants of Arizona Territory adorn their dwellings with stones, shells, etc. "I have often disturbed their piles in order to find garnets, etc. The ant on guard would then regularly call out an army of miniature warriors, whose attacks I had to avoid. As I stirred one pile with a stick, the guard ran inside; but instead of returning with a number of angry ants, he brought out a large clear garnet and rolled it down towards me; I kept stirring until he had brought five, when I thought the sagacious animal had been taxed sufficiently."

LAND DRAINS.

An excellent subsoil drain may be made by digging a trench and filling in the bottom with sticks of wood, compressing them together with the feet and then covering them with the mold. The effectiveness of such a drain will endure for several years, and the final decay of the wood will serve to enrich the soil.

MAGNETS FOR ELECTRO-MOTORS.

Magnets or armatures for electro-motors may be softened as follows: Heat the iron to an even dull red heat all over; and if the surface of the iron has not been faced off in a machine, lightly file it to remove the scale, and then immerse it in common soft soap, allowing it to remain therein until it is quite cold. Then reheat the magnet to an even red heat whose redness is barely perceptible, and bury it in pulverized lime, wherein it must also remain until quite cold, when the metal will be found as soft as it is possible to make it, and the blade of an ordinary penknife will cut it. At the second heating the iron will emit a light blue flame, showing the effect of the immersion in the soft soap. The conductibility of the magnet may be, by this process, very much increased.

Siam at the Centennial.

His Majesty the King of Siam, having accepted the invitation of the United States Government to take part in the International Exhibition at Philadelphia next year, has appointed J. H. Chandler, Esq. as Royal Commissioner. Mr. Chandler is a native of Pomfret, Conn. He has resided in Siam about thirty-two years past, and is well acquainted with the productions and resources of the country. His early labors in that country were devoted to type-founding, printing, bookmaking, and the introduction of various improvements. He has the honor of having introduced steamboats, and also steam machinery for manufacturing purposes, beside numerous labor-saving machines to facilitate and improve the mechanic arts. Nearly all the early improvements which have done so much for the country were introduced by him. For the last twelve years or so, he has devoted himself mainly to the language, teaching, etc., and has for a long time held the position of chief government translator in the foreign office. He was tutor to His Majesty before his first coronation. With Mr. Chandler for Commissioner, and the readiness with which the King and his ministers have entered upon the work of preparing and forwarding the productions of the country, it may be expected that the kingdom of Siam will make a good display at the International Exhibition.

Sailing of the New Arctic Expedition.

The new British arctic expedition, for polar discovery, comprising two vessels, sailed from Portsmouth on the 29th of May. The expedition is commanded by Commodore Markham, in the Alert, while Captain Nares, navigator, sails the Discovery. Both vessels were prepared and equipped in the best possible manner, with all the appliances for safety and success which arctic experience could suggest.

The route is up the west coast of Greenland, on the same track as the Hall expedition. Special preparations have been made for sledge expeditions, and the explorers are bound to reach the north pole this time, unless ice or other obstacle prevents.

Adulteration of Linseed Oil with Cod Liver Oil.

According to the foreign pharmaceutical journals, linseed oil is now frequently adulterated with cod liver oil. To detect this adulteration. 10 parts by weight of the oil is mixed with 3 parts by weight of commercial nitric acid in a glass cylinder, and well mixed by stirring with a glass rod. It is then left quiet until the oil and acid separate. If cod liver oil is present, the layer of oil will have a dark brown or black color, and the acid will be orange yellow or yellowish brown. Pure oil treated in the way is at first a water green, then a dirty yellowish green, and the acid takes on a brighter yellow color.

RAPID TRANSIT IN LONDON.—Recently, during one day, Whit Monday, 246,547 passengers were carried on the Metropolitan Underground Railway, London, being at the rate of ninety millions of passengers per annum. The stations are half a mile apart. The trains run every two minutes; they consist of twelve cars each, and are drawn by locomotives weighing forty-five tuns each. They discharge and take up a load of passengers, run to the next station, and stop, all within the space of two minutes.

MR. JAMES T. GARDNER, Chief Geographer of the Geological and Geographical Survey of the Territories, with his staff, left New York on May 26, and will have head quarters until October at Denver, Col. Ter

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