Scientific Items.

SPECTROSCOPIC TEST OF BLOOD WHILE IN THE HUMAN BODY.—The compound which oxygen makes with the coloring matter of blood—namely, oxyhæmoglobin — gives a well-marked spectrum having two absorption bands. Herr Vierordt, a German physiologist, has pointed out that this may be simply observed by putting the fourth and fifth fingers one over the other, and bringing their line of union before the slit of a spectroscope, the light used being sunlight transmitted. If now a caoutchouc ring be passed around the fingers so as to stop the access of arterial blood, the two absorption bands in the spectrum disappear in a few minutes, the spectrum giving place to that of reduced hæmoglobin. Take the ring off, and the former spectrum recurs. These phenomena evidently give information in regard to the rate at which oxygen is being used up in the human body, and might, Herr Vierordt thinks, be advantageously utilized by physicians. To this end, he goes on to show that even reflected light will give the indications, and they can be conveniently observed from a finger, the red part of the lips, the tongue, red cheeks of young persons, &c., with a Browning spectroscope. The observer notes exactly the moment at which, say, a caoutchouc ring is applied to the finger and the moment of disappearance of the bands. The latter may seem vague, but with practice a sufficiently exact judgment may be formed. Vierordt gives a detailed account of the changes that occur. Without here following him in this, we note the results of a large number of experiments made on himself between the 7th of May and the 3rd of July. The amount of consumption of oxygen then in normal, quiet life, is found to show considerable variations (as much as nearly threefold). Immediately on rising out of bed, the process is slowest—about 4 minutes 5 seconds on an average. The muscular exertion in dressing and washing increases it somewhat (it was 4 minutes 42 seconds), and it becomes much quicker in the next half hour (2 minutes 35 seconds), doubtless partly due to breakfast. The values then are pretty constant till after the mid-day meal. Immediately after this it rose (2 minutes 10 seconds), and one hour later—at 2 o'clock — reached a maximum (1 minute 24 seconds). Then comes a gradual decrease, till, between 6 and 8 o'clock, something like the value in the forenoon is reached again. Supper gave, in the only two cases observed, a considerable rise (1 minute 36 seconds). Various occupations had a marked influence on the phenomenon ; thus, continuous speaking always increased the consumption of oxygen ; so did sundry other bodily movements, such as walking, &c. Specially interesting was the increase in consumption observed during a temporary indisposition of the experimenter. Shortly before and during the ailment low values were had ; but as he grew better the values rose again. By intensifying his breathing he could considerably increase the time in which the absorption bands disappeared. It is notable that the dissociation of oxyhæmoglobin occurs in about two minutes—that is, about the time in which suppression of breathing is found to cause the greatest phenomena in the system.

COATING METALS WITH PLATINUM.—Mr. Dode, a Frenchman, has recently invented a process for covering iron with platinum. The iron is first coated with a preparation of lead and copper. It is then ready for the platinum composition, which is thus made : Ten parts of platinum are converted into chloride, mixed with five parts of ether, and permitted to evaporate in the open air. The residue is incorporated with a compound of 20 parts borate of lead, 11 parts of red lead, some oil of lavender, and 50 parts of amyle alcohol. Into this mixture the article to be coated is dipped, then allowed to dry in the air, and finally heated to a moderate temperature, in a muffle furnace. A practical demonstration of the *modus operandi* was recently given at the laboratory connected with the Mint and Bank of England, at which the ease and simplicity of the operation were fully seen and acknowledged ; but as the invention is a recent one, the important element of time and wear to test his work is as yet wanting. The invention relates more particularly to the coating of articles of cast-iron, but is also applicable to the covering of other metals in order to preserve them from oxidation under the action of air, fire, or acid gases. The same process is applicable to glass. The processes hitherto known for the coating of metals have only imperfectly attained the object in view, inasmuch as the coverings of copper, nickel, silver, or tin, applied by immersion or with the aid of galvanism, are not adapted to prevent oxidation. Mr. Dode's invention consists in the application of platinum in such a state of division as to enable it to be employed as a preservative against the oxidation of metals, whereby a considerable saving is effected, as compared with the systems at present in use, and much greater efficiency is obtained.

COATING METALS WITH TIN.—The process of coating metals with tin promises to extend its use for culinary and other uses. Its electro-deposition is proposed by means of a zinc and carbon battery. The inner cell containing the zinc is filled with dilute sulphuric acid. The articles to be coated with tin are put into a bath composed of 8 parts of proto-chloride of tin, 16 of cream of tartar, and 2 of the chloride if the latter is used. When it is present the tin coating is effected more rapidly, whereas, when the bath is composed of proto-chloride of tin and cream of tartar only, the tin coating is very white, but is not produced so rapidly as when the chloride is used. These ingredients should be dissolved in about 100 gallons of distilled water. The black plates are first "pickled" in any suitable manner, and then immersed in the above described bath or solution, and are allowed to remain in the same for a longer or shorter time, according to the thickness of the deposit or coating of tin required on the plates. While in this bath the plates or other pieces to be coated are connected by a wire with the positive end of the battery, while the negative end of the battery is connected with a piece of tin hung in the same bath. When the plates or other pieces or articles have been sufficiently coated with tin, they are held over a fire in order to give the tin a lustrous appearance.

TRANSMITTING POWER BY ELECTRICITY.—Profs. Elihu Thomson and Edwin J. Houston have an important article in the journal of the Franklin Institute for January, concerning the practicability of the transmission of power to long distances by means of electricity. It has been stated by an eminent electrician that the thickness of the cable required to convey the current that could be produced by the power of Niagara would require more copper than exists in the enormous deposits in the Lake Superior region. Another statement estimates the cost of the cable at about $60 per lineal foot. Profs. Thomson and Houston on the contrary assert that it is possible, should it be deemed desirable, to convey the total power of Niagara a distance of 500 miles or more by copper cable not exceeding one-half of an inch in thickness. Stripped of its theoretical considerations, they say the important fact still remains, that with a cable of very limited size, an enormous quantity of power may be transferred to considerable distances. The burning of coal in the mines, and the conveyance of the power generated by the flow of rivers, may therefore be regarded as practicable, always, however, remembering that a loss of about 50 per cent. will be almost unavoidable.

TRIUMPH OF ELECTRICAL SCIENCE.—In the cable news of a few days since, it was stated that the French Atlantic cable was "broken 161 miles from St. Pierre Miquelon, in 500 fathoms of water." These few words show one of the many triumphs of modern electrical science. Here is a wire cord buried under three-fifths of a mile of the water of the ocean, and 180 miles from land—and yet the people on shore can exactly locate the points at which it is broken. Strange as that seems, it is actually done, and has been time and again. The repairing vessels will go out to the indicated point, throw over their grappling hooks, and within a few hundred yards will find the broken ends and splice them. This wonder is accomplished, first, by exact knowledge of the laws of electricity, which make known what amount of currents a wire of a given dimension will carry, and the resistance it must overcome in going to a given distance, and next, by the instruments made by the mechanicians of our day, which will make the operation of both laws visible to the experienced observer, even if the break in the cable is a thousand miles away and two miles under the sea.—*Philadelphia Ledger.*

PIG-LEAD FROM SMOKE.—The following explanation is given as to how pig-lead may be produced from smoke : In the process of smelting the ore a great deal of it escapes in the form of lead fumes, and the White Lead Company was organized for the purpose of catching this smoke, and, by passing it through an almost endless line of pipes of sheet-iron and woollen bags, condense it. The result was that after an outlay of many thousand dollars and a year's experimenting, they have succeeded in condensing the smoke or lead fumes, into metallic lead, the same as steam is converted into water. The product of the fumes is a bluish, impalpable powder, which makes a splendid blue paint, pronounced equal to the corroded article. For the purpose of making it white several furnaces were built, and the blue product, with the aid of an intense heat, is again changed into lead fumes, which are again condensed, and come out pure white lead. In the transforming of the blue lead into fumes, the object is to sublimize it all, but the heat is not powerful enough to do so.