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For the Week ending January 13, 1877.

PHYSICIANS AS PATENTEES.

We have seldom seen a prettier illustration of professional prejudice than appears in a late number of the *Medical Record*. Speaking of the ingenuity of American physicians the *Record* remarks that scarcely a day passes without some new design for the alleviation or cure of disease being submitted to the instrument maker, who first takes good care to charge the designer a round sum for making it, and then goes on to manufacture and sell the article at an immense profit to himself.

Against this one-sided arrangement, the *Record* protests mildly, and raises the question whether the profession could not arrange with the trade to allow the inventor some return for his work, while the manufacturer retained the exclusive right of patenting and selling the article invented and adopted. "This plan," the *Record* observes, "would save the dignity of the profession; and though not so remunerative as the holding of a patent, it would nevertheless give a physician some pecuniary recompense for the outlay of his time and means and the labor of his brain."

This solicitude for the dignity of the profession seems to us rather far-fetched. The logic of the *Record's* position appears to be something of this sort:

First: It is the duty of medical men to give the world unreservedly the benefit of all professional inventions and discoveries they may make. Second: To take out a patent is to retain a proprietary interest in the invention patented. Therefore it is an undignified and unprofessional thing to patent a medical or surgical invention. But a physician may surreptitiously derive a pecuniary benefit from such an invention, or rather from the sale of it, provided he can persuade a manufacturer to allow it to him! For our part we think that this indirect way of getting one's due is infinitely less dignified than the straightforward matter-of-fact way provided by the law. The prejudice against retaining a personal interest in anything pertaining to the profession—a pecuniary interest, we mean—no doubt had a highly honorable origin; but when it is allowed to react, as it clearly does, to the injury of the profession, it becomes anything but a virtue.

No physician objects to the copyright of a medical book—nor does any one imagine that the dignity of the profession is in any way lowered by the circumstance that many of its members add largely to their income by such means. On the contrary, it would be easy to show that copyright has greatly helped to raise the profession in usefulness and in the estimation of men. It serves as a powerful inducement for the preparation of medical works, and, when completed, assures their publication. Without the protection which copyright offers to both author and publisher, it would be quite impossible to get the more costly and valuable of such professional contributions printed at all; and without the prospect of printing there would be little encouragement to undertake their preparation. What the dignity of the profession would have been without its literature we need not attempt to say.

What the profession has lost, in refusing to take advantage equally of the privileges and benefits of patent rights, it is impossible to estimate. There is not another line of manufacturing business in so unsatisfactory a condition, all things considered, as the making and selling of medical and surgical appliances not patented. Most admirable work is done, but it is done in the most expensive manner. Articles which might be cheaply made by machinery, and should be widely used, are turned out slowly and dearly by hand; the price reacts upon the demand; patients suffer for lack of mechanical aids which they or their physicians cannot afford to buy; and the profession loses in both usefulness and dignity in consequence.

The free gift which the profession intends to make of professional inventions thus results only in making such articles so costly as to restrict their use. The motive is honorable, but the practice conflicts with the conditions of trade to such a degree that it defeats its own end and purpose. Lacking the protection which a patent gives, the maker of any new medical appliance can have no object in making its merits known, or in spending money on machinery for its cheaper or more rapid production; so he meets the limited absolute demand in his own slow and costly way, and charges a profit which helps still more to lessen the demand. As a further result, the mass of medical practitioners are but poorly equipped with professional aids, and the general efficiency of the profession is less than it might be and should be.

The cure of these grave evils hinges, we believe, on the adoption of more business-like and practical views touching this matter by the profession as a whole. The moment physicians and surgeons abandon their prejudice against patents, and act like other people, the business of the professional instrument maker will take on a much more satisfactory aspect. Protected in his work, he would have some inducement to improve its methods. The first result would be to cheapen the products and so encourage their more general use. Enlarged demand would react upon the price, and that again upon the employment of such professional aids, to the natural increase of the intelligence and efficiency of the profession.

Further, invention begets invention; and whatever is done to increase the use of improved professional means and appliances increases also, the probability of still other improvements. The inventor's royalty steps in to encourage the good work, and to secure the preservation of valuable suggestions and devices now commonly lost to the profession. The benefit that would ultimately accrue to the profession from and through this line of advancement is quite incalculable.

THE OBLIGATIONS OF SCIENCE TO GOETHE.

The great German poet Goethe, is generally more appreciated by students of German literature than by scientists for the simple reason that most of his literary labors were at once understood, while his scientific labors, in which he was half a century in advance of his contemporaries, are only just beginning to be valued; and even now, the large majority of people have no idea of their high importance. He went forward with such great steps that he was soon far ahead of his time, and contemporary philosophers were utterly unable to keep pace with him, a misfortune which he himself felt and acknowledged!

Goethe approached the grand problems of nature not as an unimpassioned investigator, but as an inspired poet, and the wonderful generalizations which he made in metaphysics, in botanical and zoological anatomy, in embryology and comparative anatomy, were the basis of the modern theory of evolution. These theories sprang from his intensely poetical conception of the necessary unity of nature, and have now been generally acknowledged and accepted. Metaphysics he reformed entirely, by proving that in fact there is no such thing as a metaphysical universe, no nature above the visible nature; and therefore, to Goethe, metaphysics proper did not exist. He saw that matter without mind was as unthinkable as mind without matter; and he was the first who attacked the *dualismus* which treated mind and material nature, essence and phenomenon, or whatever else they may be called, as opposing principles. He held that in place of being distinct, they form an inseparable unit. Neither matter nor spirit can exist alone; but everything is both in one; and it is evident that it is just as erroneous to call natural objects materialisms as it would be to call them spiritualisms. Nor can any one call this view of the universe atheism, as it acknowledges a God grander and nearer to man than the hypothetical *deus ex machina* of the ancient creeds.

There was recently published a letter from Goethe to Jacobi, in which the writer says: "Why some good people want a God existing outside of the universe is what I do not understand. Does not God exist in the universe, everywhere in the universe? If he does not exist everywhere, entirely and undivided (because the whole universe is a manifestation of His, to us, visible form) then does He exist nowhere. Outside of the universe, there is no space; space comes only to existence as an abstraction when a universe is evolved. A limited personality does not fit an infinite being, which must be the highest, living, active unit: not *in* all things, as if there could be anything outside of Him, but *by* all things, which appear only as perceptible conceptions to the observing faculties of material beings."

In regard to Goethe's labors in special branches of the natural sciences, we must first consider a principle which he insisted on in all his works, namely: That "a bad hypothesis is better than none at all." Professor Huxley endorses this, and adds: "It forces the mind into lines of thought, in which it is more profitable to go wrong than to stand still." One of Goethe's most celebrated works in the natural sciences is his "Metamorphoses of Plants," first published in 1790. In this work he attempted to prove that there was one fundamental organ, by the infinitely manifold transformation of which the whole world of the vegetable forms was evolved. This fundamental organ he thought he had found in the leaf; but if he had been a microscopist he would have gone farther back, and recognized the cell as the organic cause of the leaf. Applying the same reasoning to the cell development, he would have done as we, enlightened by his example, do now; he would have looked for the primary form or type, or other name by which the originating germ may be called.

Goethe's next great labor was his famous theory of the skulls of man and the other mammalia, that they are only modifications or differentiations of vertebræ of the spinal column, being composed of similar parts. This idea, further developed and applied to other parts, is of the utmost importance, and has effected a reform in comparative anatomy, or, rather, has elevated it to be one of the most solidly founded sciences. To have proved the unity of type of two objects so different in appearance as a vertebra and a skull, and afterwards of other objects, was to have made an immensely progressive step.

Goethe also proved that certain differences between the osseous systems of man and the lower mammalia, which had been insisted on before his time, did not exist in the embryos, and only appeared during and after growth.

It is evident that what Goethe called metamorphosis, is identical with what we call evolution. Witness the following expression: "The triumph of metamorphosis is shown when this theory teaches how simple organization begets families, how families split up into races, and races into various types, with an infinity of individualities. Nature cannot rest, nor preserve what she produces, but her actions go on *ad infinitum*."

COLOR MUSIC.

A correspondent sends us an essay on the analogies between sound and color, describing a new instrument (which he terms a color organ), which displays lights of various colors, claimed to be harmonious with the music produced. An analogy is traced between arrangement of the colors of the spectrum and that of the notes of the minor scale. Our cor-

respondent thinks that color music might be produced by the arrangement of colored lights, and that such an addition would prove valuable in the presentation of operas, or even in connection with church music.

The analogy that really exists between sound and color is, that both are the products of vibrations which the brain, in accordance with their velocity, translates into one or the other impression. Viewing the physical characteristics, we may proceed a step further, and admit that there exist harmonies and discords between colors, as between sounds; and that in this respect a finely painted picture may be as gratifying as a finely written musical composition. Still further, we may concede that there is such a thing as sound painting; but here the analogy grows weak, for a trained perception is needed to interpret the meaning of sounds which express ideas. Still, it is, and always has been, a motive of composers to make music present pictures or thoughts to the mind's eye, as clearly as a painting conveys ideas to the physical senses. But the composer's motive merely offers the bare idea which the hearer clothes to suit himself; and in no instance can it be urged that any musical writer ever wrote a note to express the sensation of blue or green; although, to listen to early pastoral music is to have the idea of blue sky and green fields brought uppermost in one's mind.

There are, however, the clearest scientific objections to the many repeated attempts to demonstrate the analogy which our correspondent suggests. The deepest musical tone perceptible to the ear is caused by about 30 single vibrations per second, the highest by about 24,000. Beyond the latter limit there is silence, or a sensation of pain to the ear. In music, the range is from 32 to about 4,000 vibrations, or about seven octaves. Comparing these figures with those indicating the vibrations of the color sensation, we shall at once perceive the dissimilarity. Thus, the extreme red of the spectrum shows 407 trillions, and the extreme violet 793 trillions. Now, the upper octave of a given note has just double the number of vibrations; and, therefore, our sensations of color do not correspond to a single octave, else the extreme violet would show 814 instead of 793 trillions. We can, of course, see light showing 814 trillions of vibrations, but the color sensation is exceedingly weak and indefinable.

Again, if several notes are sounded simultaneously, we do not hear a sound of medium pitch, but a chord, which is not easily mistaken for a simple sound. A practised ear can easily analyze this consonance into its components; and a skilled musician can readily follow any instrument or voice even in a full orchestra or chorus. A noise, instead of a musical sound, is only heard when the vibrations take place without any regularity, or when a number of sounds burst upon the ear simultaneously and without any regard to law. But when several colors act on the retina, we see no elementary color, but a hue composed of several simple colors, while several musical tones sounded simultaneously do not blend, but remain perfectly distinct to the ear. No eye is capable of recognizing the elements which compose such a mixed color. The artist may know that such and such colors produce another hue; but he cannot see the components in the mixture. The most practised colorist the world ever saw would be utterly incapable of deciding whether a gray upon a rotating disk were mixed from white and black, from yellow and blue, or from purple and green. If there existed a complete analogy between the two classes of sensation, every mass of sound would resolve itself into a confused noise, and all polyphonous music would be impossible.

There is still another difference (which Professor Von Bezold, whose reasoning we are following, in his admirable work on the "Theory of Color," points out). A tone will be perceived as such when only a few of its component vibrations are executed; but if the number of vibrations which reach the ear is too small, a confused impression is the result. Rapid passages on the bass notes of a pianoforte degenerate to a mere rumble; while there is a crystalline sharpness to quick runs on the high notes. In one case, as each note is struck, but a very few vibrations enter the ear; in the other, the vibrations are received by hundreds. With colors the case is different. The impression of a succession of colors can only be produced when the number of vibrations entering the eye from each color exceeds five trillions, and even then it will be quite imperfect, and little more than a glitter. If we paint a color top half of one color and half of another, the two sensations, rapidly produced alternately, are analogous to those of the trill in music. But if such a trill were executed so that each sound should execute the number of vibrations corresponding to the number of vibrations of light, which must enter the eye to produce the effect of alternating colors, the sounds would have to succeed each other in periods measuring at least years.

Returning to the numbers of vibrations corresponding to each color, and constructing with them a scale in accordance with the spectrum, we shall find the same to be very different for the musical scale. In such a scale we cannot illustrate the intervals which are almost involuntarily indicated by the ear in music. Take the fifth, where the vibration numbers are as two to three. A person having a good ear will at once recognize, as discords, variations on either side of the correct proportion. Yet the numbers of vibration of the red of the Fraunhofer line C, and those of the ultramarine blue, a little on the other side of G, likewise bear the same ratio; but it is absolutely impossible, even for the eye of the best colorist, to determine the exact point at which this proportion is reached. So the difference between the octaves in colors is of extraordinary magnitude; while, in music, a note and its octave may easily be confounded by an unpractised ear.

Mr. John Ruskin, in his "Modern Painters," dwells with great elaboration on the principle of gradation in color. He tells us that Nature never uses a color without grading it; that is, never employs flat tints. And he further claims that Turner, whom he considers only inferior to Nature, probably because of his fallible humanity, never painted a square inch of canvas without grading his tint. If we accept this, we are led, according to the theory of musical analogy, to a ludicrous conclusion. Gradation in color must be analogous to the *portamento* in music. The semitone interval of the chromatic scale is but very sparingly employed in music, because it really produces the howl of some wild animal. Therefore, it would follow that if our correspondent had Turner's "Slave Ship" placed before him, and were told to reverse his theory, and translate color into sound, his instrument or chorus would begin a series of hideous howls and whines. A tiled mosaic pavement, consequently, being destitute of gradation, would be the highest possible translation of a musical composition into a composition of colors.

MORE REMARKABLE CLOCKS.

In a recent number, we referred to a clock without any apparent works, nothing being visible but a transparent dial and a pair of hands. Such clocks are, we are informed, no great novelties, as several of these "mysterious clocks" have been invented, and two were patented in this country previous to that of M. Robert. An informant saw one in Birmingham in 1856, and he remembers reading in the Scientific American of a similar clock being on exhibition in San Francisco several years ago.

One of the clocks above referred to (that of C. Schwippl, of this city, patented June 21, 1864), differs from M. Robert's clock in having the works in boxes in the centre of the hands. but the patent of C. King, June 16, 1868, shows a clock with the movement concealed in the counterpoise on the end of the hand, like that of M. Robert.

Another style of clock without apparent works was exhibited in a Broadway store some fifteen years ago. It consisted of a heavy ornamental base on which stood a transparent glass column, having a metallic cap on which rested a light round frame surrounding a transparent glass dial of about five inches in diameter, having the usual figures on it, but only one hand, so that it could only point out the hours, or such fractions thereof as could be indicated in the space between two figures.

The works in this clock were probably concealed in the base, and the connection made with the hand by means of a glass rod or tube passing through the centre of the glass column, which rod or tube moved a glass plate at the back of the dial; which, being of the same shape and size as the dial, and the edges of both being concealed by the frame before mentioned, could not be distinguished from the dial plate, and was supposed to be part of it by the ordinary observer. This plate had the hand firmly attached to it, so as to travel with it, and it probably had a metallic ring around it having teeth gearing with a small pinion on the end of the glass rod or tube before referred to, as there was sufficient room in the frame of the dial and the cap of the column to conceal both teeth and pinion.

As there appeared to be no connection between the base and cap supporting the frame of the dial, excepting the plain transparent glass column, and nothing but the figures and a small, ordinary hand on the equally transparent dial, this was truly a "mysterious clock" to most people, but the above is probably the explanation of the mystery.

A third style of mysterious clock was exhibited in Cortlandt street, in this city, a short time since. This consisted of what appeared to be an ordinary French clock contained in a base, supporting a bronze figure with an outstretched arm, from which hung the pendulum There appeared to be no connection whatever between the pendulum and the works, and the question: How is the pendulum kept in motion? was a puzzle that baffled some of the best mechanicians and horologists in the city. Many different theories were advanced to account for the continued movement, such as the application of a blast of air acting on the ball, electricity, magnetism, etc., all of which were denied by the exhibitor; but the real explanation was probably as follows: The figure itself, instead of being stationary on the base, as it appeared to be, was fixed on the top of a vertical shaft, concealed in the base and connected with the movement in such a manner as to give the figure a turning motion sufficient to swing the pendulum, but so small as to be imperceptible to an ordinary observer.

Among other curious clocks we may mention that patented by T. A. Davis, January 15, 1846, which had neither weight nor springs to drive it. Instead of using the cord to hang a weight on in the usual manner, the clock was suspended by it and the weight of the clock itself became the driving power.

A patent was granted by the Assembly of Connecticut, in 1783, for a clock to wind itself up by means of air, which was probably on the same plan as that patented by C. B. Hoard, April 3, 1860, in which the warm air escaping from a room through a ventilating fan or windwheel wound up a spring or weight.

Several attempts have been made to drive clocks by the expansion and contraction of mercury or metallic rods caused by the variation of temperature between day and night. One was exhibited by Coxe in London, in 1827, driven by the expansion of mercury, and the expansion of metallic rods for the same purpose and by the same means is proposed in the patent of Washburne, July 4, 1865.

A recent patent (E. Stockwell, March 2, 1876), shows a safe with a "time lock," in which the clock work is wound up by the opening and closing of the door of the safe, and the apparatus is provided with a device to prevent overwinding, no matter how many times the door may be opened after the spring is properly wound. This is something on the same principle as a French invention we saw some years since, in which the opening of the door of a wardrobe or bookcase wound up the spring of a clock connected with it, and of the watch which is wound up by the opening of the case to see the time.

Almost every one has heard of the wonders of the great clock at Strasburg, its automaton figures, etc; but few know that it has a sphere showing the precession of the equinoxes. This sphere turns once in 25,920 years! at least, we were informed so, but could not then spare the time required to wait and verify the statement.

THE RESIGNATION OF THE COMMISSIONER OF PATENTS.

Judge R. H. Duell has resigned the Commissionership of Patents, his resignation taking effect on January 1. He leaves the position through motives similar to those which have influenced many of his predecessors, namely, to engage in the private practice of patent law, having completed arrangements, it is said, whereby he connects himself with a law firm of this city. Judge Duell's administration has been marked by much ability; and in the last annual report of the Secretary of the Interior it is stated that, during the year which he has been in charge, the income of the Patent Office has been greater and the expenses less than in any previous year in the history of the office.

Although Judge Duell explicitly states that he has had his present course in contemplation for several months, his resignation will be by many regarded as untimely, in view of the irregularities recently discovered among his subordinates. In some cases, false names appeared on the pay rolls, which were explained to be those of draughtswomen who objected to being known as Government employees; and in others, drawings given out to be made as piece work were sublet by those to whom they were entrusted to other parties. This was irregular; but, it it stated, in no case did it involve loss to the government. The objectionable practices appear to have been promptly checked by an order from the Commissioner, on his attention being publicly called to them.

Among the names of persons suggested for the Commissionership, are those of Congressman Hoskins, of New York, Mr. W. H. Doolittle, and Mr. R. L. B. Clark, Chairman of the Appeal Board of the Patent Office. It is highly important that the person selected for this very responsible position shall possess considerable legal knowledge, and be well informed on matters pertaining to the present state of the arts and of inventions, and also well versed in the practical workings of the Patent Office itself. These requirements, we think, would all be fulfilled by Mr. Clark, whom we have no doubt would make an excellent Commissioner. He is an old and experienced employee of the Patent Office, where he has attained high rank.

Since the above was in type, we learn that our old friend and former associate on the Scientific American, Salem H. Wales, Esq., is strongly advocated for the Commissionership. For more than one year Mr. Wales occupied the position of President of the Department of Parks, and subsequently and now for over three years has been the official head of the Department of Docks of this city. In discharging the difficult duties of both of these highly responsible positions, he has exhibited rare executive ability. In both he has been called upon to direct engineering work of magnitude, to govern the expenditure of large sums, to interpret laws, many intricate and perplexing, yet involving interests, both public and private, of the highest importance. Through his extended experience in these varied and onerous requirements, he has acquired a breadth and class of knowledge which render him exceptionally well fitted for filling the Commissionership in a manner acceptable to inventors and to the country at large.

Osmose Plan for Blisters.

The removal of infilteration of the skin is easily accomplished, according to M. Ungerer, by osmose. He had occasion to prove this lately in having to treat an extensive scald on the hand, which resulted in a large and exceedingly painful swelling without wounds. Cold water treatment for 12 hours did not relieve the swelling in the least, and the pain was almost unbearable when the hand was removed from the water only a few seconds. He, therefore made a diffusion experiment, dipping the hand in a saturated salt solution, and the success was surprising. Though the salt solution had not the temperature of the ice water, the pain diminished almost immediately, and in 4 hours blister and pain were both entirely gone. The hand next day differed from the other only by a very slight swelling and redness.

Neptune the Most Distant Planet.

After a long continued labor, M. Leverrier has at length, with the theory of Neptune and Uranus, completed the study of all the members of the solar system. The author's chief object was to decide the question whether there is an ultra-Neptunian planet, which might be detected, as Neptune was, by the perturbations produced by it on planets already known. The conclusion is negative; there is nothing indicating the existence of a body outside of Neptune