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CHANGES IN THE PATENT OFFICE.

Mr. R. G. Dyrenforth, of New York, Assistant Commissioner of Patents, has resigned the office, and Mr. R. B. Vance, of North Carolina, has been appointed to the same position.

During the recent brief interval between the resignation of Mr. Commissioner Butterworth and the appointment of Mr. Montgomery, the present Commissioner of Patents, the duties of that office devolved upon Mr. Dyrenforth, and he at once set to work to try to bring about a reform in the bureau, with a view to putting an end to the long delays in the transaction of business—abuses which Mr. Butterworth was unable to cope with. Under Mr. Dyrenforth's rule, brief as it was, there was a notable increase in the activity of the office.

Mr. Vance, the new Assistant Commissioner, was lately a member of Congress and chairman of the Committee on Patents. During his Congressional service he made himself very familiar with the affairs of the Patent Office, and took an active part in the House of Representatives in upholding the interests of inventors, at a time when hostile legislation was advocated by others. Mr. Vance is a man of much ability, and his acceptance of the office of Assistant Commissioner will, we think, be highly advantageous to the bureau.

HERAT.

Whether the Russian advance upon the northwestern frontier of Afghanistan shall be stayed at the mountains or pass on to Herat the coming summer, remains to be seen. In either case that ancient city will continue to be the center of the most commanding political and military interest. Sooner or later it must be determined, by skillful diplomacy or much fighting, whether Russia or England shall hold that time-honored key to Central Asia. Meantime all readers of telegraphic news from that quarter are asking for information touching the present condition of the city and its surroundings, and the reasons for its apparent importance from commercial and military points of view.

The geographical situation of Herat, 34° 22' N. lat., 62° 9' E. long., with its elevation of about 2,500 feet above the sea, gives it a charming climate. The valley in which it lies is the granary of Afghanistan, and its surrounding gardens yield fruits corresponding with those of Southern Europe. Central New Mexico has about the same latitude and a similar climate, though less temperate and somewhat drier. The plain of Herat is well watered by canals from the Heri River, and is said to contain fully 400 square miles of arable land. The upper valley of the Heri is described as a beautiful rolling country furnishing the finest of pasture lands. Three or four miles south of Herat the river is crossed by a magnificent bridge of 23 arches.

The territory tributary to Herat extends east and west from near the sources of the Heri to the Persian frontier, about 300 miles; formerly it extended north and south 200 miles from the Merv boundary to the northern limit of Seistan. The Russian conquest of Merv has cost Herat all its territory on the plain north of the Parapomus Mountains, and has pushed the disputed boundary to within 40 miles of the city to the north, as the Russians claim, or about twice that distance according to the English and Afghan authorities.

The city is in the form of a quadrangle, nearly a mile on each side. On the western, southern, and eastern faces the lines of defense are almost straight, and are broken only by the great gates and their defenses. The northern line is broken by two gigantic earthworks, the old citadel and the new citadel, built of sun-dried bricks. The city wall rests on the summit of a huge embankment averaging 250 feet wide at the base and fifty feet high. The wall proper which crowns this vast earthwork is 25 feet high and 14 feet thick at the base. It is surrounded by a ditch 46 feet wide and 16 feet deep, and is supported by 150 semicircular towers.

The colossal character of these earthworks leads Sir Henry Rawlinson to infer that the city, as a stronghold, must date from prehistoric times—from that period of Central Asian history which preceded the rise of the Achæmenian power, and which in Greek romance is illustrated by the names of Bacchus, Hercules, and Semiramis. Its dominant position with reference to Central Asian and Indian affairs is proved by a military history unequalled by any other city—a record of more than fifty sieges, undertaken, as Vambéry has pointed out, not so much for the sake of the rich soil which surrounds Herat, as on account of the desire for conquest with which it has inspired sometimes India, sometimes Central Asia.

The population of the city under these great vicissitudes of fortune has naturally varied greatly. In times of great prosperity and peace it has numbered a million or more; at other times it has dwindled to a few thousand; now, it is variously estimated from 25,000 to 50,000 or more. It is believed that the present city comprises only the citadel of the city that once covered the surrounding plain for many miles.

DO WE WORK TOO MUCH?

We have before us an interesting paper on "The Hygiene of the Nervous System," contributed to and reprinted from the *Alienist and Neurologist* by C. H. Hughes, M.D., of St. Louis. The belief expressed therein of a cholera visitation during the coming summer or autumn is supported by good authority, viz., the experience with former European epidemics, and the precautions suggested by the author are well advised and timely. He enumerates and describes the various physical and mental conditions which invite the infection in man and increase its virulence, among which he reckons engrossing and continuous application to business affairs. Dr. Hughes denounces a tendency he has discovered among Americans to "overwork."

He says: "The cause of much of the premature decrepitude and nerve degeneracy and breakdown of our day is in the many inventions man has devised whereby he robs himself of timely rest. The morning newspaper, often read through before breakfast; the telephone in his house to call him at any and all times aside from his repose; the electric light to keep his brain unduly stimulated through the retina; the railroad and the sleeping coach, which may keep him constantly on the rail (if he chooses to so travel) for continuous weeks without rest from the noisy and exhaustive cerebrospinal concussions of this mode of travel; hasty meals and telegrams, and business, and nightmare sleep, all commingled, wither and wreck lives innumerable, which, under wiser management, might end differently; and the needless noises of the city, the bells and steam whistles, howling hucksters, noisy street cars, yelling hoodlums, that make night hideous with soul-jarring sounds, hasten the premature endings of useful lives. And when, superadded to all this unphysiological strain, we have the assault of a pestilence that poisons, like cholera, how much exemption can such overwrought organisms expect? How much of resisting immunity can such overstrained and exhausted nerve force oppose to the invading foe?"

The question, How much resistance can an overstrained organism offer to the assault of the gruesome scourge? it is not for the lay mind, but for the medical faculty to consider. There is, however, good reason to believe that Doctor Hughes would find it impossible to prove that this "overwrought" condition is due to overwork. There are, of course, exceptional cases, but it is not with these we have to do, but with the broad assertion that we are an overworked people, and that "the cause of much of the premature decrepitude and nerve degeneracy and breakdown of our day" is begotten of overwork. Were we so bold as to express an opinion on the cause, we should say that it proceeded in great measure, if not in nearly every instance, from bad habits, from the immoderate use of liquor or other stimulants or irregular habits, or both, and in this assertion we could hope to be sustained by business and professional men of long experience, who have had the opportunity and inclination to study their business associates and employes.

Singularly enough, the Doctor, after informing us that undue excitement, anxiety, and overwork leave the system peculiarly exposed to and at the mercy of the infection, proceeds then to furnish us with evidence to disprove his own proposition. He says: "During the week of the great St. Louis fire in 1849, the ravages of cholera, which up to that event had reached a mortality of over two hundred a day out of a population of fifty thousand, almost entirely ceased, so stimulating and invigorating was the excitement of that week to the brains and nervous systems of the people, the psychical exaltation inseparable from the sudden necessity thrown upon so many business men for repairing the sudden damage and re-establishing their abruptly interrupted business."

If the Doctor is sure about this, it would seem as though active employment, both mental and physical, furnished the best protection against cholera, and that the condition of nervous excitement and overwork which he most deplores as inviting the dire malady in reality presents the most effective barrier against it.

Among the many beliefs or rather superstitions which the light of recent investigation and experience has served to dissipate, is that which attributed a continuance of good health to a saving of the vital forces by inaction. A man was supposed to have a certain amount of vitality with which, as with his bank account, he could be saving or prodigal. Goldsmith, who besides being a poet was a doctor of medicine, and attended lectures in England, France, and Germany, only reflected the general belief in the doctrine when he tells us that he had hopes by a life of ease,

"To husband out life's taper to the close,  
And keep the flame from wasting by repose."

His contemporary, Dr. Johnson, too, believed that the seven years of unceasing labor that he gave to his dictionary would shorten his life. There is reason to believe, however, that a life of ease would have hastened rather than postponed the demise of the former, and that Johnson's physical ailments would long before have proved unsupportable without the unremitting toil of which he so bitterly complains.

The medical practitioner to-day advises exercise and fresh air where formerly he prescribed jalap, bleeding, and attenuations of aconite and belladonna, and the remedies of nature have been discovered to be more potent in the preservation of the health than any of the agents to be found in the pharmacopœia.

Nature, we have learned, is a careful economist who permits only those faculties or muscles to develop which are used; and as every faculty and muscle has a use, it follows that that condition is nearest perfect where all are employed, and, *per contra*, that inactivity leads to decay.

We hear much of the evils of "overwork," but see little of them in fact. Who has not seen those supposed to be overworked, who, in fact, never seem to be rid of their labors, grow stronger rather than weaker, the pallor begotten of inactivity succeeded by the glow of health, and the eye sparkle with fresh life?

Hard work hurts no one; it would not, perhaps, be saying too much to assert that those who have lived what are called "busy" lives have kept the vital spark longest aglow. In a little house in Beach Street, this city, we find John Ericsson, in his eighty-third year, studying from sunrise to sunset. Humboldt, who slept but little and worked incessantly, lived to 90, Newton to 85, Faraday and Agassiz to about 70. In France, M. Chevreul, the celebrated scientist, now in his ninety-ninth year, is still vigorous; and in England that eminent and honored philanthropist, Sir Moses Montefiore, an ever-busy workman, is still engaged in charitable schemes, though a century has passed over his head.

In Sailors' Snug Harbor, on Staten Island, there are more than 800 men, most of them aged, to whose careers of toil have been added the experiences and dangers incident to a seafaring life.

It is curious, indeed, to note how much those who have led active lives are capable of at that period when we are inclined to regard them as aged.

Though surrounded by a myriad of warriors, the great Agamemnon calls out regretfully to the aged Nestor on the field: "Ah, how I wish that thy stout heart were but supported by as firm a knee!" and the valiant Nestor responds:

"Yet, ancient as I am, I will be seen,  
Still mingling with the charioteers,  
Still prompt to give them counsel."

#### Various Forms of Tracing Paper.

A recent invention has for its object the rendering more or less transparent of paper used for writing or drawing, either with ink, pencil, or crayon, and also to give the paper such a surface that such writing or drawing may be completely removed by washing, without in any way injuring the paper. The object of making the paper transparent is that when used in schools the scholars can trace the copy, and thus become proficient in the formation of letters without the explanations usually necessary; and it may also be used in any place where tracings may be required, as by laying the paper over the object to be copied it can plainly be seen. Writing paper is used by preference, its preparation consisting in first saturating it with benzine and then immediately coating the paper with a suitable rapidly drying varnish before the benzine can evaporate. The application of varnish is by preference made by plunging the papers into a bath of it, but it may be applied with a brush or sponge. The varnish is prepared of the following ingredients: Boiled bleached linseed oil, 20 lb.; lead shavings, 1 lb.; oxide of zinc, 5 lb.; Venetian turpentine, ½ lb.; mix, and boil 5 hours. After cooling strain, and add 5 lb. white copal, 6½ lb. sandarac.

The following is a capital method of preparing tracing paper for architectural or engineering tracings: Take common tissue or cap paper any size of sheet; lay each sheet on a flat surface and sponge over (one side) with the following, taking care not to miss any part of the surface: Canadian balsam 2 pints, spirits of turpentine 3 pints, to which add a few drops of old nut oil; a sponge is the best instrument for applying the mixture, which should be used warm. As each sheet is prepared it should be hung up to dry over two cords stretched tightly and parallel, about 8 in. apart to prevent the lower edges of the paper from coming in contact. As soon as dry, the sheets should be carefully rolled on straight and smooth rollers covered with paper, about 2 in. in diameter. The sheets will be dry when no stickiness can be felt. A little practice will enable any one to make good tracing paper in this way at a moderate rate. The composition gives substance to the tissue paper.

You may make paper sufficiently transparent for tracing by saturating it with spirits of turpentine or benzoline. As long as the paper continues to be moistened with either of these, you can carry on your tracing; when the spirit has evaporated, the paper will be opaque. Ink or water colors may be used on the surface without running.

A convenient method for rendering ordinary drawing paper transparent for the purpose of making tracings and of removing its transparency, so as to restore its former appearance when the drawing is completed, has been invented by M. Puschers. It consists in dissolving a given quantity of castor oil in one, two, or three

volumes of absolute alcohol, according to the thickness of the paper, and applying it by means of a sponge. The alcohol evaporates in a few minutes, and the tracing paper is dry and ready for immediate use. The drawing or tracing can be made either with lead pencil or India ink, and the oil removed from the paper by immersing it in absolute alcohol, thus restoring its original opacity. The alcohol employed in removing the first oil is of course preserved for diluting the oil used in preparing the next sheet.

Put ¼ oz. gum mastic into a bottle holding 6 oz. best spirits of turpentine, shaking it up day by day; when thoroughly dissolved, it is ready for use. It can be made thinner at any time by adding more turps. Then take some sheets of the best quality tissue paper, open them, and apply the mixture with a broad brush. Hang up to dry.

Carbon tracing paper is prepared by rubbing into a tissue a mixture of 6 parts lard, 1 of beeswax, and sufficient fine lamp black to give it a good color. The mixture should be warm, and not be applied in excess.

Saturate ordinary writing paper with petroleum and wipe the surface dry.

Lay a sheet of fine white wove tissue paper on a clean board, brush it softly on both sides with a solution of beeswax in spirits of turpentine (say about ½ oz. in half pint), and hang up to dry for a few days out of the dust.

#### Dissolving Rubber.

The solution of India rubber or gutta-percha in chloroform or benzole, frequently called for in photographic work, is usually attended with so many difficulties and drawbacks that, in nine cases out of ten, says the *British Journal of Photography*, where the solution is required the experimentalist usually purchases it ready made. Yet there need be no difficulty about the matter. First, pure rubber should be obtained—when vulcanized, it is perfectly insoluble. Secondly, pure solvents are necessary; chloroform containing a large excess of alcohol and water will fail to act even upon the purest rubber. Again, under the most satisfactory conditions, the action is very slow, and the amount of rubber capable of being taken up is proportionately very small. The plan usually adopted is to place a large amount of shredded rubber in a bottle, which is then filled up with the solvent, and shaken at intervals a few times; and when the shreds do not dissolve like pieces of sugar the whole is thrown aside, and we are written to for an explanation of the failure. If a small quantity of rubber had been placed in the bottle, and the liquid added, it would have been observed gradually to swell out very considerably after the lapse of some time, and a mixture of the whole would be facilitated by stirring with a glass rod or a splinter of wood. The rapidity with which the rubber absorbs the solvent will depend upon its condition; but the action is never very quick, nor is it in any way analogous to the dissolution of a crystal.

One cause of the failure of chloroform to act upon the caoutchouc may arise from the presence of alcohol in too great a proportion. Chloroform as sold almost always contains alcohol in small quantity, owing to the fact that when none is present it cannot be prevented from decomposing spontaneously, more especially in the light. It is, however, stated that when entirely protected from light absolute chloroform will not undergo any change.

A solution of gutta-percha in chloroform has a use which is not generally known. It forms when carefully made, and filtered quite bright, the best possible material for obscuring glass for focusing screens. For fine microscopic work it is said by those whose opinions are of weight to be unequaled.

#### A King's Workshop.

In a letter recently received from Burmah a characteristic sketch is given in illustration of the state of the country under its present ruler, in which it is stated that at Sagine there is what is called the king's workshop, which was erected at the instance of the last ruler at an enormous expense, his idea being to build steamers for his own and the country's use. The ship-building yard is at Mandalay, and the place at Sagine was designed as a foundry, in which cast and wrought iron was to be treated. Two large furnaces, fifteen boilers, three furnaces for cast iron, seven large engines, five rolling mills for bar iron, and a quantity of other machinery (including a large steam hammer, lathes, punching and shearing machines, and stone and ore crushers) have been put down. All that is required is to start the fires and raise steam; yet this valuable property is meantime overgrown with the products of the soil. The large steam hammer is twined round with beautiful crimson creepers; from out of one of the furnaces grows a large prickly cactus; the rolling mills are shaded with large tree ferns. The machinery, however, is not rusted, though nearly ten years have elapsed since the last king died. The works were suspended at his death, and the present king will neither spend more money on the undertaking nor sell it to others.—*Iron*.

#### Resuscitating Fish.

Mr. W. O. Chambers, secretary of the National Fish Culture Association, of London, conducted lately an interesting experiment in resuscitating fish by the use of brandy, before a number of gentlemen at South Kensington:

"Taking two Prussian carp from the tanks of the aquarium, he deposited them in separate dry cans, adorning one with blue ribbon to denote its enforced temperance principles and to distinguish it from the other, which was selected for the administration of spirituous liquors. After a lapse of four hours the fish were placed in water, evident signs of expiration being apparent in both cases. A small quantity of brandy and water was then given to the carp selected for the imbibition of intoxicating liquors, through the medium of a feather, and no sooner was the fish replaced in water than it assumed its normal condition, and seemed to be restored to vigor and strength. The carp enlisted under the banner of the 'blue ribbon league' to all appearances died half an hour after its more fortunate associate, and was taken out of the water and thrown on the ground. About four hours later, however, the fish was picked up by Mr. Chambers, who observed it by appearance to be *in rigor mortis*. He then at once operated on the seemingly inanimate fish by opening its mouth and pouring a dose of brandy and water down its throat, and again inserting it in the water, when, to his utter astonishment, he noticed slight signs of animation. For five minutes the unfortunate object of the experiment floated helplessly on its side, when presently, to the still greater astonishment of the secretary and those who watched the experiment, it gradually asserted itself in the water, and with considerable effort made use of its fins—feebly at first, but afterward energetically. Both the resuscitated fishes, which show no signs of their late prostration, now swim about with their *confreres* in the tanks as usual.

"The instantaneous reanimation produced in the carp in the first instance was indeed remarkable; but what can be said of the latter, which recovered after remaining out of the water for eight hours? Surely this discovery will prove of the greatest utility and value in restoring fish that would otherwise perish, and be the means of securing greater longevity among them.

"Experiments in relation to brandy as a means of restoring suspended animation with quick dying fish resulted equally as satisfactory. It was highly interesting to see the plucky manner in which a trout (*S. ferax*) battled with his fainting condition and came out the conqueror. Strange to say, the salmon (*S. salar*) did not once attempt to rouse himself after being dosed, the consequences being fatal to him; this was the only fish that succumbed under the treatment. The dace (*Leuciscus vulgaris*) was out of water three times of five minutes each. He was exceedingly faint and almost dead; but immediately after the brandy was given, he pulled himself together, and in the course of a few minutes not only recovered, but darted round the can with a rapidity positively amazing."

#### Compounds Formed by Chlorophyl.

Chlorophyl when isolated is very soluble in alcohol as well as in benzol or in petroleum ether. Leaves, either fresh or dried, however, do not give off their chlorophyl to petroleum ether, but merely a mixture of yellow or colorless matters. Hence it seems that the chlorophyl is contained in envelopes insoluble in petroleum ether, but soluble in alcohol. The deep green alcohol extract of dried and powdered leaves, if refrigerated, yields an abundant deposit of yellowish or colorless matter insoluble in petroleum ether. Chlorophyl is very unstable in presence of dilute acids, or even of pure water. It is very stable in presence of bases, behaving like a true acid. Hence M. Fremy gave the name of phylloeyanic acid to the green matter of leaves when freed from the accompanying yellow matters. With bases it forms definite salts; those of potassium and sodium being very soluble in water, but insoluble in absolute alcohol and in petroleum ether. The lead salt is insoluble. Chlorophyl may be found unchanged in the excretions of herbivorous animals, and even in peat.

#### The Telephone in Paris.

There has just been introduced in Paris a new system of telephone communication. The company issue tickets at five cents each. These tickets may be presented at any of the Paris post offices, and entitle the owner to hold five minutes' conversation with persons in any other post office or at any of the Telephone Company's stations. The Telephone Company offers, at the same rate, conversations at any of their eleven stations with persons at any other station or at the residence of any of their subscribers. For securing prompt medical assistance in cases of accident in the public streets, telephonic communication between the druggists and the hospitals in various quarters of the city is about to be established. By this means the nature of the accident and of the remedies or assistance required for its relief can at once be indicated.