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THE EFFECT OF PATENTS IN THE DEVELOPMENT OF THE GAS INDUSTRY.

Some weeks ago, an article on the present status of the gas industry in America appeared in this journal. After reviewing the changes that have taken place, and improvements that have been made during the recollection of the younger gas engineers, the natural conclusion was reached that much of this advance was due to inventors, encouraged in their work by the protection of the patent laws. This belief was predicated on several facts, in great measure on the numerous gas process and apparatus patents taken out every year. Since the article in question appeared, our position has been attacked by the London *Journal of Gas Lighting*. It thus states our review of improvements: "The progress in gas making is summarized as consisting of an advance from a production of from 9,300 to 9,600 cubic feet of gas per ton of coal, when carbonized in 20 inch retorts, yielding from 5,500 to 6,000 cubic feet per day, to a yield per ton of 12,000 cubic feet and a double duty from the retorts, which are stated to be sometimes 36 inches wide, and worked at a high heat by means of generator furnaces." Apparently, our contemporary disputes these statements, but as we presumably know more about American gas engineering we prefer to let the statement speak for itself. What we are most concerned about are the statements that follow, to the effect that patents have little or nothing to do with this progress. Our contemporary in words challenges us "to show the patents under which the progress already mentioned can be realized." This of course we cannot do, as we do not propose to advertise patents or processes here.

In speaking of a 12,000 cubic foot ton and retort yield, our reference was more particularly to the Providence, R. I., gas works. There, under the management of one of our most accomplished gas engineers, these results, in round numbers, were reached with patent retorts. So much for patents as affecting retorts. To show what patents have to do with the other parts of works, we may now review an ordinary American gas works. The retorts will be fitted with self-sealing lids, patented, that do away with the old luting and loose cutterbar. The next point in the manufacture is to preserve a steady vacuum on the hydraulic main. To secure this end, overflow tar valves, engine gas governors, and engine steam governors, all patented, patent smooth running exhausters, with patent compensators, will be found simultaneously in use in many or almost all coal gas works. Condensers and washers of different types and friction scrubbers come next, each probably patented or perhaps the subject of several patents. Then come purifiers, whose lids are raised, perhaps, by patent traveling cranes and whose contents are sustained on patent grids. The station meter may embody several patents. The holders are next reached. There little progress has been made. Gas holders in this country are the same to-day as they were ten years ago, and accordingly we find that they have not been favorite subjects of the inventor's art. There are few patents connected with holders. Hence comes the lack of improvement in them. Finally, to finish our review of gas works, the outlet governor, controlled, perhaps, by an automatic pressure changer, must be noted, both of which, if of an approved type, are certain to be subjects of patent right. The course of the gas through the works is regulated by patent gas valves and center seal. On the most moderate estimate, from ten patented structures upward will be found in use in the most primitive coal gas works.

If we go a step further into a more advanced type of works, we find many more patented structures in use; patent generator furnaces, patent tar burners, and patent testing apparatus, for determining the quality of the gas. The water used for scrubbing is accurately measured by patent water meters. The profession in this country has to render tribute to England for many of these advances, notably in condensing, washing, and purifying processes, all patented. The gas engineers of our contemporary's country are as quick as those of our own land to patent everything.

It seems idle to say that patents have had nothing to do with the advancement of the gas industry in this country, after the above showing. For every device named above, many representative names of patentees could be given, were it not out of place here.

To leave coal gas and enter the realm of water gas, we find more emphatic testimony on our side. Out of some six thousand millions of cubic feet of gas made per annum in this city, over half is made by patent water gas processes.

In examining English gas engineering, the same thing is found to prevail there. Paper after paper has been read at their engineers' meeetings on the coal liming process—patented. The most advanced attempt at purification by ammoniacal liquor, on which a very interesting paper was read at the recent meeting of the Gas Institute, and which was duly reported by our patent-hating contemporary, is patented. Reviewing the advertising columns of our contemporary, we find innumerable patents advertised, all more or less connected with the gas industry. Can any one assert that all the necessary expense incurred in perfecting these inventions would have been incurred without hope of reward?

Furthermore, it must be stated that in our hasty summary we have given nothing like a full catalogue of devices, the subject of patents, actually in use today. Leaving the gas works, we find gas burned in improved patented burners, that, compared with the unpatented rat tail burner of the past generation, give, on a moderate estimate, ten to fifteen times the light per unit of gas. To compete with the electric light a cheapening of light was necessary, and immediately patent regenerative burners appeared that multiply the light given by the best of the burners of five years ago, two and three fold. This was within the last five years. We repeat that the inventor's record in the gas industry is an honorable one, and that the progress of the last fifteen years owes everything to him.

The literature of gas engineering, at least in the case of our esteemed contemporary, seems deeply concerned in patents. Of its forty-eight pages, no less than twenty-six are filled with advertisements, for the most part of patented articles or mechanisms more or less pertaining to the gas industry. For example, a full page is devoted to advertising a patent scrubber, another a patent regenerative gas burner, another a patent retort drawing and charging machine, and so on. In attacking patentees, it carefully distinguishes between business and sentiment, accepting all the advertising patronage it can get from "the host of Yankee" as well as English "patentees" that it so slightingly speaks of. To one conversant with the cost of publication, it is clear that the London *Journal of Gas Lighting* derives its bread and butter almost wholly from patents. With its limited circulation, and appearing weekly, it could not be sustained without the aid of the advertising gas patentees, whom it insults by telling them that their patents are a drag upon real industrial progress and that their efforts have in no recognizable manner assisted the progress of gas making.

In all that we have ever said in our columns on the utility and beneficent effect of the patent laws, we are sustained by the words and practice of the best jurists both of this country and England. In the recent revision of the patent laws of Great Britain, we have found another confirmation of our views. Thus supported, we may with propriety consider our opinions well sustained and just.

THE TILDEN TRUST.

The late Samuel J. Tilden began his professional career in the law. Owing to his aptitude for business calculations of the most intricate class, he acquired fame as a corporation lawyer. Gradually assuming importance in politics, he was elected to Congress, then chosen as Governor of the State of New York, and subsequently nominated for the Presidency. Since that last exciting period he has lived to a great extent in retirement, and little has been heard of him in later years, except where he was referred to as the Nestor of the political party to which he had always belonged. He had retired on his fortune, and was only a power in the sense of being the adviser of acting politicians. When he died, it was to be supposed that he would, to a great extent, disappear from memory, except as one of the presidential candidates of 1876. No reputation is so evanescent as that of the lawyer and politician. Both of them are, as a rule, concerned with issues of the day, whose interest soon dies out. Any such anticipation of oblivion for Mr. Tilden has been done away with. By his will he has placed his name by the side of those of Astor, Lenox, Ottendorfer, Peabody, Vassar, and Holloway.

The composition of the will, that will do much for his reputation with posterity, and that has already lifted him from the level of the successful politician and business man to the pre-eminence of the philanthropist, presumably occupied much of his time during the last two years of his life. In it he provides for the management of immense residuary legacies, to be devoted to benevolent objects. New Lebanon, N. Y., his birthplace, Yonkers and New York, his residences, are chosen as the recipients.

For New Lebanon, one hundred thousand dollars is authorized as foundation for a free library and reading room, and, if possible, for a school for the education of girls. The latter provision shows an appreciation of the tendency of the day.

For Yonkers, the city where he died, the expenditure of the sum of fifty thousand dollars is authorized for the establishment of a free library and reading room.

But for this city the great donation is reserved, to be known as the Tilden Trust. It is to be devoted to the establishment and maintenance of a free library and reading room in New York, and for other scientific and educational objects. The amount of this legacy will be very great, probably four millions of dollars and over.

This bequest is destined to exercise an important in-

fluence on the city. It will tend to make New York one of the library cities of the world. The Lenox collection of Shakespearean and other special classes, the Astor general collection, may all be eclipsed, and the city's literary wealth more than duplicated. Taking four millions as the probable amount of the trust, it will be found that few institutions in this country surpass it.

A wise disposition of the Tilden Trust may create a new scientific and literary life and reputation for New York, and cause its scientific status to rise to a level with its commercial importance.

THE ART OF PITCHING IN BASEBALL.

In answer to our invitation of July 31, we have received a large number of communications discussing the problem of horizontal curve pitching in baseball. We take this opportunity of thanking the writers, and assure them that their letters have received careful attention, though we are unable to publish more than a small number, on account of our limited space.

From an examination of the almost unanimous testimony thus submitted, and from an independent consideration of the problem on its own merits, it appears the horizontal curve is in the same direction that the ball is rotating, and not in a contrary direction, as first stated by our contributor, Mr. Chadwick, in the original article. Consequently, the ball represented in cut A, SCIENTIFIC AMERICAN, July 31, will describe a curve away from the retarded side instead of toward it, or, in baseball parlance, will be an *out* in place of an *in* curve. The diagrams showing the method of giving a rotary motion to the ball have been indorsed by well-known players, and will prove helpful, we think, to those who are trying to master the art of curve pitching.

GOOD AND BAD TAXIDERMAL ART.

From the student of natural science down to the sportsman who looks in at a museum, and tries to identify the curlew he knows so well in the field among the stuffed specimens bearing the same name, there is general, and it may be said just, complaint against the taxidermist. If a skin is to be stuffed according to the amount of cotton or hemp it is capable of holding, and mounted after the taste and fancy of the operator, then the representation of live forms must depend, not upon the natural shape, dimensions, and pose of the original, but upon the condition of elasticity the skin happens to be in when it is treated.

Artemus Ward, in his "Moral Show of Wax Figgers," put the placard, "This is a horse," under a figure resembling the beast, and was wont to explain that he knew it was a horse because the man that made it told him that was what he intended it for.

Stuffed specimens in museums often require similar guarantees, because to those familiar with the species they represent there is little to identify them with their originals.

For the purpose of distinguishing the skillful and conscientious workman from the mere bungler, and raising the art of taxidermy to the place it ought to have among the natural sciences, the American Society of Taxidermists was formed, several years ago. The influence of this admirable society may already be seen in the nicer discrimination evinced by museums and collectors in selecting their specimens. It is no longer a question of how much work a man can do in a day in the taxidermist's shop, but rather of the character of his work; and he who can stuff a pheasant or a starling and preserve its proper dimensions, attitude, and expression, can obtain a greater reward than he who has stuffed three pet cats and four canary birds in the same period of time, without care as to their scientific configuration.

It should, however, be said for the ordinary taxidermist, that he labors under serious disadvantages. The sportsman sends him the skin of a tufted grouse, a sandhill crane, or the like, without supplying the dimensions, which should invariably be taken in the field, when the body is warm, and, as he is not a student of natural science, he models by guesswork. Perhaps he tries to work up to a picture of the bird, and this picture being after a poorly stuffed specimen, as nine-tenths of these pictures are, only serves to mislead him. The skillful taxidermist maintains, and with reason be it said, that only the student of live forms should essay to stuff their skins, else he cannot hope to catch their expressions and reproduce their lines and attitudes.

The Museum of Natural History, in the New York Central Park, like other museums, contains both good and bad taxidermal work. Some of the untrustworthy work was once good, like the Maximilian de Nerwiede collection, but has deteriorated with age, while another portion is presumably bad because the taxidermal work was done by those unfamiliar with the subjects in the live state. The new monkey collection furnishes good circumstantial evidence of this. Some of the specimens are very rare, and their habits and general appearance are little known. The skins are collected by agents of the Rochester dealer, who has contracted to furnish the collection. They are stuffed in whatever the taxidermist supposes to be the real forms of the animals. Naturally enough, he will guess it wrong ninety-nine times out of a hundred, and on the hundredth be four-fifths out of the way.

It is invariably the case that when a rare specimen is finally captured alive, and confronted with his counterfeit presentment, the two seem not in anywise related.

Quite recently a live monkey was brought hither from the upper waters of the Amazon, and offered for sale to the Park Commissioners. It was a rare specimen, none of its kind having been here before—scarlet-faced, yellow-headed white-backed, short-tailed—and several students of natural science got out their text books and compared descriptions and pictures with the original. According to all these, *the live specimen was altogether wrong in design.* He ought to have been fat and dumpy—a sort of hedgehog with heavy furring and short legs.

In order to avoid this sort of thing as much as possible, the directors of the Museum of Natural History have taken great pains with its taxidermal department, employing only skillful men, who are, at the same time, students. They know the specimens they handle, their habits, measurements, and contours. As a result of this, all the recent work, especially that on the collection of North American birds, is as nearly accurate as is possible when man attempts to imitate nature. Still further efforts are being made just now to furnish these criteria for the investigation of the student and the comparison and information of all others interested in this department of natural science.

PHOTOGRAPHIC NOTES.

Advantages of Centrifugal Action in the Making of Gelatino-Bromide Silver Emulsions.—Upon this subject Mr. A. L. Henderson, of London, recently spoke before the Glasgow Photographic Association as follows, which we take from the *British Journal of Photography:*

The advantages of using centrifugal action for the removal of impurities from emulsion will almost necessitate my referring to the whole operations of emulsion making. Gelatine, as we know, is a very variable substance, no two batches being alike either in purity or hardness, and success depends on the perfection and uniformity of the materials employed, as well as the manner in which they are used. Nothing has yet been discovered that has such a powerful restraining action as gelatine; half a grain per ounce of emulsion will give a finer precipitate of bromide of silver than any saturated mucilaginous solution, and I confess my inability to account for this. I, for one, will hail with pleasure any substance that will not combine with the gelatine in forming a gelatinate or phosphate, or, perhaps, both. It has commonly been believed that the complete removal of the colloid emulsified, and with a renewal of fresh, pure gelatine, all fogging would be prevented. The separator which I have pleasure in showing you to night will do a great deal to substantiate this common belief, but it will not cure all diseases in emulsion. The most formidable that it will not remove is one that has been affected by light. Green fog and gray fog will be removable, the former entirely, if the centrifugal action is not carried too far, *i. e.*, for complete separation. Green fog is a silver compound, and I think I can prove this. If I submit the green fog to the action of the fumes of hydrocyanic acid, it is removed; if I emulsify with ten grains of gelatine, I get ten times more green fog than if I employed one grain. Green fog being a finer precipitate of silver, it is not so readily amenable to removal by centrifugal action. It may be argued, Why not always use one grain? Well, the answer is very simple: the more gelatine I use, the finer the precipitate, and, as a rule, the slower or less sensitive is the emulsion, but it is quite possible, by the addition of other restraining substances, to greatly assist the small quantity of gelatine to do the work. For instance, acetates, citrates, or, in fact, almost any neutral salt, added to the gelatine or silver, will act, and the result is, not only do we get a finer crystalline form of bromide of silver, but the form is a more sensitive one. Mr. A. Haddon was the first to point out that rapidity depended on the form of crystal. He observed that when a few molecules of silver bromide were placed under a microscope, and heat applied, the crystals rapidly passed from one shape into another, the larger ones absorbing the smaller. I would like to say a little about the purity of the silver and bromide. I have frequently found minute quantities of sulphates therein (a prolific source of pinholes in the negatives). I cure these by the addition of a few drops of a saturated solution of nitrate of baryta, allowing the solutions to stand before filtration. Supposing all the materials were fairly pure, and the emulsion has been made and ripened by any of the well-known methods, another uncertainty is introduced, namely, in washing the emulsion in order to free it from all soluble matter, that the water employed for this cleansing process is not always pure, and by removing one evil we are introducing another, and more particularly decomposing the gelatine, not considering the disadvantage of an ever-varying quantity. By the use of a separator nearly all these difficulties are avoided. Mr. Plener, I think, we have to thank for the idea of suggesting centrifugal action in emulsion making. Mr. Plener, doubtless in ignorance of a previous patent, took out one. To sum up, in a few words, the principal advantages to emulsion makers of this process are: 1. Complete removal of all the salts in an exceedingly short time. 2. That the bulk of emulsion need never vary. 3. That the bulk of gelatine may be melted and filtered before adding to the bromide. 4. That emulsion may be made in weather such as we have had lately with great ease. Most makers suspend operations when the temperature gets near the eighties. 5. That emulsion may be made and in the coater's hands within a few minutes. 6. That the quality is much better. 7. Last, if not least, great economy. Saving of twenty-five to fifty per cent. One firm to whom I have supplied a separator is now saving £40 a month in alcohol.

Drop Shutters.—We have found by blackening the back of the shutter slide with plumbago, such as is used in lead pencils, the slide works perfectly free. The plumbago appears to answer the two-fold purpose of a lubricant and blackening medium.

Abyssinian Economic Productions.

Among the vegetable articles of diet of the Abyssinians, the first place is taken by *teff* (*Poa abyssinica*), a herbaceous plant, whose grains are as small as a pin's head; the meal from this forms the bread in general use. A much inferior black bread used by the poor is made from a kind of millet called *tocusso* (*Eleusine tocusso*), frequenting the low grounds. In addition, the roasted seed of the flax plant (*Linum usitatissimum*) is sometimes eaten, as it was by the ancient Romans and Greeks. Another admired vegetable is the flower stalk of the local plantain, called *ensete* (*Musa ensete*), the fruit of which is dry and unfit for eating. The stem is cooked with milk and butter. It is cut off just above the rootlets, and about two feet high. If old, the green outer coat is peeled off till the white interior shows. It is as tender as a well cooked turnip, with a flavor like the best new bread somewhat underdone. It is an excellent dish, nourishing, wholesome, and digestible. From meal cakes a fermented drink called *bousa* is made.

The coffee grown in Abyssinia is principally sent to Djedda and Upper Egypt; though not of first rate quality, it possesses a special aroma, and is sold at the rate of $16 per *cantaro* of 113 *rottoli* (say 37s. per cwt.).

The women of Gurage make mats of the leaves of the *ensete*. The *ecca* of the Abyssinians, a species of asclepiad, produces a tough fiber, used in making cordage and tissues on the Red Sea littoral. The bark of *Calotropis gigantea* affords excellent fiber, used for various purposes. The tender leaves newly pulled from the stipa of the *doum* palm are woven into all kinds of matting and basket ware. The powdered seed of a large tree called *berebera* (*Milettia ferruginea*) is thrown into the water to stupefy fish and facilitate their capture. The native dress consists of a large folding mantle and close-fitting drawers. The houses are rude conical structures, covered with thatch.

Among the local products figuring in the exports are: Calves' hides, salted and sun dried; beeswax, chiefly from Gedaref; ivory, tamarinds, ostrich feathers, gutta percha, from Kassala; gum arabic, mother-of-pearl, leopard skins, about 1,000 annually to India; musk, contained in bulls' horns, to the number of 200 to 300 a year; honey, and tobacco, chiefly from Sanaaid.

Kauri Gum as a Medicinal Substance.

Many years ago Dr. Hammond, of Bournemouth, presented me with a fine specimen of kauri gum, which one of his sons had brought from Auckland, in New Zealand. In experimenting with the gum thus supplied, I have found that it may be made to perform many useful services in medicine. When the gum is burned—and it burns briskly—it gives out a very pleasant odor which destroys the odor of putrefying organic substances most effectively. Dissolved in spirit, it makes a fluid which burns in the lamp with good effect. Reduced to a fine powder and shaken with water, it communicates to the water new properties, so that, sprayed in a room, it renders the air ozonic. It mixes well with ointments, forms a good combination with soap, and, combined with iodine, is a useful deodorizer and disinfectant. The gum is from a pine, the kauri tree, *Dammara australis.—The Asclepiad.*

Large Planing Machine.

Messrs. Killock & Galbraith, engineers, Glasgow, are at present constructing a planing machine, to the order of Messrs. William Arrol & Co., the eminent contractors of the same city, which is said to be the largest of the kind ever made. When finished, this machine will weigh 35 tons, and it is to be capable of planing the edge of a plate of 38 ft. in length by 5 ft. wide. It is specially intended to be employed in connection with the preparation of steel plates for the girders of a railway bridge which is about to be erected across a river in New South Wales.