["OLD AND NEW."]

DENTISTRY IN THE UNITED STATES.

NUMBER 4.

INSTRUMENTS USED BY DENTISTS.

These are classed by the profession into extracting, plugging, excavating, and scaling instruments. It is impossible to give an accurate statement of the number of different forms used of all these; but the dental catalogues of the present day will show over ninety different patterns of forceps alone—an instrument used only for extracting teeth. There are, besides, five different forms of turnkeys, and eighteen different forms of screws, punches, and elevators. All these hundred and thirteen instruments are used solely for extracting teeth and stumps, or roots, of teeth. As a fully furnished mouth contains thirty-two teeth, arithmetic will show that there are just $3\frac{1}{32}$ kinds of these instruments to each tooth. This proportion, however, becomes quite insignificant when compared to the number of plugging instruments. Of these, according to the catalogues and to my own knowledge, there are over four hundred varieties in respect to size and to shape of point, all used to consolidate the material with which the cavities in the teeth are filled. The patterns of excavators, burrs, and drills, used to clean out these cavities before filling, will number over three hundred and twenty-five; and one hundred and eighty different patterns and sizes are used of chisels, gouges, and scalers, used to remove tartar from the surface of the teeth, or for cutting down the walls of cavities before using the excavators. This grand total of one thousand one hundred and eighteen differently shaped instruments sums up the class of standard patterns regularly sold by the dealer to the operator. As though this were not variety enough, it is made still greater by putting all these instruments, except the forceps, in handles of different kinds and sizes. The finer ones are of pearl, agate, and cameo; the second class of ivory, ebony, buffalo horn, walrus tooth, and bleached bones; and the cheapest, of steel file-cut, steel octagon, taper steel, and plain steel finish. This makes twelve styles of handles. Of each there are several sizes; those most commonly used being quarter inch, half inch, five eighths, and seven eighths. These forty-eight different sizes and styles, of course, make the total number, in a complete assortment of plugging instruments, fifty-three thousand, six hundred and sixty four, which the dealer must keep on hand, at only one of each. As, however, he must have in stock several gross of some of them, that total gives a very inadequate idea of the capital invested in the stock of a first class dealer.

To give the names of these different instruments would require, at least, twenty octavo pages closely printed. The specification would begin somewhat thus:

First, extracting instruments, divided into forceps, turn keys, and stump instruments. The forceps are subdivided into lower central, lower lateral, lower canine, right lower bicuspid, left lower bicuspid, right lower molar, left lower molar, right lower wisdom, left lower wisdom; then the same over again, substituting upper for lower; also various shapes of alveolar forceps, splitting forceps, screw forceps, cow horn forceps (named from a peculiarity in their shape), bayonet forceps, separating forceps, fragment forceps, wedge-cutting forceps, and so on. (N. B —These are the names of a part only.) The turnkeys have each a particular name, and so have the stump instruments. The pluggers are subdivided into hand, mallet, and automatic pluggers, and each of these heads is subdivided. The burnishers, by the way, are always classified with the pluggers. As the names indicate, the hand pluggers are used to condense the filling by manual pressure; the mallet pluggers, by striking them with a small mallet, some dentists using a leaden one, because its blow is "soft," while the majority prefer lignum vitæ. The automatic plugger has a hollow handle and a spring inside with a small catch: the head has a solid piece set in; and, when the point is pressed against the filling, the shaft recedes into the handle a fraction of an inch, pressing against the spring, which, slipping off the catch, allows the handle head to come suddenly down upon the butt of the shaft, which thus receives a blow like that given by the mallet. Other automatic instruments have an arrangement inside for striking with a drop weight, somewhat as in a pile driver. The names of the excavating instruments are too numerous to give; there are hoes, hatchets, spades, rights, lefts, etc., hooks, wedges, and spears. The burrs are cone, cocked hat, flat head, bevel edge, round, spoon bill, etc. The drills are square, twisted, bevel point, Scranton, etc. In like manner, the scalers and chisels have their separate descriptive names. Then there are a number of miscellaneous instruments, which could not be classified under any of the above heads: nerve and abscess instruments; gold, silver, rubber, and glass syringes; saliva pumps; napkin, check, and tongue holders; lip protectors, and a variety of others, all used solely in repairing the natural teeth.

The manufactures of dental materials, knowing what instruments are most generally used, have contrived various neat patterns of cases for holding them, and will furnish a case with the most useful operating instruments, complete, at prices varying from seventy-five dollars to twelve hundred and fifty dollars. More expensive ones can be had if required. The dentists of the Eastern division of the States prefer using what are termed the loose instruments, for they believe more in fact than fancy; and they find it economical, if the point of an instrument break, to be able to fit another at once into the same handle. An Eastern dentist will probably be satisfied with an operating kit costing fifty dollars—this means of instruments, only for repairing the natural teeth—while the dentist of the Western division will not be contented unless he has a two hundred and fifty dollar case of instruments to start with. This he keeps to show to his patients, the majority of whom will judge of his professional ability by the amount and quality of his outfit. He is shrewd enough, however, both to use this as a plaster to draw custom, and to use "loose instruments" to operate with. More sad is the case of the beginner in the Southern division. He must not only have his fine outfit for show, but must use it to cover up some of the blunders of his inexperience. The quality and style of an operator's instruments are no criterion of his ability; for I have known dentists, who, with a chamois skin roll-up case, with seven pairs of forceps, one turnkey, four stump instruments, and a gum lancet, were ready to extract any tooth that was ready to be extracted, and to do it neatly, quickly, and successfully. During the civil war, the United States Government furnished its military surgeons with this kind of outfit; and no complaint was made about it, although cause enough might have been found. There was not a sufficient variety of tools; and, as they were made of that inferior steel called German steel, they had to be heavy or clumsy in order to bear the strain put on them. Nor would the price paid by the government allow of their being polished as highly as is required both for the looks and for the preservation of instruments.

Over two hundred dozen of these cases were made by one manufacturer in New York city; and those which were rejected by the inspectors were purchased by private practitioners at fair prices, which shows what materials some dentists will use. The richest outfits of dental instruments, as a general rule, are sold for foreign service. I call to mind two dental cases, one costing $1,800, the other $1,500. The former was made expressly for an employee of the Chilian Government. He was not engaged in a dental capacity, but as an engineer, having, with several others, to make a map of that country. Notwithstanding the high position he held, he could not forego the pleasure he derived from his original profession of dentistry, which he had practised in the Eastern states before going South. The case ordered and accepted by him has never been excelled; the extracting instruments being all octagon-shaped and plated, the others having, some agate handles, others pearl set with garnets and rubies, all with coin gold ferrules. The case was rosewood with silver corners, and plate inlaid. It was on exhibition at the manufacturers', in New York, several days before shipment, and was seen by hundreds. The other was for a young man who borrowed enough to pay for a handsome outfit, and went to Havana, Cuba, where it assisted him not only in paying for itself, but in accumulating a fortune. The most parsimonious outfit ever purchased, in proportion to the wealth of the purchaser, so far as I know, was bought for two hundred and fifty dollars by the far famed Don Esteban de Santa Cruz de Oviedo, of diamond wedding notoriety. He owned an extensive plantation in Cuba, and preferred operating on the teeth of his slaves himself, to giving it out to any of the many itinerant practitioners who perambulate that country. There are at present only three large firms who manufacture dental instruments exclusively; though there are many small shops in which instruments of all kinds are made on a small scale. One of these large firms made and sold during one year twenty-five thousand pairs of forceps (one instrument is called a pair); that is, about eighty a day for each working day in the year. This was something more than the usual quantity. But sixty a day is considered a medium business in that establishment; and this number, with the additional labor necessary to turn out enough of the smaller instruments to make up assortments, gave employment to sixty workmen.

In the manufacture of dental instruments, each workman must thoroughly understand his part; for the slightest blunder, from the "forger" to the "burnisher," will cause an instrument to be rejected from the first class. Any one not conversant with the practice of dentistry might suppose that a dentist once supplied is always supplied; but not so. He is continually breaking the points of the smaller instruments, cracking the joints of larger ones, having them altered into new patterns, getting new styles, and discarding the old; and is thus daily purchasing and changing. Many dentists who commence with two hundred dollars' worth of instruments keep on purchasing to the extent of three hundred dollars during their first year, and even at that they find they have not all they require, and repeat the same the following year. There is expended every year for dental instruments in the United States not less than half a million of dollars. The Eastern division invests about $160,000 of this; the Western, about $140,000; and the Southern about $200,000.

Usual Causes of Fires.

Churches and lecture rooms of all descriptions.—Hot air, hot water and steam pipes, and furnaces and stoves. Sticking candles against coffins in vaults. Christmas and other decorations around or too near gas fittings, fires, or lights. Sparks falling upon birds' nests in spires and belfries.

Curriers and workers in leather.—Lime slaked by rain. Sparks from foul flues and furnaces passing through opening and projecting eaves of drying rooms. Friction of machinery in bark mills. Timber, coals, shavings of wood, and leather too near flues. Drying stoves and furnaces. Spontaneous ignition. Smoking in bark and other rooms.

Drapers, tailors, makers up and vendors of male and female attire.—Working late, being tired and falling asleep, or becoming careless too near fires and lights. Unprotected and swinging gas brackets. Crinolines coming in contact with fire in open fireplaces. Light, pendent goods being blown, by the opening and shutting of doors or by concussions or drafts, into unprotected lights. Goods hung on lines increase the risk in various ways, such as conveying the flame from one end of a room to the other, and, when the line breaks down, making three separate fires, one at each end and one in the middle at the same time, thus originating three distinct fires for each line. Cuttings left carelessly about. Using lights while intoxicated, especially by tailors' workpeople. Ironing stoves, hot plates, smoothing irons, etc., too near and sometimes on timber and goods. Smoking tobacco, and matches for lighting it.

Engineering works, and workers in metal of all descriptions.—Sparks from striking hot metal. Hot metal castings, etc., left too near timber. Heat from furnaces, forges, and smiths' hearths and flues. Friction of machinery. Japanners' stoves overheated or defective. Accidents with melted or hot metal. Explosions of blast furnaces. Spontaneous ignition of oily waste, molders, lamp, and other blacks: sawdust or sweepings and oil; spontaneous heating of iron turnings, etc., when mixed with water and oil.

Farming stock, stables, hay, grain, or flour stores of all descriptions—Stacking hay while green. Sparks from passing locomotives, etc. Sparks from steam thrashing machines. Sticking candles against walls and timber in barns and stables. Vagrants smoking in stables. Vagrants being refused alms. Fire arms used near farming stock, such as haystacks, etc.

Makers of gunpowder, fireworks, lucifer matches, and explosive compounds.—Overheating of drying stoves, and explosive mixtures. Dropping lucifers. Unprotected lights. Smoking. Leaving phosphorus uncovered with water. Friction and percussion from nails in boots. Sparks passing through broken windows. The sun's rays being concentrated through bull's eyes, knots, etc., in glass. Defective casks containing gunpowder or other explosive materials. Spontaneous ignition of red fire and such like compositions. Carelessness in the supervision of young children employed. Shavings and chips too near fires and lights.

Gas works—Hot coke near timber, etc. Seeking for an escape with unprotected lights. Timber too near furnaces, retorts, etc. Lime slaked by rain. Defective fittings and appliances. Spontaneous ignition of coals.

Hat manufactures.—Boiling shellac. Hot irons left on timber and other inflammable things. Defective drying and other stoves. Smoking tobacco.

New Lecture Experiments.

Oxydizing Power of Charcoal.—Freshly prepared leucaniline dissolves in alcohol, and forms a perfectly colorless liquid, which may be kept for a long time without change. If this solution is boiled for a few moments with a small quantity of animal charcoal, it becomes of a deep carmine red, due to the action of the oxygen condensed in the pores of the charcoal.

Oxidation, shown by Change of Color in Compounds on Contact with Air.—If a tolerably concentrated alcoholic solution of naphthalene red is boiled for a few minutes with zinc dust, a colorless solution is obtained; and if the flask is corked while full of the vapor of the alcohol, the liquid remains colorless, and the zinc settles to the bottom. If the flask is then shaken so as to wet the sides, and the cork withdrawn, the inner walls are instantly colored deep red. It is only necessary to boil again, in order to repeat the experiment.

Liquid Phosphoretted Hydrogen.—A thick walled U tube, about one seventh of an inch in diameter, and provided with a stopcock on each arm, is surrounded by a freezing mixture (—16° to 20°), and receives the phosphoretted hydrogen prepared from 7 to 10 drams of freshly made calcium phosphide. A wide glass tube in the cork of the generating flask, dipping beneath the surface of the water (at about 60°), serves for the introduction of the phosphide. While the liquid is being collected, spontaneously inflammable phosphoretted hydrogen escapes; if this is displaced by a stream of carbonic acid, the bright flame is replaced by a scarcely luminous green flame, of so low a temperature that a taper cannot be lighted at it. This flame is caused by the liquid phosphoretted hydrogen in the stream of carbonic acid coming in contact with the air. The carbonic acid may be replaced by a stream of some combustible gas, for example, hydrogen, and a luminous flame again obtained.

Point of Maximum Density of Water.—The apparatus consists of a tall cylinder and a pear-shaped glass float, which is so weighted (with mercury or otherwise) that when immersed in distilled water, at + 39 2° Fah., it neither sinks nor floats. On cooling or heating the water in the cylinder, the float rises to the top or falls to the bottom.

Sodium Press.—The sodium is placed in a metal cylinder, at the lower end of which is a fine opening, and forced through by a screw. If it be received in mercury instead of rock oil, a pure amalgam may be readily formed.

Leidenfrost's Experiment Reversed, to Explain the Action of the Alkali Metals on Water.—When potassium is thrown in water, the hydrate formed by the reaction swims about on the water for a few seconds, in the form of a red hot globule, and then disappears with a sudden explosion. The manner in which this effect is produced may be illustrated by the following experiment: An ellipsoid of pure silver (weighing about 150 grains) is provided with an ear to which a stout copper wire is fastened. If it be heated to redness and dipped into water in a large beaker, it remains passive for five or six seconds, and then a violent explosion suddenly takes place, scattering the water, and usually shattering the beaker.—*A. W. Hofmann.—Deut. Chem. Ges. Ber.—Journal of the Chemical Society.*

THE yield of precious metal from the Pacific slope during the last quarter century is found from an aggregation of the various yearly returns to be in value $1,534,280,000. The product for 1873 was 14 per cent greater than for 1872, amounting in value to $77,440,000.